U.S. FISH AND WILDLIFE SERVICE BIOLOGICAL OPINION

ON SELETED PESTICIDES:

DATED JUNE 14, 1989

REVISED SEPTEMBER 14, 1989

REVISIONS TO BIOLOGICAL

OPINION DATED JUNE 14, 1989

U.S. FISH AND WILDLIFE SERVICE

SEPTEMBER 14, 1989

SECTION II - PESTICIDE PROFILES

The following section records the biological opinions for the effects of each pesticide on listed species, with corresponding actions required to preclude jeopardy [reasonable and prudent alternatives (RPA)] or reduce the likelihood of incidental take (IT/RPM), as appropriate. The pesticide profiles are presented in alphabetical order by common chemical name.

REASONABLE AND PRUDENT ALTERNATIVES (RPA)

The following are frequently adopted reasonable and prudent alternatives, cited by number in the individual pesticide profiles in this section under the column titled RPA.

1. Prohibit use of the chemical within 20 yards of the water's edge at the time of application for ground applications and 100 yards for aerial applications at sites of known populations or within designated critical habitat, whichever is larger.

2. Prohibit use of the chemical within 40 yards of the water's edge at the time of application for ground applications and 200 yards for aerial applications at sites of known populations or within designated critical habitat, whichever is larger.

3. Prohibit use of the chemical within 100 yards of the water's edge at the time of application for ground applications and 1/4 mile for aerial applications at sites of known populations or within designated critical habitat, whichever is larger.

4. Use only granular formulations or soil incorporation.

5. Prohibit ultra low volume (ULV) application within 1 mile of species' occupied habitat.

6. Prohibit the use of this chemical within identified aquifer recharge zones for cave/spring dwelling species.

7. Prohibit use of chemical within 20 yards of the edge of all caverns, sinkholes, and surface waters within the defined recharge areas of the species' habitat for ground application and 100 yards for aerial application.

8. Extend prohibited use buffer zone upstream 1/2 mile from known species' populations or within designated critical habitat, whichever is larger.

9. Extend prohibited use buffer zone upstream 2 miles from known species' populations or within designated critical habitat, whichever is larger.

10. Prohibit direct application of mosquito larvicides to water within 1 mile upstream, and, if applied aerially, 400 yards downstream from species' occupied habitat.

11. Prohibit use within a 1/2 mile radius of the species' occupied habitat.

12. This action is a local alternative to the labeling/bulletin restriction. Under this action the buffer, or other restriction, carried on the label/bulletin is the restriction to be followed unless the user is operating under an approved agreement pursuant to a Federal or State endangered species protection plan. The Federal or State endangered species plan would have to be found to be not likely to jeopardize the continued existence of any listed species. Any such plan would be under

Agency administration for all necessary reviews, effect determinations, and enforcement.

Under this action, further formal Section 7 consultation would not be required for each such agreement provided the following criteria are met:

A. Landowner agreements and any amendments thereto are concurred in by the appropriate Regional Office of the Fish and Wildlife Service prior to their implementation.

B. The agreement may incorporate alternative farming practices, chemicals or application methods tailored to site-specific conditions if those alternatives provide the same or greater level of enforceable protection as the action addressed in the labeling/bulletin restriction.

C. Protective actions will be enforceable against all owners, their successors and assigns (contractors, et al). Each new owner will have to concur in the agreement or be subject to the labeling/bulletin restriction.

D. Newly listed species and/or new chemicals/uses may be included in approved agreements if the protective actions in place, when applied to that species/chemical/use, will result in a no affect determination by the Agency.

E. The Agency will report annually (in the report required under generic reasonable and prudent measures) on the effectiveness of such programs in providing the needed species protection.

F. The agreement will remain effective until cancelled by the landowner, or significant new biological or chemical data become available, incidental take occurs that exceeds the anticipated level (or that level at which the Agency is required to reinitiate consultation), or subsequent may affect determinations are made.

For any given species, any party applying the chemical within the prohibited use zone for that pesticide who does not enter into an approved agreement will continue to be subject to the restrictive action specified by the label/bulletin.

13. Adjust maximum application rates to reduce hazard ratios to below one (1.0), using the appropriate model, for both freshwater fish and aquatic invertebrates.

14. Prohibit application, by any method, within 100 yards from the edge of the field being treated, except those borders contiguous to neighboring fields.

15. Prohibit use of chemical above 6,000 feet elevation within the occupied range of the New Mexican ridge-nosed rattlesnake.

16. Extend prohibited use buffer zone upstream 5 miles from known species' populations.

17. Prohibit use of the chemical within 100 yards of occupied habitat for ground applications and 1/4 mile for aerial application.

18. Prohibit use of the chemical within 3 miles of known populations.

19. Applicators of the listed jeopardy pesticides must limit their use within all identified wood stork rookeries, including a buffer extending 8 to 12 miles from the rookery (to encompass essential feeding habitat), as depicted on the maps provided. Within these mapped areas, use of the chemicals is prohibited in habitats described as shallow (2-12 inches) permanent or temporary wetland areas (flooded pastures, roadside ditches, etc...) with still or slowly flowing water. In addition, as a conservation recommendation, areas not fitting the above description, but still within the 8 to 12 mile mapped boundary, are still considered vital to the health and maintanance of the rookery. Applicators are urged to use caution when applying chemicals within these areas.

20. The prior biological opinion for this species/chemical and reasonable and prudent alternatives, if any, are reaffirmed. Use of this pesticide is prohibited within the occupied range of the listed species.

21. Applicators of the listed forestry use pesticides will be required to conduct a survey for red-cockaded woodpecker colonies prior to using this pesticide in forests containing pine trees over 30 years old. Contact the Fish and Wildlife Service for information on proper survey techniques. If any colonies are found, use of this pesticide shall be prohibited from the colony site, including at least a 200 foot buffer around the perimeter of all woodpecker trees (i.e. start holes, inactive and active trees). This prohibited zone shall be no less than 10 acres, with an appropriate concentric diameter from trees added as necessary to make up this minimum acreage as needed. Extending 1/2 mile from this prohibited zone, this pesticide shall be used only as a spot treatment or direct application to affected trees. Surveys conducted up to five years prior to application will be acceptable, except in the case of an apparently abandoned colony. If survey results indicate an abandoned colony, a search shall be conducted that would encompass an area of 1 mile radius from the abandoned colony.

22. After periods of heavy rains, as measured by surface water (greater than 4 inch puddles) within identified habitat, do not apply chemical within a 100 yard radius of the known breeding sites of the Puerto Rican crested toad. Restrictions shall remain in place for no less than 25 days.

23. Prohibit use of the chemical (as a burrow fumigant) within gopher tortoise habitat, as described in the species profile, in the currently occupied range of the eastern indigo snake.

24. Prohibit use of the chemical within 20 miles of the boundary of Laguna Atascosa National Wildlife Refuge.

25. Prohibit use of the chemical within 10 miles of the boundary of Laguna Atascosa National Wildlife Refuge.

26. Use of this pesticide within the identified range of the Sacramento Mountains thistle will have to be approved by the U.S. Fish and Wildlife Service, Albuquerque Field Office, New Mexico, Tel: (505) 883-7877.

27. Extend prohibited use zone for a distance of 1/2 mile along all tributaries from their confluence with species occupied river reaches (as shown on the species' map).

REASONABLE AND PRUDENT MEASURES (RPM)

The following are frequently adopted reasonable and prudent measures for minimizing incidental take and their implementing terms and conditions. These action items are cited by number in the individual pesticide profiles in this section under the column titled IT/RPM. A zero (0) in the IT/RPM column means that no incidental take is anticipated or authorized. (Note: Incidental take is not applicable to plants.)

1. Establish buffer zones adjacent to the species' habitat.

   a. Prohibit use of the chemical within 20 yards of the water's edge at the time of application for ground applications and 100 yards for aerial applications at sites of known populations.

   b. Prohibit use of the chemical within 40 yards of the water's edge at the time of application for ground applications and 200 yards for aerial applications at sites of known populations.

   c. Prohibit use of the chemical within 100 yards of the water's edge at the time of application for ground applications and 1/4 mile for aerial applications at sites of known populations.

   d. Extend prohibited use buffer zone upstream 1/2 mile from known species' populations.

   e. Extend prohibited use buffer zone upstream 2 miles from known species' populations.

   f. Prohibit direct application of mosquito larvicide to water within 1 mile upstream, and, if applied aerially, 400 yards downstream from species' habitat.

   g. Prohibit use within a 1/2 mile radius of the species' habitat.

   h. Prohibit application, by any method, within 100 yards from the edge of the field being treated, except those borders contiguous to neighboring cultivated fields.

   i. Extend prohibited use buffer zone upstream 5 miles from known species' populations.

j. Prohibit use of the chemical within 100 yards of known populations for ground applications and 1/4 mile for aerial application.

k. Prohibit use of the chemical within 3 miles of known populations.

l. Prohibit use of the chemical within 10 miles of the boundary of Laguna Atascosa National Wildlife Refuge.

m. Extend prohibited use zone for a distance of 1/2 mile along all tributaries from their confluence with species occupied river reaches (as shown on the species' map).

2. Modify pesticide practices.

a. Use granular formulations/soil incorporation.

b. No ultra low volume (ULV) application within 1 mile of species' habitat.

c. Prohibit use of chemical within 20 yards of the edge of all caverns, sinkholes and surface waters within the defined recharge areas of the species' habitat for ground application and 100 yards for aerial application.

d. Adjust maximum application rates to reduce hazard ratios to below one (using appropriate model) for both freshwater fish and aquatic invertebrates.

e. After periods of heavy rains, as measured by surface water (greater than 4 inch puddles) within identified habitat, do not apply chemical within a 20 yard radius of the known breeding sites of the Puerto Rican crested toad. Restrictions should remain in place for no less than 25 days.

3. Establish a pesticide user education program.

a. Direct the user to read, in the county bulletin or other special Agency brochure, a message on the endangered species protection program and information encouraging the use of chemical alternatives and/or farming/forestry practices that will reduce exposure, including runoff and drift, to listed species.

b. Require the user to complete an Agency (for restricted use chemicals) or Agency approved State training program including a satisfactory endangered species protection element (as determined by the Agency) and information on the use of chemical alternatives and/or farming/forestry practices that will reduce exposure, including runoff and drift, to listed species.

4. This action is a local alternative to the labeling/bulletin restriction. Under this action the buffer, or other restriction, carried on the label/bulletin is the restriction to be followed unless the user is operating under an approved agreement pursuant to a Federal or State

endangered species protection plan. The Federal or State endangered species plan would have to be found to be not likely to jeopardize the continued existence of any listed species. Any such plan would be under Agency administration for all necessary reviews, effect determinations, and enforcement.

Under this action, further formal Section 7 consultation would not be required for each such agreement provided the following criteria are met:

A. Landowner agreements and any amendments thereto are concurred in by the appropriate Regional Office of the Fish and Wildlife Service prior to their implementation.

B. The agreement may incorporate alternative farming practices, chemicals or application methods tailored to site-specific conditions if those alternatives provide the same or greater level of enforceable protection as the action addressed in the labeling/bulletin restriction.

C. Protective actions will be enforceable against all owners, their successors and assigns (contractors, et al). Each new owner will have to concur in the agreement or be subject to the labeling/bulletin restriction.

D. Newly listed species and/or new chemicals/uses may be included in approved agreements if the protective actions in place, when applied to that species/chemical/use, will result in a no affect determination by the Agency.

E. The Agency will report annually (in the report required under generic reasonable and prudent measures) on the effectiveness of such programs in providing the needed species protection.

F. The agreement will remain effective until cancelled by the landowner, or significant new biological or chemical data become available, incidental take occurs that exceeds the anticipated level (or that level at which the Agency is required to reinitiate consultation), or subsequent may affect determinations are made.

For any given species, any party applying the chemical within the prohibited use zone for that pesticide who does not enter into an approved agreement will continue to be subject to the restrictive action specified by the label/bulletin.

4sm For the Scioto madtom: All of this species' habitat is to be protected in landowner agreements which shall contain appropriate protective provisions or alternatives for the use of No Jeopardy chemicals in order to minimize the likelihood for incidental take.

KEY TO TABLES

USES:

Crop = Most or all of the following: corn, cotton, soybeans, sorghum, wheat, barley, oats, rye, unless otherwise specified. (See assumption #7 in Section I.)

OPINION:

NE = No exposure
NJ = Exposure but no jeopardy
J = Jeopardy

REASONABLE AND PRUDENT ALTERNATIVES (RPA)/INCIDENTAL TAKE (IT/RPM):

+ = and
/ = or
- = not applicable

PESTICIDE PROFILE

PESTICIDE: Acephate TYPE: Insecticide

AQUATIC SPECIES (Request Parts 1 and 5):

USES CONSIDERED IN CURRENT OPINION: Crops, forests, pasture/rangeland

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NJ	-	0
Salamander, Santa Cruz long-toed	NJ	-	3a/3b
Salamander, Texas blind	NJ	-	0
Toad, Houston	NJ	-	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	NJ	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	NJ	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NJ	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NJ	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NJ	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NJ	-	0
Darter, leopard	NJ	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NJ	-	0
Gambusia, Clear Creek	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 5): **ACEPHATE**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	0
Gambusia, San Marcos	NJ	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	0
Pupfish, desert	NJ	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	0
Pupfish, Owens	NJ	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	NJ	-	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NJ	-	3a
Sucker, June	NJ	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NJ	-	0
Topminnow, Yaqui	NJ	-	0
Trout, Apache	NJ	-	0
Trout, Gila	NJ	-	0
Trout, greenback cutthroat	NJ	-	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	NJ	-	0
Trout, Paiute cutthroat	NJ	-	0
Woundfin	NJ	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 5): **ACEPHATE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NJ	-	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NJ	-	1a
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C], forests [F], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	NJ	-	0	C
Plover, piping	J	3	0	R
Stork, wood	J	19	0	C
Tern, interior least	NJ	-	1c+e	C,R
Vireo, least Bell's	NJ	-	0	C,R
Rattlesnake, New Mexican ridge-nosed	NJ	-	0	R
Snake, eastern indigo	NJ	-	0	R

AQUATIC SPECIES (Request Parts 1 and 5): **ACEPHATE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NJ	-	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NJ	-	1a
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C], forests [F], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	NJ	-	0	C
Plover, piping	J	3	0	R
Stork, wood	J	19	0	C
Tern, interior least	NJ	-	1c+e	C,R
Vireo, least Bell's	NJ	-	0	C,R
Woodpecker, red-cockaded	J	21	0	R
Rattlesnake, New Mexican ridge-nosed	NJ	-	0	R
Snake, eastern indigo	NJ	-	0	R

PESTICIDE PROFILE

PESTICIDE: Aldicarb (granular) TYPE: Insecticide, acaricide, nematicide

USES CONSIDERED IN CURRENT OPINION: Crops [C]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **ALDICARB**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): ALDICARB

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C]

	OPINION	RPA	IT/RPM
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Aluminum phosphide TYPE: Fumigant

USES CONSIDERED IN CURRENT OPINION: Pasture/rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Rattlesnake, New Mexican ridge-nosed	J	15	0
Snake, eastern indigo	J	23	0

PESTICIDE PROFILE

PESTICIDE: Aminocarb TYPE: Insecticide

AQUATIC SPECIES (Request Part 3)

USES CONSIDERED IN CURRENT OPINION: Crops

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm
Trout, Gila	NJ	-	1a+d/2d

TERRESTRIAL SPECIES (Request Part 4)

USES CONSIDERED IN CURRENT OPINION: Forests [F]

	OPINION	RPA	IT/RPM
Woodpecker, red-cockaded	J	21	0

PESTICIDE PROFILE

PESTICIDE: Aminopyridine (Avitrol) TYPE: Avicide

USES CONSIDERED IN CURRENT OPINION: Crops

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	NJ	-	11
Plover, piping	NJ	-	1c
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Amitrole TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	NE	-
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Ammonium sulfamate TYPE: Herbicide

TERRESTRIAL SPECIES (Request Part 3):

USES CONSIDERED IN CURRENT OPINION: Forests [F], rangeland [R]

	OPINION	RPA	USE
Aster, Ruth's golden	NE	-	F
Barberry, Truckee	NE	-	R
Beauty, Harper's	J	20	R
Broom, San Clemente Island	J	20	R
Bush-mallow, San Clemente Island	J	20	R
Cactus, Lee pincushion	NE	-	R
Evening-primrose, Antioch Dunes	J	20	R
Evening-primrose, Eureka Valley	NE	-	R
Goldenrod, Blue Ridge	J	20	R
Gooseberry, Miccosukee	J	20	F,R
Grass, Eureka Valley dune	NE	-	R
Grass, Solano	NE	-	R
Heather, mountain golden	NE	-	F
Larkspur, San Clemente Island	J	20	R
Liveforever, Santa Barbara Island	NE	-	R
Manzanita, Presidio	NE	-	R
Mint, longspurred	NE	-	F
Paintbrush, San Clemente Island indian	J	20	R
Pawpaw, four-petal	NE	-	R
Rattleweed, hairy	NE	-	R
Rock-cress, McDonald's	NE	-	R
Thistle, Sacramento Mountains	J	26	F
Thornmint, San Mateo	J	20	R
Townsendia, last chance	J	17	F
Vetch, Hawaiian	NE	-	F
Wallflower, Contra Costa	J	20	R

PESTICIDE PROFILE

PESTICIDE: Atrazine TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, pasture/rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	2+4/3+6+8/13	0
Salamander, Santa Cruz long-toed	J	1	3a/3b
Salamander, Texas blind	NJ	-	2c
Toad, Houston	J	17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NJ	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NJ	-	1a+d/2d
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NJ	-	1a+d/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	J	2+4/3+6+8/13	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	NJ	-	1a+e+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NJ	-	1a+d/2d
Gambusia, Clear Creek	J	2+4/3+6+8/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **ATRAZINE**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NJ	-	1a+d/2d
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/4
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NJ	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	2+4/3+8/13	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NJ	-	3a
Sucker, June	NJ	-	1a
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NJ	-	1a+d/2d
Topminnow, Yaqui	NJ	-	1a+d/2d
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NJ	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **ATRAZINE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	J	6+11	0
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3): **ATRAZINE**

USES CONSIDERED IN CURRENT OPINION: Crops [C], forests [F], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Vireo, least Bell's	NJ	-	0	C,R
Aster, Ruth's golden	NE	-	-	F
Barberry, Truckee	NE	-	-	R
Beauty, Harper's	J	20	-	R
Broom, San Clemente Island	J	20	-	R
Bush-mallow, San Clemente Island	J	20	-	R
Cactus, Lee pincushion	NE	-	-	R
Evening-primrose, Antioch Dunes	J	20	-	R
Evening-primrose, Eureka Valley	NE	-	-	R
Goldenrod, Blue Ridge	J	20	-	R
Gooseberry, Miccosukee	J	20	-	F,R
Grass, Eureka Valley dune	NE	-	-	R
Grass, Solano	NE	-	-	R
Heather, mountain golden	NE	-	-	F
Larkspur, San Clemente Island	J	20	-	R
Liveforever, Santa Barbara Island	NE	-	-	R
Manzanita, Presidio	NE	-	-	R
Mint, longspurred	NE	-	-	F
Paintbrush, San Clemente Island indian	J	20	-	R
Pawpaw, four-petal	NE	-	-	R
Rattleweed, hairy	NE	-	-	R
Rock-cress, McDonald's	NE	-	-	R
Thistle, Sacramento Mountains	J	26	-	F
Thornmint, San Mateo	J	20	-	R
Townsendia, last chance	J	17	-	F
Vetch, Hawaiian	NE	-	-	F
Wallflower, Contra Costa	J	20	-	R

PESTICIDE PROFILE

PESTICIDE: Azinphos-methyl (Guthion) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	J	1	3b
Salamander, Texas blind	NE	-	0
Toad, Houston	J	5+17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	3+5+8/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	J	3+5+8/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	3b
Darter, Okaloosa	J	2+5+8/13	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **AZINPHOS-METHYL**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+5+8/13	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	3+5+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	3+5+8/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	3+5+8/13	0
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	3+5+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+5+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	3+5+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	J	3+5+8/13	0
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **AZINPHOS-METHYL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	J	2+8+27	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4): **AZINPHOS-METHYL**

USES CONSIDERED IN CURRENT OPINION: Crops [C], forests [F]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	J	24	0	C
Plover, piping	J	3	0	C
Stork, wood	J	19	0	C
Tern, interior least	NJ	-	1c+e	C
Vireo, least Bell's	NJ	-	0	C
Woodpecker, red-cockaded	J	21	0	F
Aster, Ruth's golden	NE	-	-	F
Goldenrod, Blue Ridge	J	20	-	F
Gooseberry, Miccosukee	J	20	-	F
Heather, mountain golden	NE	-	-	F
Mint, longspurred	NE	-	-	F
Thistle, Sacramento Mountains	J	26	-	F
Townsendia, last chance	J	18	-	F
Vetch, Hawaiian	NE	-	-	F

PESTICIDE PROFILE

PESTICIDE: Benomyl TYPE: Fungicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	J	1	3a/3b
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	J	2+8/13	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **BENOMYL**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4sm
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, birdwing	NJ	-	1a+d+m+3a

AQUATIC SPECIES (Request Parts 1 and 3): **BENOMYL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	la+d+m+3a
Pearly mussel, Cumberland monkeyface	NJ	-	la+d+m+3a
Pearly mussel, Curtis'	NJ	-	la+d/4
Pearly mussel, dromedary	NJ	-	la+d+m+3a
Pearly mussel, green-blossom	NJ	-	la+d+m+3a
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	la+d+m+3a
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	la+d+m+3a
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	la+d+m+3a
Pearly mussel, turgid-blossom	NJ	-	la+d+m+3a
Pearly mussel, white cat's paw	NJ	-	la+d/4
Pearly mussel, white wartyback	NJ	-	la+d+m+3a
Pearly mussel, yellow-blossom	NJ	-	la+d+m+3a
Pigtoe, fine-rayed	NJ	-	la+d+m+3a
Pigtoe, rough	NJ	-	la+d+m+3a
Pigtoe, shiny	NJ	-	la+d+m+3a
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	la+d+m+3a
Spinymussel, James	NJ	-	la+d+m
Spinymussel, Tar River	NJ	-	la+d+m
Stirrup shell	NJ	-	la+d+m
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	la+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Bensulide TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops [Cotton only]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NE	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): BENSULIDE

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	2+4/3+8/13	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+4/3+8/13	0
Shiner, Pecos bluntnose	J	2+4/3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NE	-	0
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	NE	-	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	NE	-	0
Pearly mussel, Alabama lamp	NE	-	0
Pearly mussel, Applachian monkeyface	NE	-	0
Pearly mussel, birdwing	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): BENSULIDE

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NE	-	0
Pearly mussel, Cumberland monkeyface	NE	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NE	-	0
Pearly mussel, green-blossom	NE	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NE	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NE	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NE	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NE	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NE	-	0
Pigtoe, rough	NE	-	0
Pigtoe, shiny	NE	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NE	-	0
Spinymussel, James	NE	-	0
Spinymussel, Tar River	NE	-	0
Stirrup shell	NE	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Bifenox TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NJ	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): BIFENOX

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	NJ	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	0
Trout, Gila	NJ	-	0
Trout, greenback cutthroat	NJ	-	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	NJ	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **BIFENOX**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Bifenthrin TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops [cotton]

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Bufencarb TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

PESTICIDE PROFILE

PESTICIDE: Cacodylic acid (Dimethylarnic acid) TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	J	17
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Camphechlor (Toxaphene) TYPE: Insecticide, rodenticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Tern, interior least	NJ	-	1c+e
Stork, wood	J	19	0
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Captan TYPE: Fungicide

USES CONSIDERED IN CURRENT OPINION: Crops, rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NJ	-	1a+d/2d
Salamander, Santa Cruz long-toed	J	1	3b
Salamander, Texas blind	NJ	-	2c
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NJ	-	1a+d/2d
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NJ	-	1a+d/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NJ	-	1a+d/2d
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NJ	-	1a+d/2d
Gambusia, Clear Creek	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): **CAPTAN**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NJ	-	1a+d/2d
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	J	2	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	3a
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NJ	-	1a+d/2d
Topminnow, Yaqui	NJ	-	1a+d/2d
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, birdwing	NJ	-	1a+d+m+3a

AQUATIC SPECIES (Request Parts 1 and 3): **CAPTAN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	1a+d+m+3a
Pearly mussel, Cumberland monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	1a+d+m+3a
Pearly mussel, green-blossom	NJ	-	1a+d+m+3a
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	1a+d+m+3a
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	1a+d+m+3a
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	1a+d+m+3a
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	1a+d+m+3a
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	1a+d+m+3a
Pigtoe, rough	NJ	-	1a+d+m+3a
Pigtoe, shiny	NJ	-	1a+d+m+3a
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	1a+d+m+3a
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	NJ	-	1a+d+m
Stirrup shell	NJ	-	1a+d+m
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NJ	-	1a
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Carbaryl TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, pasture/rangeland

AQUATIC SPECIES (Request Parts 1, 3 and 5):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	3+6+8/13	0
Salamander, Santa Cruz long-toed	J	1	3a/3b
Salamander, Texas blind	J	6/13	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	3+6+8/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	J	3+8/13	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	J	3+8/13	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	J	3+8/13	0
Darter, leopard	J	3+8/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	J	2+5+8/13	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	J	3+6+8/13	0
Gambusia, Clear Creek	J	3+6+8/13	0

AQUATIC SPECIES (Request Parts 1, 3 and 5): **CARBARYL**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+6+8/13	0
Gambusia, San Marcos	J	3+6+8/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	3+6+8/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	3+6+8/13	0
Pupfish, Owens	J	2	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	J	3/13	0
Spikedace	J	3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	3+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	3a
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	J	3+8/13	0
Topminnow, Yaqui	J	3+8/13	0
Trout, Apache	J	3+8/13	0
Trout, Gila	NJ	-	1c+d/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1, 3 and 5): **CARBARYL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	J	1+8/12	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	1a/3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	J	2+8+27	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	J	1+8/12	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	6/13	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	J	6+11/13	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Part 2):

USES CONSIDERED IN CURRENT OPINION: Crops [C], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Plover, piping	J	3	0	C,R
Tern, interior least	NJ	-	1c+e	C

PESTICIDE PROFILE

PESTICIDE: Carbofuran (granular) TYPE: Insecticide, acaricide, nematicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0

AQUATIC SPECIES (Request Part 1): **CARBOFURAN**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	la+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	2+4+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	J	2+4+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	la+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	la
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	la+d/2d
Trout, Gila	NJ	-	la+d/2d
Trout, greenback cutthroat	NJ	-	la
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	la
Mussel, Curtus'	NJ	-	la+d+m
Mussel, Judge Tait's	NJ	-	la+d+m
Mussel, Marshall's	NJ	-	la+d+m
Mussel, penitent	NJ	-	la+d+m
Pearlshell, Louisiana	NJ	-	la+d+m
Pearly mussel, Alabama lamp	NJ	-	la+d+m
Pearly mussel, Applachian monkeyface	NJ	-	la+d+m+3b

AQUATIC SPECIES (Request Part 1): **CARBOFURAN**

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	NJ	-	la+d+m+3b
Pearly mussel, Cumberland bean	NJ	-	la+d+m+3b
Pearly mussel, Cumberland monkeyface	NJ	-	la+d+m+3b
Pearly mussel, Curtis'	NJ	-	3b
Pearly mussel, dromedary	NJ	-	la+d+m+3b
Pearly mussel, green-blossom	NJ	-	la+d+m+3b
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	la+d+m+3b
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	la+d+m+3b
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	la+d+m+3b
Pearly mussel, white cat's paw	NJ	-	3b
Pearly mussel, white wartyback	NJ	-	la+d+m+3b
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	la+d+m+3b
Pigtoe, rough	NJ	-	la+d+m+3b
Pigtoe, shiny	NJ	-	la+d+m+3b
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	la+d+m+3b
Spinymussel, James	NJ	-	la+d+m
Spinymussel, Tar River	NJ	-	la+d+m
Stirrup shell	NJ	-	la+d+m
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	la+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	lc+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Carbophenothion TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops, forests [Note: suspended]

AQUATIC SPECIES (Request Part I):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	la+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	la+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	la+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	J	2+4/3+8/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	la/3b
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0

AQUATIC SPECIES (Request Part 1): **CARBOPHENOTHION**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	J	2+4/3+8/13	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	2+4/3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	2+4/3+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	J	2+4/3+8/13	0
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0

AQUATIC SPECIES (Request Part 1): **CARBOPHENOTHION**

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	1a+d/3b
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgin's eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	1a/3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	J	2+8+27	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	1a+d/3b
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Chlorothalonil TYPE: Fungicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): CHLOROTHALONIL

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1/4	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1/4	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	1a
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): CHLOROTHALONIL

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Chlorpyrifos TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, mosquito larvicide, pasture/rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	2+4/3+8/10/13	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	J	7/13	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	J	7/12	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	2+4/3+8/10/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	J	2+4/3+8/13	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	J	2+4/3+8/13	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	J	2+4/3+8/10/13	0
Darter, leopard	J	2+4/3+8/10/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	J	1+8/12	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/10/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NJ	-	1f+2b/4
Gambusia, Big Bend	J	2+4/3+8/10/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **CHLORPYRIFOS**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	J	2+4/3+8/10/13	0
Gambusia, Pecos	J	2+4/3+8/10/13	0
Gambusia, San Marcos	J	2+4/3+8/10/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+8/10/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	2+4/3+8/10/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	2+4/3+8/10/13	0
Pupfish, Owens	J	2	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	2+4/3+8/10/13	0
Silverside, Waccamaw	J	2+8/10/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/10/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	2+4/3+8/13	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	3a
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	J	2+4/3+8/13	0
Topminnow, Yaqui	J	2+4/3+8/13	0
Trout, Apache	J	2+4/3+8/13	0
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **CHLORPYRIFOS**

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	J	1+8/12	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	1a/3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ		3a
Pearly mussel, tubercled-blossom	J	2+8+27	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	J	1+8/12	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	J	2+8/10/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	J	11	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C], mosquito larvicide [L]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	J	24	0	C
Plover, piping	J	3	0	C
Stork, wood	J	19	0	C,L
Tern, California least	J	20	0	L
Tern, interior least	NJ	-	1c+e	C
Vireo, least Bell's	NJ	-	0	C,L

PESTICIDE PROFILE

PESTICIDE: Cloethocarb TYPE: Insecticide, nematicide

USES CONSIDERED IN CURRENT OPINION: Crops

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	NJ	--	11
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Cloethocarb TYPE: Insecticide, nematicide

USES CONSIDERED IN CURRENT OPINION: Crops

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	NJ	-	11
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Clopyralid TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Barberry, Truckee	NE	-
Beauty, Harper's	J	20
Broom, San Clemente Island	J	20
Bush-mallow, San Clemente Island	J	20
Cactus, Lee pincushion	NE	-
Evening-primrose, Antioch Dunes	J	20
Evening-primrose, Eureka Valley	NE	-
Gooseberry, Miccosukee	NJ	-
Grass, Eureka Valley dune	NE	-
Grass, Solano	NE	-
Larkspur, San Clemente Island	J	20
Liveforever, Santa Barbara Island	NE	-
Manzanita, Presidio	NE	-
Paintbrush, San Clemente Island indian	J	20
Pawpaw, four-petal	NE	-
Rattleweed, hairy	NE	-
Rock-cress, McDonald's	NE	-
Thornmint, San Mateo	J	20
Wallflower, Contra Costa	J	20

PESTICIDE PROFILE

PESTICIDE: Copper sulfate, basic TYPE: Algicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NE	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **COPPER SULFATE**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ		1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	1a
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **COPPER SULFATE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Cuprous oxide TYPE: Fungicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT
Madtom, Scioto	NJ	-	4+4sm

PESTICIDE PROFILE

PESTICIDE: Cypermethrin TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT
Madtom, Scioto	NJ	-	4+4sm

PESTICIDE PROFILE

PESTICIDE: 2,4-D acid/salts and esters TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Barberry, Truckee	NE	-
Beauty, Harper's	J	20
Broom, San Clemente Island	J	20
Bush-mallow, San Clemente Island	J	20
Cactus, Lee pincushion	NE	-
Evening-primrose, Antioch Dunes	J	20
Evening-primrose, Eureka Valley	NE	-
Gooseberry, Miccosukee	J	20
Grass, Eureka Valley dune	NE	-
Grass, Solano	NE	-
Larkspur, San Clemente Island	J	20
Liveforever, Santa Barbara Island	NE	-
Manzanita, Presidio	NE	-
Paintbrush, San Clemente Island indian	J	20
Pawpaw, four-petal	NE	-
Rattleweed, hairy	NE	-
Rock-cress, McDonald's	NE	-
Thornmint, San Mateo	J	20
Wallflower, Contra Costa	J	20

PESTICIDE PROFILE

PESTICIDE: Dalapon TYPE: Herbicide

TERRESTRIAL SPECIES (Request Parts 2 and 3)

USES CONSIDERED IN CURRENT OPINION: Crops [C], forests [F]

	OPINION	RPA	IT/RPM	USE
Vireo, least Bell's	NJ	-	0	C
Aster, Ruth's golden	NE	-	-	F
Goldenrod, Blue Ridge	J	20	-	F
Gooseberry, Miccosukee	J	20	-	F
Heather, mountain golden	NE	-	-	F
Mint, longspurred	NE	-	-	F
Thistle, Sacramento Mountains	J	26	-	F
Townsendia, last chance	J	17	-	F
Vetch, Hawaiian	NE	-	-	F

PESTICIDE PROFILE

PESTICIDE: Dazomet (Mylone)　　TYPE: Nematicide, fungicide, herbicide, insecticide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	NE	-
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Demeton　　TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Diazinon (all formulations) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, mosquito larvicide, pasture/rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	2+4/3+6+8/10/13	0
Salamander, Santa Cruz long-toed	J	1	3a/3b
Salamander, Texas blind	J	6/13	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	2+4/3+6+8/10/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	J	2+4/3+8/13	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	J	2+4/3+8/13	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/10/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/10/13	0
Darter, bayou	J	2+8/10/13	0
Darter, boulder	J	2+8/10/13	0
Darter, fountain	J	2+4/3+6+8/10/13	0
Darter, leopard	J	2+4/3+8/10/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	J	2+5+8/10/13	0
Darter, slackwater	J	2+8/10/13	0
Darter, snail	J	2+8/10/13	0
Darter, watercress	NJ	-	1f+2b/4
Gambusia, Big Bend	J	2+4/3+6+8/10/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **DIAZINON**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	J	2+4/3+6+8/10/13	0
Gambusia, Pecos	J	2+4/3+6+8/10/13	0
Gambusia, San Marcos	J	2+4/3+6+8/10/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/10/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+8/10/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	2+4/3+6+8/10/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	2+4/3+6+8/10/13	0
Pupfish, Owens	J	2	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/10/13	0
Shiner, Pecos bluntnose	J	2+4/3+8/10/13	0
Silverside, Waccamaw	J	2+8/10/13	0
Squawfish, Colorado	J	3+8/13	0
Spikedace	J	2+4/3+8/10/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	2+4/3+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	3a
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	J	2+4/3+8/13	0
Topminnow, Yaqui	J	2+4/3+8/13	0
Trout, Apache	J	2+4/3+8/13	0
Trout, Gila	NJ	-	1c+d/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **DIAZINON**

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	J	1+8/12	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	1a/3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	J	1+8/12	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	J	6/13	0
Crayfish, Nashville	J	2+8/10/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	J	6+11	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	6/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	J	24	0	C
Plover, piping	J	3	0	C
Stork, wood	J	19	0	C
Tern, interior least	NJ	-	1c+e	C
Vireo, least Bell's	J	14	0	C
Rattlesnake, New Mexican ridge-nosed	NJ	-	1j	R
Snake, eastern indigo	NJ	-	0	R

PESTICIDE PROFILE

PESTICIDE: Dicamba
Dimethylamine dicamba

TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Pasture/rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Barberry, Truckee	NE	-
Beauty, Harper's	J	20
Broom, San Clemente Island	J	20
Bush-mallow, San Clemente Island	J	20
Cactus, Lee pincushion	NE	-
Evening-primrose, Antioch Dunes	J	20
Evening-primrose, Eureka Valley	NE	-
Gooseberry, Miccosukee	NJ	-
Grass, Eureka Valley dune	NE	-
Grass, Solano	NE	-
Larkspur, San Clemente Island	J	20
Liveforever, Santa Barbara Island	NE	-
Manzanita, Presidio	NE	-
Paintbrush, San Clemente Island indian	J	20
Pawpaw, four-petal	NE	-
Rattleweed, hairy	NE	-
Rock-cress, McDonald's	NE	-
Thornmint, San Mateo	J	20
Wallflower, Contra Costa	J	20

PESTICIDE PROFILE

PESTICIDE: Dichlobenil

TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	J	17
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Dichlorprop (2,4-DP) TYPE: Herbicide

AQUATIC SPECIES (Request Part 3)

USES CONSIDERED IN CURRENT OPINION: Forests

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm
Trout, Gila	NJ	-	1a+d/2d

TERRESTRIAL SPECIES (Request Part 3)

USES CONSIDERED IN CURRENT OPINION: Forests [F], rangeland [R]

	OPINION	RPA	USE
Aster, Ruth's golden	NE	-	F
Barberry, Truckee	NE	-	R
Beauty, Harper's	J	20	R
Broom, San Clemente Island	J	20	R
Bush-mallow, San Clemente Island	J	20	R
Cactus, Lee pincushion	NE	-	R
Evening-primrose, Antioch Dunes	J	20	R
Evening-primrose, Eureka Valley	NE	-	R
Goldenrod, Blue Ridge	J	20	R
Gooseberry, Miccosukee	J	20	F,R
Grass, Eureka Valley dune	NE	-	R
Grass, Solano	NE	-	R
Heather, mountain golden	NE	-	F
Larkspur, San Clemente Island	J	20	R
Liveforever, Santa Barbara Island	NE	-	R
Manzanita, Presidio	NE	-	R
Mint, longspurred	NE	-	F
Paintbrush, San Clemente Island indian	J	20	R
Pawpaw, four-petal	NE	-	R
Rattleweed, hairy	NE	-	R
Rock-cress, McDonald's	NE	-	R
Thistle, Sacramento Mountains	J	26	F
Thornmint, San Mateo	J	20	R
Townsendia, last chance	J	18	F
Vetch, Hawaiian	NE	-	F
Wallflower, Contra Costa	J	20	R

PESTICIDE PROFILE

PESTICIDE: Dichlorvos (DDVP) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Mosquito larvicide

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4):

	OPINION	RPA	IT/RPM
Stork, wood	J	19	0
Tern, California least	NJ	-	0
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Dicofol (Kelthane) TYPE: Acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **DICOFOL**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+8/13	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **DICOFOL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	1a+d/4
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	1a+d/4
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Vireo, Least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Dicrotophos TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops [cotton, soybeans]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Part 1): **DICROTOPHOS**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NE	-	0
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Part 1): **DICROTOPHOS**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Soccorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Diflubenzuron (Dimilin)   TYPE: Insect growth inhibitor

USES CONSIDERED IN CURRENT OPINION: Crops [cotton, soybeans], forests, pasture [CA only]

AQUATIC SPECIES (Request Parts 1, 3 and 5):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NJ	-	1j
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NJ	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0

AQUATIC SPECIES (Request Parts 1, 3 and 5): **DIFLUBENZURON**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	NJ	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	NJ	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0

AQUATIC SPECIES (Request Parts 1, 3 and 5): **DIFLUBENZURON**

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, speckled	NE	-	0
Pocketbook, fat	NJ	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Soccorro	NE	-	0
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Part 3)

USES CONSIDERED IN CURRENT OPINION: Forests

	OPINION	RPA	IT/RPM
Snail, flat-spired three-toothed	NE	-	0
Snail, painted snake coiled forest	NE	-	0
Snail, Virginia fringed mountain	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Dimethoate TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, pasture

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	5+17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2b/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	J	3+5+8/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Part 1): DIMETHOATE

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+5+8/13	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	3+5+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	--	la+d/2b/2d
Pupfish, desert	NJ	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2b/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	3+5+8/13	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	J	3+5+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	la+d/2b/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NJ	-	3a
Sucker, June	NJ	-	la
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	la+d/2b/2d
Trout, Gila	NJ	-	la+d/2b/2d
Trout, greenback cutthroat	NJ	-	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	NJ	-	0
Trout, Paiute cutthroat	NJ	-	0
Woundfin	NJ	-	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Part 1): **DIMETHOATE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	la+d/3b
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	J	2+8+27	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	la+d/3b
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	NJ	-	la+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Dinoseb TYPE: Herbicide, insecticide

USES CONSIDERED IN CURRENT OPINION: None - Registration suspended, stocks bought up by the Agency. See generic discussion of cancelled/ suspended chemicals in the introduction to this opinion.

PESTICIDE PROFILE

PESTICIDE: Diphenamid TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	NE	-
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Diquat dibromide TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops [sorghum]

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Disulfoton (Disyston) [all formulations]   TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	J	2+4/3+8/13	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **DISULFOTON**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, bèautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	2+4/3+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1/4	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1/4	3a
Sucker, Warner	J	1/4	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	J	2+4/3+8/13	0
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **DISULFOTON**

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	1a+d/4
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	1a+d/4
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Part 2):

USES CONSIDERED IN CURRENT OPINION: Crops [C]

	OPINION	RPA	IT/RPM USE
Plover, piping	J	3	0

PESTICIDE PROFILE

PESTICIDE: Diuron TYPE: Herbicide, algicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Part 1): **DIURON**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	la+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	la+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	NJ	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	NJ	-	la+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Part 1): **DIURON**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Endosulfan TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	J	1	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2b/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **ENDOSULFAN**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+5+8/13	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	3+5+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2b/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2b/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	3+5+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+5+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **ENDOSULFAN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	NJ	-	11
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Endrin TYPE: Insecticide, rodenticide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: EPN TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: EPTC TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	J	17
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Ethion TYPE: Acaricide, insecticide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	3b
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **ETHION**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	2+4/3+8/13	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	2+4/3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): ETHION

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	3b
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	3b
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Ethoprop (granular) TYPE: Nematicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	3b
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **ETHOPROP**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	1a+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1/4	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3b
Pearly mussel, birdwing	NJ	-	1a+d+m+3b

AQUATIC SPECIES (Request Parts 1 and 3): **ETHOPROP**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	la+d+m+3b
Pearly mussel, Cumberland monkeyface	NJ	-	la+d+m+3b
Pearly mussel, Curtis'	NJ	-	3b
Pearly mussel, dromedary	NJ	-	la+d+m+3b
Pearly mussel, green-blossom	NJ	-	la+d+m+3b
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	la+d+m+3b
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	la+d+m+3b
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	la+d+m+3b
Pearly mussel, white cat's paw	NJ	-	3b
Pearly mussel, white wartyback	NJ	-	la+d+m+3b
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	la+d+m+3b
Pigtoe, rough	NJ	-	la+d+m+3b
Pigtoe, shiny	NJ	-	la+d+m+3b
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	la+d+m+3b
Spinymussel, James	NJ	-	la+d+m
Spinymussel, Tar River	NJ	-	la+d+m
Stirrup shell	NJ	-	la+d+m
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	la+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Soccorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	lc+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Ethyl parathion (parathion) TYPE: Insecticide, acaricide, tadpole shrimp control

USES CONSIDERED IN CURRENT OPINION: Crops, mosquito larvicide, pasture

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	10/13	0
Salamander, Santa Cruz long-toed	J	1	3b
Salamander, Texas blind	J	7	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	2+4/3+8/13	0
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/10/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/10/13	0
Darter, bayou	J	2+8/10/13	0
Darter, boulder	J	2+8/10/13	0
Darter, fountain	J	10/13	0
Darter, leopard	J	10/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	3b
Darter, Okaloosa	J	2+5+8/10/13	0
Darter, slackwater	J	2+8/10/13	0
Darter, snail	J	2+8/10/13	0
Darter, watercress	NJ	-	1f+2b/4
Gambusia, Big Bend	J	10/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **ETHYL PARATHION**

	OPINION	RPA	IT/RPM
Gambusia, Clear Creek	J	10/13	0
Gambusia, Pecos	J	2+4/3+8/10/13	0
Gambusia, San Marcos	J	10/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/10/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+8/10/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	2+4/3+8/10/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	2+4/3+8/10/13	0
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/10/13	0
Shiner, Pecos bluntnose	J	2+4/3+8/10/13	0
Silverside, Waccamaw	J	2+8/10/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/10/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NJ	-	1f
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **ETHYL PARATHION**

	OPINION	RPA	IT/RPM
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	J	1+8/12	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	J	1+8/12	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	J	6/13	0
Crayfish, Nashville	J	2+8/10/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	6/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (EPA Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C], mosquito larvicide [L]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	J	24	0	C
Plover, piping	J	3	0	C
Stork, wood	J	19	0	C,L
Tern California least	J	20	0	L
Tern, interior least	NJ	-	1c+e	C
Vireo, least Bell's	J	14	0	C,L

PESTICIDE PROFILE

PESTICIDE: Fenamiphos [all formulations] TYPE: Nematicide

USES CONSIDERED IN CURRENT OPINION: Crops [cotton, soybeans]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): **FENAMIPHOS**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1/4	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **FENAMIPHOS**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	6/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Fenitrothion TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Forests [spruce, fir]

AQUATIC SPECIES (Request Parts 3 and 5):

	OPINION	RPA	IT/RPM
Cavefish, Alabama	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NE	-	0
Chub, humpback	NJ	-	0
Chub, Mohave tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, spotfin	NJ	-	2d/3b
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, bayou	NJ	-	1a+d/2d
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NE	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NE	-	0
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Madtom, Scioto	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NE	-	0
Pupfish, desert	NE	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NE	-	0
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Squawfish, Colorado	NJ	-	0
Stickleback, unarmored threespine	NE	-	0
Topminnow, Gila	NE	-	0
Trout, Apache	J	3+8/13	0
Trout, Gila	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 3 and 5): **FENITROTHION**

	OPINION	RPA	IT/RPM
Trout, greenback cutthroat	NJ	-	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NJ	-	0
Woundfin	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Vireo, least Bell's	NJ	-	0
Woodpecker, red-cockaded	J	21	0

PESTICIDE PROFILE

PESTICIDE: Fenoprop (Silvex)

TYPE: Herbicide, growth inhibitor

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Barberry, Truckee	NE	--
Beauty, Harper's	J	20
Broom, San Clemente Island	J	20
Bush-mallow, San Clemente Island	J	20
Cactus, Lee pincushion	NE	-
Evening-primrose, Antioch Dunes	J	20
Evening-primrose, Eureka Valley	NE	-
Gooseberry, Miccosukee	NJ	-
Grass, Eureka Valley dune	NE	-
Grass, Solano	NE	-
Larkspur, San Clemente Island	J	20
Liveforever, Santa Barbara Island	NE	-
Manzanita, Presidio	NE	-
Paintbrush, San Clemente Island indian	J	20
Pawpaw, four-petal	NE	-
Rattleweed, hairy	NE	-
Rock-cress, McDonald's	NE	-
Thornmint, San Mateo	J	20
Wallflower, Contra Costa	J	20

PESTICIDE PROFILE

PESTICIDE: Fensulfothion (Dasanit) [all formulations] TYPE: Nematicide, insecticide

USES CONSIDERED IN CURRENT OPINION: Crops (C) [Note: Registration cancelled for use on corn, cotton, sorghum and soybeans in September, 1988, but product still available in the market. Opinions provided for bulletins. See discussion on cancelled chemicals in the introduction to this opinion.]

AQUATIC SPECIES (EPA Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0

AQUATIC SPECIES (EPA Parts 1 and 3): **FENSULFOTHION**

	OPINION	RPA	IT/RPM
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	la+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	NJ	-	la+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	la
Spikedace	NJ	-	la+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1/4	3a
Sucker, Modoc	J	1/4	0
Sucker, shortnose	J	1/4	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0

AQUATIC SPECIES (EPA Parts 1 and 3): **FENSULFOTHION**

	OPINION	RPA	IT/RPM
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NE	-	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (EPA Part 2):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Fenthion TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Mosquito larvicide

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

TERRESTRIAL SPECIES (Request Parts 2, 3 and 5):

	OPINION	RPA	IT/RPM
Stork, wood	J	19	0
Tern, California least	J	20	0
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Fenvalerate (Pydrin) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests [douglas-fir]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	I/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	--	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish,.Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2b/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2b/2d

AQUATIC SPECIES (Request Parts 1 and 3): **FENVALERATE**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	la+d/2b/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2b/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2b/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	la+d/2b/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	la
Spikedace	NJ	-	la+d/2b/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	3+5+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	la
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	la+d/2b/2d
Trout, Gila	NJ	-	la+d/2b/2d
Trout, greenback cutthroat	NJ	-	la
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	la+d+m
Mussel, Judge Tait's	NJ	-	la+d+m
Mussel, Marshall's	NJ	-	la+d+m
Mussel, penitent	NJ	-	la+d+m
Pearlshell, Louisiana	NJ	-	la+d+m
Pearly mussel, Alabama lamp	NJ	-	la+d+m
Pearly mussel, Applachian monkeyface	NJ	-	la+d+m+3b
Pearly mussel, birdwing	NJ	-	la+d+m+3b
Pearly mussel, Cumberland bean	NJ	-	la+d+m+3b

AQUATIC SPECIES (Request Parts 1 and 3): **FENVALERATE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	1a+d+m+3b
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	1a+d+m+3b
Pearly mussel, green-blossom	NJ	-	1a+d+m+3b
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	1a+d+m+3b
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	1a+d+m+3b
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	1a+d+m+3b
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	1a+d+m+3b
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	1a+d+m+3b
Pigtoe, rough	NJ	-	1a+d+m+3b
Pigtoe, shiny	NJ	-	1a+d+m+3b
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	1a+d+m+3b
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	NJ	-	1a+d+m
Stirrup shell	NJ	-	1a+d+m
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE -

PESTICIDE: Fluchloralin TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

PESTICIDE PROFILE

PESTICIDE: Flucythrinate TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

PESTICIDE PROFILE

PESTICIDE: Fonofos TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	J	1	3b
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): FONOFOS

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): FONOFOS

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	--	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	6/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Fosamine-ammonium TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	NE	-
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Gas cartridges TYPE: Fumigant

USES CONSIDERED IN CURRENT OPINION: Rangeland/pastureland

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Rattlesnake, New Mexican ridge-nosed	J	15	0
Snake, eastern indigo	J	23	0

PESTICIDE PROFILE

PESTICIDE: Glyphosate TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	J	17
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Hexazinone TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests [F], rangeland [R]

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA	USE
Aster, Ruth's golden	NE	-	F
Barberry, Truckee	NE	-	R
Beauty, Harper's	J	20	R
Broom, San Clemente Island	J	20	R
Bush-mallow, San Clemente Island	J	20	R
Cactus, Lee pincushion	NE	-	R
Evening-primrose, Antioch Dunes	J	20	R
Evening-primrose, Eureka Valley	NE	-	R
Goldenrod, Blue Ridge	J	20	R
Gooseberry, Miccosukee	J	20	F,R
Grass, Eureka Valley dune	NE	-	R
Grass, Solano	NE	-	R
Heather, mountain golden	NE	-	F
Larkspur, San Clemente Island	J	20	R
Liveforever, Santa Barbara Island	NE	-	R
Manzanita, Presidio	NE	-	R
Mint, longspurred	NE	-	F
Paintbrush, San Clemente Island indian	J	20	R
Pawpaw, four-petal	NE	-	R
Rattleweed, hairy	NE	-	R
Rock-cress, McDonald's	NE	-	R
Thistle, Sacramento Mountains	J	26	F
Thornmint, San Mateo	J	20	R
Townsendia, last chance	J	17	F
Vetch, Hawaiian	NE	-	F
Wallflower, Contra Costa	J	20	R

PESTICIDE PROFILE

PESTICIDE: Isofenphos (Oftanol) TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops [corn]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Part 1): **ISOFENPHOS**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	NJ	-	0
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	0
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Part 1): **ISOFENPHOS**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	NJ	-	11
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Linuron TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crop [Sorghum]

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Vireo, least Bell's	NJ	=	0

PESTICIDE PROFILE

PESTICIDE: Magnesium phosphide TYPE: Fumigant

USES CONSIDERED IN CURRENT OPINION: Rangeland/pastureland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Rattlesnake, New Mexican ridge-nosed	J	15	0
Snake, eastern indigo	J	23	0

PESTICIDE PROFILE

PESTICIDE: Malathion TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, mosquito larvicide, rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	2+4/3+5+8/10/13	0
Salamander, Santa Cruz long-toed	J	1	3a/3b
Salamander, Texas blind	J	7/13	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	2+4/3+5+8/10/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	J	2+4/3+5+8/13	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	J	2+4/3+5+8/13	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/10/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	5	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/10/13	0
Darter, bayou	J	2+8/10/13	0
Darter, boulder	J	2+8/10/13	0
Darter, fountain	J	2+4/3+5+8/10/13	0
Darter, leopard	J	2+4/3+5+8/10/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	J	2+4+8/10/13	0
Darter, slackwater	J	2+8/10/13	0
Darter, snail	J	2+8/10/13	0
Darter, watercress	NJ	-	1f+2b/4
Gambusia, Big Bend	J	2+4/3+5+8/10/13	0
Gambusia, Clear Creek	J	2+4/3+5+8/10/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **MALATHION**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	2+4/3+5+8/10/13	0
Gambusia, San Marcos	J	2+4/3+5+8/10/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/10/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	J	2+8/10/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+5+8/10/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	2+4/3+5+8/10/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	2+4/3+5+8/10/13	0
Pupfish, Owens	J	2	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/10/13	0
Shiner, Pecos bluntnose	J	2+4/3+5+8/10/13	0
Silverside, Waccamaw	J	2+8/10/13	0
Squawfish, Colorado	J	3/13	0
Spikedace	J	2+4/3+5+8/10/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	2+4/3+5+8/10/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	3a
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	J	2+4/3+5+8/13	0
Topminnow, Yaqui	J	2+4/3+5+8/13	0
Trout, Apache	J	2+4/3+5+8/13	0
Trout, Gila	NJ	-	1c+d/2b/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	5	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **MALATHION**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	1a+d/4
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	1a/3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	J	2+8+27	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	1a+d/4
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	6/13	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	J	11	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Mancozeb TYPE: Fungicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests [conifers]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NJ	-	1j
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Part 1): **MANCOZEB**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	la+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	la
Spikedace	NJ	-	la+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	la+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	la
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	la+d/2d
Trout, Gila	NJ	-	la+d/2d
Trout, greenback cutthroat	NJ	-	la
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	la
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Part 1): **MANCOZEB**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	--	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: MCPA-thioethyl TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Barberry, Truckee	NE	-
Beauty, Harper's	J	20
Broom, San Clemente Island	J	-20
Bush-mallow, San Clemente Island	J	20
Cactus, Lee pincushion	NE	-
Evening-primrose, Antioch Dunes	J	20
Evening-primrose, Eureka Valley	NE	-
Gooseberry, Miccosukee	J	20
Grass, Eureka Valley dune	NE	-
Grass, Solano	NE	-
Larkspur, San Clemente Island	J	20
Liveforever, Santa Barbara Island	NE	-
Manzanita, Presidio	NE	-
Paintbrush, San Clemente Island indian	J	20
Pawpaw, four-petal	NE	-
Rattleweed, hairy	NE	-
Rock-cress, McDonald's	NE	-
Thistle, Sacramento Mountains	J	26
Thornmint, San Mateo	J	20
Wallflower, Contra Costa	J	20

PESTICIDE PROFILE

PESTICIDE: Methidathion TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE		0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): METHIDATHION

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	NJ	-	la+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	la
Spikedace	NJ	-	la+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	la
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **METHIDATHION**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Methomyl TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, pasture

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NJ	-	1a+d/2b/2d
Salamander, Santa Cruz long-toed	J	1	3b
Salamander, Texas blind	NJ	--	2c
Toad, Houston	J	5+17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2b/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2/4	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, Sonora	NJ	-	1a+d/2b/2d
Chub, spotfin	NJ	-	2d/3b
Chub, Virgin River	NE	-	0
Chub, Yaqui	NJ	-	1a+d/2b/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NJ	-	1a+d/2b/2d
Darter, leopard	J	3+5+8/13	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NJ	-	1a+d/2b/2d
Gambusia, Clear Creek	NJ	-	1a+d/2b/2d
Gambusia, Pecos	J	3+5+6+8/13	0

AQUATIC SPECIES (Request Part 1): **METHOMYL**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NJ	-	la+d/2b/2d
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	3+5+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	--	la+d/2b/2d
Pupfish, desert	J	2/4	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2b/2d
Pupfish, Owens	J	2/4	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	3+5+8/13	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	la
Spikedace	J	3+5+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	3+5+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	0
Sucker, June	NJ	-	la
Sucker, Lost River	J	1/4	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1/4	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NJ	-	la+d/2b/2d
Topminnow, Yaqui	NJ	-	la+d/2b/2d
Trout, Apache	NJ	-	la+d/2b/2d
Trout, Gila	NJ	-	la+d/2b/2d
Trout, greenback cutthroat	NJ	-	la
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	NJ	-	la
Mussel, Curtus'	NJ	-	la+d+m
Mussel, Judge Tait's	NJ	-	la+d+m
Mussel, Marshall's	NJ	-	la+d+m
Mussel, penitent	NJ	-	la+d+m
Pearlshell, Louisiana	NJ	-	la+d+m
Pearly mussel, Alabama lamp	NJ	-	la+d+m
Pearly mussel, Applachian monkeyface	NJ	-	la+d+m+3b
Pearly mussel, birdwing	NJ	-	la+d+m+3b
Pearly mussel, Cumberland bean	NJ	-	la+d+m+3b

AQUATIC SPECIES (Request Part 1): **METHOMYL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	1a+d+m+3b
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	1a+d+m+3b
Pearly mussel, green-blossom	NJ	-	1a+d+m+3b
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	1a+d+m+3b
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	1a+d+m+3b
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	1a+d+m
Pearly mussel, turgid-blossom	NJ	-	1a+d+m+3b
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	1a+d+m+3b
Pearly mussel, yellow-blossom	NJ	-	1a+d+m+3b
Pigtoe, fine-rayed	NJ	-	1a+d+m+3b
Pigtoe, rough	NJ	-	1a+d+m+3b
Pigtoe, shiny	NJ	-	1a+d+m+3b
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	1a+d+m+3b
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	NJ	-	1a+d+m
Stirrup shell	NJ	-	1a+d+m
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	J	6/11	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Methoprene TYPE: Insect growth regulator

USES CONSIDERED IN CURRENT OPINION: Mosquito larvicide

AQUATIC SPECIES (Request Parts 3 and 5):

	OPINION	RPA	IT/RPM
Cavefish, Alabama	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1f
Chub, humpback	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, spotfin	NJ	-	1a+d/2d/3b
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, bayou	NJ	-	2d/3a
Darter, fountain	NJ	-	1f
Darter, leopard	NJ	-	1f
Darter, Maryland	NE	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NJ	-	1f
Gambusia, Clear Creek	NJ	-	1f
Gambusia, Pecos	NJ	-	1f
Gambusia, San Marcos	NJ	-	1f
Killifish, Pahrump	NE	-	0
Madtom, Scioto	NJ	-	0
Madtom, yellowfin	NJ	-	2d/3a
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1f
Pupfish, desert	NE	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1f
Pupfish, Owens	NJ	-	0
Pupfish, Warm Springs	NE	-	0
Squawfish, Colorado	NJ	-	0
Stickleback, unarmored threespine	NJ	-	3a
Topminnow, Gila	NJ	-	1f
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0

AQUATIC SPECIES (Request Parts 3 and 5): **METHOPRENE**

	OPINION	RPA	IT/RPM
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0

PESTICIDE PROFILE

PESTICIDE: Methoxychlor TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops, mosquito larvicide

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

PESTICIDE PROFILE

PESTICIDE: Methyl parathion TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, mosquito larvicide, rangeland

AQUATIC SPECIES (Request Parts 1, 3 and 5):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	3+5+6+8/10/13	0
Salamander, Santa Cruz long-toed	NJ	-	3b
Salamander, Texas blind	J	7/13	0
Toad, Houston	J	5+17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	3+5+6+8/10/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	NJ	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	2d/3b
Chub, Sonora	NJ	-	1a+d/2b/2d
Chub, spotfin	NJ	-	2d/3b
Chub, Yaqui	NJ	-	1a+d/2b/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	J	3+5+6+8/10/13	0
Darter, leopard	J	3+5+8/10/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/10/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NJ	-	1f+2b/4
Gambusia, Big Bend	J	3+5+6+8/10/13	0
Gambusia, Clear Creek	J	3+5+6+8/10/13	0

AQUATIC SPECIES (Request Parts 1, 3 and 5): **METHYL PARATHION**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+5+6+8/10/13	0
Gambusia, San Marcos	J	3+5+6+8/10/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	3+5+8/10/13	0
Pupfish, Ash Meadows Amargosa	NE	--	0
Pupfish, Comanche Springs	J	3+5+6+8/10/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	3+5+6+8/10/13	0
Pupfish, Owens	NJ	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	3+5+8/10/13	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+5+8/10/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	3+5+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NJ	-	3a
Sucker, June	J	3/13	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	J	3+5+8/13	0
Topminnow, Yaqui	J	3+5+8/13	0
Trout, Apache	J	3+5+8/13	0
Trout, Gila	NJ	-	1a+d/2b/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3b
Pearly mussel, birdwing	NJ	-	1a+d+m+3b

AQUATIC SPECIES (Request Parts 1, 3 and 5): **METHYL PARATHION**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	la+d+m+3b
Pearly mussel, Cumberland monkeyface	NJ	-	la+d+m+3b
Pearly mussel, Curtis'	J	1+8/12	0
Pearly mussel, dromedary	NJ	-	la+d+m+3b
Pearly mussel, green-blossom	NJ	-	la+d+m+3b
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	la+d+m+3b
Pearly mussel, orange-footed	NJ	-	la+d/4
Pearly mussel, pale liliput	NJ	-	la+d+m+3b
Pearly mussel, pink mucket	NJ	--	la+d/4
Pearly mussel, tubercled-blossom	NJ	-	la+d+m
Pearly mussel, turgid-blossom	NJ	-	la+d+m+3b
Pearly mussel, white cat's paw	J	1+8/12	0
Pearly mussel, white wartyback	NJ	-	la+d+m+3b
Pearly mussel, yellow-blossom	NJ	-	la+d+m+3b
Pigtoe, fine-rayed	NJ	-	la+d+m+3b
Pigtoe, rough	NJ	-	la+d+m+3b
Pigtoe, shiny	NJ	-	la+d+m+3b
Pocketbook, fat	NJ	-	la+d/4
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	la+d+m+3b
Spinymussel, James	NJ	-	la+d+m
Spinymussel, Tar River	NJ	-	la+d+m
Stirrup shell	NJ	-	la+d+m
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	6/13	0
Crayfish, Nashville	J	2+8/10/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	J	5+6+11	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	6/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C], forests [F], mosquito larvicide [L], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	J	24	0	C
Plover, piping	J	3	0	R
Stork, wood	J	19	0	C,L
Tern, California least	NJ	-	0	L
Tern, interior least	NJ	-	1c+e	C,R
Vireo, least Bell's	J	14	0	C,L,R
Woodpecker, red-cockaded	J	21	0	F
Rattlesnake, New Mexican ridge-nosed	NJ	-	11	R
Snake, eastern indigo	NJ	-	0	R

PESTICIDE PROFILE

PESTICIDE: Mevinphos (Phosdrin) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	3b
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	J	3+8/13	0

AQUATIC SPECIES (Request Part 1): **MEVINPHOS**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0

AQUATIC SPECIES (Request Part 1): **MEVINPHOS**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Naled TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, mosquito larvicide, pasture/rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	3+5+8/10/13	0
Salamander, Santa Cruz long-toed	J	1	3b
Salamander, Texas blind	J	7/13	0
Toad, Houston	J	5+17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	3+5+8/10/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2/4	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NJ	-	1a+d/2b/2d
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NJ	-	1a+d/2b/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	J	3+5+8/10/13	0
Darter, leopard	J	3+5+8/10/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NJ	-	1f+2b/4
Gambusia, Big Bend	J	3+5+8/10/13	0
Gambusia, Clear Creek	J	3+5+8/10/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **NALED**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+5+8/10/13	0
Gambusia, San Marcos	J	3+5+8/10/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	3+5+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	3+5+8/10/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	3+5+8/10/13	0
Pupfish, Owens	J	2/4	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	3+5+8/10/13	0
Silverside, Waccamaw	J	2+8/10/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+5+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	3+5+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1/4	3a
Sucker, June	J	3/13	0
Sucker, Lost River	J	1/4	3a
Sucker, Modoc	J	1/4	0
Sucker, shortnose	J	1/4	3a
Sucker, Warner	J	1/4	0
Topminnow, Gila	J	3+5+8/13	0
Topminnow, Yaqui	J	3+5+8/13	0
Trout, Apache	NJ	-	1a+d/2b/2d
Trout, Gila	NJ	-	1a+d/2b/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, birdwing	NJ	-	1a+d+m+3a

AQUATIC SPECIES (Request Parts 1 and 3): **NALED**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	1a+d+m+3a
Pearly mussel, Cumberland monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, Curtis'	J	1+8/12	0
Pearly mussel, dromedary	NJ	-	1a+d+m+3a
Pearly mussel, green-blossom	NJ	-	1a+d+m+3a
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	NJ	-	1a+d+m+3a
Pearly mussel, orange-footed	NJ	-	1a/3b
Pearly mussel, pale liliput	NJ	-	1a+d+m+3a
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	NJ	-	1a+d+m
Pearly mussel, turgid-blossom	NJ	-	1a+d+m+3a
Pearly mussel, white cat's paw	J	1+8/12	0
Pearly mussel, white wartyback	NJ	-	1a+d+m+3a
Pearly mussel, yellow-blossom	NJ	-	1a+d+m+3a
Pigtoe, fine-rayed	NJ	-	1a+d+m+3a
Pigtoe, rough	NJ	-	1a+d+m+3a
Pigtoe, shiny	NJ	-	1a+d+m+3a
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	1a+d+m+3a
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	NJ	-	1a+d+m
Stirrup shell	NJ	-	1a+d+m
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	J	2+8/10/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	J	11	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Nitrapyrin TYPE: Bacteriostat

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	0
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	0

AQUATIC SPECIES (Request Part 1): **NITRAPYRIN**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	0
Pupfish, desert	NJ	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	0
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NE	-	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	NJ	-	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, birdwing	NJ	-	1a+d+m+3a
Pearly mussel, Cumberland bean	NJ	-	1a+d+m+3a

AQUATIC SPECIES (Request Part 1): **NITRAPYRIN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	1a+d+m+3a
Pearly mussel, green-blossom	NJ	-	1a+d+m+3a
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	1a+d+m+3a
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	1a+d+m+3a
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	1a+d+m+3a
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	1a+d+m+3a
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	1a+d+m+3a
Pigtoe, rough	NJ	-	1a+d+m+3a
Pigtoe, shiny	NJ	-	1a+d+m+3a
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	1a+d+m+3a
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	NJ	-	1a+d+m
Stirrup shell	NJ	-	1a+d+m
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Oxamyl

TYPE: Insecticide, acaricide, nematicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0

AQUATIC SPECIES (Request Part I): **OXAMYL**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	NJ	-	la+d/2d
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	la+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	la
Spikedace	NJ	-	la+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0

AQUATIC SPECIES (Request Part 1): **OXAMYL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	NJ	-	0
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	J	14	0

PESTICIDE PROFILE

PESTICIDE: Oxydemeton-methyl (Metasystox-R) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests [douglas-fir]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Part 1): **OXYDEMETON-METHYL**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Part 1): **OXYDEMETON-METHYL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Oxyfluorfen TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): **OXYFLUORFEN**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	1a
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **OXYFLUORFEN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NJ	-	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	NJ	-	11
Plover, piping	NJ	-	1c
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Paraquat dichloride TYPE: Herbicide

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Crops [C], forests [F], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Falcon, northern aplomado	NJ	-	0	C
Plover, piping	NJ	-	1c	R
Stork, wood	J	19	0	C
Tern, interior least	NJ	-	1c+e	C,R
Vireo, least Bell's	NE	-	0	C,R
Aster, Ruth's golden	NE	-	-	F
Barberry, Truckee	NE	-	-	R
Beauty, Harper's	J	20	-	R
Broom, San Clemente Island	J	20	-	R
Bush-mallow, San Clemente Island	J	20	-	R
Cactus, Lee pincushion	NE	-	-	R
Evening-primrose, Antioch Dunes	J	20	-	R
Evening-primrose, Eureka Valley	NE	-	-	R
Goldenrod, Blue Ridge	J	20	-	R
Gooseberry, Miccosukee	J	20	-	F,R
Grass, Eureka Valley dune	NE	-	-	R
Grass, Solano	NE	-	-	R
Heather, mountain golden	NE	-	-	F
Larkspur, San Clemente Island	J	20	-	R
Liveforever, Santa Barbara Island	NE	-	-	R
Manzanita, Presidio	NE	-	-	R
Mint, longspurred	NE	-	-	F
Paintbrush, San Clemente Island indian	J	20	-	R
Pawpaw, four-petal	NE	-	-	R
Rattleweed, hairy	NE	-	-	R
Rock-cress, McDonald's	NE	-	-	R
Thistle, Sacramento Mountains	J	26	-	F
Thornmint, San Mateo	J	20	-	R
Townsendia, last chance	J	17	-	F
Vetch, Hawaiian	NE	-	-	F
Wallflower, Contra Costa	J	20	-	R

PESTICIDE PROFILE

PESTICIDE: Pendimethalin TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	1a+i
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	J	2+4/3+8/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **PENDIMETHALIN**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	2+4/3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **PENDIMETHALIN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Permethrin TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	J	1	3b
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	3b
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): **PERMETHRIN**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **PERMETHRIN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	3b
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	3b
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Phorate (granular) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	J	3+8/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **PHORATE**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3b
Pearly mussel, birdwing	NJ	-	1a+d+m+3b
Pearly mussel, Cumberland bean	NJ	-	1a+d+m+3b

AQUATIC SPECIES (Request Parts 1 and 3): **PHORATE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	1a+d+m+3b
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	1a+d+m+3b
Pearly mussel, green-blossom	NJ	-	1a+d+m+3b
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	1a+d+m+3b
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	1a+d+m+3b
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	1a+d+m+3b
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	1a+d+m+3b
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	1a+d+m+3b
Pigtoe, rough	NJ	-	1a+d+m+3b
Pigtoe, shiny	NJ	-	1a+d+m+3b
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	1a+d+m+3b
Spinymussel, James	NJ	-	1a+d+m
Spinymussel, Tar River	NJ	-	1a+d+m
Stirrup shell	NJ	-	1a+d+m
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Falcon, northern aplomado	J	24	0
Plover, piping	J	3	0
Stork, wood	J	19	0
Tern, interior least	NJ	-	1c+e
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Phosmet TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests [pine]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	J	7/12	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NJ	-	2d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Part 1): **PHOSMET**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	J	3/13	0
Spikedace	J	3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	1a+d+m
Mussel, Judge Tait's	NJ	-	1a+d+m
Mussel, Marshall's	NJ	-	1a+d+m
Mussel, penitent	NJ	-	1a+d+m
Pearlshell, Louisiana	NJ	-	1a+d+m
Pearly mussel, Alabama lamp	NJ	-	1a+d+m
Pearly mussel, Applachian monkeyface	NJ	-	1a+d+m+3a
Pearly mussel, birdwing	NJ	-	1a+d+m+3a
Pearly mussel, Cumberland bean	NJ	-	1a+d+m+3a

AQUATIC SPECIES (Request Part 1): **PHOSMET**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	la+d+m+3a
Pearly mussel, Curtis'	NJ	-	la+d/3b
Pearly mussel, dromedary	NJ	-	la+d+m+3a
Pearly mussel, green-blossom	NJ	-	la+d+m+3a
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	NJ	-	la+d+m+3a
Pearly mussel, orange-footed	NJ	-	la/3b
Pearly mussel, pale liliput	NJ	-	la+d+m+3a
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	la+d+m+3a
Pearly mussel, white cat's paw	NJ	-	la/3b
Pearly mussel, white wartyback	NJ	-	la+d+m+3a
Pearly mussel, yellow-blossom	NJ	-	la+d+m+3a
Pigtoe, fine-rayed	NJ	-	la+d+m+3a
Pigtoe, rough	NJ	-	la+d+m+3a
Pigtoe, shiny	NJ	-	la+d+m+3a
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	la+d+m+3a
Spinymussel, James	NJ	-	la+d+m
Spinymussel, Tar River	NJ	-	la+d+m
Stirrup shell	NJ	-	la+d+m
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Phosphamidon TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops [cotton]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NJ	-	3b
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Part 1): **PHOSPHAMIDON**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	la+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	NJ	-	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NE	-	0
Spikedace	NJ	-	la+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NJ	-	la+d+m
Mussel, Judge Tait's	NJ	-	la+d+m
Mussel, Marshall's	NJ	-	la+d+m
Mussel, penitent	NJ	-	la+d+m
Pearlshell, Louisiana	NJ	-	la+d+m
Pearly mussel, Alabama lamp	NJ	-	la+d+m
Pearly mussel, Applachian monkeyface	NJ	-	la+d+m+3b
Pearly mussel, birdwing	NJ	-	la+d+m+3b
Pearly mussel, Cumberland bean	NJ	-	la+d+m+3b

AQUATIC SPECIES (Request Part 1): **PHOSPHAMIDON**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	la+d+m+3b
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	la+d+m+3b
Pearly mussel, green-blossom	NJ	-	la+d+m+3b
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	la+d+m+3b
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	la+d+m+3b
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	la+d+m+3b
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	la+d+m+3b
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	la+d+m+3b
Pigtoe, rough	NJ	-	la+d+m+3b
Pigtoe, shiny	NJ	-	la+d+m+3b
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	la+d+m+3b
Spinymussel, James	NJ	-	la+d+m
Spinymussel, Tar River	NJ	-	la+d+m
Stirrup shell	NJ	-	la+d+m
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	la+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Picloram
Potassium picloram
Triethylene picloram

TYPE: Herbicide

TERRESTRIAL SPECIES (Request Part 3)

USES CONSIDERED IN CURRENT OPINION: Forests [F], rangeland [R]

	OPINION	RPA	USE
Aster, Ruth's golden	NE	—	F
Barberry, Truckee	NE	-	R
Beauty, Harper's	J	20	R
Broom, San Clemente Island	J	20	R
Bush-mallow, San Clemente Island	J	20	R
Cactus, Lee pincushion	NE	-	R
Evening-primrose, Antioch Dunes	J	20	R
Evening-primrose, Eureka Valley	NE	-	R
Goldenrod, Blue Ridge	J	20	R
Gooseberry, Miccosukee	J	20	F,R
Grass, Eureka Valley dune	NE	-	R
Grass, Solano	NE	-	R
Heather, mountain golden	NE	-	F
Larkspur, San Clemente Island	J	20	R
Liveforever, Santa Barbara Island	NE	-	R
Manzanita, Presidio	NE	-	R
Mint, longspurred	NE	-	F
Paintbrush, San Clemente Island indian	J	20	R
Pawpaw, four-petal	NE	-	R
Rattleweed, hairy	NE	-	R
Rock-cress, McDonald's	NE	-	R
Thistle, Sacramento Mountains	J	26	F
Thornmint, San Mateo	J	20	R
Townsendia, last chance	J	17	F
Vetch, Hawaiian	NE	-	F
Wallflower, Contra Costa	J	20	R

PESTICIDE PROFILE

PESTICIDE: Profenfos (Curacron) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops [cotton]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NE	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NE	-	0
Darter, Niangua	NE	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	J	3+8/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **PROFENFOS**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NE	-	0
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	NE	-	0
Minnow, loach	J	3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NE	-	0
Spikedace	J	3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NE	-	0
Mussel, Judge Tait's	NE	-	0
Mussel, Marshall's	NE	-	0
Mussel, penitent	NE	-	0
Pearlshell, Louisiana	NE	-	0
Pearly mussel, Alabama lamp	NE	-	0
Pearly mussel, Applachian monkeyface	NE	-	0
Pearly mussel, birdwing	NE	-	0
Pearly mussel, Cumberland bean	NE	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **PROFENFOS**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NE	-	0
Pearly mussel, Curtis'	NE	-	0
Pearly mussel, dromedary	NE	-	0
Pearly mussel, green-blossom	NE	-	0
Pearly mussel, Higgins' eye	NE	-	0
Pearly mussel, little-wing	NE	-	0
Pearly mussel, orange-footed	NE	-	0
Pearly mussel, pale liliput	NE	-	0
Pearly mussel, pink mucket	NE	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NE	-	0
Pearly mussel, white cat's paw	NE	-	0
Pearly mussel, white wartyback	NE	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NE	-	0
Pigtoe, rough	NE	-	0
Pigtoe, shiny	NE	-	0
Pocketbook, fat	NE	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NE	-	0
Spinymussel, James	NE	-	0
Spinymussel, Tar River	NE	-	0
Stirrup shell	NE	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Profluralin TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

PESTICIDE PROFILE

PESTICIDE: Propachlor (all formulations) TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, pasture/rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	2+4/3+6+8/13	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NJ	-	2c
Toad, Houston	J	17	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	2+4/3+6+8/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NJ	-	1a+d/2d
Chub, spotfin	NE	-	0
Chub, Yaqui	NJ	-	1a+d/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	J	2+4/3+6+8/13	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	J	2+4/3+6+8/13	0
Gambusia, Clear Creek	J	2+4/3+6+8/13	0
Gambusia, Pecos	J	2+4/3+6+8/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **PROPACHLOR**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	J	2+4/3+6+8/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	2+4/3+6+8/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	2+4/3+6+8/13	0
Pupfish, Owens	NJ	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	J	2+4/3+8/13	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NJ	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1/4	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1/4	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	J	2+4/3+6+8/13	0
Topminnow, Yaqui	J	2+4/3+6+8/13	0
Trout, Apache	J	2+4/3+8/13	0
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3/4	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **PROPACHLOR**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	J	6+11	0
Shrimp, Alabama cave	J	6/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Propargite TYPE: Acaricide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): **PROPARGITE**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **PROPARGITE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Propazine TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ		1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Part 1):	PROPAZINE OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	NJ	--	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	0
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	1a

[As noted in the Ecological Effects science chapter for the Propazine Standard, dated June 3, 1987, the Agency's requirement for an acute toxicity study on aquatic invertebrates has not been accomplished. Other data on this chemical's effect on invertebrates are not available. Based on joint staff discussions, the Service will not provide a biological opinion on invertebrates at this time. It is our understanding that the Agency will reinitiate consultation when the data become available.]

PESTICIDE PROFILE

PESTICIDE: Pyrethrin (Pyrethrum I) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, mosquito larvicide, pasture

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	3+5+8/10/13	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	J	7/13	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	J	3+5+8/10/13	0
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NJ	-	1a+d/2b/2d
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NJ	-	1a+d/2b/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/10/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/10/13	0
Darter, bayou	J	2+8/10/13	0
Darter, boulder	J	2+8/10/13	0
Darter, fountain	J	3+5+8/10/13	0
Darter, leopard	J	3+5+8/10/13	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	J	2+8/10/13	0
Darter, snail	J	2+8/10/13	0
Darter, watercress	NJ	-	1f+2b/4
Gambusia, Big Bend	J	3+5+8/10/13	0
Gambusia, Clear Creek	J	3+5+8/10/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **PYRETHRIN**

	OPINION	RPA	IT/RPM
Gambusia, Pecos	J	3+5+8/10/13	0
Gambusia, San Marcos	J	3+5+8/10/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/10/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	3+5+8/10/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	J	3+5+8/10/13	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	J	3+5+8/10/13	0
Pupfish, Owens	J	2	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/10/13	0
Shiner, Pecos bluntnose	J	3+5+8/10/13	0
Silverside, Waccamaw	J	2+8/10/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+5+8/10/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2b/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	3a
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NJ	-	1a+d/2b/2d
Topminnow, Yaqui	NJ	-	1a+d/2b/2d
Trout, Apache	NJ	-	1a+d/2b/2d
Trout, Gila	NJ	-	1a+d/2b/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **PYRETHRIN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland bean	J	2+8+27	0
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	1a+d/4
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	J	2+8+27	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	1a+d/4
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	J	2+8+27	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	J	2+8/10/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	J	6+11	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Simazine TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Forests

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Aster, Ruth's golden	NE	-
Goldenrod, Blue Ridge	J	20
Gooseberry, Miccosukee	J	20
Heather, mountain golden	NE	-
Mint, longspurred	NE	-
Thistle, Sacramento Mountains	J	26
Townsendia, last chance	J	17
Vetch, Hawaiian	NE	-

PESTICIDE PROFILE

PESTICIDE: Sodium cyanide TYPE: Rodenticide

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Plover, piping	NE	-	0
Tern, interior least	NE	-	0
Vireo, least Bell's	NE	-	0

PESTICIDE PROFILE

PESTICIDE: SSS-tributyl phosphorotrithioate (DEF) TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops [cotton]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NE	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	J	3+5+8/13	0

AQUATIC SPECIES (Request Part 1): SSS-TRIBUTYL PHOSPHOROTRITHIOATE

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NE	-	0
Minnow, loach	J	3+5+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2b/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2b/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	3+5+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NE	-	0
Spikedace	J	3+5+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	NE	-	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	NE	-	0
Pearly mussel, Alabama lamp	NE	-	0
Pearly mussel, Applachian monkeyface	NE	-	0
Pearly mussel, birdwing	NE	-	0
Pearly mussel, Cumberland bean	NE	-	0

AQUATIC SPECIES (Request Part 1): **SSS-TRIBUTYL PHOSPHOROTHITHIOATE**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NE	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NE	-	0
Pearly mussel, green-blossom	NE	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NE	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NE	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NE	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NE	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NE	-	0
Pigtoe, rough	NE	-	0
Pigtoe, shiny	NE	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NE	-	0
Spinymussel, James	NE	-	0
Spinymussel, Tar River	NE	-	0
Stirrup shell	NE	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Strychnine TYPE: Rodenticide

USES CONSIDERED IN CURRENT OPINION: Rangeland, all other above ground use

TERRESTRIAL SPECIES (Request Parts 2 and 4):

	OPINION	RPA	IT/RPM
Bear, grizzly	NJ	-	0
Wolf, gray	NJ	-	0
Falcon, northern aplomado	J	-25	0
Plover, piping	NE	-	0
Tern, interior least	NE	-	0
Vireo, least Bell's	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Sulprofos (Bolestar) TYPE: Insecticide, acaricide

USES CONSIDERED IN CURRENT OPINION: Crops [cotton, soybeans]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	1a+d/4
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): SULPROFOS

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	--	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NE	-	0
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **SULPROFOS**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NE	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: 2,4,5-T TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Barberry, Truckee	NE	-
Beauty, Harper's	J	20
Broom, San Clemente Island	J	20
Bush-mallow, San Clemente Island	J	20
Cactus, Lee pincushion	NE	-
Evening-primrose, Antioch Dunes	J	20
Evening-primrose, Eureka Valley	NE	-
Gooseberry, Miccosukee	NJ	-
Grass, Eureka Valley dune	NE	-
Grass, Solano	NE	-
Larkspur, San Clemente Island	J	20
Liveforever, Santa Barbara Island	NE	-
Manzanita, Presidio	NE	-
Paintbrush, San Clemente Island indian	J	20
Pawpaw, four-petal	NE	-
Rattleweed, hairy	NE	-
Rock-cress, McDonald's	NE	-
Thornmint, San Mateo	J	20
Wallflower, Contra Costa	J	20

PESTICIDE PROFILE

PESTICIDE: Tebuthiuron TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 3):

	OPINION	RPA
Barberry, Truckee	NE	-
Beauty, Harper's	J	20
Broom, San Clemente Island	J	20
Bush-mallow, San Clemente Island	J	20
Cactus, Lee pincushion	NE	-
Evening-primrose, Antioch Dunes	J	20
Evening-primrose, Eureka Valley	NE	-
Gooseberry, Miccosukee	NJ	-
Grass, Eureka Valley dune	NE	-
Grass, Solano	NE	-
Larkspur, San Clemente Island	J	20
Liveforever, Santa Barbara Island	NE	-
Manzanita, Presidio	NE	-
Paintbrush, San Clemente Island indian	J	20
Pawpaw, four-petal	NE	-
Rattleweed, hairy	NE	-
Rock-cress, McDonald's	NE	-
Thornmint, San Mateo	J	20
Wallflower, Contra Costa	J	20

PESTICIDE PROFILE

PESTICIDE: Temephos TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Mosquito larvicide

AQUATIC SPECIES (Request Part 3):

	OPINION	RPA	IT/RPM
Madtom, Scioto	NJ	-	4+4sm

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4):

	OPINION	RPA	IT/RPM
Stork, wood	J	19	0
Tern, California least	NJ	-	0
Vireo, least Bell's	NJ	-	0

PESTICIDE PROFILE

PESTICIDE: Terbufos TYPE: Insecticide, nematicide

USES CONSIDERED IN CURRENT OPINION: Crops [corn, sorghum]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	3b
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	J	3+4+8/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **TERBUFOS**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	3+4+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	3+4+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **TERBUFOS**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	NJ	-	3b
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	--	0
Pearly mussel, tubercled-blossom	NE	--	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	NJ	-	3b
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Terbutryn TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Part 1): **TERBUTRYN**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	la+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	la+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	la+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	la+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	la
Spikedace	NJ	-	la+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NE	-	0
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NE	-	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Part 1): **TERBUTRYN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Thiodicarb TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops [corn, sorghum]

AQUATIC SPECIES (Request Part 1):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NE	-	0
Toad, Wyoming	NE	-	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	NJ	-	2c/4
Cavefish, Ozark	NJ	-	0
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	0
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NE	-	0
Chub, Sonora	NE	-	0
Chub, spotfin	NE	-	0
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NE	-	0
Darter, Maryland	NJ	-	0
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NE	-	0
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	0

AQUATIC SPECIES (Request Part 1): **THIODICARB**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NE	-	0
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	NJ	-	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	0
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	0
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	0
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	NE	-	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	1a
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Part 1): **THIODICARB**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	NE	-	0
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NE	-	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Thiophanate-methyl TYPE: Fungicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/4
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	NJ	-	1a+i+m
Darter, Niangua	NJ	-	0
Darter, Okaloosa	NJ	-	2d/4
Darter, slackwater	J	2+8/13	0
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): **THIOPHANATE-METHYL**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	0
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	NJ	-	1a+d/2d
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	NJ	-	2d/4
Squawfish, Colorado	NJ	-	1a
Spikedace	NJ	-	1a+d/2d
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NJ	-	1a+d/2d
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	NJ	-	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	NJ	-	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NJ	-	1a+d/2d
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	NJ	-	1a
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	NJ	-	1a
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **THIOPHANATE-METHYL**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	NJ	-	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	la+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	NJ	-	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Trichlorfon TYPE: Insecticide

USES CONSIDERED IN CURRENT OPINION: Crops, forests, pasture/rangeland

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	J	2+4/3+8/13	0
Salamander, Santa Cruz long-toed	J	1	3a/3b
Salamander, Texas blind	J	7/13	0
Toad, Houston	J	17	0
Toad, Puerto Rican crested	J	22	0
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	7	0
Cavefish, Ozark	NJ	-	2c/3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NJ	-	0
Chub, Hutton tui	J	2	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NJ	-	1a+d/2d
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NJ	-	1a+d/2d
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	J	2+8/13	0
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	J	3/13	0
Dace, Moapa	NE	-	0
Darter, amber	J	2+8/13	0
Darter, bayou	J	2+8/13	0
Darter, boulder	J	2+8/13	0
Darter, fountain	J	2+4/3+8/13	0
Darter, leopard	J	2+4/3+8/13	0
Darter, Maryland	J	3+16+27	0
Darter, Niangua	NJ	-	1a/3b
Darter, Okaloosa	J	2+5+8/13	0
Darter, slackwater	J	2+8/13	0
Darter, snail	J	2+8/13	0
Darter, watercress	NE	-	0
Gambusia, Big Bend	J	2+4/3+8/13	0
Gambusia, Clear Creek	J	2+4/3+8/13	0
Gambusia, Pecos	J	2+4/3+8/13	0

AQUATIC SPECIES (Request Parts 1 and 3): **TRICHLORFON**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	J	2+4/3+8/13	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	J	2+8/13	0
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	J	2+8/12/13	0
Madtom, yellowfin	J	2+8+27/12/13	0
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	J	2	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	J	2+8/13	0
Shiner, Pecos bluntnose	J	2+4/3+8/13	0
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	J	2+4/3+8/13	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	J	1	3a
Sucker, June	J	3/13	0
Sucker, Lost River	J	1	3a
Sucker, Modoc	J	1	0
Sucker, shortnose	J	1	3a
Sucker, Warner	J	1	0
Topminnow, Gila	J	2+4/3+8/13	0
Topminnow, Yaqui	J	2+4/3+8/13	0
Trout, Apache	J	2+4/3+8/13	0
Trout, Gila	NJ	-	1a+d/2d
Trout, greenback cutthroat	J	3+8/13	0
Trout, Lahontan cutthroat	NJ	-	3a
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	J	3	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	J	2+8+27	0
Mussel, Judge Tait's	J	2+8+27	0
Mussel, Marshall's	J	2+8+27	0
Mussel, penitent	J	2+8+27	0
Pearlshell, Louisiana	J	2+8+27	0
Pearly mussel, Alabama lamp	J	2+8+27	0
Pearly mussel, Applachian monkeyface	J	2+8+27	0
Pearly mussel, birdwing	J	2+8+27	0
Pearly mussel, Cumberland bean	J	2+8+27	0

AQUATIC SPECIES (Request Parts 1 and 3): **TRICHLORFON**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	J	2+8+27	0
Pearly mussel, Curtis'	J	1+8/12	0
Pearly mussel, dromedary	J	2+8+27	0
Pearly mussel, green-blossom	J	2+8+27	0
Pearly mussel, Higgins' eye	NJ	-	3a
Pearly mussel, little-wing	J	2+8+27	0
Pearly mussel, orange-footed	NJ	-	1a/3b
Pearly mussel, pale liliput	J	2+8+27	0
Pearly mussel, pink mucket	NJ	-	3a
Pearly mussel, tubercled-blossom	NE	-	0
Pearly mussel, turgid-blossom	J	2+8+27	0
Pearly mussel, white cat's paw	J	1+8/12	0
Pearly mussel, white wartyback	J	2+8+27	0
Pearly mussel, yellow-blossom	NE	-	0
Pigtoe, fine-rayed	J	2+8+27	0
Pigtoe, rough	J	2+8+27	0
Pigtoe, shiny	J	2+8+27	0
Pocketbook, fat	NJ	-	3a
Pocketbook, speckled	NE	-	0
Riffle shell, tan	J	2+8+27	0
Spinymussel, James	J	2+8+27	0
Spinymussel, Tar River	J	2+8+27	0
Stirrup shell	J	2+8+27	0
Amphipod, Hay's spring	NE	-	0
Crayfish, [cave]	J	7/13	0
Crayfish, Nashville	J	2+8/13	0
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	J	11	0
Shrimp, Alabama cave	J	7/13	0
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	J	7/13	0
Naucorid, Ash Meadows	NE	-	0

TERRESTRIAL SPECIES (Request Parts 2, 3 and 4)

USES CONSIDERED IN CURRENT OPINION: Forest [F], rangeland [R]

	OPINION	RPA	IT/RPM	USE
Plover, piping	NJ	-	1c	R
Tern, interior least	NJ	-	1c+e	R
Vireo, least Bell's	NJ	-	0	R
Woodpecker, red-cockaded	J	21	0	F
Rattlesnake, New Mexican ridge-nosed	NJ	-	1j	R
Snake, eastern indigo	NJ	-	0	R

PESTICIDE PROFILE

PESTICIDE: Trifluralin (all formulations) TYPE: Herbicide

USES CONSIDERED IN CURRENT OPINION: Crops, forests [hardwoods]

AQUATIC SPECIES (Request Parts 1 and 3):

	OPINION	RPA	IT/RPM
Salamander, San Marcos	NE	-	0
Salamander, Santa Cruz long-toed	NE	-	0
Salamander, Texas blind	NE	-	0
Toad, Houston	NE	-	0
Toad, Puerto Rican crested	NJ	-	2e
Toad, Wyoming	J	17	0
Catfish, Yaqui	NE	-	0
Cavefish, Alabama	J	6	0
Cavefish, Ozark	NJ	-	2c/3b
Chub, bonytail	NE	-	0
Chub, Borax Lake	NE	-	0
Chub, Chihuahua	NJ	-	1a+d/2d
Chub, humpback	NE	-	0
Chub, Hutton tui	NE	-	0
Chub, Mohave tui	NE	-	0
Chub, Owens tui	NE	-	0
Chub, Pahranagat roundtail	NE	-	0
Chub, slender	NJ	-	1a+d/2d/3b
Chub, Sonora	NE	-	0
Chub, spotfin	NJ	-	1a+d/2d/3b
Chub, Yaqui	NE	-	0
Cui-ui	NE	-	0
Dace, Ash Meadows speckled	NE	-	0
Dace, blackside	NJ	-	2d/4
Dace, desert	NE	-	0
Dace, Foskett speckled	NE	-	0
Dace, Kendall Warm Springs	NE	-	0
Dace, Moapa	NE	-	0
Darter, amber	NJ	-	2d/3a
Darter, bayou	NJ	-	2d/3a
Darter, boulder	NJ	-	1a+d/2d/3b
Darter, fountain	NE	-	0
Darter, leopard	NJ	-	1a+d/2d
Darter, Maryland	J	3+6+27	0
Darter, Niangua	NJ	-	1a/3b
Darter, Okaloosa	NJ	-	2b+d/4
Darter, slackwater	NJ	-	2d/3a
Darter, snail	NJ	-	2d/3a
Darter, watercress	NE	-	0
Gambusia, Big Bend	NE	-	0
Gambusia, Clear Creek	NE	-	0
Gambusia, Pecos	NJ	-	1a+d/2d

AQUATIC SPECIES (Request Parts 1 and 3): **TRIFLURALIN**

	OPINION	RPA	IT/RPM
Gambusia, San Marcos	NE	-	0
Killifish, Pahrump	NE	-	0
Logperch, Conasauga	NJ	-	2d/3a
Madtom, Scioto	NJ	-	4+4sm
Madtom, smoky	NJ	-	2d/4
Madtom, yellowfin	NJ	-	2d/3a
Minnow, loach	J	2+4/3+8/13	0
Pupfish, Ash Meadows Amargosa	NE	-	0
Pupfish, Comanche Springs	NJ	-	1a+d/2d
Pupfish, desert	J	2	0
Pupfish, Devils Hole	NE	-	0
Pupfish, Leon Springs	NJ	-	1a+d/2d
Pupfish, Owens	NE	-	0
Pupfish, Warm Springs	NE	-	0
Shiner, beautiful	NE	-	0
Shiner, Cape Fear	NJ	-	2d/3a
Shiner, Pecos bluntnose	NJ	-	1a+d/2d
Silverside, Waccamaw	J	2+8/13	0
Squawfish, Colorado	NJ	-	1a
Spikedace	J	2+4/3+8/13	0
Spinedace, Big Spring	NE	-	0
Spinedace, Little Colorado	NE	-	0
Spinedace, White River	NE	-	0
Springfish, Hiko White River	NE	-	0
Springfish, Railroad Valley	NE	-	0
Springfish, White River	NE	-	0
Stickleback, unarmored threespine	NE	-	0
Sucker, June	NJ	-	1a
Sucker, Lost River	J	1/4	3a
Sucker, Modoc	NJ	-	0
Sucker, shortnose	J	1/4	3a
Sucker, Warner	NJ	-	0
Topminnow, Gila	NE	-	0
Topminnow, Yaqui	NE	-	0
Trout, Apache	NE	-	0
Trout, Gila	NE	-	0
Trout, greenback cutthroat	NE	-	0
Trout, Lahontan cutthroat	NE	-	0
Trout, Little Kern golden	J	1	0
Trout, Paiute cutthroat	NE	-	0
Woundfin	J	3+8/13	0
Mussel, Curtus'	NJ	-	0
Mussel, Judge Tait's	NJ	-	0
Mussel, Marshall's	NJ	-	0
Mussel, penitent	NJ	-	0
Pearlshell, Louisiana	NJ	-	0
Pearly mussel, Alabama lamp	NJ	-	0
Pearly mussel, Applachian monkeyface	NJ	-	0
Pearly mussel, birdwing	NJ	-	0
Pearly mussel, Cumberland bean	NJ	-	0

AQUATIC SPECIES (Request Parts 1 and 3): **TRIFLURALIN**

	OPINION	RPA	IT/RPM
Pearly mussel, Cumberland monkeyface	NJ	-	0
Pearly mussel, Curtis'	NJ	-	0
Pearly mussel, dromedary	NJ	-	0
Pearly mussel, green-blossom	NJ	-	0
Pearly mussel, Higgins' eye	NJ	-	0
Pearly mussel, little-wing	NJ	-	0
Pearly mussel, orange-footed	NJ	-	0
Pearly mussel, pale liliput	NJ	-	0
Pearly mussel, pink mucket	NJ	-	0
Pearly mussel, tubercled-blossom	NJ	-	0
Pearly mussel, turgid-blossom	NJ	-	0
Pearly mussel, white cat's paw	NJ	-	0
Pearly mussel, white wartyback	NJ	-	0
Pearly mussel, yellow-blossom	NJ	-	0
Pigtoe, fine-rayed	NJ	-	0
Pigtoe, rough	NJ	-	0
Pigtoe, shiny	NJ	-	0
Pocketbook, fat	NJ	-	0
Pocketbook, speckled	NE	-	0
Riffle shell, tan	NJ	-	0
Spinymussel, James	NJ	-	0
Spinymussel, Tar River	NJ	-	0
Stirrup shell	NJ	-	0
Amphipod, Hay's spring	J	3	0
Crayfish, [cave]	NJ	-	2c/4
Crayfish, Nashville	NJ	-	1a+d/3b
Crayfish, Shasta	NE	-	0
Isopod, Madison Cave	J	11	0
Isopod, Socorro	NE	-	0
Shrimp, Alabama cave	NJ	-	2c/4
Shrimp, California freshwater	NE	-	0
Shrimp, Kentucky cave	NJ	-	2c/4
Naucorid, Ash Meadows	NE	-	0

PESTICIDE PROFILE

PESTICIDE: Zinc phosphide TYPE: Rodenticide

USES CONSIDERED IN CURRENT OPINION: Rangeland

TERRESTRIAL SPECIES (Request Part 2):

	OPINION	RPA	IT/RPM
Plover, piping	NE	-	0
Tern, interior least	NE	-	0
Vireo, least Bell's	NJ	--	0

SECTION III - SPECIES PROFILE

The following section presents profiles of the listed species considered in this biological opinion, including their potential for exposure to pesticides, determinations of jeopardy/no jeopardy and incidental take statements with their accompanying reasonable and prudent measures. Actions required to preclude jeopardy (reasonable and prudent alternatives) and to reduce the likelihood of incidental take (terms and conditions of reasonable and prudent measures) are recorded under each pesticide profile in Section II of this opinion.

Note: Citations in the text of species accounts are maintained in the administrative history of this consultation.

SPECIES	PAGE

SPECIES PROFILE

The following species do not have separate species accounts, as it has been determined that they are not likely to be affected by any of the pesticides in request parts 1, 3, or 5 for the chemical uses considered in this opinion. No incidental take is anticipated or authorized.

Yaqui catfish*
Bonytail chub
Borax Lake chub
Mohavi tui chub
Owens tui chub
Pahranagat roundtail chub
Cui-ui
Ash Meadows speckled dace
Desert dace
Foskett speckled dace
Moapa dace
Pahrump killifish
Ash Meadows Amargosa pupfish
Devils Hole pupfish
Warm Springs pupfish
Beautiful shiner*
Big Spring spinedace
White River spinedace
Hiko White River springfish
Railroad Valley springfish
White River springfish
Speckled pocketbook
Shasta crayfish
California freshwater shrimp
Ash Meadows naucorid

* These fish are currently extirpated from the United States, however reintroductions are planned. The Agency will be provided advance notice of proposed reintroduction so that consultation on may affect pesticides can be addressed.

The grizzly bear and gray wolf (request part 3) are covered in the discussion on cancelled and suspended chemicals in the introduction to this opinion.

SPECIES PROFILE

SPECIES: Northern aplomado falcon (Falco femoralis septentrionalis)

ADDRESSED IN REQUEST PART 2

SPECIES/HABITAT DESCRIPTION:

The northern aplomado falcon presently is known to occur as a breeding bird only in southeastern Mexico. It formerly occurred in suitable habitat throughout eastern Mexico, southeastern Arizona, southern New Mexico, and western and southwestern Texas. The aplomado falcon is generally considered to be nonmigratory.

Typical habitat for the northern aplomado falcon is open woodland, savanna or open grassland. In the Chihuahuan desert, falcons lived in grasslands containing scattered mesquite and yucca (Yucca elata). On the gulf coastal plain of Texas and northeastern Mexico, aplomados nested in yucca and mesquite savannas. Its last known nesting in the United States occurred in Luna County, New Mexico in 1952. It has been sporadically sighted in southern Texas, New Mexico and Arizona since then, but there has been no further evidence of nesting in this country.

Food for the aplomado falcon consists of birds, insects, reptiles and small mammals. Observation of falcons and identification of prey remains indicate that birds comprise the bulk of dietary biomass (97 percent), while insects are consumed with greatest frequency (65 percent). White-winged doves, mourning doves, female great-tailed grackles, groove-billed anis and yellow-billed cuckoos are frequently taken in eastern Mexico.

The biggest threat to the survival of the northern aplomado falcon is the continued use of pesticides in Latin America. Habitats otherwise suitable for falcons are subject to the adverse impacts of organochlorine pesticides widely applied on agricultural lands where the falcons' avian prey reside or feed. Aplomados will continue to suffer pesticide-induced reproductive failure wherever they nest near areas of DDT application.

A secondary threat to the aplomado falcon is brush encroachment. Woody vegetation, such as mesquite and creosote, invade open grassland or savanna due to overgrazing, fire suppression or other disturbances. Such a decline of suitable habitat has been documented in Arizona, New Mexico and Texas.

Recovery measures include protection and improvement of habitat, captive breeding and releasing hacked birds into the wild, and monitoring population numbers and habitat conditions. Four young falcons have been hacked in south Texas each year since 1985. A total of eight birds were fledged successfully in 1986 and 1987 at Laguna Atascosa National Wildlife Refuge and have dispersed from the area. The refuge is the focal point of recovery efforts in the United States. Land types which adjoin the refuge include agricultural cropland and rangelands.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

As noted above, one of the principal reasons for the decline of aplomado falcons is the continued use of chlorinated hydrocarbon pesticides in Mexico and elsewhere in Latin America. Because of its persistence, bioaccumulation potential and subacute toxicity to birds through eggshell thinning and consequent reproductive failure, use of DDT and its derivatives has been banned for use in the United States. However, migratory birds do not observe international boundaries, and residues of DDT and DDE persist in wildlife on both sides of the border.

The use of pesticides in the United States also poses a risk to the aplomado falcon from mortality due to direct contact with pesticides and consumption of contaminated prey. Reproductive impacts may also occur due to the use of certain chemicals, such as dicofol, which contains residues of DDT, and has recently been shown to cause eggshell thinning in bird eggs.

Granular formulations of toxic chemicals are particularly hazardous to wildlife since granules can be taken as grit by nontarget birds. Wildlife die-offs have been confirmed from the use of granular formulations of pesticides, such as carbofuran and diazinon, and presumably could occur from use of other granular pesticides toxic to wildlife. Aplomado falcons could receive a disproportionately large dose of granular pesticides if prey which consume granules are made more susceptible to predation.

The aplomado falcon is associated with agricultural and rangeland cover types near its hacking site at Laguna Atascosa National Wildlife Refuge. Birds hacked on the Refuge may disperse and nest in the vicinity. Nest sites are usually found in yucca, mesquite and other low-growing shrubs. Falcons are likely to be exposed to chemicals registered for use on croplands and rangelands. Primary routes of exposure are by consumption of contaminated insects and birds and by direct exposure of adults, eggs and juveniles from direct application to nest sites on rangelands or drift from adjacent croplands.

Although the aplomado falcon's foraging range is reduced during the nesting period, its prey may range widely. For this reason, the Service recommends a prohibited use zone of 20 miles, extending outward from the boundary of Laguna Atascosa National Wildlife Refuge, for jeopardy insecticides and a 10-mile buffer for jeopardy vertebrate pesticides targeted at mammals and non-jeopardy pesticides.

The Service is unclear why the Agency requested consultation on certain chemicals or chemical clusters but not others. For example, the aplomado falcon inhabits cropland and rangeland cover types, but the Agency requested consultation only on chemicals registered for use on croplands, with the exception of strychnine, which the Agency specifically cited as potentially jeopardizing this species. The Service has confined its review to those chemicals for which the Agency requested consultation. It should be noted, however, that the aplomado falcon is susceptible to impacts from all pesticides registered for use on rangelands and croplands, and the Agency should initiate formal consultation with the Service on these chemicals.

It should be noted also that the Agency's exposure analysis model, which is based on the consumption of contaminated insects, may be inappropriate for the aplomado falcon, since the bulk of its dietary biomass consists of birds rather than insects. It is more likely that secondary poisoning would occur from avian prey which consumes contaminated insects, treated seed, leafy vegetation or pesticide granules. Nevertheless, the Agency model was used as an index of relative pesticide toxicity.

Toxicity data were provided for only 10 of the 25 chemicals for which consultation was requested. Our determination of jeopardy/no jeopardy for the 15 remaining chemicals was based on acute toxicity to comparable taxa, known application rates and formulations, predicted bioconcentration factors, and documented incidents of wildlife kills.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the coninued existance of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, camphechlor, carbofuran, chlorpyrifos, diazinon, dicrotophos, endrin, EPN, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fonofos, methyl parathion, mevinphos, oxamyl, phorate, strychnine.

Pesticides that may affect but are not likely to jeopardize the continued existance of the species are: acephate, aminopyridine, cloethocarb, endosulfan, isofenphos, oxyflourfen, paraquat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated</u>:

For these chemicals (azinphos-methyl, camphechlor, carbofuran, chlorpyrifos, diazinon, dicrotophos, endrin, EPN, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fonofos, methyl parathion, mevinphos, oxamyl, phorate, strychnine), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern:</u>

Given unrestricted use of any or all of the following chemicals, the Service expects an unquantified level of incidental take to occur: cloethocarb, endosulfan, isofenphos, oxyflourfen.

This level of take is unquantifiable for the following reasons: The chemicals listed above have low to moderate avian toxicity and bioaccumulation potential. The migratory prey species of this falcon could be contaminated and migrate from the source of comtamination into the occupied range of the falcon. These effects are likely to be sublethal, since neither the toxicity or bioaccumulation of the chemicals is likely to cause death.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Piping Plover (Charadrius melodus)

ADDRESSED IN REQUEST PART 2

SPECIES/HABITAT DESCRIPTION:

Piping plovers breed in three regions in North America; the Atlantic coast from Newfoundland to South Carolina, the beaches throughout the Great Lakes, and river systems and lakes of the Northern Great Plains from eastern Montana through southern Nebraska. This species winters along the coastal areas of Texas, Louisiana, Mississippi, Alabama, and Florida.

Breeding pair estimates for 1986-87 reveal 17 pairs in the Great Lakes (all in Michigan), 1258 to 1326 pairs in the Northern Great Plains of the United States and Canada, and 745 pairs on the Atlantic coast of the United States and Canada.

As stated in request part 2, plovers have been observed eating marine worms, fly larvae, beetles, crustaceans, molluscs, and other invertebrates. Piping plovers also have been observed eating grasshoppers and spiders in the grass near nest sites in Manitoba, Canada and Nebraska. As stated by the Agency, piping plovers feed primarily on exposed beach substrates. Adults have been noted foraging within 5 meters of the water's edge. It also has been reported that chicks tended to feed on firmer sand at greater distances from the shorelines than the adults.

Piping plovers breed in open, sparsely vegetated habitats. In north central North America, piping plovers nest on barren sand and gravel shorelines of the Great Lakes and along sand and gravel shores of rivers and lakes in the Great Plains.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

By letter of May 17, 1989, the Agency stated (page 55) that the crop pesticides listed on pages 48-49 of the request were intended for evaluation for the piping plover. Page 56 of that same letter states that the pesticides listed on Table 22 of the request were also intended for evaluation. The Agency further states that carbaryl and malathion were screened out because of the body weight determination. It appears that carbaryl and malathion were ruled out without taking other factors into consideration such as loss of food source, dermal toxicity and their actions as chloresterase inhibitors.

The Agency stated that both adult and young plovers may ingest insects contaminated with pesticides and pesticide runoff and direct application through spray drift or by accident would be expected to reduce the aquatic invertebrate population. If this occurs during nesting and raising of young, food could become scarce providing additional stress to the plovers.

Plovers could be expected to forage in nearby fields thus increasing their risk of exposure. Drinking water sources also can be expected to be contaminated either through direct application or runoff.

A single dose exposure scenario was applied, comparing the single lethal dose of a pesticide that will kill 50 percent of a test population of birds with the amount of pesticide potentially carried by an insect and subsequently eaten by an insectivorous bird such as a piping plover. The initial formula was used to determine the number of 100 mg insects (weight of a "typical" bee) it would take to reach 1/10 of the LD50. This assumes that the insect was sprayed directly and carries a maximum concentration of 58 ppm for each pound of pesticide active ingredient applied per acre. This weight of insects was then compared to 13 percent of the plover body weight to determine whether plover would be likely to consume that many insects per day. In other words, it is believed that adult piping plovers are likely to consume 13 percent of their body weight per day.

Additional impacts could include plovers receiving pesticides dermally if they are young and feathers have not developed. Plovers also could be expected to preen themselves and receive an oral dose of a pesticide.

Until further information is provided by the Agency, an insecticide is assumed to kill the terrestrial and/or aquatic food organisms of the piping plover. Little or no data were provided on chloresterase, dermal toxicity, or inhalation toxicty. Where insufficient data were provided, the Service has assumed worst case.

BIOLOGICAL OPINION:

[Note: The Atlantic Coast population of piping plovers is not addressed in this analysis as rangeland and crop uses are not anticipated in or adjacent to this population's habitat.]

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): acephate, aldicarb, azinphos-methyl, camphechlor, carbaryl, carbofuran, chlorpryifos, cloethocarb, diazinon, dicrotophos, disulfothion, endosulfan, ethoprop, ethyl parathion, fenamiphos, fensulthion, fonofos, isofenphos, malathion, methyl parathion, mevinphos, oxamyl, phorate.

Pesticides that may affect, but are unlikely to jeopardize the continued existence of the species are: aminopyridine, oxyfuorfen, paraquat, trichlorfon.

The remainder of the pesticides considered (sodium cyanide, strychnine, and zinc phosphate) are not likely to affect the piping plover because their use is not anticipated to occur in or adjacent to the species' habitat in such a way to impact the species.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (acephate, aldicarb, azinphos-methyl, camphechlor, carbaryl, carbofuran, chlorpryifos, cloethocarb, diazinon, dicrotophos, disulfothion, endosulfan, ethoprop, ethyl parathion, fenamiphos, fensulthion, fonofos, isofenphos, malathion, methyl parathion, mevinphos, oxamyl, phorate), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service expects an unquantified level of incidental take to occur: aminopyridine, oxyfuorfen, paraquat, trichlorfon.

This level of take is unquantifiable because of the difficulty of anticipating take of this species which occurs in numerous States and the lack of information on how much chemical use may be expected of these two chemicals on rangeland.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals (sodium cyanide, strychnine, and zinc phosphate), and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Wood Stork (Mycteria americana)

ADDRESSED IN REQUEST PART 4

SPECIES/HABITAT DESCRIPTION:

The wood stork occurs in the southeastern United States, breeding only in Florida, Georgia and South Carolina. It is a large, long-legged wading bird with a characteristically dark, unfeathered head and neck. Wood storks are birds of freshwater and brackish wetlands, primarily nesting in cypress or mangrove swamps and feeding in freshwater marshes, flooded pastures and flooded ditches. Particularly attractive feeding sites are depressions in marshes or swamps where fish become concentrated during periods of falling water levels. Their primary food is small fish 1-6 inches long which they capture by a specialized technique called grope-feeding. Wood storks can travel up to 50 miles from nesting to feeding sites and are dependant upon fluctuating water levels for both feeding and nesting. The major cause of decline of this species is loss of feeding areas and nesting failures due to human alteration of wetlands.

CONSIDERATION OF PROPOSED ALTERNATIVE

This species is addressed in part 4 of the request not to evaluate toxicities to certain chemicals, but to provide an additional reasonable and prudent alternative to preclude jeopardy to listed chemicals. The reasonable and prudent alternative provided by the Agency is to apply pesticide use limitations to identified wood stork rookeries but not to the foraging areas. This alternative is based on the fact that wood storks forage great distances from their rookeries and in a wide variety of habitats. While this is a true assumption, the Fish and Wildlife Service does not believe that just because a species is wide ranging and difficult to map, essential areas of its habitat should be eliminated from protection from pesticides. However, the Service also realizes that if all nesting and foraging areas were subject to pesticide use restrictions, the entire state of Florida and a large portion of Georgia would be restricted. Therefore, the Service is recommending another reasonable and prudent alternative to preclude jeopardy that is equitable and protects sufficient areas of wood stork habitat. This restriction is adopted by the Florida Task Force on Endangered Species and Pesticides and encompasses not only wood stork rookeries but also a portion of the feeding areas around the rookeries. These distributions usually extend outward 8 to 12 miles from the rookery. The Florida Task Force maps have been sent under separate cover, as have similar maps for Georgia and South Carolina.

BIOLOGICAL OPINION

While the Service is not adopting the proposed alternative provided by the Agency, it is providing a new reasonable and prudent alternative to preclude jeopardy (listed in Section II). Therefore, the pesticides listed as jeopardy for the wood stork in request part 4 remain as pesticides likely to jeopardize the continued existence of the species: acephate, aldicarb, avitrol, azinphos-methyl, carbofuran, chlorpyrifos, cloethocarb, diazinon, dichlorvos, dicrotophos, dinoseb, endosulfan, endrin, EPN, ethoprop, ethyl parathion, fenamiphos, fenthion, fonofos, isophenphos, methyl parathion, mevinphos, oxamyl, oxyflurofen, paraquat, phorate, temephos, toxaphene.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (acephate, aldicarb, avitrol, azinphos-methyl, camphechlor, carbofuran, chlorpyrifos, cloethocarb, diazinon, dichlorvos, dicrotophos, dinoseb, endosulfan, endrin, EPN, ethoprop, ethyl parathion, fenamiphos, fenthion, fonofos, isophenphos, methyl parathion, mevinphos, oxamyl, oxyflurofen, paraquat, phorate, temephos), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: California least tern (Sterna antillarum browni)

ADDRESSED IN REQUEST PART 3

SPECIES/HABITAT DESCRIPTION:

The least tern is a small marine bird that winters in Mexico and breeds along the ocean shore in southern California. The first birds appear in California in early to mid-April. Fall migration usually begins by August. Beaches, dunes, sandbars and spits on the ocean shore are the typical and preferred nesting habitat for the tern. Colonies are often located close to salt flats, saltmarshes and estuaries.

Foraging habitat encompasses any waters within two or three miles of a nesting site where small fish may be caught. The ocean (particularly near-shore waters), river mouths, saltmarshes, marinas, river channels, lakes and ponds are all used for foraging. The staple diet of least terns is small fish; they have not been observed eating any other food. Species favored seem to be topsmelt, northern anchovy, shiner perch, and jacksmelt. During nesting, adults forage nearby and return to feed the chicks smaller specimens but not different species of fish.

Current limiting factors include lack of suitable nesting areas, and human disturbances at remaining nest sites, severe predation at certain nesting locations, and periodic food shortages.

CONSIDERATION OF PROPOSED ALTERNATIVE:

Near-shore foraging for fish indirectly exposes terns to pesticides that may runoff from agricultural areas. You have specifically requested review of six pesticides used for mosquito larvicide control (fenthion, ethyl parathion, methyl parathion, temephos, chlorpyrifos, and dichlorvos). Dichlorvos was not included in the cluster biological opinion dated October 25, 1983, that evaluated mosquito larvicides. Because pesticides are likely to enter the water first, the Agency predicted aquatic concentrations up to 147 parts per billion (ppb) versus a minimum avain LC-50 of 300ppb (3ppm). Table 20 from part 2 provides this data. The Agency also cites the probable lack of bioaccumulation for all chemicals except chlorpyrifos as a basis for the conclusion that, presumably, five of the six chemicals will not cause toxicity to least terns.

The Service is unable to concur totally with this interpretation of data or the Agency's conclusions regarding these chemicals. Chemical fact sheets (Section V) highlight other relevant factors. Chlorpyrifos, fenthion and ethyl parathion are extremely toxic to fish, the food supply for terns (LC-50 as low as 2.4ppb for chlorpyrifos). Fenthion and chlorpyrifos have caused bird kills when used at label rates (Section V). Ethyl parathion has caused unintended wildlife die-offs also (4). The Service believes that considerable weight must be given to this historic record as compared to the Agency's theoretical calculations. There is agreement, however, that temephos, dichlorvos and methyl parathion are not of concern given their toxicity to birds and fish, environmental persistence and bioaccumulation potential.

While empirical evidence of chronic and widespread pesticide poisoning in least terns is not available, one deformed chick has been recovered from a nesting colony in southern California (Copper, pers. comm.) The tern population is so low that we do not know if one such recovery is significant or if this one instance is pesticide related. However, the Service is not prepared to conclude that pesticides will not affect terns based on a lack of data. Terns are known to forage in areas and at times when mosquito larvicides are being applied to saltmarsh environs. It is not inconceivable that terns would directly ingest pesticides, via drinking water, immediately after application and thus acquire concentrations considerably greater than estimated (diluted) concentrations. In addition, contaminated forage fish may be fed to tern chicks resulting in toxicities and impacts greater than expected for adult birds alone.

BIOLOGICAL OPINION:

Existing jeopardy calls will stand for chlorpyrifos, ethyl parathion, and fenthion. Previous biological opinions for all other chemicals not addressed in this opinion, that may affect the California least tern, remain unchanged.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

> For these chemicals (chlorpyrifos, ethyl parathion, fenthion) if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Interior least tern (Sterna antillarum)

ADDRESSED IN REQUEST PART 2

SPECIES/HABITAT DESCRIPTION:

The interior population of the least tern nests on gravel and sand shores of lakes and on riverine systems through the central United States from central North Dakota along the Missouri River and south into Texas. A few birds also have been found in northeast Montana in Valley County.

The current breeding distribution of this subspecies extends along the Yellowstone River in western North Dakota, the Missouri River in northeast Montana (Charles M. Russell National Wildlife Refuge), North Dakota, South Dakota, western Iowa, and northeastern Nebraska; the Cheyenne River in western South Dakota; the Niobara River in north-central Nebraska; the Platte and Loup Rivers in central Nebraska; Cheyenne Bottoms Wildlife Management Area and Quivera National Wildlife Refuge in central Kansas; the Cimarron River in southern Kansas and northern Oklahoma; Optima National Wildlife Refuge in northeast Oklahoma; Salt Plains National Wildlife Refuge in north central Oklahoma; Canadian and Red Rivers in northern Texas; Bitter Lake National Wildlife Refuge in eastern New Mexico; and the Rio Grande and Pecos Rivers (including Falcon and Amistad Rivers) in south central Texas.

Additional breeding distribution includes the Arkansas River in central Arkansas and the Mississippi River in eastern Arkansas, northwest Mississippi, southeast Missouri, western Tennessee, western Kentucky, and southern Illinois. In 1985, 322 interior least tern pairs were known to nest in the Great Plains riverine system and 742 pairs nested elsewhere in the central United States. In 1987, the total number of interior least terns reached 4,500. Increased censusing efforts during the past four years probably account for the difference between the 1987 census and earlier surveys.

Interior least tern populations have declined as a result of alterations of habitat. Shoreline, bank, and channel alterations from the construction of locks, dams, dikes, levees, and reservoirs have resulted in the loss of tern habitat. Habitat also is being lost to increasing development (both rural and agricultural), recreational uses (such as boating and off-road vehicles), and natural erosion. Predation of chicks, human and domestic pet harassment, trampling by grazing cattle, and flooding during the nesting season are other factors which have contributed to nesting failures.

Pollution (from all sources including pesticides) and its affect on water quality, aquatic habitat, and small fish populations (the terns primary food source) can limit the amount of suitable foraging habitat available to these birds. Good quality foraging areas are often a limiting factor, especially when selecting for breeding sites. Pollution and its effect on water quality and aquatic habitat can negatively impact small fish populations and thus affect least tern populations.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Both rangeland and crop use of pesticides could impact the interior least tern in several ways. The information provided by the Agency states that pesticides could enter the aquatic habitat through drift and runoff. The Agency also states that resulting residues in fish would be well below concern level for birds feeding on those fish, except for pesticides that may bio-concentrate in fish. According to the Agency, chlorpyrifos is the only still registered pesticide to impact the tern through bio-concentration. It also is our understanding that camphechlor, endrin, EPN, fonophos, and possibly endosulfan may have a high potential for bio-concentration but this is not mentioned by the Agency.

A fish kill, as a result of use of the 30 pesticides used on crops and rangeland and listed in request part 2, could severely reduce the terns' food supply. This would, in turn, cause stress of feeding hatchlings as well as the adults depending on the size of the fish kill. The Agency provides no hazard ratios for terrestrial species. In some cases (e.g. cloethocarb), no toxicity data on birds is provided. As discussed for the piping plover but not the tern, drift of pesticides could impact young birds while older birds would be expected to preen themselves and receive oral doses of pesticides. Drift of pesticides on nesting colonies of terns could have an extremely adverse impact on that colony.

The pesticide uses that may occur in the vicinity of the interior least tern include rangeland, corn, wheat, sorghum, soybeans, oats, barley, and rye. As stated above, very little information was provided by the Agency on pesticides in part 2. Part 1 provided some aquatic information on some but not all of the pesticides covered in part 2. Most of the pesticide use for the 30 pesticides are for crops, and only acephate, methyl parathion, paraquat, trichlorfon, sodium cyanide, strychnine, and zinc phosphide of the 30 pesticides are registered for use on rangeland. From the information that was provided by the Agency, it would appear that use of most of the pesticides could result in mortality to the food source of the tern (fish). In addition, some of the pesticides including aminopyridine (avitrol), azinphos-methyl, camphechlor, carbofuran, chloropyrifos, diazinon, dicrotophos, dinozeb, endrin, EPN, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fonofos, isofenphos, methyl parathion, mevinphos, oxamyl, and oxyfluoren could directly impact the terns themselves since most of these pesticides appear to be toxic to birds.

While exposure is possible, based on the wide range of the species, including numerous breeding colonies on Federal and State lands, the Service believes that the use of the above pesticides is not likely to jeopardize the continued existence of the population of interior least terns.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species, are: acephate, aldicarb, aminopyridine, azinphos-methyl, camphechlor, carbofuran, chlorpyrifos, cloethocarb, diazinon, dicrotophos, endosulfan, endrin, EPN, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fonophos, isofenphos, methyl parathion, mevinphos, oxamyl, oxyfluoren, paraquat, phorate, trichlorfon.

The remainder of the pesticides considered (sodium cyanide, strychnine, and zinc phosphate) are not likely to affect the interior least tern because their use is not anticipated to occur in or adjacent to the species' habitat in such a way to impact the species.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, aminopyridine, azinphos-methyl, camphechlor, carbofuran, chlorpyrifos, cloethocarb, diazinon, dicrotophos, endosulfan, endrin, EPN, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fonophos, isofenphos, methyl parathion, mevinphos, oxamyl, oxyfluoren, paraquat, phorate, trichlorfon.

This level of take is unquantifiable because of the difficulty of anticipating take of this wide ranging species and the lack of information provided by the Agency on each chemical thus making it exceedingly hard to predict the chances and levels of take that may occur. Terns certainly could be taken by pesticide drift into tern colonies but the Agency has not provided sufficient information to attempt to make such a determination of the amount of take anticipated.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals (sodium cyanide, strychnine, and zinc phosphate) and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Least Bell's vireo (Vireo belli pusillus)

ADDRESSED IN REQUEST PART 2

SPECIES/HABITAT DESCRIPTION:

Most of the remaining breeding least Bell's vireos in the U.S. occur in San Diego County where suitable habitat remains and includes the riparian zones of: Jamul and Dulzura Creeks in the San Ysidro Mountains, the Tijuana River near the city of Imperial Beach, the San Diego River near Mission Dam and El Cajon Reservoir, Tecolote Canyon near Bay Parks, Santa Ysabel Creek, Agua Hedionda Creek, the San Luis Rey River at several sites from the mouth to Lake Henshaw, the Santa Margarita River on Camp Joseph H. Pendleton Marine Corps Base, Pilgrim Creek, the Sweetwater River in the vicinity of the Sweetwater Reservoir upstream to Loveland Reservoir, and Anza Borrego Desert State Park drainages (Coyote Creek, Sentenac Canyon, Hellhole Canyon, Indian Canyon, Borrego Palm Canyon, San Felipe Canyon and Vallecito Creek).

Riverside County areas where the vireo was found in a 1986 spring census include portions of the Santa Ana River, Mill Creek, and Temescal Creek near the Prado Basin, Temescal Creek near Lake Elsinore, San Timoteo Canyon near the City of Redlands, and Andreas, Palm, Chino, and Murray Canyons near Palm Springs. Big Morrongo Canyon, the Mohave River and Fort Piute Canyon in the eastern Mohave Desert comprise the known locales in San Bernardino County. Vireos have been found in three localities in Inyo County: Shoshone Creek, China Ranch and Resting Springs. Portions of the Santa Clara River in Ventura and Los Angeles Counties contain vireos. Two other Los Angeles County locales were occupied - San Francisquito Canyon and Whittier Narrows. All vireos in Santa Barbara County occur in the vicinity of the Gibralter Reservoir and Mono Basin of the Santa Ynez drainage. This vireo is also known from Orange County in Aliso Creek. Recent sightings (1984) on the Salinas River suggest that the range of the vireo may extend into San Luis Obispo and Monterey Counties. Many creeks and rivers within the vireos present range contain suitable, riparian habitat, but are unoccupied by the species. These drainages should be considered as possible locations for this species.

Federal lands on which the least Bell's vireo is known to occur include the Los Padres National Forest; the Bureau of Land Management, California Desert District, Barstow Resource Area; the Pala Indian Reservation, and the Agua Caliente Indian Reservation (San Bernardino, Riverside Counties). Vireos may also occur on Vandenberg Air Force Base (Santa Barbara County) and La Jolla Indian Reservation.

Formerly the range occupied by least Bell's vireo was much larger, extending from Tehama County, California, south to northern Baja California, Mexico. Most (if not all) drainages in the Central Valley contained vireos. Many areas in Inyo County also were occupied. The decline of the least Bell's vireo has been attributed to a number of factors. Habitat losses have been due to agricultural developments, livestock grazing, urban expansion, flood control projects and reservoir and flood control basin developments. Each of these incrementally destroys riparian nesting habitats. The use of pesticides in agriculture, road maintenance, and flood control projects is also a threat to the vireo.

The least Bell's vireo is vulnerable to brood parasitism by the brown-headed cowbird, and this has been responsible for reduced nesting success at most existing locales of the vireo. Some areas which contain vireos are near urban areas, consequently there may be an increased predator population of feral house cats.

Activities adversely impacting the vireo that need to be controlled include sand and gravel mining; the spread of pollutants; some agricultural practices (e.g., grazing and land clearing); road maintenance actions (e.g., rebulldozing roads and herbicide spraying); the use of off-road vehicles; and stream bank or channel modification. The water table in reservoirs and in areas subject to agricultural use needs to be maintained to preserve riparian vegetation. Captive propagation for reintroduction may be a useful tool (12). Control of pesticides is specifically mentioned as a necessary recovery task.

Ongoing recovery actions include cowbird trapping programs on several drainages and monitoring the status of the species. In 1988, all vireo populations increased where cowbird nest parasitism was actively controlled. Efforts to design Habitat Conservation Plans for key drainages are also underway.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Although not an aquatic species, you have advanced an argument for re-evaluation of cropland, range, forest use, and mosquito larvicidal chemicals based on a dietary concentration evaluation, essentially a secondary poisoning line of reasoning (8). You have compared the single lethal dose of a chemical that will kill 50 percent of a test population (of birds) with the amount of pesticide potentially carried by an insect (presumably a sub-lethal dose), which is subsequently eaten by an insectivorous bird. You have calculated the number of standard weight (100 mg.) insects, each carrying 58 ppm of a pesticide, that would need to be consumed by a vireo to reach 1/10 of the LD50 (for birds). This number (weight) of insects was subsequently compared to 30 percent of the vireo body weight to determine whether a vireo would be likely to consume that many insects per day. (Vireos are believed to consume about 30 percent of their body weight per day.)

This analysis requires a number of assumptions that are difficult, at best, to accept. Among these are:

- Insects dosed at 58 ppm survive to become food for vireos. Lethal doses for aquatic crustaceans rarely exceed 1 ppm (LC50)(8).

Terrestrial insects would not likely differ in their LD50 values from related aquatic species.

- Vireos contact pesticides only indirectly via their food. They do not receive direct contamination from spraying or other application.

- Vireos eat only fully dosed insects at a level equal to 30 percent of their body weight per day. They consume no other "clean" food.

- Pesticide residues in vireos dissipate to zero and no ill effects remain before the beginning of the next feeding session (next day). Carbamate and organochlorine pesticides exhibit some toxicity reversibility, whereas, organophosphate pesticides often do not (Turner, pers. comm.).

The Agency's analysis estimated only a level of pesticide poisoning that would likely result in an observable effect on vireos (i.e., 1/10 LD50). At this level the Agency concluded only that a product may affect a listed species.

The recovery plan for the vireo calls for restrictions on pesticide uses as one element to aid in recovery and delisting of the species (12). The Service believes that only those chemicals displaying the greatest threat need be controlled at this time. Accordingly, those chemicals that exceed 1/10 LD50 for birds at less than 10 percent of the body weight of the vireo, as opposed to the Agency's threshold level of less than 30 percent of body weight, pose a sufficient threat to rise to the level of jeopardy to the species.

Three chemicals from part 2 of the request, EPN, endrin, and toxaphene, are indicated as "Discontinued Use" and no data are given in Table 20 on which to render a biological opinion. At this time, the Service is not prepared to concur that discontinued pesticides will not affect listed species (see discussion of cancelled chemicals in the introduction to this biological opinion). Therefore, biological opinions regarding the effects of these pesticides are based on a comparison with those chemicals in Table 20 otherwise found to jeopardize the vireo.

EPN and endrin both exhibit very high toxicity to birds with LD50's in the 1-10 ppm range which is characteristic of all of the other chemicals that jeopardize the vireo. EPN is noted as having a high bioaccumulation potential. Endrin is extremely toxic to birds, fish and other aquatic species.

Camphechlor (toxaphene) is less toxic to birds (LD50 of 10-70 ppm). However this product is known to limit reproduction of quail and pheasants in test situations. It also displays a high degree of bioaccumulation and is highly persistent in the environment.

Data were not provided for four other chemicals (dalapon, demeton, fensulfothion and linuron) from Table 20. To ignore these chemicals would be to grant a <u>de facto</u> "no affect" finding which is not appropriate under the circumstances. Determinations of jeopardy/no jeopardy were based on LD50's or other toxicity data available for birds.

To provide a level of consistency the Service also has evaluated all chemicals strictly on the basis of acute toxicity, bioaccumulation and other factors pertinent to individual chemicals (Sevtion V). Jeopardy was determined for four additional pesticides on this basis (methyl parathion, chlorpyrifos, fenthion, and dichlorvos).

Four chemicals from part 2 were not listed in Table 20 (cloethocarb, paraquat, sodium cyanide, strychnine). No pertinent data were provided for cloethocarb. However, as this insecticide is highly persistent and may reduce food supplies for the vireo, a jeopardy determination was made.

Paraquat dichloride, a herbicide, displays a very low toxicity to birds and is not likely to affect vireos. Sodium cyanide and strychnine are primarily rodenticides used in burrows either as a fumigant or treated grain or other bait. Neither product should attract vireos and thus exposure would be precluded.

Any reasonable and prudent alternative to eliminate jeopardy must recognize that riparian zones are, at best, indistint and can vary as stream courses change with floodflows and time. Thus a blanket restriction of pesticide applications on riparian vegetation or within the "riparian zone" will yield ambiguities. Further, restrictions tied to riparian zones alone could encourage destruction of riparian vegetation thereby exascerbating an already serious cumulative effect on this species. Thus prohibited use zones are established relative to the edge of agricultural fields (in appropriate areas depicted on bulletin maps).

In an effort to reduce the scope and effect of this otherwise broad restriction, it will apply only on a seasonal basis and does not apply along common borders between agricultural fields.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbofuran, camphechlor, cloethocarb, demeton, diazinon, dicrotophos, endrin, EPN, ethyl parathion, fenamiphos, fensulfothion, methyl parathion, mevinphos, oxamyl.

Pesticides that are not likely to jeopardize the continued existence of this species through its food supply are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, dalapon, dichlorvos, dicofol, diflubenzuron, dimethoate, diquat dibromide, disulfoton, diuron, endosulfan, ethion, ethoprop, fenitrothion, fenthion, fenvalerate, fonofos, isofenphos, linuron, malathion, mancozeb, methidathion, methomyl, methoprene, naled, nitrapyrin, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenofos, propachlor, propargite, propazine, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, temophos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin. However, some of these chemicals could affect vireos outright if the birds experience direct exposure.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbofuran, camphechlor, cloethocarb, demeton, diazinon, dicrotophos, endrin, EPN, ethyl parathion, fenamiphos, fensulfothion, methyl parathion, mevinphos, oxamyl), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Red-cockaded woodpecker (Picoides borealis)

ADDRESSED IN REQUEST PART 4

SPECIES/HABITAT DESCRIPTION:

The red-cockaded woodpecker occurs throughout the southeast. Its basic habitat requirement is for open stands of pines/pine hardwoods with a minimum age of 30 years. Dense stands, stands that are primarily hardwoods, or that have a dense understory are avoided. The species feeds primarily on insects. Cavity excavation for roosting almost always occurs in living pines. A cavity tree area, which includes the nest cavity tree and other cavities is referred to as a colony. Foraging area for a colony may range from 100 acres in excellent habitat to 1000 acres in areas of poor habitat. The average home range for a clan (family unit) is 200 acres. The major cause of decline for this species is the change in forestry management practices that favor short-term rotations and a subsequent decline in old-age pine trees.

CONSIDERATION OF PROPOSED ALTERNATIVE:

This species is addressed in part 4 of the request not to evaluate toxicities to certain chemicals but to provide an additional reasonable and prudent alternative to preclude jeopardy to listed chemicals. The reasonable and prudent alternative proposed by the Agency is for applicators of the listed jeopardy pesticides to conduct a survey for red-cockaded woodpecker colonies prior to using these pesticides in forests containing pine trees over 30 years old. If any colonies are found, use of the listed pesticides should be prohibited within 100 yards of the colony trees.

While the Fish and Wildlife Service believes that a reasonable and prudent alternative of this nature could be applied to the red-cockaded woodpecker, it recommends that several changes be made to the alternative. The alternative should read as follows: Applicators of the listed forestry use pesticides will be required to conduct a survey for red-cockaded woodpecker colonies prior to using these pesticides in forests containing pine trees over 30 years old. If any colonies are found, use of the listed pesticides will be prohibited from the colony site including at least a 200 foot buffer around the perimeter of all woodpecker trees (ie: start holes, inactive and active trees). This prohibited zone shall be no less than 10 acres. Extending one half mile form this prohibited zone, the listed forestry use pesticides shall be used only as spot treatment or direct application to affected trees. Surveys conducted up to five years prior to application would be acceptable, except in the case of an apparently abandoned colony. If survey results indicate an abandoned colony, a search shall be conducted that encompasses an area of a 1 mile radius from the edge of the trees that comprised the abandoned colony.

BIOLOGICAL OPINION

While the Service is not adopting the proposed alternative provided by the Agency, it is providing a new reasonable and prudent alternative to preclude jeopardy (listed in Section II). Therefore, the pesticides listed as jeopardy for the red-cockaded woodpecker in request part 4 still remain as pesticides likely to jeopardize the continued existence of the species: acephate, aminocarb, azinphos-methyl, fenitrothion, methyl parathion, trichlorfon.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (acephate, aminocarb, azinphos-methyl, fenitrothion, methyl parathion, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)

ADDRESSED IN REQUEST PART 2

SPECIES/HABITAT DESCRIPTION:

The New Mexican ridge-nosed rattlesnake occurs in the Animas Mountains, Hidalgo County, New Mexico, and in the Sierra San Luis in Chihuahua, Mexico. In the Animas Mountains, the species has been observed in Indian Creek Canyon and vicinity, Bear Canyon and Spring Canyon. The known occupied habitat of the species is on private lands and covers an area of two square miles or less. It may also occur in the Peloncillo Mountains, Hidalgo County, where a specimen believed to be *C. w. obscurus* was taken; its taxonomic status is being investigated.

The New Mexican ridge-nosed rattlesnake is most frequently found in canyon bottoms between 5600 and 8000 feet in elevation in habitats dominated by pine, oak and associated trees, shrubs, forbs and grasses. In total this combination of elements occupies, at most, a few thousand acres in the Animas Mountains. Winter retreats are probably talus areas and other labyrinthine formations. In warm weather, the rattlesnake is frequently found in or near vegetated areas, which provide shade, a stable temperature regime and concealment from both predators and prey. It is not known to what extent it utilizes existing rodent burrows for shelter; however, other members of this genus are sometimes found in burrows.

Lizards appear to be its chief prey, with lesser numbers of small mammals, birds, and even invertebrates being taken on occasion. The most frequently recorded prey species include Yarrow's spiny lizard and the Arizona alligator lizard. The brush mouse, Wilson's warbler and rufous-crowned sparrow have also been recorded as prey. There is limited evidence to support the thesis that the ridge-nosed rattlesnake feeds on carrion.

The New Mexican ridge-nosed rattlesnake is listed as a Federally threatened species because of its limited range, vulnerability and past excesses of collection. The greatest threat to the species is loss of habitat in the Animas and San Luis Mountains due to excessive livestock grazing, development, off-road vehicle use, pollution, mining, timber harvesting and other factors. Collecting has had a significant impact on the species, due to the direct loss of individuals from the population, as well as the destruction or alteration of suitable habitat by collection efforts.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The New Mexican ridge-nosed rattlesnake, like other members of its genus, seeks out holes, crevices, rock overhangs and perhaps animal burrows to escape from predators, as well as extremes of heat and cold. This secretive habit makes it potentially vulnerable to adverse impacts from the use of burrow fumigants within its occupied range. For this reason it would be prudent to prohibit the use of fumigants in habitat where the ridge-nosed rattlesnake is known to occur.

It is probably less vulnerable to pesticides applied above ground. It would be most vulnerable to pesticides with high inhalation toxicity but less vulnerable to contact toxicants due to the relative impermeability of its skin. Secondary poisoning from insecticides is possible, also, since its principal prey are insectivorous and may eat contaminated insects and concentrate low environmental residues of these chemicals. Bioaccumulation potential for acephate, diazinon and trichlorfon is low, while methyl parathion has moderate bioaccumulation potential with a predicted bioconcentration factor of less than 100. Although it is unlikely that levels of pesticides ingested through contaminated prey would be acutely toxic to the ridge-nosed rattlesnake, it could adversely affect the species by reducing its prey base, its ability to elude predators, combat parasites and disease, or reproduce successfully.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its designated critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): aluminum phosphide, gas cartridges, magnesium phosphide.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its designated critical habitat are: acephate, diazinon, methyl parathion, trichlorfon.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (aluminum phosphide, gas cartridges, magnesium phosphide), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, diazinon, methyl parathion, trichlorfon.

This level of take is unquantifiable for the following reasons: affected individuals are likely to seek refuge in holes, burrows, crevices, under leaf litter or in some inaccessible place, making accurate assessment of direct mortality impossible. Incapacitation by pesticides could render the ridge-nosed rattlesnake more susceptible to predation or reduce their ability to hunt or reproduce.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Eastern indigo snake (Drymarchon corias couperi)

ADDRESSED IN REQUEST PART 3

SPECIES/HABITAT DESCRIPTION:

The eastern indigo snake occurs throughout peninsular Florida, the coastal plain of Georgia and possibly coastal Alabama. In the northern portion of its range, it inhabits xeric habitats supporting populations of gopher tortoises. In peninsular Florida, the snake may be found in all terrestrial habitats. However, it is usually associated with gopher tortoise habitats. Characteristics of gopher tortoise habitats include dry, well-drained soils, a partially open canopy, with diverse herbaceous cover. Examples of tortoise habitat types include sandhills, pine-flatwoods, scrub, zeric hammock and beach dunes.

This snake is a generalized predator that will eat any vertebrate small enough to be overpowered.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The eastern indigo snake does not eat carrion regularly and is not expected to ingest small animals contaminated by pesticides. Additionally, the eastern indigo snake does not inhabit areas of high agricultural use, and is not expected to come into direct contact with many agricultural pesticides. However, three of the seven chemicals being reviewed are often used as burrow fumigants and could have a direct impact on the species.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): aluminium phosphide, gas cartridges, magnesium phosphide.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species, are: acephate, diazinon, methyl parathion, trichlorfon.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals, if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: San Marcos salamander (Eurycea nana)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

The San Marcos salamander occurs in the San Marcos River in the vicinity of San Marcos, Hays County, Texas. The San Marcos River arises in a series of springs along the Balcones Fault Zone. The second largest spring system in Texas, the San Marcos springs have historically exhibited the greatest flow dependability and environmental stability of any spring system in the southwestern United States. The San Marcos Spring ecosystem, including its spring run, the San Marcos River, has a greater known diversity of aquatic organisms than any other ecosystem in the Southwest. Many of the species found here are endemic and restricted to a few kilometers of the spring run.

The San Marcos salamander is found in Spring Lake, created by the San Marcos River not far from the headsprings. Its habitat is composed of sand and gravel substrate interspersed with large limestone boulders and concrete covered with aquatic moss and algae. Habitat requirements include clean, clear flowing water, vegetative cover, and a food supply of living invertebrates.

The San Marcos ecosystem is in a precarious situation due to a variety of factors, including increased human use of aquifer waters, increased urbanization in the San Marcos region, resulting in increased pollution, recreational use and alteration of the river.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Pesticides have been identified as potentially causing adverse impacts to the San Marcos salamander. Controlling or restricting the use of pesticides has been suggested as one means by which to promote its recovery. Because of the urban land use in the immediate vicinity of San Marcos and the prevalence of rangeland cover types in the surrounding area, including the recharge zone of the Edwards Aquifer, we find that the potential exists for exposure of the species to rangeland pesticides and mosquito larvicides. For rangeland pesticides, probable routes of exposure are runoff within the surface drainage basin and percolation from the aquifer recharge area. Table 18 was used for hazard ratios of chemicals for which a stream model was available. Table 14 was used for all other rangeland chemicals. For larvicides, direct application and drift are the most likely routes of exposure (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, captan, methomyl.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (atrazine, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon) if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, captan, methomyl.

This level of take is unquantifiable for the following reasons: The characteristics of the salamander's habitat limit the likelihood of recovering any specimens.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Santa Cruz long-toed salamander (Ambystoma macrodactylum croceum)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Santa Cruz long-toed salamander was discovered in 1954 at Valencia Lagoon, Santa Cruz County, California. Only six breeding localities in Santa Cruz and Monterey counties are known. Three of these in Santa Cruz County are Valencia Lagoon, Rio Del Mar, Ellicott Pond, and Seascape Pond. Valencia Lagoon and many lots in the surrounding hillside are owned by the State of California. Ellicott Pond and a surrounding 30 acres of land is owned by the State of California. An additional 124 acres adjacent to this property is owned by the U.S. Fish and Wildlife Service. Together, Valencia Lagoon and the area at Ellicott Pond comprise the Santa Cruz long-toed salamander Ecological Reserve administered by Ellicott Slough National Wildlife Refuge. The three known localities for this salamander in Monterey County are McClusky Slough, Struve Pond, north of Moss Landing, and Moro Cojo Slough, east of Moss Landing.

Principle factors affecting mortality of Santa Cruz long-toed salamanders are weather, available habitat, natural enemies, disease and longevity, and activities of man. During the terrestrial phase of its life, the Santa Cruz long-toed salamander inhabits oak-chaparral woodlands with dense understory and abundant burrows. At Ellicott Slough, juveniles may also spend the summer in the willow grove to the east of the pond. During the larval stage, and while breeding, salamanders utilize temporary ponds. The temporary ponds are shallow with persistent, emergent and submerged vegetation. The salamanders attach their eggs to the vegetation. The vegetation also provides cover and foraging areas for the larvae. The presence of numerous homes on the western portion of the ridge at Valencia Lagoon limits available habitat.

Juvenile salamanders may spend their first summer in the ground under the dried pond and the phreatophytic vegetation and edge detritus surrounding it. When the fall rains come they migrate to the oak woodlands. In terrestrial habitat the salamanders live in burrows of tunneling mammals and other ground dwelling animals, and in the root systems of plants.

Populations in Monterey County are located adjacent or near roads. Maintenance or improvement of these roads could impact the species.

The adult Santa Cruz long-toed salamander eats insects (spring-tails, flies, mosquitos, crickets, grasshoppers, caterpillars, beetles, centipedes, pill bugs, earthworms, snails and slugs). The young eat insects (midges, water-boatmen, beetles, and insect larvae), copepods, ostracods, snails, leeches, annelid worms, and salamander and frog larvae.

Salamanders annually migrate distances up to 1.3 km (0.8 miles) between the terrestrial habitat and winter breeding grounds. Salamanders leave their terrestrial retreats and migrate to the breeding pond at the on-set of the first rains in late September and October. They travel only on misty, foggy, or rainy nights. Their routes follow hillside gullies. They arrive at the breeding pond from November to February with the majority of them arriving in January and February. Once they finish breeding they return to their terrestrial habitat.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The State of California has prepared a special report detailing the agricultural activity immediately surrounding Monterey County salamander habitats and listing the chemicals used (20). (Several chemicals listed in that report were not a part of the Agency's request and are not evaluated here.) These chemicals, identified by the State, are probably used in the vicinity of the Santa Cruz County habitats as well. Thus, the focus of the Service's concern is not limited to the rangeland chemicals previously considered (Rangeland Cluster Opinion, 12/11/84).

The nature of the small, shallow ponds utilized by salamanders during breeding matches Agency modeling for hazard ratios in a 1-acre pond, 0.5 feet deep (Tables 11 and 12). For many chemicals, hazard ratios are exceedingly high (up to 26,000 times the threshold effects level). Risk assessments indicate a high potential for adverse effects for all chemicals used in the vicinity of salamander habitat except acephate, phosphamidon, and methyl parathion. This compares well with the State's own assessment based primarily on the toxicity of the chemicals to test animals (20).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, captan, carbaryl, diazinon, endosulfan, ethyl parathion, fonofos, malathion, methomyl, naled, permethrin, trichlorfon.

The State has outlined a tentative proposal for periodic controls on certain more toxic pesticides recognizing the amphibious and migratory nature of the salamander (20). This draft proposal is limited to Monterey County habitats. The Service has not attempted to craft as intricate a program of restrictions because a sufficiently detailed understanding of agricultural practices in the immediate vicinity of all pertinent habitats in both Monterey and Santa Cruz Counties was not available. The State's intent to prepare a detailed specific plan to implement restrictions notwithstanding, the Agency should proceed to include Santa Cruz and Monterey Counties in their endangered species program, preparing County bulletins depicting prohibited use zones surrounding all recognized salamander habitats of not less than 20 yards for ground application and 100 yards for aerial application. Such restrictions would apply to all chemicals that jeopardize the Santa Cruz long-toed salamander. At such time as the State presents an acceptable alternate plan, the Service will evaluate it in terms of reasonable and prudent alternatives and measures.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, methyl parathion, phosphamidon.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat or their toxicity levels are insignificant.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and incidental take is anticipated:

For any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: atrazine, azinphos-methyl, captan, carbaryl, diazinon, endosulfan, ethyl parathion, fonofos, malathion, methomyl, naled, permethrin, trichlorfon.

This level of take is unquantifiable for the following reasons: Based on the extreme toxicity of many chemicals considered and the intensity of use in proximity to salamander habitats, both upland and aquatic, the Service anticipates incidental take associated with routine, authorized chemical applications. However, it will be impossible to quantify the expected level or impact of such incidental take. This secretive and largely nocturnal species is not likely appear to be affected by chemicals or to be recovered if lost due to pesticide applications in its intensely agricultural range.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individual Santa Cruz long-toed salamanders be incidentally taken in connection with chemical applications and subsequently recovered, remains should be chilled (or preferably frozen) and immediate contact made with California Department of Fish and Game at (916) 355-0842 to obtain further instructions.

SPECIES PROFILE

SPECIES: Texas blind salamander (<u>Typhlomolge rathbuni</u>)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

The Texas blind salamander occurs in the vicinity of San Marcos, Hays County, Texas. This species is aquatic throughout life, living in interconnected, water-filled cavernous areas in the San Marcos pool of the Edwards Aquifer. Most of its 10,000-hectare range is located directly below the City of San Marcos. Surface lands are primarily mixed urban development and herbacous rangeland.

The salamander travels along ledges and occasionally swims in deep pools. Adults feed on invertebrates such as palaemontid shrimp and amphipods, while juveniles feed on smaller invertebrates such as copepods. Both feed on hydrobid snails.

Primarily reasons for its decline include urban pollution, water drawdown, over-collecting and spelunking. Survival of the species is tied to the continued quality of the Edwards Aquifer. Controlling or restricting the use of pesticides has been suggested as one means by which to promote the recovery of the Texas blind salamander.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Because of the urban land use in the immediate vicinity of San Marcos and the prevalence of rangeland cover types in the surrounding area, including the recharge zone of the Edwards Aquifer, the potential exists for exposure of the species to rangeland pesticides and mosquito larvicides. Due to its association with underground pools of the Edwards Aquifer, probable routes of exposure are percolation into the aquifer from the San Marcos area as well as the aquifer recharge area upslope from San Marcos.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, captan, methomyl, propachlor.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, captan, methomyl, propachlor.

This level of take is unquantifiable for the following reasons: This salamander lives in underground caves. Many of the cave apssages are inaccessible to humans. Those that are accessible are entered infrequently to prevent disturbance of the fragile cave ecosystem. Thus, the likelihood of finding a salamander carcass is small. Furthermore, sublethal effects could occur due to reductions in prey species, impairment of reproductive potential and other factors.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Houston toad (Bufo houstonensis)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

Recent records of Houston toads are known from only three counties in Texas, Bastrop, Burleson and Harris. Bastrop County probably has the largest number of Houston toads today. They exist in Burleson County near Lake Woodrow in low numbers but frequently fail to breed due to the absence of surface water. No toads have been reported from Harris County since 1976.

Water is one of the most important parts of Houston toad habitat, as reproduction cannot occur if there is insufficient water to fill breeding pools. Toads occur where there is an abundance of loblolly pine, probably as an artifact of their mutual preference for friable sandy soils, which are common to all Houston toad localities. Other land types where Houston toads occur include wet grasslands and pastures. Its range has been highly modified by residential and other urban development.

Houston toads need sandy soils in which to burrow. They rest in burrows, under logs, in leaf litter, and undercut banks around pools. The diet of adult Houston toads consists primarily of small arthropods. Houston toad tadpoles are known to eat algae and pollen.

Decline of the Houston toad has been attributed to climatic change and destruction or adverse modification of their habitat. Recovery includes measures to control or restrict the use of pesticides within its existing range.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Because the Houston toad is found in association with forestlands, pastures and grasslands, it is likely to be exposed to those pesticides registered for use on forests and rangelands. It is also at risk of exposure to mosquito larvicides due to the increased urbanization of its occupied range.

Table 8 was used for all hazard ratios as this toad reproduces in shallow rainwater-filled depressions.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dimethoate, disulfoton, ethyl parathion, malathion, methomyl, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, diflubenzuron, mancozeb.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dimethoate, disulfoton, ethyl parathion, malathion, methomyl, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, diflubenzuron, mancozeb.

This level of take is unquantifiable for the following reasons: The Houston toad is dependent upon rainfall for reproduction. We are unable to determine, for any given year, the number of young produced in a breeding cycle. Toad larvae or tadpoles are most susceptible to the impacts of pesticides. Because their numbers will vary depending on the duration and frequency of rainfall, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of acephate and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Puerto Rican crested toad (Peltophryne lemur)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Puerto Rican crested toad is the only native bufonid of the Puerto Rican Island shelf. It is a medium sized toad with blackish-brown coloration, found in the semi-arid, rocky areas of the island. The major cause of decline for this species is destruction of breeding habitat.

Three life stages have been identified for this toad: tadpole, toadlet, and adult. Different environmental conditions are required for each. Adult toads are semifossorial and widely dispersed when not breeding. Adults may be found in limestone fissures, under limestone boulders and in cavities. Breeding is known to occur at only two coastal sites when sufficient rainfall (greater than 10 cm) is received. Adult toads have been known to travel long distances to reach breeding grounds (up to 4 km). Eggs hatch within 24 hours and tadpoles metamorphose within 25 days.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The life stage most susceptible to pesticides is the aquatic tadpole stage. The tadpole stage often takes 25 days. This species is known to breed in only two areas, Quebradillas and Guanica Forest. In the Quebradillas area, the toads have been seen breeding in permanent cattle troughs. The other area occurs within the confines of the Guanica State Forest. Therefore, this species is expected to be impacted by the use of rangelend pesticides in the Quebradillas and forest use pesticides in the Guanica State Forest.

Table 8 was used to determine the hazard ratios for freshwater fish, the most closely related taxa to the tadpole stage of the toad.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): benomyl, captan, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, malathion, methyl parathion, naled, phosmet, pyrethrin, thiophanate-methyl, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species, are: acephate, atrazine, azinphos-methyl, bifenox, carbofuran, diflurbenzuron, dimethoate, disulfoton, fensulfothion, mancozeb, methomyl, oxyfluorfen, propachlor, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals, (benomyl, captan, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, malathion, methyl parathion, naled, phosmet, pyrethrin, thiophanate-methyl, trichlorfon) if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, azinphos-methyl, bifenox, carbofuran, diflurbenzuron, dimethoate, disulfoton, fensulfothion, mancozeb, methomyl, oxyfluorfen, propachlor, trifluralin.

This level of take is unquantifiable for the following reasons: The Puerto Rican crested toad is dependent upon rainfall for reproduction. The Service is unable to determine, for any given year, the number of young produced in a breeding cycle. These numbers will vary depending on the duration and frequency of rainfall. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Wyoming toad (Bufo hemiophrys baxteri)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Wyoming toad was formerly common in Albany County, Wyoming on the floodplain of the Big and Little Laramie Rivers and in irrigated regions in the Laramie Basin west of the City of Laramie. In 1983, an intensive search of the Laramie Basin revealed two immature toads about 15 miles southwest of Laramie. A new population of Wyoming toads was located 15 miles southwest of Laramie during the summer of 1987 with a total of 7 toads first discovered and during a second survey in late summer 57 toads were located.

Larvae of the toads feed primarily on algae while the adults are primarily insectivorous and opportunistic in their selection of food. Habitats used by the Wyoming toad are primarily floodplain ponds, small ponds and lakes produced by irrigation runoff, and small seepage lakes in the basin. One of the factors believed to have led to the endangerment of this species is the widespread spraying of insecticides to control mosquitoes.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The uses in the vicinity of Wyoming toad habitat include rangeland, sorghum, small grains (barley and oats), and mosquito larvicides. There is a high exposure potential to the Wyoming toad for any pesticides used in the above areas.

Tables 8 (mosquito larvicide) and 11 were used to obtain hazard ratios for freshwater fish and invertebrates. Table 12 (runoff) was used for the pesticides aldicarb, carbofuran, and phorate. Very little information is available on amphibians so information on fish was used.

It is believed that 44 of the pesticides of Table 1 have a potential to impact the Wyoming toad through drift or runoff into the habitat as well as pesticides being directly applied to the habitat as a mosquito larvicide. The Service also believes that the use of 43 of these 44 pesticides is likely to jeopardize the continued existence of the Wyoming toad. This determination is based primarily on the species distribution, known use patterns, the hazard ratios of both fish and invertebrate species, as well as other factors such as persistance, bioaccumlation, and in some cases, lack of sufficient information on one of the above factors.

From Table 1 provided by the Agency, the Service has determined that there would not be exposure to the Wyoming toad from the remaining 15 pesticides in this table. This is because none of the known registered uses of those pesticides considered in this consultation are for uses that occur near Wyoming toad habitat.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): aldicarb, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorpyrifos, copper sulfate, diazinon, dimethoate, disulfoton, diuron, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, envalerate, fonofos, malathion, mancozeb, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, pendimethalin, permethrin, phorate, propachlor, propargite, propazine, pyrethrin, terbufos, thiophanate-methyl, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (aldicarb, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorpyrifos, copper sulfate, diazinon, dimethoate, disulfoton, diuron, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, envalerate, fonofos, malathion, mancozeb, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, pendimethalin, permethrin, phorate, propachlor, propargite, propazine, pyrethrin, terbufos, thiophanate-methyl, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of acephate and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Alabama cavefish (Speoplatyrhinus poulsoni)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The Alabama cavefish is an albinistic cave fish of the family Amblyopsidae. It feeds on fish, crustaceans and zooplankton. It appears to be the rarest of American cavefishes and perhaps of all American freshwater fishes and possibly one of the rarest vertebrates in the world. Their habitat is genarally lacustrine and consists of large carbonate conduits developed in thick-bedded limestones. Water enters the system by movement through porous limestone. Aquatic substrates within the cave are various bedrock and unconsolidated rubble/gravel/sand. Groundwaters are highly insulated from surface conditions.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Alabama cavefish is found only in Key Cave in Lauderdale County, Alabama. According to 1986 crop use statistics, the following agricultural activities occur in Lauderdale County: corn, cotton, sorghum, wheat and cattle production. Much of Key cave's 10,731 feet of passage lie beneath privately owned land in agricultural service. The potential for the Alabama cavefish to be exposed to pesticides is great based on its location. Cave systems have a very low flushing rate. Any introduction of chemicals either by drift or groundwater seepage will remain in the system longer than an ordinary stream. The Alabama cavefish is especially susceptible to pesticide impacts because of its apparent endemicity, its very small population size and it's depressed reproduction potential. Any environmental impacts that alter the groundwater quality in the aquifer could eliminate this monotypic genus.

Table 19B was used to obtain hazard ratios for freshwater fish.

All 60 pesticides in part 1 could potentially impact the Alabama cavefish either through groundwater contamination, runoff or seepage. Of those 60 chemicals, 45 chemicals will jeopardize the continued existence of the Alabama cavefish if used in its habitat. Of the remaining chemicals, 15 are not likely to result in jeopardy to the species.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): aldicarb, azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, methomyl, mevinphos, naled, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorothithioate, terbufos, terbutryn, thiophanate-methyl, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, bifenox, diflubenzuron, dimethoate, diuron, fenitrothion, isophenfos, mancozeb, methoprene, methyl parathion, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, phosphamidon, propazine, sulprofos, thiodicarb.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (aldicarb, azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, methomyl, mevinphos, naled, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorothithioate, terbufos, terbutryn, thiophanate-methyl, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, bifenox, diflubenzuron, dimethoate, diuron, fenitrothion, isophenfos, mancozeb, methoprene, methyl parathion, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, phosphamidon, propazine, sulprofos, thiodicarb.

This level of take is unquantifiable for the following reasons: The Alabama cavefish lives in underground caves. Many of the cave passages are inaccessible to humans. Those that are accessible are entered infrequently in order to prevent disturbance to the fragile cave ecosystem. The likelihood of discovering a cavefish carcass is small. Therefore, we are unable to identify a specific level of incidental take. Moreover, for this species, should any incidental take from

pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Ozark cavefish (Amblyopsis rosae)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Ozark cavefish is adapted to cave environments which may limit the species ability to recover from even minor pertubations. This, combined with the shrinking of its known range was the basis of the species being listed. The distribution of the species is entirely within the Springfield Plateau, an area of approximately 21,000 square kilometers which is drained by the White, Neosho and Osage Rivers. The area is one of limestone with karst topography, largely forested, interspersed with farms that produce a variety of products. There are numerous urban settlements within the area.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Of special concern to the survival of the species is the potential for drift and runoff of pesticides into caverns, sinkholes and surface waters which supply the cave habitats of the species. Likewise, there is also concern with those chemicals that are persistant and have a likelihood of leaching into underground recharge systems of the species habitats. The Service, working through the Missouri Division of Geology and Land Survey, is refining the boundaries of the recharge areas. It is anticipated that within a year, specific cavern/sinkhole/surface water sources will be identified. This will allow the Service to identify specific areas of impact which have need for protection rather then entire recharge zones, presently identified.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): chlorpyrifos, phosmet.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: atrazine, benomyl, carbaryl, carbofuran, carbophenothion, chlorothalonil, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenvalerate, isofenphos, mancozeb, methyl parathion, naled, pendimethalin, propazine, pyrethrin, sulprofos, terbufos, thiophanate-methyl, trichlorfon, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (chlorpyrifos, phosmet), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, carbaryl, carbofuran, carbophenothion, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenvalerate, isofenphos, naled, pendimethalin, pyrethrin, sulprofos, terbufos, thiophanate-methyl, trichlorfon, trifluralin.

This level of take is unquantifiable for the following reasons: The Ozark cavefish lives in underground caves. These caves are not monitored regularly, and the likelihood of discovering a cavefish carcass is very slight. Therefore, we are unable to identify a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Chihuahua chub (Gila nigrescens)

ADDRESSED IN REQUEST PART 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The Chihuahua chub is endemic to the Guzman Basin in southwestern New Mexico and the northwestern portion of the Mexican State of Chihuahua. In New Mexico, the chub occupies a four to five kilometer stretch of the Mimbres River from Allie Canyon downstream to the town of Mimbres, Luna County, New Mexico, and a small, privately owned, spring-fed tributary on the east side of the river opposite Bear Canyon Reservoir.

Chihuahua chubs prefer habitats which include pools at least one meter deep, shade, undercut banks or other cover features, such as downed logs, submerged shrubs, etc. These fish are usually found over substrates of sand, gravel and cobble, with some occasional fine mud or silt. The Chihuahua chub is also found in association with aquatic vegetation. Its food preferences probably include surface insects, aquatic invertebrates and vegetation. Spawning occurs from late April through May in quiet pools, 1-2.5 meters deep, over matted beds of aquatic vegetation.

Adjacent uplands are highly diverse in cover types. Land uses include residential housing, agriculture including apple orchards, pasture (including hay production), small garden plots (corn, fruit, vegetables and grapes), and riparian vegetation including cottonwoods, willows, Arizona sycamore, Arizona walnut, alder, live oak, juniper, sagebrush and a variety of forbs and grasses.

Its decline in abundance and distribution is attributed to habitat alteration from groundwater mining, stream channelization, water diversion for irrigation, deforestation (causing erosion, siltation and water temperature alteration), and pollution. Severe flooding caused by watershed degradation and the loss of riparian vegetation has further aggravated the decline of the species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Within its narrow range, the Chihuahua chub is especially vulnerable to the effects of pesticides which are directly toxic to the species. Toxicity to food items and vegetative cover are less critical; nevertheless, these factors must be considered in this risk assessment. Its association with range, forest and agricultural cover types make the Chihuahua chub vulnerable to chemicals registered for these uses. The probable routes of contamination are through runoff from adjacent treated areas or seepage to the source aquifer of its spring habitat. Although agricultural cover types are not extensive, the proximity of this cover type to the Chihuahua chub and its very limited range, require use of certain pesticides be prohibited or restricted within the known range of the species. While the probability that mosquito larvicides will be used is small, the potential impact is greater due to the direct application of larvicides to water.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals except mosquito larvicides (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, carbophenthion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methomyl, methoprene, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenfos, propargite, propazine, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, carbophenthion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methomyl, methoprene, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenfos, propargite, propazine, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Humpback chub (*Gila cypha*)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

Humpback chub generally tend to reside throughout the year within limited reaches of the Colorado, Green, and Yampa Rivers. Humpback chub are found inhabiting narrow, deep canyon areas, and are relatively restricted in distribution. They seldom leave their canyon habitat.

Adult humpback chub concentration areas occur in the Colorado River (Black Rocks and Westwater Canyons), the Green River (Gray Canyon), and the Yampa River (Yampa Canyon). Confirmed spawning areas occur at Black Rocks and Yampa Canyon. Suspected humpback chub spawning areas also occur in Westwater Canyon and Gray Canyon.

A reproducing population of humpback chub is found in the Little Colorado River and the Colorado River at their confluence in the Grand Canyon. The collection location of young humpback chub indicated that successful reproduction only occurred in the Little Colorado River.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The only use patterns that the Service believes could impact the humpback chub are for rangeland and forestry. As stated above, the humpback chub is found primarily in narrow, deep water canyon areas of the Colorado River drainage system. There is some potential for exposure from rangeland and forestry uses.

Table 15 was used to obtain hazard ratios for freshwater fish. For the pesticide carbofuran (granular), Table 16 was used.

It is believed that 30 of the pesticides of Table 1 and fenitrothion in part 5, have a potential to impact the humpback chub primarily through drift of the pesticides into the habitat of this endangered species as well as runoff. However, based on the primarily deep water canyon habitat of the humpback chub, the Service concludes that the use of the these pesticides on range and forest lands is not likely to jeopardize the continued existence of the humpback chub. There would be no exposure to the remaining pesticides in Table 1 and methoprene in part 5, since none of the known registered uses of those pesticides considered in this consultation are for uses that occur near humpback chub habitat.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, diflubenzuron, dimethoate, disulfoton, endosulfan, fenvalerate, malathion, mancozeb, methomyl, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of these chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Hutton tui chub (Gila bicolor ssp.)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Hutton tui chub occurs in Hutton Spring and in an unnamed spring about 3/4 mile to the east in Lake County, Oregon. Past distribution is uncertain. This form, or its ancestor, is known to have occurred in pluvial Alkali Lake. The isolation of the Hutton tui chub is due to the desiccation of that ancient lake.

The Hutton tui chub lives in clear springs and outflow channels. Observations of the species over a period of 20 years indicate the population has remained stable. The size of the springhole of Hutton Spring varies with excavations made by the owner. It has ranged from 20 feet to nearly 40 feet in diameter, and is about 15 feet deep in the center. The smaller spring hole is about 10 feet across and 2 feet deep. The outflows from the springs form small areas of wetland, occupied by grasses, water parsley, and sedges. The springs are in a grassy rangelend bordered to the north and west by shrubby rangeland and to the east and south by the lake bed of Pluvial Alkali Lake. The latest estimated tui chub population in Hutton Springs is 450 fish (33).

Present status is in part a result of unrestricted access by cattle to "Three-eights" Spring (formerly known to support the species but not recently confirmed) and past access by cattle to Hutton Spring. Threats to the populations of tui chubs include pumping of water from the springs, which occurred in the past but is not occurring now, and contamination of ground water by dispersal of chemicals from a herbicide-manufacturing residue disposal site just south of Hutton Spring. Modification of the springs (via heavy equipment - thus in turn causing other problems, such as siltation, erosion, vegetaion cover loss, water diversion and drawdown, etc.) has had detrimental effects on the chub population.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

A modest amount of small grains, barley, wheat, and oats, were planted in Lake County in 1986 (30), but are not known to be grown on land immediately adjacent to springs supporting the Hutton tui chub (Lorentzen, pers. comm.). The focus of concern should be on rangeland chemicals given the livestock grazing that occurs in proximity to the chub (Williams, pers. comm.). Desert shrub/desert grasslands are the primary associated range types (11). Cattle are known to wander into Hutton Spring proper, and its outflow channels, causing siltation, bank erosion, and habitat modifications adverse to the chub (Lorentzen, pers. comm.). (At the same time cattle may benefit the species by preventing the spring and its channels from becoming choked with aquatic vegetation.) Nevertheless, chemical management that may occur may expose the entire chub population and all sensitive life stages given the restrictive location of the species.

The tui chub occurs in such a restricted range and in such low numbers that any loss due to pesticide contamination could extinguish the species. Some use of pesticides, even in accordance with label directions, may produce large fish kills. Even incidents involving relatively low numbers of fish killed could not be sustained by this species. There is virtually no level of pollution predicted by Tables 15 and 16 for some of these chemicals for which we could foresee survival of any tui chub.

Rangeland chemicals considered were evaluated against Agency modeling (Table 15/16; (8)) of hazard ratios for runoff/drift from a 40-acre area into a 1-acre pond, 6 feet deep. This only grossly approximates Hutton tui chub habitat in that the largest habitat, Hutton Spring, is much smaller but deeper (11).

Toxicity of all these chemicals is high for tested fish species and very high for invertebrate food sources (Section V). Hazard ratios are high to extreme for all chemicals except methyl parathion, which is insignificant for fish, but high for invertebrates.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): captan, carbaryl, chlorpyrifos, diazinon, dimethoate, malathion, methomyl, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, methyl parathion

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (captan, carbaryl, chlorpyrifos, diazinon, dimethoate, malathion, methomyl, naled, propachlor, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should incidental take attributable to chemical applications and individual Hutton tui chubs be recovered, they should be chilled immediately and the Service's Portland Field Office contacted at (503) 231-6179. That office will provide further guidance on final disposition of any remains.

SPECIES PROFILE

SPECIES: Slender chub (Hybopsis cahni)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The slender chub is a small, slender minnow from the family Cyprinidae. It feeds largely on immature benthic insects and small snails. This chub occurs in streams of large size, with clean gravel substrate, swift current and alkaline water. Overall, the range of habitat conditions of the chub comprise warm, well-oxygenated, moderate gradient, Ridge and Valley province streams that tend to have more frequent pools than riffles and swift shoals. One of the reasons for this species' decline has been the construction of impoundments and siltation from strip-mining.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The slender chub is found only in the extreme upper Tennessee River Drainage, Tennessee and Virginia. Currently it occurs in the Powell and Clinch Rivers (52.7 and 17.4 total miles, respectively). According to species experts, the agriculture occurring along the Clinch and Powell Rivers within the chub's habitat is not of a suficient magnitude to greatly impact the species. Of the forests bordering the rivers, most are managed for food plots for deer and quail, not timber. No use of mosquito larvicides are expected in the area. In prior Service opinions, the slender chub was listed as being jeopardized by range, mosquito larvacide and forestry pesticides. Agricultural pesticide clusters such as corn or crops, were not considered detrimental to the chub. Based on the habitat characteristics of the slender chub, the Service does not anticipate adverse impacts to this species as a result of the use of these pesticides.

Thirty one chemicals of the 60 requested for consultation in part 1 are considered forestry, range or mosquito larvacide chemicals. The Service does not anticipate any adverse effects to the slender chub from the use of these chemicals for the following reasons: large, fast flowing streams increase the dilution factor and, consequently, the amount of pesticides available for intake by the chub; most of the eleven pesticides listed rapidly breakdown in alkaline waters; the limited amount of agriculture occurring in the chub's habitat decreases the likelihood of encountering pesticides in great enough concentrations to result in jeopardy to the chub.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, disulfoton, ethyl parathion, fenitrothion, malathion, mancozeb, methomyl, methoprene, methyl parathion, naled, oxyfluorfen, phosmet, pyrethrin, thiophanate-methyl, triflualin, trichlorfon.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, disulfoton, ethyl parathion, fenitrothion, malathion, mancozeb, methomyl, methoprene, methyl parathion, naled, oxyfluorfen, phosmet, pyrethrin, thiophanate-methyl, triflualin, trichlorfon.

This level of take is unquantifiable for the following reasons: Due to the characteristics of the slender chub habitat, the likelihood of recovering any specimens is small. Therefore, we are unable to identify a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Sonora chub (Gila ditaenia)

ADDRESSED IN REQUEST PART I.

SPECIES/HABITAT DESCRIPTION:

The known Sonora chub populations in the United States presently occur northwest of Nogales, Santa Cruz County, Arizona, in Sycamore (Bear) Canyon. The Sonora chub is abundant to common in deep pools, which are adjacent to protective cover such as undercut banks, boulders and tree roots. Known habitat requirements include clean, permanent water with pools and intermediate riffle areas, and/or intermittent pools maintained by bedrock or subsurface flow. Preferred food includes terrestrial and aquatic insects and algae.

Woody vegetation adjacent to Sycamore Creek includes both pinyon/juniper and chaparral rangeland with an oak woodland forest type. Predominant riparian trees include sycamore, willow, cottonwood, and Arizona walnut. Activities in Sycamore Canyon are generally restricted to bird-watching, hiking and other forms of recreation.

Most of the critical habitat for the species is located within the Gooding Natural Research Area of the Coronado National Forest. This area was established on July 8, 1970, to protect unique species. Consequently, the Gooding Natural Research Area is withdrawn from mineral entry and is closed to grazing. A portion of the critical habitat is included in a livestock grazing allotment, but steep and rocky terrain generally precludes grazing along the streambanks within the riparian zone of the critical habitat.

The chub is relatively secure in the small area it occupies in the United States due to Federal ownership and special-use designation already provided its habitats and surroundings. However, its limited distribution and apparently narrow ecological niche make it very susceptible to any habitat disturbances, particularly the introduction of pesticides and other toxic pollutants. Excessive siltation from erosion and surface runoff could cause habitat loss. Another significant threat to the Sonora chub is the introduction of predatory exotic and nonnative fishes, parasites and diseases. The recovery of the species is dependent upon efforts to protect and set aside a portion of Sonora chub range in Mexico.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Although the Sonora chub currently enjoys a certain degree of protection from the special-use designation of its habitat, its narrow geographical range make it especially vulnerable to the adverse impacts of toxic chemicals. There is potential for exposure of the Sonora chub to pesticides used within its rangeland watershed, due to runoff from adjacent treated areas.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other rangeland chemicals.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, malathion.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, captan, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (carbaryl, chlorpyrifos, diazinon, malathion), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, captan, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Spotfin chub (Hybopsis monacha)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The spotfin chub is a small minnow of the family Cyprinidae. Chubs feed virtually entirely on immature aquatic insects. It is almost entirely a benthic feeder. It is known only from freely flowing, large streams with swift current and bottoms of hard gravel (rarely sand). The spotfin chub also requires moderately alkaline waters. The chub is a crevice spawner, depositing eggs in fissures of rubble, bedrock and probably boulders. Natural limiting factors may be cool water, interspecific competetion, and lact of swift surrent and small stream size. Low population density/gene pool, typical of the chub at many sites also reduces recruitment opportunities.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The spotfin chub is endemic to the Tennessee River drainage, North Carolina, Tennessee and Virginia. According to species experts familiar with both the spotfin and slender chubs, there is a limited amount of agriculture occurring within the habitat of the spotfin chub. In prior Service opinions, the spotfin chub was listed as being jeopardized by range, mosquito larvacide and forestry pesticides. Agricultural pesticide clusters such as corn or crops, were not considered detrimental to the chub. Based on the habitat characteristics of the spotfin chub, the Service does not anticipate significant adverse impacts to this species as a result of the use of these pesticides.

Thirty one chemicals of the 60 requested for consultation in part 1 are considered forestry, range or mosquito larvacide chemicals. The Service does not anticipate any adverse effects to the spotfin chub from the use of these chemicals for the following reasons: large, fast flowing streams increase the dilution factor and, consequently, the amount of pesticides available for intake by the chub; most of the eleven pesticides listed rapidly breakdown in alkaline waters; the limited amount of agriculture occurring in the chub's habitat decreases the likelihood of encountering pesticides in great enough concentrations to result in jeopardy to the chub.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, disulfoton, ethyl parathion, fenitrothion, malathion, mancozeb, methomyl, methoprene, methyl parathion, naled, oxyfluorfen, phosmet, pyrethrin, thiophanate-methyl, triflualin, trichlorfon.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, disulfoton, ethyl parathion, fenitrothion, malathion, mancozeb, methomyl, methoprene, methyl parathion, naled, oxyfluorfen, phosmet, pyrethrin, thiophanate-methyl, triflualin, trichlorfon.

This level of take is unquantifiable for the following reasons: The characteristics of the spotfin chub habitat limit the likelihood of recovering any specimens.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Yaqui chub (Gila purpurea)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

In the United States, the Yaqui chub occurs only in the Rio Yaqui basin in extreme southeastern Arizona. Black Draw and North Pond (San Bernardino National Wildlife Refuge) and Leslie Creek (private land) harbor the largest populations. It is also abundant in the Rio Sonora drainage of Sonora, Mexico.

The Yaqui chub is associated with a variety of different aquatic habitats within the mixed shrub and brush rangeland of the Rio Yaqui basin, but most commonly in perennial streams and spring habitats. Food consist of algae, terrestrial and aquatic insects and arachnids and small fishes when available.

Primary reasons for decline of the Yaqui chub include arroyo cutting, erosion and siltation due to overgrazing, removal of riparian vegetation, groundwater pumping, impoundments, and introduction of exotic and nonnative species, which either compete with, prey upon or hybridize with the native Yaqui chub. Recovery of the Yaqui chub is dependent upon successful implementation of the Master Plan for the San Bernardino National Wildlife Refuge. Delisting is recommended when six stable populations have been established on the refuge and the population in Leslie Creek is secure.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

San Bernardino National Wildlife Refuge was established for the purpose of protecting and promoting recovery of several Yaqui basin fishes. The Leslie Creek tract has been purchased by the Nature Conservancy, and the Service is planning to acquire it for inclusion as part of the San Bernardino refuge complex. Nevertheless, there is potential for exposure to pesticides used on rangelands within the watershed of the species. Primary routes of exposure are through runoff from treated rangelands within the watershed of the Yaqui chub at San Bernardino and Leslie Creek, although inadvertent direct application or drift from wide area aerial spraying cannot be ruled out.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other rangeland chemicals.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its

critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, malathion.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, captan, methomyl, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, diazinon, malathion), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, captan, methomyl, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Blackside dace (Phoxinus cumberlandensis)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The blackside dace is a small fish from the family Cyprinidae. It has been observed grazing on rocks and on sandy substrate and consumes detritus, bacteria, phytoplankton, diatoms, algae and various insects and spiders. This dace inhabits small, upland streams and springs with moderate flows. The fish is generally associated with undercut stream banks and large rocks, and it is usually found within well vegetated watersheds with good riparian vegetation. The areas of Kentucky and Tennessee inhabited by the fish are rich in coal reserves and forest resources, and it is believed that impacts associated with the development of these resources caused the loss of many blackside dace populations.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The blackside dace is presently known from a total of 14 stream miles in 30 streams in the following counties: Bell, Harlan, Laurel, Letcher, McCreary, Pulaski and Whitley, KY; and Campbell, Claiborne, and Scott, TN. Agricultural development and forestry are listed as some of the factors causing a decline in the species. This species prefers small, upland streams and springs with moderate flows. It is most often found in relationship with heavy riparian cover and vegetated watersheds. All 60 chemicals being reviewed in part 1 could potentially impact the blackside dace. Even though this species has different characteristics than the related darters, its potential for exposure and toxicity is roughly similar. Therefore, based on available information, the Service is assuming similar toxicities for this species as for the darters.

Table 18 was used to obtain hazard ratios for freshwater fish. When data was not available in table 18, table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits 14 miles of flowing stream. The likelihood of recovering a specimen is very small. Population levels also flucuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Kendall Warm Springs dace (Rhinichthys osculus thermalis)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Kendall Warm Springs are located on the Bridger-Teton National Forest, 31 miles north-northwest of Pinedale, Sublette County, in western Wyoming. The spring area and short stream (984 feet) comprise the total habitat of the Kendall Warm Springs dace. The average width of the stream is 6 feet and a depth generally less than 1-foot.

Adult Kendall Warm Springs dace inhabit the fairly shallow pools and stream. Plant growth within the water is necessary for escape cover and protection from the main current. Fry also use the vegetation as nursery areas. Spawning for this species probably occurs several times each year, and possibly throughout the year.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Vegetation near Kendall Warm Springs includes grasses, forbes, and small shrubs and trees such as willow, sagebrush, and aspen. Aquatic vegetation surrounds the stream and is often very thick within the pools. Thus, the only likely use of pesticides in the vicinity of the Kendall Warm Springs dace is for forestry and rangelands. It is highly unlikely that mosquito larvicides would be used in this area.

Table 11 was used to obtain hazard ratios for freshwater fish. Table 12 was used for carbofuran.

Based on the use patterns that may occur near or adjacent to the habitat of the Kendall Warm Springs dace, it is believed that 30 of the pesticides listed in Table 1 and part 5, have a potential to impact the dace primarily through drift of the pesticide into their shallow water habitat as well as runoff into the habitat. Based primarily on the species distribution, known use patterns, hazard ratios of both fish and invertebrates, the Service believes that 27 of the 30 pesticides are likely to jeopardize the continued existence of the Kendall Warm Springs dace.

The Service also has determined that there would not be exposure to the Kendall Warm Springs dace from the remaining 31 pesticides in Table 1 and part 5. This conclusion has been reached because none of the known registered uses of those pesticides considered in this consultation are for uses that occur near the Kendall Warm Springs dace habitat.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dimethoate, disulfoton, endosulfan, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, bifenox, diflubenzuron.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, azinphos-methyl, benomyl, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dimethoate, disulfoton, endosulfan, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Amber darter (<u>Percina antesella</u>)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The amber darter is a slender, small, golden-brown darter from the subgenus Imostoma, family Percidae. Like other species of Imostoma, it appears that the amber darter feeds on gastropods (river snails and limpets) and aquatic insect larvae. The amber is found in silt-free, moderately flowing deeper riffle areas or flowing pools where substrates are sand or gravel, and cobbles or boulders. There is a seasonal change in habitat from deeper riffle areas, or flowing pools to shallow vegetated riffles in mid-summer. The amber darter cannot tolerate slack waters or areas with silty or muddy substrates. Any major land use activity or change which increases siltation or adversely alters the water flow regime could impact this species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The amber darter occurs in the Coosa River system, in the main channels of two headwater tributaries, the Conasauga and Etowah rivers in southeastern Tennessee and northern Georgia. Portions of this darter's range passes through the Cherokee and Chatahoochee National Forests. Agricultural practices occurring along the amber darter's habitat include corn, soybeans and cattle production. Additionally, forestry operations occur both on private land and within the above mentioned National Forests. Therefore, 58 of the chemicals in part 1 could potentially impact the amber darter. Because of the similarities in habitat type, biology and physiology of some listed fishes, similar exposure potential and toxicity is assumed for the following species: blackside dace, amber darter, bayou darter, boulder darter, snail darter, Conasauga logperch, and Cape Fear shiner.

Table 18 was used to obtain hazard ratios for freshwater fish. When data was not available in table 18 , table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in

Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Bayou darter (Etheostoma rubrum)

ADDRESSED IN REQUEST PART 1 and 5

SPECIES/HABITAT DESCRIPTION:

The Bayou darter prefers stable gravel riffles or sandstone exposure with large sized gravel or rock, and shallow water less than 15 cm deep with moderate to swift flow located in meander sections of streams. The Bayou darter is believed to feed on insect larvae, spiders, and centipeds. The major cause for decline of this species is gravel mining, clearing of riparian vegetation, cultivation of river bank, road and bridge construction and construction and maintenance of transmission line corridors.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The bayou darter is endemic to 60 km of stream in the Bayou Pierre system in southwestern Mississippi. Cropland, pastureland and forestry practices occur within this watershed. Because of the similarities in habitat type, biology and physiology, similar exposure potential and toxicity is assumed for the following species; blackside dace, amber darter, bayou darter, boulder darter, snail darter, Conasauga logperch, and Cape Fear shiner.

Table 18 was used to determine hazard ratios for freshwater fish. When data was unavailable in table 18, table 12 was used instead.

All 60 pesticides could potentially impact the bayou darter, either through drift, runoff or direct application.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorothithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Boulder darter (Etheostoma [Nothonothus] ssp.)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The boulder darter is an undescribed species in the subgenus Nothonotos. It attains a maximum length of 3 inches and is olive gray in color. Because of the species' rarity its biology is largely unknown. The species decline has resulted primarily from habitat alteration associated with water impoundment.

The boulder darter is presently known from only about 25 miles of the lower Elk River system in Giles County, Tennessee, and Limestone County, Alabama. It inhabits fast moving water over boulder substrate. The distribution of this fish is discontinuous over the 25 mile river reach. Most of the land adjacent to this species' limited habitat is privately owned.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The boulder darter could potentially be impacted by all 60 chemicals in part 1. Due to the species limited distribution, any factor that adversely modifies habitat or water quality in the short river reach it now inhabits could further threaten its survival. Because of the similarities in habitat type, biology and physiology, similar exposure potential and toxicity is assumed for the following species: blackside dace, amber darter, bayou darter, boulder darter, snail darter, Conasauga logperch, and Cape Fear shiner.

Table 18 was used to obtain hazard ratios for freshwater fish. When data were not available in table 18, table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Fountain darter (Etheostoma fonticola)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESRIPTION:

The fountain darter occurs in headsprings and runs of the San Marcos River in the vicinity of San Marcos, Hays County, Texas. The San Marcos River arises in a series of springs along the Balcones Fault Zone. The second largest spring system in Texas, the San Marcos springs have historically exhibited the greatest flow dependability and environmental stability of any spring system in the southwestern United States. The San Marcos Spring ecosystem, including its spring run, the San Marcos River, has a greater known diversity of aquatic organisms than any other ecosystem in the Southwest. Many of the species found here are endemic and restricted to a few kilometers of the spring run.

The San Marcos ecosystem is in a precarious situation due to a variety of factors, including increased human use of the aquifer, increased urbanization in the San Marcos region, resulting in increases in flood intensity, pollution, recreational use and alteration of the river.

In addition to inhabiting the San Marcos River, the fountain darter also is found in the Comal River, which begins at numerous springs collectively called Comal Springs that originate from the Edwards Aquifer within the City of New Braunfels, Comal County, Texas. The fountain darter has very narrow habitat requirements which include clear, clean, thermally constant flowing water, an undisturbed stream bottom with riffles and pools, mats of filamentous algae for cover, a food supply of living invertebrates, and protection from severe floods.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Pesticides have been identified as potentially causing adverse impacts to the fountain darter. Controlling or restricting the use of pesticides has been suggested as one means by which to promote its recovery. Because of the urban land use in the immediate vicinity of San Marcos and the prevalence of rangeland cover types in the surrounding area, including the recharge zone of the Edwards Aquifer, the potential exists for exposure of the species to rangeland pesticides and mosquito larvicides. For rangeland pesticides, probable routes of exposure are runoff within the surface drainage basin and percolation from the aquifer recharge area. For larvicides, direct application and drift are the most likely route of exposure.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals except mosquito larvicides (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, captan, methomyl, methoprene.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, captan, methomyl, methoprene.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Leopard darter (Percina pantherina)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The leopard darter is endemic to the Little River system in southeastern Oklahoma and southwestern Arkansas, including the counties of Howard, Polk and Sevier in Arkansas, and Le Flore, McCurtain and Pushmataha in Oklahoma. Since 1977, this species has been studied extensively in the Glover Creek drainage with sporadic observations outside this drainage. Surrounding land types include forest lands (oak-hickory, pine-oak, long-leaf/slash and loblolly/ short-leaf pine) and agriculture (hay, pasture, cattle ranches and chicken production). Past agricultural crops have included cotton.

Leopard darters have been collected in both riffles and runs, but show a preference for pools. Leopard darters spawn in riffles during spring. Substrates where the species is found range from gravel and rubble to bedrock, but rubble and boulders are preferred. Water quality is good in streams where leopard darters are found. Primary food items include insects and other aquatic invertebrates.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Threats to the species include impacts from silviculture, gravel mining operations, agriculture and industry. The use of pesticides and fertilizers also have the potential of severe habitat degradation, impacts on food supply and direct effects on the species itself. Although not specifically mentioned in the Recovery Plan, options concerning habitat management and protection may include controlling the use of pesticides in surrounding agricultural areas.

Because of the species' association with forest habitats, and the limited amount of cropland within its range, we anticipate exposure to pesticides will be limited to those registered for use on forests and rangelands, including hay fields and pasture. The primary routes of exposure would be through runoff and drift from adjacent treated areas. Exposure to mosquito larvicides is also possible, through direct application to the aquatic environment.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals except mosquito larvicides (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its

critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenthion, chlorpyrifos, diazinon, dimethoate, disulfoton, ethyl parathion, malathion, methomyl, methyl parathion, naled, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, mancozeb, methoprene, oxyfluorfen, oxydemeton-methyl, phosmet, propachlor, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenthion, chlorpyrifos, diazinon, dimethoate, disulfoton, ethyl parathion, malathion, methomyl, methyl parathion, naled, pyrethrin, trichlorfon if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, mancozeb, methoprene, oxyfluorfen, oxydemeton-methyl, phosmet, propachlor, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Maryland darter (Etheostoma sellare)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The Maryland darter is a small member of the freshwater perch family. Its only known permanent population occurs in a single riffle in Deer Creek near the Stafford road crossing in Harford County, Maryland. It has also been recorded occasionally in Gashey's Run near Aberdeen, Maryland.

Because of the extreme rarity of the Maryland darter, little is known of the specifics of its life history and habitat requirements. Like many other darters, it evidently prefers rock crevices and similar shelters in clean, well-oxygenated, swiftly flowing parts of streams: the riffle habitat.

Analysis of gut contents indicates that the Maryland darter feeds on snails, caddisfly larvae, stonefly nymphs and mayflies. Specific spawning sites of Maryland darters have not been located. High and turbid water conditions typical of lower Deer Creek during the spring make collecting and observation of breeding darters difficult. Spawning is believed to occur in late April or early May, but no specimens have actually been taken during the reproductive period.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses immediately adjacent to (or a short distance upstream of) the Maryland darter's habitat include forest and pasture. Forest (mixed hardwood) and rangeland pesticides may come into contact with the Maryland darter by drifting into Deer Creek or Gashey's Run in close proximity to the darter's habitat. Table 13 (Drift from a 10-acre drainage area into a 1-acre pond of 3-foot depth) was used to determine hazard ratios for forest and rangeland pesticides.

For croplands, which occur farther away from the darter's habitats, Table 18 (Runoff-Pond/stream model-stream 1) was used, whenever possible, to derive hazard ratios for non-forest/rangeland pesticides used on crops; otherwise Table 14 was used. Most jeopardy findings for the darter were based primarily on the fish hazard ratios and other factors affecting the fish directly. However, for the following chemicals, toxicity to food organisms was a key factor: dimethoate, ethion, fenamiphos, methyl parathon, mevinphos, and trichlorfon.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, methyl parathion, mevinphos, naled, phorate, propachlor, terbufos, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: aldicarb, acephate, atrazine, bifenox, dicrotophos, diflubenzuron, disulfoton, diuron, isofenphos, mancozeb, methomyl, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phosmet, phosphamidon, propargite, propazine, pyrethrin, sulprofos, terbutryn, thiodicarb, thiophanate-methyl.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, methyl parathion, mevinphos, naled, phorate, propachlor, terbufos, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: aldicarb, atrazine, diflubenzuron, disulfoton, methomyl, pendimethalin, permithrin, phosmet, phosphamidon, propargite, pyrethrin, sulprofos, terbutryn, thiophanate-methyl.

This level of take (in the form of harm) is unquantifiable as it is anticipated to represent sublethal effects. All of these chemicals have fish hazard ratios greater than one and/or invertebrate hazard ratios greater than 10.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize this take. For these chemicals the Service does not anticipate any incidental take in the form of lethal toxicity to adult darters, and no such take is authorized. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Niangua darter (Etheostoma nianguae)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Niangua darter has a highly localized distribution in the Osage River basin of the Ozark Region in west-central Missouri. Nymphs of stoneflies comprise most of the diet of the Niangua darter and spawning occurs in mid April. All known populations are in steams of the Salem Plateau, having gradients of 3 to 21 feet per mile. Most collections are from localities where the local relief ranges between 150 and 250 feet. The streams are characterized as medium sized, moderately clear upland creeks draining hilly topography underlain by bedrock consisting principally of chert-bearing dolomites.

The habitats are found in areas which are primarily forested with small farms and relatively sparce population. Principle threats to the species as identified by the Recovery Plan include conversion of woodlands to pasture, increased sedimentation and nutrient enrichment, reservoir construction, channelization, and introduction of non-native fish species to the watershed.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Primary concerns of pesticides focus on the potential of drift or runoff at the habitat sites and the effects on food sources. As there are several discrete populations, most concerns can be avoided if buffer areas are established consisting of 20 yards for direct application and 100 yards for aerial applications extending upstream one half mile.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): chlorpyrifos.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: atrazine, azinphos-methyl, bifenox, carbaryl, carbophenothion, chlorothalonil, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenvalerate, isofenphos, methyl parathion, mevinphos, naled, oxamyl, permethrin, phosmet, propazine, pyrethrin, sulprofos, terbufos, trichlorfon, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For chlorpyrifos, if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: azinphos-methyl, bifenox, carbaryl, carbophenothion, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenvalerate, isofenphos, mevinphos, permethrin, phosmet, pyrethrin, terbufos, trichlorfon, trifluralin.

This level of take is unquantifiable for the following reasons: The Niangua darter is a secretive fish occurring in fast flowing water. The chances of finding an incidentally take fish is very remote.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Okaloosa darter (Etheostoma okaloosae)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The Okaloosa darter is a small, perch-like fish from the family Percidae. It feeds on midges, mayflies and caddisflies. The primary spawning period is late April or early May. The Okaloosa darter prefers cool, fast flowing streams with clear water. The bottoms are mostly sand, with detritus collecting in areas along edges. Darter streams are heavily shaded over most of their courses. They also prefer areas with aquatic vegetation. The main reason for decline of the Okaloosa darter is interspecific competetion with the brown darter.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Okaloosa darter occurs in Okaloosa and Walton counties, Florida. Of the 113,000 acres that comprise this species' watershed, only 12,000 acres occur on private land. The remaining acreage occurs on Eglin Air Force Base. No agricultural practices occur on Eglin AFB in Okaloosa darter habitat. Additionally, the 12,000 acres of habitat in public ownership is made up of the cities of Niceville and Valpariso. Therefore, the Service does not anticipate this species to be exposed to agricultural or rangeland pesticides. The only pesticide clusters that have the potential of impacting the darter are the forestry and mosquito larvacide clusters.

Table 18 was used to determine the hazard ratios for freshwater fish. When data was unavailable from table 18, table 19B was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, carbaryl, diazinon, ethyl parathion, malathion, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, bifenox, captan, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diflubenzuron, dimethoate, disulfoton, fenitrothion, fensulfothion, mancozeb, methomyl, methoprene, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, carbaryl, diazinon, ethyl parathion, malathion, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, bifenox, captan, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diflubenzuron, dimethoate, disulfoton, fenitrothion, fensulfothion, mancozeb, methomyl, methoprene, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Slackwater darter (Etheoatoma boschungi)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The slackwater darter occurs in two distinctly different, but necessarily adjacent habitats: non-breeding and breeding. Non-breeding habitat is made up of small to moderately large streams with slow current. They are found on gravel infiltered with silt, on silt and mud, or on a combination of these. They show a preference for accumulations of detritus. Breeding habitat is made up of slow-moving seepage water in open fields or pastures and woods. The slackwater darter's diet consists of zooplankton, crustaceans and insects. Siltation resulting from forest clearing is probably the single most significant factor in altering the abundance and distribution of the slackwater darter.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The slackwater darter occurs in Cypress Creek, Swan Creek and Flint River in Alabama; and the Cypress Creek and Buffalo River in Tennessee. Additionally, the breeding habitat of the slackwater darter is slow moving seepage water in open fields or pastures and woods. During this time, the species is especially vulnerable to impacts from pesticides. All of the 60 chemicals in part 1 could potentially impact the darter by drift or runoff into occupied streams, direct application to breeding habitat or physical disturbance of breeding habitat during pesticide application.

Table 18 was used to obtain hazard ratios for freshwater fish. When data was not available in table 18, table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorpyrifos, diazinon, dicrotophos, disulfoton, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, methomyl, methyl parathion, mevinphos, oxydemeton-methyl, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, terbutryn, thiophanate-methyl, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, bifenox, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, diuron, ethoprop, fenitrothion, isofenphos, mancozeb; methoprene, naled, nitrapyrin, oxamyl, oxyfluorfen, phosphamidon, propazine, sulprofos, thiodicarb, trifluralin.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorpyrifos, diazinon, dicrotophos, disulfoton, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, methomyl, methyl parathion, mevinphos, oxydemeton-methyl, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, terbutryn, thiophanate-methyl, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, bifenox, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, diuron, ethoprop, fenitrothion, isofenphos, mancozeb, methoprene, naled, nitrapyrin, oxamyl, oxyfluorfen, phosphamidon, propazine, sulprofos, thiodicarb, trifluralin.

This level of take is unquantifiable for the following reasons: Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Snail darter (Percina tanasi)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The snail darter is a small, bottom-dwelling percid fish. The most important component of the adult snail darter's diet is aquatic gastropods. Adult snail darters prefer clean, gravel-sand shoals for feeding and almost certainly require shoals that are relatively shallow or have a significant current for successful reproduction. Survival of eggs and larval young is dependant upon slackwater habitats such as deep pools or basins downstream from the spawning sites. The primary factor limiting snail darter population size and numbers is the lack of suitable preferred habitats. The reason for the present staus of the snail darter is habitat destruction.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The snail darter is presently known to occur in a few localities in the Tennessee River and some large tributaries in southeastern Tennessee, NE Alabama and NW Georgia. All types of agriculture, including forestry and cattle production, occur within the habitat of the snail darter. Therefore, this species has the potential of being exposed to all of the 60 chemicals in part 1. Because of the similarities in habitat type, biology and physiology, similar exposure potential and toxicity is assumed for the following species: blackside dace, amber darter, bayou darter, boulder darter, snail darter, Conasauga logperch and Cape Fear shiner.

Table 18 was used to obtain hazard ratio information on freshwater fish. When data was unavailable in table 18, table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Watercress darter (Etheostoma nuchale)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The watercress darter presently occurs in two springs in the Hall's Creek and one spring in the Village Creek watersheds of the upper Black Warrior River system in Jefferson County, Alabama. This species occurs entirely within the urban limits of Birmingham, AL.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The watercress darter is found only in spring basins, spring fed ponds, and the runs and creeks issuing from them. These springs and runs have bottoms of chert gravel in the areas of swifter current and silt in the areas of little current. This darter is dependent upon the presence of submerged aquatic vegetation for shelter from predators and egg deposition sites. Very little information is available on the food habits of the watercress darter, but it is assumed that they consume aquatic insects and microcrustaceans. The reason for decline of this species is disruption and pollution of the aquifers that the springs are dependent upon.

The greatest threat to the species is from urban development, not impacts from agricultural pesticides. No agricultural or forestry practices occur within watercress darter habitat. The only potential impact to the species is from the use of mosquito larvicide. However, the use of these chemicals is not expected to seriously jeopardize the continued existence of the species.

The only chemicals, of the 60 in part 1, that could be potentially toxic to the watercress darter are those chemicals used as mosquito larvicide. However, none of those chemicals are likely to result in a jeopardy to the species.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, pyrethrum.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, pyrethrum.

This level of take is unquantifiable for the following reasons: Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Big Bend gambusia (Gambusia gaigei)

ADDRESSED IN REQUEST PARTS 1, 4 and 5.

SPECIES/HABITAT DESCRIPTION:

The Big Bend gambusia is known only from spring habitats in the vicinity of Boquillas Crossing and Rio Grande Village in Big Bend National Park, Brewster County, Texas. Areas immediately adjacent to its habitats are used for campgrounds within Big Bend National Park. The surrounding rangeland is classified as Texas savanna.

The Big Bend gambusia appears to be best adapted to warm stenothermal, flowing water with dense aquatic vegetation. It is able to coexist with introduced mosquitofish, Gambusia affinis, only under these conditions and is rapidly replaced by the mosquitofish under eurythermal conditions. Like other Poeciliids, the Big Bend gambusia probably feeds on insect larvae and other aquatic invertebrates.

The primary threats to the taxon include declining spring flow from groundwater drawdown or diversion for further park development, changes in outflow temperature, and competition with the introduced mosquitofish.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Although pesticide use has not been specifically identified as a cause of its decline or as a factor in its recovery, its proximity to an area of locally intense human use and its dependence upon mosquito larvae and other aquatic invertebrates as a food source, make it vulnerable to adverse effects from the use of mosquito larvicides and rangeland pesticides in its restricted habitat. Because the only known population of this species occurs on Big Bend National Park, Administered by the Department of the Interior, National Park Service, it is not likely to be exposed to a broad spectrum of pesticides; however, the Service cannot preclude the possibility of use of any pesticides registered for use on rangelands or as mosquito larvicides.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals except mosquito larvicides (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, captan, methomyl, methoprene.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, captan, methomyl, methoprene.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Clear Creek gambusia (Gambusia heterochir)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The Clear Creek gambusia occurs in the headsprings of Clear Creek, Menard County, 16.7 kilometers west of Menard, Texas. The headwaters of Clear Creek consist of a series of springs (Wilkinson Springs) originating from the Edwards Aquifer and issuing from the base of a limestone cliff. The watershed emptying into Clear Creek is extremely limited, encompassing about ten hectares and forming intermittent streams which discharge into Clear Creek downstream from the head pool.

The habitat of the Clear Creek gambusia consists of stenothermal spring environments with dense growths of Ceratophyllum and Ludwegia. The amphipod Hyalella texana represents 80 percent of the diet of adult gambusia in Clear Creek. It is presumed that other prey would be taken in proportion to their availability.

The presumed primary cause of the restricted distribution of the Clear Creek gambusia was construction of an earthen dam, three kilometers east of the headsprings which backs eurythermal water to the base of the dam forming the headspring pool. Subsequent competition and hybridization with introduced nonnative mosquitofish, Gambusia affinis, has reduced the range of the species from three kilometers of stream to the present two ponded areas.

Additional threats to the taxon include reductions in spring flow and riparian development activities (e.g. resort housing) that introduce silt, pesticides and herbicides into the spring pool. It is essential that the Edwards-Trinity Aquifer recharge zone, which appears to be in ranchland north and west of the headspring, remain undisturbed. The Recovery Plan for the species suggests the headspring pool and the aquifer recharge zone be protected and use of pesticides known to be detrimental to the Clear Creek gambusia be controlled to further its recovery.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Because of its association with rangelands and its dependence upon a healthy invertebrate prey base, the Clear Creek gambusia is vulnerable to the adverse impacts from pesticides registered for rangeland uses. Exposure to mosquito larvicides could occur through direct application to the headsprings, pools and springruns within the species' habitat. The probable routes of contamination for rangeland pesticides is surface runoff within the watershed and percolation into the Edwards Aquifer from applications within the aquifer recharge zone. For mosquito larvicides, direct application is the most likely route of exposure.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals except mosquito larvicides (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, carbaryl, chlorpryifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, captan, methomyl, methoprene.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, carbaryl, chlorpryifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, captan, methomyl, methoprene.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Pecos gambusia (Gambusia nobilis)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The Pecos gambusia is endemic to the Pecos River Basin in Texas and New Mexico. It currently occurs in four separate areas: Bitter Lake National Wildlife Refuge, Chaves County, New Mexico; Blue Spring, Eddy County, New Mexico; Phantom Lake Spring in easternmost Jeff Davis County, Giffen and East Sandia Springs, Reeves County, and Leon Creek, Pecos County, Texas.

The Pecos gambusia occurs abundantly in stenothermal springheads and spring runs, with or without dense cover. It also occurs in moderate abundance in open gypsum sinkholes and areas with little spring influence but abundant overhead cover or dense aquatic vegetation, such as sedge-covered marshes. Occasionally individuals are taken in irrigation ditches, especially in the Balmorhea Spring area. Lands surrounding its known habitats are classified as Texas savanna and shrub/brush rangelands. In addition, there are agricultural crops of corn, cotton, small grains, alfalfa and pecans grown within the range of the Pecos gambusia.

Like other Poeciliids, the Pecos gambusia is considered to be a carnivorous surface feeder. It consumes relatively more amphipods than do coexisting fishes. It also consumes a variety of other small invertebrates and occasionally filamentous algae. The species appears to be an opportunistic feeder, consuming whichever prey is in greatest abundance.

The Pecos gambusia is threatened by loss of habitat and competition from non-native fish species, especially nonnative gambusia. Agricultural development and flood control have depleted natural flow in the Pecos River, and limits dispersal of G. nobilis between tributaries and springs. Competition, predation, and hybridization with non-native species have been identified as major factors affecting the abundance and distribution of the Pecos gambusia. Pecos gambusia are less abundant where cogenors such as the nonnative mosquitofish, G. affinis, have a competitive advantage. However, G. nobilis competes successfully in habitats which have reliable, swift, stenothermal flows.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Pecos gambusia is vulnerable to toxic effects of pesticides within its occupied range, as well as to the impacts of pesticides on its invertebrate prey base. The areas in which this species is found are susceptible to the application of pesticides for control of cropland and rangeland insects and mosquito larvae. Probable routes of exposure are runoff for agricultural pesticides, runoff and percolation to groundwater for rangeland pesticides, and direct application and drift for mosquito larvicides.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals except mosquito larvicides (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, bensulide, carbaryl, carbophenthion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, malathion, methyl parathion, methomyl, mevinphos, naled, pendimethalin, phorate, profenofos propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methoprene, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phosmet, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, bensulide, carbaryl, carbophenthion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, malathion, methomyl, methyl parathion, mevinphos, naled, pendimethalin, phorate, profenofos, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methoprene, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phosmet, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small.

Furthermore, population levels fluctuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: San Marcos gambusia (Gambusia georgei)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The San Marcos gambusia occurs in the headsprings of the San Marcos River in the vicinity of San Marcos, Hays County, Texas. The San Marcos River arises in a series of springs along the Balcones Fault Zone. The second largest spring system in Texas, the springs at San Marcos have historically exhibited the greatest flow dependability and environmental stability of any spring system in the southwestern United States. The San Marcos Spring ecosystem, including its spring run, the San Marcos River, has a greater known diversity of aquatic organisms than any other ecosystem in the Southwest. Many of the species found here are endemic and restricted to a few kilometers of the spring run.

The San Marcos ecosystem is in a precarious situation due to a variety of factors, including increased human use of aquifer waters, increased urbanization in the San Marcos region, resulting in increases in flood intensity, pollution, recreational use and alteration of the river.

The San Marcos gambusia prefers quiet waters adjacent to sections of faster moving, thermally consistent waters. Habitats are generally shallow with muddy but not silted substrates. Shade from overhanging vegetation and/or bridge structures is one factor common to all localities where San Marcos gambusia have been found. Few localities along the upper San Marcos River have all the necessary habitat components of the San Marcos gambusia. The San Marcos gambusia has not been collected for over ten years, and it is probable that this species is extinct. Nevertheless, until the species is delisted, the Service must consider any potential impacts to the species which may result from the use of pesticides within its historic range.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Pesticides have been identified as potentially causing adverse impacts to the San Marcos gambusia. Controlling or restricting the use of pesticides has been suggested as one means by which to promote its recovery. Because of the urban land use in the immediate vicinity of San Marcos and the prevalence of rangeland cover types in the surrounding area, including the recharge zone of the Edwards Aquifer, the potential exists for exposure of the species to rangeland pesticides and mosquito larvicides. For rangeland pesticides, probable routes of exposure are runoff within the surface drainage basin and percolation from the aquifer recharge area. For larvicides, direct application and drift are the most likely routes of
exposure.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other chemicals except mosquito larvicides (Table 9).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, captan, methomyl, methoprene.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, captan, methomyl, methoprene.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Conasauga logperch (Percina jenkinsi)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Conasauga logperch is a medium-sized, slender logperch of the subgenus Percina. Like other logperches, it feeds by flipping small stones with its snout and consuming aquatic invertebrates. It is most often found in deep runs or moderate to swiftly flowing pools. Substrates in its preferred habitat have been described as mixed cobble, gravel, sand and vegetation. Seasonally, however, (during the spring reproductive period) the Conasauga logperch may also be found in swift, shallow gravel shoal areas. Any major land use activity or change which increases siltation or alters the water flow regime could be detrimental to the species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Conasauga logperch is restricted to approximately 11 miles of the main channel of the upper Conasauga River in Polk and Bradley counties, Tennessee, and Murray and Whitfield counties, Georgia. A portion of this species' range falls within the Cherokee and Chatahoochee National Forests. Agricultural practices occurring in the area include corn, soybeans and cattle production. Additionally, forestry practices occur in the National Forests and on privately owned property within this habitat. Therefore, all 60 chemicals could potentially impact the Conasauga logperch. Because of the similarities in habitat type, biology and physiology of some listed fishes, similar exposure potential and toxicity have been assumed for the following species: blackside dace, amber darter, bayou darter, boulder darter, snail darter, Conasauga logperch and Cape Fear shiner.

Table 18 was used to obtain hazard ratios for freshwater fish. When data was not available in table 18 , table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from

pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Scioto madtom (Noturus trautmani)

ADDRESSED IN REQUEST PARTS 1, 3 and 5

SPECIES/HABITAT DESCRIPTION:

Historically, the Scioto madtom has been found at only one locality, Big Darby Creek, one mile south of Fox, Ohio and 30-60 meters upstream from State Route 104. Responding to your question in request part 3, the Service acknowledges this species has not been found since the late 1950's. However, because of the reclusive nature of madtoms and the difficulties inherent in surveys for this group, we are reluctant at this time to declare the species extinct.

The area surrounding the species habitat is largely forested, interspersed with farms that produce a variety of products. The river is designated by the State as a wild river and hence provides some protection to water quality. The State has initiated a limited landowner contact program to further protection of the watershed, but efforts need to be increased.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Because the species existance is focused on only one small habitat, the Service believes maximum protection should be provided. This protection can be achieved through user education and a landowner contact program which will seek voluntary commitment to provide protection to the species.

As a result of discussions with Agency personnel, the Service has indication the Agency is willing to initiate a user education and landowner contact program targeted to develop agreements which would provide species' protection. The Service agrees with this approach and believes jeopardy can be avoided and incidental take minimized if all of the land base at the location of the madtom, extending upstream one half mile, is protected through agreements between the Agency, the Service and the landowner. The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: aminocarb, atrazine, benomyl, bifenox, biphenthrin, bufencarb, campechlor, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, cuprous oxide, cypermethrin, demeton, diazinon, dichlorprop, dichlorvos, dicofol, dinoseb, disulfoton, endrin, EPN, ethion, ethoprop, ethyl parathion, fenthion, fensulfothion, fenvalerate, fluchloralin, flucythrinate, fonofos, isofenphos, methoxychlor, methyl parathion, naled, phosmet, profluralin, propargite, propazine, prophenphos, sulprofos, temephos, terbufos, trichlorfon, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: aminocarb, benomyl, bufencarb, campechlor, carbaryl, carbofuran, carbophenothion, chlorpyrifos, copper sulfate, cuprous oxide, cypermethrin, demeton, diazinon, dichlorprop, dichlorvos, dicofol, dinoseb, disulfoton, endrin, EPN, ethion, ethoprop, ethyl parathion, fenthion, fensulfothion, fenvalerate, fluchloralin, flucythrinate, fonofos, isofenphos, methoxychlor, phosmet, profluralin, propargite, prophenphos, temephos, terbufos, trichlorfon, trifluralin.

This level of take is unquantifiable for the following reasons: This species is a bottom dweller that does not lend itself to surveys. The chance of finding a dead fish is very remote.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Smoky madtom (Noturus baileyi)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The smoky madtom is a small madtom catfish. Aquatic insect larvae account for the bulk of their diet. From late May to early November, smoky madtoms occur in all parts of riffles, especially riffle crests. From early November to late May, they occur in shallow pools. They are found under flat, palm-sized rocks, called slabrocks, to the exclusion of other species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The smoky madtom occurs only in Citico Creek, Monroe County, Tennessee. All but the lower 1.0 km of its range is within the Cherokee National Forest. No agricultural activities occur within the smoky madtom's range. Forestry practices in the National Forest may have a detrimental effect on the species including the use of forestry pesticides. The federally threatened yellowfin madtom occurs in the same habitat as the smoky madtom but in much greater numbers and over a wider range. However, it is safe to assume that, due to the similarity of the species and their habitats, the smoky madtom has the same potential for exposure to forestry chemicals as the yellowfin madtom. Smoky madtoms, like most madtoms rely on chemoreception for survival, any changes in the water quality could detrimentally affect the species survival.

Table 18 was used to obtain hazard ratios for freshwater fish. When information was available on catfish that was used instead. When data was not available from table 18, table 12 was used. Only those chemicals listed as forestry or range chemicals were reviewed for toxicity.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, carbaryl, diazinon, ethyl parathion, malathion, permethrin, phorate, profenofos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, bensulide, bifenox, captan, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diflubenzuron, disulfoton, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxydemeton-methyl, oxyfluorfen, phosmet, propazine, pyrethrin, sulprofos, terbutryn, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, carbaryl, diazinon, ethyl parathion, malathion, permethrin, phorate, profenofos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, bensulide, bifenox, captan, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diflubenzuron, disulfoton, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxydemeton-methyl, oxyfluorfen, phosmet, propazine, pyrethrin, sulprofos, terbutryn, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Yellowfin madtom (Noturus flavipinnis)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The yellowfin madtom is a small madtom catfish from the family Ictaluridae. This species feeds almost exclusively on aquatic insect larvae, although crustaceans may also be consumed. As with most madtom species, yellowfin madtoms are nocturnal. Yellowfin madtoms can live to three or four years and are reproductively mature at two years old.

This species is an inhabitant of pools and backwaters of small to moderate-sized streams. They are diurnally associated with cover, presumably near the stream bank beneath bedrock ledges or tree roots. During spring, summer and fall, the adult madtoms are nocturnally associated with open benthic areas or under cover during their nightime forages. Current limiting factors for yellowfin madtoms are apparently suitable pool areas free of pollution and silt.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The yellowfin madtom occurs in three geographically isolated populations in Claiborne, Hancock and Monroe counties, Tennessee and in Scott and Russell counties, Virginia. Two of the three known populations occur on creeks and rivers that are surrounded by agriculture (Powell River and Copper Creek). The remaining population in Citico Creek, runs through Cherokee National Forest where no agriculture occurs. The National Forest is managing its forests along Citico Creek for the protection of the yellowfin madtom and harmful pesticides are not used in the area. The potential for yellowfin madtoms to be exposed to agricultural pesticides is greatest in the Powell River and Copper Creek populations. The Citico Creek population is not impacted by agricultural pesticides but may be affected by forestry pesticides. Yellowfin madtoms, like most madtoms rely on chemoreception for survival, any changes in the water quality could detrimentally affect the species survival.

Table 18 was used to obtain hazard ratios for freshwater fish. When information was available on catfish that was used instead. When data was not available from table 18, table 12 was used. All 60 pesticides could potentially impact the yellowfin madtom, either through drift, runoff or direct application.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its

critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, atrazine, bensulide, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species.
Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, bensulide, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methoprene, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Loach minnow (Tiaroga cobitis)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

The loach minnow occurs in mid-elevation (600-2200 meters), cool to warmwater, low-gradient streams and rivers in the Gila River basin. It is a Gila River endemic that formerly occupied larger streams and rivers throughout much of the Gila River basin upstream from the Salt-Gila River confluence in Arizona, New Mexico and Sonora, Mexico.

Present distribution of the loach minnow is reduced. Populations in Arizona are known only from reaches of Aravaipa Creek, the White River (including its East and North Forks), and the Blue and San Francisco Rivers. Populations in New Mexico are known only from reaches of the Gila River (including its East, West and Middle Forks), the San Francisco River, and Tularosa, Whitewater and Dry Blue Creeks. These streams flow through a variety of riparian habitats ranging from ponderosa pine-dominated upstream reaches to Chihuahuan and Sonoran desert scrub at lower elevations. A large portion of the population occurs on land managed by the U.S. Bureau of Land Management, U.S. Forest Service (Apache National Forest and Gila National Forest) and the Fort Apache (White Mountain) Indian Reservation.

Riparian vegetation along streams where the species is found includes willow, cottonwood, sycamore and a variety of shrubs, grasses and sedges. Loach minnows inhabit only perennial, well-aerated lotic habitats of moderate temperature and velocity. Loach minnows are primarily carnivorous and feed on a variety of aquatic invertebrates, mostly insect larvae, thus it is important that a large and healthy invertebrate community be maintained, especially in the late spring and early summer when large numbers of larval fish are present.

Reasons for the decline of the loach minnow include habitat destruction due to loss or modification of surface water flows by impoundment and diversion, and groundwater pumping, and accelerated erosion due to livestock overgrazing and large-scale clear-cut timber removal. Importation of nonnative species placed a further strain on remaining populations of the loach minnow through competitive and/or predatory interactions. The recovery of the species depends, in part, on controlling or restricting the use of pesticides within its range.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The loach minnow is most susceptible to exposure to pesticides registered for use on forests and rangelands, where most of its habitat occurs. The Cliff-Gila Valley of New Mexico, however, is an agricultural area, where the potential exists for contamination of the species' habitat by agricultural chemicals, as well. The loach minnow population in Aravaipa Creek is also downstream from an agricultural area. The most likely routes of exposure to cropland and rangeland chemicals are through runoff and drift from adjacent treated areas. Hazard ratios of chemicals for which a stream model was available were taken from Table 18. Otherwise, Table 14 data were used. Direct application and drift are likely routes of exposure for forest chemicals and mosquito larvicides; for these Table 9 data were used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, bensulide, carbaryl, carbofuran, carbophenthion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dimethoate, disulfoton, endosulfan, ethion, ethyl parathion, malathion, methomyl, methyl parathion, mevinphos, naled, oxyfluorfen, pendimethalin, phorate, phosmet, profenfos, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, bifenox, captan, copper sulfate, dicrotophos, diflubenzuron, diuron, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, nitrapyrin, oxamyl, oxydemeton-methyl, permethrin, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (atrazine, azinphos-methyl, benomyl, bensulide, carbaryl, carbofuran, carbophenthion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dimethoate, disulfoton, endosulfan, ethion, ethyl parathion, malathion, methomyl, methyl parathion, mevinphos, naled, oxyfluorfen, pendimethalin, phorate, phosmet, profenfos, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, bifenox, captan, copper sulfate, dicrotophos, diflubenzuron, diuron, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, nitrapyrin, oxamyl, oxydemeton-methyl, permethrin, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Comanche Springs pupfish (Cyprinodon elegans)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The Comanche Springs pupfish presently occurs only in a small series of springs, spring runs and irrigation canals in the vicinity of Balmorhea, Reeves County, Texas. Its present range includes the system of irrigation canals connecting Phantom Lake and San Solomon Springs in Jeff Davis County and Giffen, and East Sandia Springs in Reeves County, Texas. Surrounding land use includes agricultural crops (cotton and sorghum) and pasture. Adjacent rangeland habitats are classified as southwestern shrubsteppe.

Comanche Springs pupfish prefer relatively swift, stenothermal water greater than ten centimeters deep with algae or debris as substrates. Food preferences probably include a variety of items including detritus, diatoms, algae, insects, crustaceans and snails.

The species is threatened by water depletion from groundwater pumping, habitat loss due to irrigation and agricultural development, competition with introduced nonnative species and loss of genetic integrity due to hybridization with introduced sheepshead minnows (Cyprinodon variegatus). The Recovery Plan for the species identifies controlling use of pesticides known to be harmful to the food chain on which the pupfish depends as being necessary to maintain existing populations of Comanche Springs pupfish.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Its dependence upon irrigation canals associated with agricultural lands make the Comanche Springs pupfish particularly vulnerable to exposure to pesticides registered for use on agricultural crops. Cotton and sorghum are the principal crops currently grown in the range of the species. Probable routes of exposure are through runoff and drift from adjacent treated areas. Exposure to mosquito larvicides could occur through direct application to springs, streams, irrigation canals and adjacent wetlands within the species' habitat. In addition, springs on which the Comanche Springs pupfish is reliant are vulnerable to water quality impacts to their source aquifer from the use of rangeland pesticides within its recharge zone.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other rangeland chemicals. Table 9 was used for mosquito larvicides.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, chlorpryifos, diazinon, ethyl parathion, malathion, methyl parathion, pyrethrin, naled, propachlor.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, carbophenthion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methomyl, methoprene, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenfos, propargite, propazine, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin, trichlorfon.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, chlorpryifos, diazinon, ethyl parathion, malathion, methyl parathion, pyrethrin, naled, propachlor), if the reasonable and prudent alternatives listed in Section II are are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, carbophenthion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methomyl, methoprene, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenfos, propargite, propazine, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin, trichlorfon.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Desert pupfish (Cyprinodon macularius)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Within California, the desert pupfish is currently restricted to portions of the San Felipe Creek (Imperial County) and its tributaries -- Carizzo Wash and Fish Creek Wash; Salt Creek (Riverside County), and a few shoreline pools and irrigation drains along the Salton Sea. The San Felipe Creek system has been designated as critical habitat (50 CFR 17.95(e)). Critical habitat extends outward 100 feet on either side of the stream channel. The Salt Creek population of the pupfish should also be given careful consideration because of the relatively large number of fish in this system. Additional critical habitat occurs at Quitobaquito Spring, Pima County, Arizona, entirely within Organ Pipe Cactus National Monument.

Desert pupfish inhabit shallow water in pools and slow-moving stretches of desert streams. They are well adapted to harsh desert environments and are capable of surviving high temperatures, low oxygen levels and high salinities.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Imperial Valley, adjacent to the Salton Sea, is one of the great crop producing areas of the world. Agricultural developments are located near the San Felipe Creek critical habitat. The integrity of portions of the critical habitat is threatened by proposals to convert nearby private land to irrigated agriculture. The restricted range of this species together with its location in areas of active agriculture indicate high potential for exposure. Pesticide drift was a factor cited in the decision to list the species as endangered. Many thousands of acres of small grains are raised in Imperial and Riverside Counties. Wheat, in particular, is apparently grown in the immediate watershed of San Felipe Creek and its tributaries (19a,b). Pesticide contamination of waterways has caused fish kills in the past (21).

Runoff/drift from large fields into shallow streams of San Felipe Creek and Salt Creek suggests that modeling results from Tables 19A and 19B are the closest available representation of desert pupfish habitat conditions. All of the chemicals in the request could be applied within the range of the desert pupfish. Even most forest use chemicals are efficacious against the pests of small grains, cotton, or corn, and so were included in the evaluation of crop/small grain chemicals.

The population at Quitobaquito Spring is downwind from nearby farms in Mexico that are sprayed with organophosphates and chlorinated hydrocarbons.

Studies of this population (32) reveal that the desert pupfish exhibited elevated levels of parathion and DDT derivatives.

Because of the extremely restricted range of this species, and major accidental spills or increased levels of pesticide contamination could have a devastating impact on the Quitobaquito population.

Hazard ratios varied widely. The risk assessment generally found those chemicals with insignificant hazard ratios presented no jeopardy to the desert pupfish. Comparisons with Table 19 (pond-stream model) to the extent possible, corroborated these results.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, methidathion, methomyl, methyl parathion, mevinphos, naled, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

Contamination of San Felipe Creek by chemicals likely to jeopardize the desert pupfish will adversely modify the critical habitat of the desert pupfish by polluting the aquatic environment upon which the pupfish depends. Concentrations of these chemicals as predicted by Agency modeling are expected to exceed levels lethal to the species. Restrictive buffer zones 40 yards wide (from stream edge) for ground application, and 200 yards wide for aerial application shall be established along San Felipe Creek and its tributaries, Carrizo Wash and Fish Creek Wash, and Tarantula Creek Wash and along Salt Creek and surrounding Quitobaquito Springs. The wider buffer is required to prevent direct application of pesticides to the critical habitat which extends 33 yards from the edge of the stream.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, bifenox, diflubenzuron, dimethoate, diuron, nitrapyrin, phosphamidon, propazine .

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, methidathion, methomyl, methyl parathion, mevinphos, naled, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species or destruction or adverse modification of its critical habitat. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should desert pupfish be recovered following chemical applications, they should be chilled (preferably frozen) and immediate contact made with the Service's Laguna Niguel Field Station at (714) 643-4270 to obtain further instructions.

SPECIES PROFILE

SPECIES: Leon Springs pupfish (Cyprinodon bovinus)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The Leon Springs pupfish occupy four separate localities within the Leon Creek drainage in an area approximately 15 kilometers north of Fort Stockton, Pecos County, Texas. It inhabits natural spring seeps and pools along Leon Creek and marsh habitats associated with spring outflows, such as Diamond-Y Spring. Rangeland in the area is characteristic of southwestern shrubsteppe, associated wetlands are nonforested, and agricultural uses include croplands (sorghum and cotton) and pasture.

Habitats where the pupfish is found are shallow, eurythermal, relatively saline, with seasonally abundant algae, Scirpus and Chara in the streambed and along the creekbank. Substrates are mostly hard clays and soft to flocculent muds. Food preferences probably include a variety of items including detritus, diatoms, algae, insects, crustaceans and snails.

Threats to the species include habitat loss due to surface water reduction resulting from agricultural development, competition with introduced species, hybridization with introduced sheepshead minnows (Cyprinodon variegatus), and pollution and habitat alteration due to oil and gas development. The Recovery Plan for the species identifies controlling use of pesticides known to be harmful to the food chain on which the pupfish depends as being necessary to maintain existing populations of Leon Springs pupfish.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Because of its association with agricultural lands, the Leon Springs pupfish is vulnerable to exposure to pesticides registered for use on agricultural crops. Cotton and sorghum are the principal crops currently grown in the range of the species. Probable routes of exposure are through runoff or drift from adjacent treated areas. Exposure to mosquito larvicides could occur through direct application to springs, streams and adjacent wetlands within the species' habitat. The Leon Springs pupfish is also reliant on a supply of spring water, which is vulnerable to water quality impacts to its source aquifer from the use of rangeland pesticides within its recharge zone.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other rangeland chemicals. Table 9 was used for mosquito larvicides.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, chlorpryifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, carbophenthion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methomyl, methoprene, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenfos, propargite, propazine, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin, trichlorfon.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, chlorpryifos, diazinon, ethyl parathion, malathion, methyl parathion, naled, propachlor, pyrethrin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, carbophenthion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, methomyl, methoprene, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenfos, propargite, propazine, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin, trichlorfon.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Owens pupfish (Cyprinodon radiosus)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The Owens pupfish originally occurred in the Owens River and adjacent springs and sloughs from Fish Slough, Mono County, to as far south, but not into, Owens Lake, Inyo County, and springs around the lake. The Owens pupfish presently occurs in three locations representing a total of only 6.0 acres of aquatic habitat: Owens Valley Native Fish Sanctuary in Fish Slough (5.6 acres) and BLM Spring (0.2 acres) in Mono County, California; and Warm Springs (0.2 acres) in Inyo County, California. Currently the pupfish is not secure in any of the three refugia. Each is vulnerable to disruption from adjacent land uses.

The native habitat of the Owens pupfish has undergone extensive modification. Water use projects (diversion, groundwater pumping) and introductions of exotic fishes (mosquito fish, largemouth bass, and carp) have kept the species on the edge of extinction. Some of these species are predacious, while others compete for food and mating resources. Hybridization with other Cyprinidae has been known to occur.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Historically, agricultural development and water export have reduced pupfish habitat. Livestock grazing occurs immediately adjacent to the refugia and chemical management of the surrounding rangeland is to be expected. Agricultural use of chemicals would be limited to range applications and possible mosquito control. Prior consultations have limited consideration to these areas and the Serivce reaffirms the scope of that coverage at this time. Considerable irrigated pasture and other rangeland occurs in both Inyo and Mono Counties, California (8). Livestock grazing occurs adjacent to the Owen's pupfish sanctuary springs. Chemicals applied for the purposes of range management could contaminate the springs and outflows supporting the species (Lorentzen, pers. comm.). The restricted ocurrence of the species heightens its vulnerability to chemical poisoning. Pesticide contamination could easily extinguish the entire population in any of the three refugia. This would seriously threaten the survival and recovery of the species.

Tables 15 and 16 were used as most closely approximating this species conditions.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, captan, diazinon, malathion, methomyl, naled, pyrethrin, trichlorfon.
Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, dimethoate, methoprene, methyl parathion, propachlor.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, captan, diazinon, malathion, methomyl, naled, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individual Owen's pupfish be lost due to chemical applications, and subsequently recovered, remains should be chilled (preferably frozen) and contact made with our Sacramento Endangered Species Field Station at (916) 978-4866.

SPECIES PROFILE

SPECIES: Cape Fear shiner (Notropus mekistochlas)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Cape Fear shiner is a small, moderately stocky minnow from the family Cyprinidae. Cape Fear shiners are herbivorous, feeding on bottom detritus, diatoms and other periphytes. It is generally associated with gravel, cobble, and boulder substrate, and it has been observed inhabiting slow pools, riffles, log jams and slow runs often associated with water willow. Rocky boulder riverine habitat is important for the species, and it appears that loss of this habitat has reduced the species' range. Dam construction in the Cape Fear system has probably had the most serious impact on the species by inundating the species' rocky riverine habitat and altering stream flows.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Cape Fear shiner is restricted to only four populations in the Cape Fear River drainage in Chatham, Harnett, Lee, Moore and Randolph counties, North Carolina. Agriculture, cattle production and forestry practices occur within the Cape Fear shiner's habitat. All 60 chemicals could potentially impact this species. Even though this species has different characteristics than the related darters, its potential for exposure and toxicity is roughly similar. Therefore, based on available information, similar toxicities are assumed for this species as for other darters.

Table 18 was used to obtain hazard ratios for freshwater fish. When data was not available in table 18, table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, dicrotophos, ethion, ethyl parathion, fenamiphos, fensulfothion, malathion, methidathion, mevinphos, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, fonofos, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, phosphamidon, propachlor, propargite, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also population levels fluctuate throughout the year.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE.

SPECIES: Pecos bluntnose shiner (Notropus simus pecosensis)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Pecos bluntnose shiner is endemic to the Pecos River system of New Mexico. While it formerly ranged from near Santa Rosa, Guadalupe County, downstream to Major Johnson Springs near Carlsbad, Eddy County, the species is presently known from 18 unevely spaced populations along a 340 kilometer reach of the Pecos River. They occur from the U.S. 60 bridge crossing west of Fort Sumner, DeBaca County, south to the outflow of Lake McMillan, Eddy County, New Mexico. Land ownership in the Pecos River Valley is predominantly private.

The shiner is found in an area of low relief where the Pecos River meanders through a broad valley. A slight stream gradient exists producing a shallow, low-velocity stream with a sand/silt substrate. Young-of-the-year shiners were found in the main channel, pools, riffles and backwaters. It is assumed that the shiner feeds on small macroinvertebrates, such as insects and other arthropods.

The primary reason for its decline is human modification of its habitat. Other threats to the species include water diversion for irrigation, siltation, pollution from agricultural runoff and competition with introduced species. Contribution of pollutants to the Pecos River from agricultural operations along the river is detrimental to the Pecos bluntnose shiner. Runoff from cultivated fields and livestock operations, and return irrigation water flows have adverse effects on water quality in the river. Controlling or restricting the use of pesticides has been identified as an element in the recovery of the species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Agricultural operations, including field cultivation (fallow, hay and pasture) and livestock grazing occur along the Pecos River. Irrigation return flows are discharged to the Pecos River along the reach in which the shiner occurs. There is a high probability that agricultural pesticides do and will continue to contaminate the species' habitat. Furthermore, the proximity of livestock grazing both within the floodplain and on adjacent uplands, indicate that rangeland chemicals may also be used within the watershed of the Pecos River. Probable routes of exposure are through runoff, especially from drain water and return flows from agricultural fields. Hazard ratios of chemicals for which a stream model is available were taken from Table 18. Otherwise, Table 14 data were used. The species' occurrence in the vicinity of several population centers also makes it vulnerable to impacts from the direct application of mosquito larvicides, which have been used in the past in the Pecos River Valley in New Mexico. Table 9 data were used for larvicides.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, bensulide, captan, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, malathion, methomyl, methyl parathion, mevinphos, naled, pendimethalin, phorate, profenfos, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, benomyl, bifenox, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, ethoprop, disulfoton, diuron, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, methidathion, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phosmet, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (atrazine, azinphos-methyl, bensulide, captan, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, malathion, methomyl, methyl parathion, mevinphos, naled, pendimethalin, phorate, profenfos, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon) if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, benomyl, bifenox, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, ethoprop, disulfoton, diuron, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, methidathion, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phosmet, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Waccamaw silverside (Menidia extensa)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Waccamaw sliverside is a long, slender, almost transparent fish from the family Atherinidae. It feeds on whatever zooplankton are most available at any given time. Waccamaw silversides reach sexual maturity at 1 year of age. Spawning peaks in March and April. The Waccamaw silverside is a lacustrine species restricted to Lake Waccamaw, where it occupies open water over a dark sand bottom. The watershed is managed primarily for agriculture and commercial lumber production. Much of the forested portions of the watershed is swamp of cypress, tupelo, and red maple of various age classes.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Waccamaw silverside exists only in Lake Waccamaw and the upper Waccamaw River, Columbus County, North Carolina. It occupies open water over a dark sand bottom. The watershed of Lake Waccamaw is managed primarily for agriculture (row crops and pasture) and commercial lumber production. Activities or disturbances contributinfg to siltation or pesticide application in these areas could adversely impact these species. This species could potentially be impacted by all 60 chemicals being reviewed.

Hazard ratios for the Waccamaw silverside were obtained from table 16 because it most closely represented the habitat associated with the species.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, mevinphos, naled, pendimethalin, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, atrazine, bifenox, carbofuran, dicrotophos, diflubenzuron, dimethoate, diuron, ethoprop, isofenphos, mancozeb, methomyl, methyl parathion, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, phosphamidon, propachlor, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, methidathion, mevinphos, naled, pendimethalin, permethrin, phorate, phosmet, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, bifenox, carbofuran, dicrotophos, diflubenzuron, dimethoate, diuron, ethoprop, isofenphos, mancozeb, methomyl, methyl parathion, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, phosphamidon, propachlor, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits a large lake and adjacent streams. Due to its small size, the likelihood of recovering a specimen is very small. Also population levels fluctuate throughout the year. Therefore, we are unable to determine a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Spikedace (<u>Meda fulgida</u>)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

The spikedace occurs in mid-elevation (600-2200 meters), cool to warmwater, low-gradient streams and rivers in the Gila River basin. It is a Gila River endemic that formerly occupied larger streams and rivers throughout much of the Gila River basin upstream from the Salt-Gila River confluence in Arizona and New Mexico.

Present distribution of the spikedace is greatly reduced with populations known only from warmwater reaches of Aravaipa Creek, Eagle Creek and the Verde River in Arizona, and the Gila River in New Mexico. These streams flow through a variety of riparian habitats ranging from ponderosa pine-dominated upstream reaches to Chihuahuan and Sonoran desert scrub at lower elevations. Streamside vegetation includes willow, cottonwood, sycamore and a variety of shrubs, grasses and sedges. Spikedace inhabit only perennial, well-aerated lotic habitats of moderate temperature and velocity. Spikedace are primarily carnivorous and feed on a variety of drifting and benthic invertebrates, mostly insect larvae. It is important that a large and healthy invertebrate community be maintained, especially in late spring and early summer when large numbers of larval fish are present.

Land ownership within the range of the spikedace is mixed with populations occurring on lands managed by the Bureau of Land Management, U.S. Forest Service (Prescott, Gila and Apache-Sitgreaves National Forests), the San Carlos Apache Indian Reservation and the Phelps-Dodge Corporation, with other private landholdings scattered throughout its range. Agricultural crops grown within its range also include corn, sorghum, cotton, sunflowers, hay and pasture.

Reasons for decline of the spikedace include habitat destruction due to loss or modification of surface water flows by impoundment and diversion and groundwater pumping, and accelerated erosion due to livestock overgrazing, large-scale clear-cut timber removal. Importation of nonnative species placed a further strain on remaining populations of the spikedace through competitive and/or predatory interactions. The recovery of the species depends, in part, on controlling or restricting the use of pesticides within its range.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The spikedace is most susceptible to exposure to pesticides registered for use on forests and rangelands, where most of its habitat occurs. The Cliff-Gila Valley of New Mexico, however, is an agricultural area, where the potential exists for contamination of the species' habitat by agricultural chemicals. In addition, both the Aravaipa Creek and Verde River populations are downstream from agricultural areas. The most likely routes of exposure are through runoff and drift from adjacent treated areas. Hazard ratios of chemicals for which a stream model was available were taken from Table 18. Otherwise, Table 14 data were used. Direct application and drift are likely routes of exposure for forest chemicals and mosquito larvicides; for these Table 9 data were used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, bensulide, carbaryl, carbofuran, carbophenthion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dimethoate, disulfoton, endosulfan, ethion, ethyl parathion, malathion, methomyl, methyl parathion, mevinphos, naled, oxyfluorfen, pendimethalin, phorate, phosmet, profenfos, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, bifenox, captan, copper sulfate, dicrotophos, diflubenzuron, diuron, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, nitrapyrin, oxamyl, oxydemeton-methyl, permethrin, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, azinphos-methyl, benomyl, bensulide, carbaryl, carbofuran, carbophenthion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dimethoate, disulfoton, endosulfan, ethion, ethyl parathion, malathion, methomyl, methyl parathion, mevinphos, naled, oxyfluorfen, pendimethalin, phorate, phosmet, profenfos, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, bifenox, captan, copper sulfate, dicrotophos, diflubenzuron, diuron, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenfos, mancozeb, methidathion, nitrapyrin, oxamyl, oxydemeton-methyl, permethrin, phosphamidon, propargite, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Little Colorado spinedace (Lepidomeda vittata)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

Endemic to the upper portions of the Little Colorado River and its north-flowing permanent tributaries on the Mogollon Rim and northern slopes of the White Mountains in eastern Arizona, the Little Colorado spinedace is now restricted to portions of East Clear Creek, Coconino County, Chevlon and Silver Creek, Navajo County, and the Little Colorado River and Nutrioso Creek, Apache County, Arizona. Its range includes both forest and rangeland biomes.

This spinedace inhabits moderate to small streams in pools with flowing water over fine gravel and silt-mud substrates. Many of the streams are seasonally intermittent, at which times the spinedace persists in deep perennial pools and spring areas. The spinedace redistributes itself during periods of high flow.

Reasons for its decline include habitat destruction and alteration associated with impoundments, water withdrawals, removal of riparian vegetation. The use of fish toxicants and the introduction of nonnative predatory and competitive fish species has also adversely affected the Little Colorado spinedace.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Because the Little Colorado spinedace is associated with both forest and rangeland habitats, it potentially could be exposed to pesticides and registered for use on these land types. Probably routes of exposure are through runoff and drift from adjacent treated areas.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other rangeland chemicals. Table 13 was used for all forest chemicals.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, disulfoton, fenvalerate, malathion, methomyl, methyl parathion, naled, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, dimethoate, mancozeb, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbohenothion, chlorpyrifos, diazinon, disulfoton, fenvalerate, malathion, methomyl, methyl parathion, naled, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, dimethoate, fenvalerate, mancozeb, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Colorado squawfish (Ptychocheilus lucius)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

Adult Colorado squawfish use a variety of habitat types which vary depending on the time of year. Adults are most abundant in the upper Green River (between the mouth of the Yampa River and head of Desolation Canyon) and lower Green River (between the Price and San Rafael Rivers). Other concentration areas include the Yampa River, the lower 21 miles of the White River, and the Ruby and Horsethief Canyon area of the Colorado River between Westwater, Utah, and Loma, Colorado. In addition, the Colorado squawfish occurs in the San Juan River downstream from Navajo Dam.

Spawning occurs in July-August in the lower 30 miles of the Yampa River and in Gray Canyon in the Green River. There also are a number of Colorado squawfish suspected spawning areas in the Green, Colorado and San Juan Rivers.

Young-of-the-year Colorado squawfish are usually captured in shallow backwaters, shoreline habitats with silt and sand substrates and little or no current. High concentrations of juveniles are found in the Green River between Green River, Utah, and the confluence of the Green River with the Colorado River. The highest density of young-of-year fish occurs 100-150 miles below the Green and Yampa spawning areas. A high-density young-of-the-year area also occurs in the upper Professor Valley of the Colorado River.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Squawfish are therefore found in approximately 1000 miles of the Green, Yampa, White, Colorado, Gunnison, and San Juan Rivers. Approximately 485 of the 1000 miles is nursery habitat including 345 miles on the Green River and 140 miles on the Colorado River. Additional young-of-year squawfish have been found in the San Juan River in the vicinity of Shiprock, New Mexico and Bluff, Utah. Some crops (corn, sorghum, wheat, barley, and oats) are grown near or adjacent to less than 90 miles of the Green River (River Mile 200-290-Ouray to Jensen) and possibly a small amount near the town of Green River, Utah. Of young-of-the-year nursery areas in the Colorado River, some crops may be grown along or adjacent to approximately 20 miles of the river including in the area of Loma, Colorado (River Mile 140 to 150) and downstream from the Gunnison River or the Grand Junction, Colorado area (River Mile 160 to 170). The use of pesticides for forestry and rangeland uses may occur throughout the range of the squawfish.

Table 13 was used for forest and rangeland use and Table 15 for crops to obtain hazard ratios for freshwater fish. Table 16 (runoff) was used for aldicarb, carbofuran, and phorate.

Based on the use patterns that occur near or adjacent to the habitat of the Colorado squawfish (forestry, rangeland, corn, and small grains), it is believed that 53 of the pesticides in Table 1 and fentitrothion and methoprene in part 5, have a potential to impact the squawfish mostly through drift as well as runoff into the habitat. The shallow backwater areas used as nursery habitat for the squawfish are particularly vulnerable to the pesticides. Of these 55 pesticides, the Service believes that the use of 4 of them are likely to jeopardize the continued existence of the Colorado squawfish. This determination is based primarily on the species distribution, known use patterns, the hazard ratios of both fish species and invertebrates as well as other factors such as persistance, bioaccumulation, and in some cases, lack of sufficient information on one of the above factors.

The primary uses of most of the 55 pesticides are for corn and small grains rather than forestry and rangeland. Thus, while the uses of most of the pesticides could result in the loss of squawfish, those pesticides are not likely to jeopardize the entire population since crops are only grown in approximately 11 percent of squawfish habitat or 23 percent of squawfish nursery habitat (does not include possible nursery habitat in the San Juan River). The use of some of the pesticides for forestry and rangeland uses could cover a much more extensive area and thus jeopardize the squawfish.

The Service has determined that there would not be exposure to the Colorado squawfish from the remaining 6 pesticides in Table 1. This is because none of the known registered uses of those pesticides considered in this consultation are for uses that occur near Colorado squawfish habitat.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, diazinon, malathion, phosmet.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fenitrothion, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, methidathion, methomyl, methoprene, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, propachlor, propargite, propazine, pyrethrin, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, diazinon, malathion, phosmet), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and incidental take is anticipated:

For any or all of the following chemicals, the Service anticipates an incidental take of 25 annually to occur: aldicarb, azinphos-methyl, benomyl, captan, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, methidathion, methomyl, methyl parathion, mevinphos, naled, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, propachlor, propargite, pyrethrin, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

This level of take is anticipated for the following reasons:

1. These pesticides have a hazard ratio above one (1), thus raising the possibility of resulting loss of the squawfish.

2. Approximately 11 percent of the squawfish habitat is most likely to have incidental take from these pesticides because crops, primarily corn and small grains, are grown in the area.

3. With no existing data on squawfish kills by these pesticides, we can only estimate an annual incidental take of 25 squawfish.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Unarmored threespine stickleback (Gasterosteus culeatus williamsoni)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

G. a. williamsoni occurs in Soledad Canyon, adjacent portions of the Santa Clara River downstream, and possibly in San Francisquito Canyon, Los Angeles County, California. The taxonomic status of the stickleback is currently somewhat confused. Until published research sheds clarifying light, the Service believes the following areas represent the range of true williamsoni:

(A) Santa Clara River downstream from the junction with San Martinez Grande Canyon.

(B) Santa Clara River in Soledad Canyon near Lang (River's End Park).

(C) San Francisquito Canyon from about 100 meters downstream of the San Francisquito Canyon Road and upstream to San Francisquito Powerhouse Number One.

(D) Southern part of Baldwin Lake and adjacent stream and spring habitats, including Shay Spring, San Bernardino County.

(E) San Antonio Creek, from the mouth to a point at the upstream end of Barka Slough, Santa Barbara County. It is possible that sticklebacks occur in other tributaries to San Antonio Creek.

The biology of Gasterosteus aculeatus williamsoni makes it more vulnerable to extinction than any typical stickleback population. Its endemism and proximity to expanding metropolitan Los Angeles also render it particularly vulnerable. Factors that have brought it to its current endangered status include:

1. Channelization which eliminates still water habitat needed for breeding, and aquatic vegetation that shelters fry.

2. Ground and surface water use (drawdown), which reduces instream flow, decreases available habitat, and ultimately causes elimination of riparian vegetation.

3. Introductions of exotic aquatic organisms. Introduced mosquito fish (Gambusia) might compete with sticklebacks for food. Other predatory fishes that tolerate warm water could have contributed to reduction of stickleback populations;

4. industrial and residential (urban) construction that increases pressure for channelization of seasonally flooded streams and for ground and surface water diversion. It also increases the potential for toxic spills and runoff of pesticides, eutrophication due to sewage leaching and fertilizer runoff, and increased runoff which may scour habitat, cause siltation of still water areas, and wash sticklebacks into areas of unsuitable habitat;

5. agricultural development in southern California often depends on use of limited local supplies of ground water, resulting in loss of habitat, and may result in release of leached nutrients or inorganic toxins, increased erosion and siltation. Siltation causes habitat distruction by covering the bottom of pools or completely fills pools;

6. the development of recreational parks in Soledad Canyon. Use of off-road vehicles along and in the stream may adversely affect sticklebacks by eliminating aquatic and riparian vegetation;

7. a southern Pacific Railroad line through Soledad Canyon, including the area immediately upstream of the most upstream population of G. a. williamsoni. A chemical spill from a train has the potential to eliminate the unarmored threespine stickleback from the type locality;

8. excessive growth of aquatic vegetation (caused by fertilizer inflow from nearby agriculture and mild siltation, both of which increase available nutrients) may reduce dissolved oxygen through plant respiration and decomposition.

Populations of G. aculeatus with high frequencies of zero-plated individuals were once abundant in low gradient reaches of the Los Angeles, San Gabriel and Santa Ana Rivers and have been eliminated by some combination of the factors listed above.

All southern California populations of Gasterosteus, will be threatened by both agricultural and urban development. Inhabitation of such small aquatic habitat patches, characteristic of southern California drainages, renders sticklebacks there vulnerable to even more environmental distrurbance.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Agricultural activity is difficult to quantify within the widely dispersed range of the stickleback. Orchards, nurseries, vineyards, rangeland, cropland, and pastures are in proximity (11). A modest amount of grain is grown (19a,b), but not enough to warrant concern.

Range and mosquito control chemicals were the major groups identified as affecting sticklebacks in previous consultations (12/11/84; 10/25/84) and are reconfirmed for the scope of the present consultation. Several hundred thousand acres of pastures occur in Los Angeles, Ventura, Santa Barbara, and San Bernardino (19a,b). Chemical management of these acres would likely introduce toxic materials to the stream courses supporting sticklebacks. The quality of available data do not allow us to proceed beyond these generalized conclusions.

The urban habitats of the G. a. williamsoni make it potentially vulnerable to mosquito control programs. Habitat streams are low gradient with vegetation for cover. Sticklebacks tend to be numerous in small ponds favored as breeding habitat (11), the type of ponds that could be subject to application of mosquito larvacides. Tables 15 and 16 were used as most closely approximating this species conditions.

Of the chemicals used in range and mosquito control, all have significantly high hazard ratios for fish, indicating a high potential for lethal exposure of sticklebacks. Additionally, hazard ratios for the invertebrate food sources are much higher than for the listed species, adding to the overall threat (18). Only methyl parathion would have low or no effects when used in the range of the stickleback.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): captan, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methomyl, naled, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, dimethoate, methoprene, methyl parathion, propachlor.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and incidental take is anticipated:

For any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: captan, carbaryl, chlorpyrifos, diazinon, ethyl parathion, malathion, methomyl, naled, pyrethrin, trichlorfon.

This level of take is unquantifiable for the following reasons: Given the extremely high toxicity to fish exhibited by virtually all chemicals used for range management or mosquito larvicidal control, (LD50 (79-900ppb) incidental take is anticipated even with adherence to the aquatic buffer stipulated. Determining a quantity or extent of incidental take of sticklebacks is problematic. Population estimates of 2-3 fish per square meter of suitable habitat would indicate a large total population (28). Population fluctuations are apparently common in response to high water flows and high turbidities during fall and winter (rainy) months. The tiny, obscure stickleback is rarely seen under the best of circumstances. Incidental take due to pesticide applications will largely go unnoticed. Together with our imprecise information on the extent of pesticide applications it will be impossible to estimate or confirm the amount or extent of incidental take that may result from pesticide applications.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should incidental take occur, and individual sticklebacks be recovered, they should be immediately chilled or frozen and transferred to the California Department of Fish and Game, (213) 590-5151.

SPECIES PROFILE

SPECIES: June sucker (Chasmistes liorus)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The June sucker is endemic to Utah Lake in Utah County, Utah, and uses the lower portion of the Provo River (4.9 miles) for spawning. Utah Lake has an average depth of 9.5 feet and a maximum depth of 13.8 feet (Radant and Sakaguchi 1981).

Adult June suckers ascend the Provo River from mid-May through June and complete spawning within 14 to 20 days. Young-of-the year June suckers have been collected in the Provo River after hatching. However, no young-of-the-year or juvenile suckers are known to have been collected from Utah Lake in recent years. Accurate population estimates for the June sucker have not been made. It is suspected that there are less than 600 adults (based on spawning run estimates).

Adult June suckers have been captured throughout Utah Lake. Each year a post-spawning concentration develops in Provo Bay. Little else is known about this species that was listed as an endangered species in the March 31, 1986, Federal Register.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The spawning habitat in the Provo River is entirely within the city limits of the city of Provo. Between one-third and one-half of the stretch of the river is highly urbanized with primarily pastures and some small grains grown adjacent to the remaining portion of the 4.9 miles of river occupied by the June sucker. Numerous agricultural uses occur adjacent to the 94,000 acre lake including rangeland uses and the growing of some corn and small grains. Approximately 54,100 acres of corn, wheat, barley, and oats were grown in Utah County in 1987. Mosquito larvicides also are used in the area.

Table 9 was used to obtain hazard ratios for freshwater fish for mosquito larvicide uses while Table 13 was used for the remaining uses in the vicinity of the June sucker. Table 14 (runoff) was used for the granular pesticides carbofuran and phorate.

Based on the use patterns that occur near or adjacent to the habitat of the June sucker (rangeland, corn, small grains, and mosquito larvicides), it is believed that 47 of the pesticides of Table 1 have a potential to impact the June sucker primarily through drift of the pesticides into the habitat of this endangered species as well as runoff into the habitat and being applied directly to the June sucker habitat (mosquito larvicides). Of these 47 pesticides, the Service believes that the use of 17 of them are likely to jeopardize the continued existence of the June sucker. This determination is based primarily on the species distribution, known use patterns, the hazard ratios of both fish species and invertebrates as well as other factors such as persistence, bioaccumulation, and in some cases, lack of sufficient information on one of the above factors.

From the information provided by the Environmental Protection Agency, the Service has determined that there would not be exposure to the June sucker from the remaining 12 pesticides in Table 1. This is because none of the known registered uses of those pesticides considered in this consultation are for uses that occur near June sucker

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): captan, carbaryl, carbophenothion, diazinon, endosulfan, ethion, ethyl parathion, fensulfothion, isofenphos, malathion, methyl parathion, mevinphos, naled, permethrin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, atrazine, azinphos-methyl, benomyl, bifenox, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, dimethoate, disulfoton, diuron, ethoprop, fenvalerate, fonofos, mancozeb, methidathion, methomyl, nitrapyrin, oxydemeton-methyl, oxyfluorfen, phorate, phosmet, propachlor, propargite, propazine, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (captan, carbaryl, carbophenothion, diazinon, endosulfan, ethion, ethyl parathion, fensulfothion, isofenphos, malathion, methyl parathion, mevinphos, naled, permethrin, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an incidental take of one adult and 50 fry or young-of-the-year to occur: atrazine, azinphos-methyl, benomyl, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, dicofol, dimethoate, disulfoton, ethoprop, fenvalerate, fonofos, mancozeb, methidathion, methomyl, oxydemeton-methyl, oxyfluorfen, phorate, phosmet, propachlor, propargite, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is anticipated for the following reasons:

1. These pesticides have a hazard ratio above one (1), that could result in the take of this sucker.

2. Take is more likely to occur in Provo River (4.9 miles of spawning habitat) than in Utah Lake where the species would be more scattered.

3. Between 1/2 and 1/3 of the area adjacent to this spawning habitat is in pasture and some small grains.

4. Without further data, we can only estimate an annual incidental take of one adult and 50 fry and/or young-of-the-year.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Lost River sucker (Deltistes luxatus)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The Lost River sucker is restricted to the Klamath basin of south-central Oregon and north-central California, specifically the Upper Klamath Lake and its tributaries. Dams, draining of marshes and diversion of rivers have reduced the range and numbers of this species by more than 95 percent. Dams have been particularly destructive by blocking spawning runs and facilitating hybridization with other sucker species.

The Lost River sucker population declined from an estimated 23,123 individuals in 1984 to 11,861 in 1985. Although this sucker is long-lived (up to 43 years) the dramatic decline can be explained by the lack of successful spawning. No significant recruitment of young has occurred for about 18 years (26).

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Lost River sucker is likely to be exposed to all classes of chemicals considered in this consultation. Timber management is actively pursued on the Modoc and Winema National Forests within the range of this species. Livestock grazing on over 700,000 acres, with associated sagebrush control, also occurs throughout the two counties supporting the fish (Williams, pers. comm.; 19a,b). Many thousands of acres of cereal grains are also grown. Klamath County is renowned for its malting barley (30). Maintenance of water quality, particularily in Klamath Lake, is a critical issue.

The aquatic scenario judged most applicable was that of a 10-acre drainage basin into a 1-acre pond, 6 feet deep (Table 15/16). We consider these models to be the most appropriate for Klamath Lake populations. These models yielded the greatest dilution factors and, hence, the lowest hazard ratios. The present assessment suffers from the lack of a flowing water model that would more closely approximate the actual habitat conditions for this species in its stream environs. In this regard, we compared results to Table 19 to the extent data were available.

The chemicals exhibit a wide range of toxicity to test fish and aquatic invertebrates best characterized by a review of Section V. In general, chemicals yielding low or insignificant hazard ratios were not considered to jeopardize this sucker. These conclusions were closely supported by comparison to Table 19 results.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, mancozeb, methidathion, methomyl, mevinphos, naled, oxamyl, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, bifenox, copper sulfate, diflubenzuron, dimethoate, diuron, isofenphos, methyl parathion, nitrapyrin, oxydemeton-methyl, oxyfluorfen, phosphamidon, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and incidental take is anticipated:

For any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, mancozeb, methidathion, methomyl, mevinphos, naled, oxamyl, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin

This level of take is unquantifiable for the following reasons: Given the widespread distribution of the species and exposure to all classes of chemicals presented in the request, we believe it impossible to anticipate accurately the amount or extent of incidental take associated with pesticide applications. Summer die-offs of suckers have occurred in Upper Klamath Lake due to blue-green algal blooms (26). Die-offs do not occur every year but may be aggravated by hot, dry weather that reduces oxygen. Pollution of the lake, and diversions that further decrease summer inflows could obscure incidental take from pesticides, rendering estimates meaningless. It would be unrealistic and misleading to attempt any estimate of incidental loss of individuals of this species from pesticide applications.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, or if the listed incidental take is exceeded where a level is identified, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individuals of either species be incidentally lost during conduct of pesticide programs, remains should be recovered if possible and frozen or chilled immediately. Contact with the Service's Sacramento Endangered Species Office at (916) 978-4866 shall be made to secure further instructions on disposal of remains.

SPECIES PROFILE

SPECIES: Modoc sucker (Catostomus microps)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Modoc sucker presently occurs in tributaries to the upper Pit River of northeastern California: the Rush-Ash Creek system and, the Washington-Turner-Hulbert Creek system. A site of possible occurrence is Bauer's Creek, Lake County, Oregon. Historically, the species may have occurred in the entire Pit River drainage of northeastern California (Modoc and Lassen Counties). Habitats exist on Modoc National Forest, Bureau of Land Management - Susanville District, and private lands. Ownership is about 50 percent Federal and 50 percent private.

A major portion of the Rush Creek Modoc sucker habitat is on privately owned land used for grazing sheep and cattle, which trample streambanks, thereby causing destruction of habitat through increased erosion, ingestion of vegetation needed as cover, and siltation. Timber sales and cattle grazing also occur on public lands supporting the species. Destruction of natural barriers to the Sacramento sucker (C. occidentalis) by flood irrigation and stream channelization has resulted in hybridization. Introductions of predacious brown trout have added to the pressure on Modoc sucker populations. All of these factors were cited by the Service during the evaluation process prior to listing the species as endangered.

Critical habitat has been designated for the Modoc sucker on 26 miles of portions of nine creeks, including Turner, Washington, Hulbert, Johnson, and Rush Creeks, Modoc County, California. Critical habitat extends outward 50 feet from either side of the stream channel of each creek.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Considerable agriculture, primarily small grain crops (19a,b) are grown in Modoc and Lassen Counties, California, and Lake County, Oregon. These data provide only circumstantial evidence of pesticide use that may affect Modoc suckers. Additionally, active timber harvest and grazing occurs in pertinent drainages. The Forest Service has eliminated cattle grazing in some areas and modified timber sales along Hulbert and Cedar Creeks. Presumably this could reduce the amount of pesticides applied. Row crops are apparently not raised (Williams, pers. comm.).

Populations of the sucker are somewhat widely distributed within tributaries and main stem rivers of the Pit River drainage (11), and are unlikely to experience 100 percent exposure to agricultural chemicals at any given time. While information is fragmentary, small grain crops are not known to be grown immediately adjacent to sucker streams (19a,b; Williams, pers. comm.).

The risk assessments reflect the high hazard ratios predicted by Agency modeling that approximates the habitat conditions (Tables 19A/19B) of the Modoc sucker (8). Several chemicals are extremely toxic to fish and other aquatic species and/or are restricted use products (azinphos-methyl, endosulfan, carbofuran).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species and result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbofuran, carbophenothion, diazinon, dicofol, endosulfan, ethion, ethyl parathion, fenamiphos, fensulthion, malathion, mancozeb, methidathion, mevinphos, naled, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, chlorothalonil, chlorpyrifos, copper sulfate, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, ethoprop, fenvalerate, fonofos, isofenphos, methomyl, methyl parathion, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, profenofos, propachlor, propazine, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbofuran, carbophenothion, diazinon, dicofol, endosulfan, ethion, ethyl parathion, fenamiphos, fensulthion, malathion, mancozeb, methidathion, mevinphos, naled, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individual fish be incidentally taken and subsequently recovered, they should be chilled (preferably frozen) and immediate contact made with the Service's Sacramento Endangered Species Field Office at (916) 978-4866 for further instructions on disposition of remains.

SPECIES PROFILE

SPECIES: Shortnose sucker (Chasmistes brevirostris)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The shortnose sucker is restricted to the Klamath basin of south-central Oregon and north-central California, specifically the Upper Klamath Lake and its tributaries. Dams, draining of marshes and diversion of rivers have reduced the range and numbers of this species by more than 95 percent. Dams have been particularly destructive by blocking spawning runs and facilitating hybridization with other sucker species.

The shortnose sucker population declined markedly in 1984-85, when too few individuals of the species were collected to make any valid population estimate. Although this sucker is long-lived (up to 43 years) the dramatic decline can be explained by the lack of successful spawning. No significant recruitment of young has occurred for about 18 years (26).

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The shortnose sucker is likely to be exposed to all classes of chemicals considered in this consultation. Timber management is actively pursued on the Modoc and Winema National Forests within the range of this species. Livestock grazing on over 700,000 acres, with associated sagebrush control, also occurs throughout the two counties supporting the fish (Williams, pers. comm.; 19a,b). Many thousands of acres of cereal grains are also grown. Klamath County is renowned for its malting barley (30). Maintenance of water quality, particularily in Klamath Lake, is a critical issue.

The aquatic scenario judged most applicable was that of a 10-acre drainage basin into a 1-acre pond, 6 feet deep (Table 15/16). These models are the most appropriate for Klamath Lake populations. These models yielded the greatest dilution factors and, hence, the lowest hazard ratios. The present assessment suffers from the lack of a flowing water model that would more closely approximate the actual habitat conditions for this species in its stream environs. Results were compared to Table 19 to the extent data were available.

The chemicals exhibit a wide range of toxicity to test fish and aquatic invertebrates best characterized by a review of Section V. In general, chemicals yielding low or insignificant hazard ratios were not considered to jeopardize this sucker. These conclusions were closely supported by comparison to Table 19 results.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, mancozeb, methidathion, methomyl, mevinphos, naled, oxamyl, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, bifenox, copper sulfate, diflubenzuron, dimethoate, diuron, isofenphos, methyl parathion, nitrapyrin, oxydemeton-methyl, oxyfluorfen, phosphamidon, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and incidental take is anticipated:

For any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: azinphos-methyl, benomyl, bensulide, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, malathion, mancozeb, methidathion, methomyl, mevinphos, naled, oxamyl, pendimethalin, permethrin, phorate, phosmet, profenofos, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon, trifluralin

This level of take is unquantifiable for the following reasons: Given the widespread distribution of the species and exposure to all classes of chemicals presented in your request, we believe it impossible to anticipate accurately the amount or extent of incidental take associated with pesticide applications. Summer die-offs of suckers have occurred in Upper Klamath Lake due to blue-green algal blooms (26). Die-offs do not occur every year but may be aggravated by hot, dry weather that reduces oxygen. Pollution of the lake, and diversions that further decrease summer inflows could obscure incidental take from pesticides, rendering estimates meaningless. It would be unrealistic and misleading to attempt any estimate of incidental loss of individuals of this species from pesticide applications.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, or if the listed incidental take is exceeded where a level is identified, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individuals of either species be incidentally lost during conduct of pesticide programs, remains should be recovered if possible and frozen or chilled immediately. Contact with the Service's Sacramento Endangered Species Office at (916) 978-4866 shall be made to secure further instructions on disposal of remains.

SPECIES PROFILE

SPECIES: Warner sucker (Catostomus warnerensis)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The threatened Warner sucker presently occurs in several streams and lakes of Warner Valley, Lake County, Oregon, and in extreme northern Washoe County, Nevada. The Warner Valley lies in south central Oregon; its watershed includes parts of Nevada and California. Long-time residents of the Warner Valley remember when suckers were adundant, ascending streams in great numbers during the spring. Current numbers are greatly reduced and only remnant populations exist (25).

The present status of the Warner sucker is attributable to both natural and manmade causes. The desiccation of the 505 square mile Pluvial Lake Warner diminished the water areas in Warner Valley. Development of water control for agricultural purposes in the late 1930's has further reduced accessible spawning waters. Before that time, according to interviews with local residents, the suckers were numerous in the creeks. Storage dams, diversion dams, diversion ditches, and irrigation canals throughout the system have stopped spawning migrations and diverted suckers into alfalfa fields and pastures, and dewatered important spawning streams at peak seasons. Livestock grazing has eliminated riparian vegetation resulting in stream bank erosion and subsequent siltation of stream and lake habitats.

Predatory fishes (largemouth bass, crappie, and bullheads) have been introduced to the valley. These could have an adverse impact on the survival of larval and juvenile suckers since they may serve as a food base for these introduced species.

The Warner sucker is a migratory species that ascends streams for spawning from early spring to early summer. Because of dams that obstruct passage, and because some populations live in pools close to suitable spawning area, the known migrations are short, although without obstructions the species might be capable of migrations of several miles.

The species requires pools, lakes, or other still water for feeding and growth. Cover can be turbidity, depth, or boulders, etc. Suckers apparently spend the fall and winter in lakes or deep portions of canals and creeks before migrating to gravel-bottomed areas in spring to spawn. Young suckers apparently remain in creeks for several months to two years before descending to larger, more still waters.

There are no historic population estimates to compare with recent data, but surveys indicate that the species no longer occurs in major portions of its former range (24).

Critical habitat for the species has been established in about 40 miles of habitat in five streams in Lake County, Oregon (50 CFR 17.95(e)). Critical habitat extends outward 50 feet on either side of the stream channel.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Land on the Warner Valley floor is primarily in private ownership, although the Hart Mountain National Wildlife efuge occupies parts of the area. Away from the valley floor much of the stream habitat is under Bureau of Land Management control (24). The Bureau has reduced or eliminated cattle grazing along portions of some streams designated as critical habitat (24). This action would be expected to reduce the application of pesticides for range management.

Almost all human use in the valley is associated with agriculture. Neither forestry nor mosquito control practices are expected in the range of the Warner sucker. No Warner sucker habitat occurs on Forest Service lands. A moderate amount of small grain is grown in Lake Country (30) and hay and pastures occur along stream reaches supporting this species (11; Williams, pers. comm.). Runoff and leachates containing fertilizers and pesticides from agricultural and ranching operations in the valley are believed to stress water quality of the streams and lakes (24). Current information on specific crop locations is inadequate to make exact determinations as to which crops occur in the immediate range of the Warner sucker and, in turn, which chemicals pose the greatest threats. However, it appears that crop chemicals are most likely to be applied within the range of the species and encompass the highest number of chemicals in the request. The Service has assumed that if crops are grown in the vicinity, pesticides registered for those crops will be applied unless contrary information is presented.

Agency modeling reflecting potential pollutant loads in the lakes, reservoirs, and low-gradient streams and canals that serve as sucker habitat was selected to evaluate appropriate chemicals (Tables 15/16). While the Service has concluded that agricultural practices such as water diversions can, with modifications, be compatible with Warner suckers, the toxicity of some chemicals in the request are so high they pose serious threats to the species and its critical habitat.

The hazard assessment results lead to conclusions of non-jeopardy for some chemicals that, elsewhere, are determined to jeopardize similar species. This is a function of the varying habitat characteristics and results from the different model applications.

Hazard ratios for chemicals found to jeopardize the Warner sucker are very high. Combined with high toxicity to fish and invertebrate food sources of the sucker (Section V), the Service believes these chemicals warrant label restrictions. The reduced numbers and populations make the species more susceptible to the adverse effects of pesticides in the aquatic environment. Many are already restricted-use products due to their recognized toxicity to wildlife (Section V) and some have been implicated in wildlife die-offs (4).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species and result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbofuran, carbophenothion, chlorpyrifos, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fenvalerate, fonofos, malathion, mancozeb, methidathion, mevinphos, naled, oxamyl, profenfos, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlofon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, chlorothalonil, copper sulfate, diflubenzuron, dimethoate, diuron, fensulfothion, isofenphos, methomyl, methyl parathion, nitrapyrin, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propazine, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbofuran, carbophenothion, chlorpyrifos, diazinon, dicofol, dicrotophos, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fenvalerate, fonofos, malathion, mancozeb, methidathion, mevinphos, naled, oxamyl, profenfos, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlofon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species or destruction or adverse modification of its critical habitat.
Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individual Warner suckers lost to chemical applications be recovered, they should be immediately chilled (or preferably frozen) and contact made with the Service's Sacramento Endangered Species Field Office at (916) 978-4866 for further instructions on disposition of remains.

SPECIES PROFILE

SPECIES: Gila topminnow (Poeciliopsis occidentalis)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The Gila topminnow prefers the sluggish, shallow margins of freshwater lotic habitats in southern Arizona and northern Mexico below an elevation of about 1500 meters. It also inhabits springs and cienega habitats. Eleven natural populations of the topminnow exist in the United State in Cochise, Santa Cruz, Pima and Graham counties, Arizona. These consist of spring systems and intermittent streams. Typical habitats include: 1) mature marshland with rich organic deposits, permanently saturated soils, and dense grass, hydrophytes, debris and canopy cover; 2) springheads and associated runs with inorganic bottoms and well-oxygenated open flows bordered by dense hydrophytes; and 3) isolated and intermittent streams with sand, gravel, or bedrock bottoms, substantial subsurface flow, and sparse to dense arid riparian vegetation. Numerous introduced populations exist in Arizona. Nearly all populations, both natural and introduced, occur on livestock range, though some sites are fenced to exclude cattle.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Because of its association with rangelands and its dependence upon a healthy invertebrate prey base, the Gila topminnow is vulnerable to the adverse impacts from pesticides registered for rangeland uses. The probable route of exposure to rangeland pesticides is through runoff, although the potential for drift or direct application from wide area aerial applications from adjacent rangelands cannot be precluded. Exposure of isolated populations to mosquito larvicides may occur; however, it is unlikely that chemicals used only as larvicides within the range of the Gila topmonnow will jeopardize the species.

Hazard ratios of rangeland chemicals for which a stream model was available were taken form Table 18. Otherwise, Table 14 data were used for rangeland chemicals. Table 9 data were used for mosquito larvicides.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, carbaryl, chlorpyrifos, diazinon, malathion, methyl parathion, naled, propachlor, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species, are: acephate, captan, ethyl parathion, methoprene, pyrethrin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, carbaryl, chlorpyrifos, diazinon, malathion, methyl parathion, naled, propachlor, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, captan, ethyl parathion, methoprene, pyrethrin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Yaqui topminnow (*Poeciliopsis occidentalis sonoriensis*)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

Once one of the most common fish in the Rio Yaqui drainage below 4,500 feet elevation in Arizona, the Yaqui topminnow now occurs only in Leslie Creek and Black Draw and springs on San Bernardino National Wildlife Refuge. Its habitat consists of springs and streams where it concentrates in shallow areas with aquatic vegetation or debris covered bottoms. Like other Poeciliids, its preferred food is insect larvae and aquatic invertebrates. Reasons for its decline include loss of springs, river backwaters and small stream habitats, and competition with nonnative mosquitofish (*Gambusia affinis*).

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

San Bernardino National Wildlife Refuge was established for the purpose of protecting and promoting recovery of several Yaqui basin fishes. The Leslie Creek tract has been purchased by the Nature Conservancy, and the Service is planning to acquire it for inclusion as part of the San Bernardino refuge complex. Nevertheless, there is potential for exposure to pesticides and used on rangelands within the watershed of the species. Primary routes of exposure are through drift and runoff from treated rangelands within the watershed of the Yaqui topminnow at San Bernardino and Leslie Creek. Hazard ratios of chemicals for which a stream model was available were taken from Table 18. Table 14 was used for all other chemicals.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, malathion, methyl parathion, naled, propachlor, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, captan, pyrethrin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, diazinon, malathion, methyl parathion, naled, propachlor, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: atrazine, captan, pyrethrin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Apache trout (Oncorhynchus apache)

ADDRESSED IN REQUEST PARTS 1 and 5.

SPECIES/HABITAT DESCRIPTION:

The Apache trout is native to tributaries of the upper Salt River drainage in eastern Arizona. It has been adversely affected by forest alteration, livestock grazing, erosion and siltation, and competition and hybridization with exotic and nonnative salmonids.

The Apache trout was once found throughout the headwater tributaries of the Little Colorado, Salt and San Francisco Rivers in east-central Arizona. Introduction of exotic and nonnative salmonids has reduced populations to those existing mainly in headwater areas upstream from natural barriers at elevations above 2500 meters. Its present range includes the Salt River drainage (Black and White Rivers).

Several populations have been reestablished in the Little Colorado and San Francisco drainages and in two other drainages outside historic range (North Canyon Creek and Grant Creek). Apache trout presently occur in small, cold, high-gradient streams flowing through mixed coniferous forests of spruce, fir and aspen at higher elevations, grading through ponderosa pine to areas of shrub/brush rangelands. Its known distribution includes Fort Apache Indian Reservation, and Apache-Sitgreaves, Kaibab and Coronado National Forests. Recovery actions include, controlling or restricting use of pesticides within the known range of the species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Trout are predaceous throughout life and require an abundant supply of insects, other invertebrate prey, and small fish. They are highly sensitive to direct toxicity from pollutants, and the Recovery Plans for this species suggests land management practices be established to control any detrimental effects to the Apache trout resulting from the use of pesticides. Because of its association with forest and rangeland cover types, the Apache trout is likely to be exposed to pesticides registered for use on forests and/or rangelands. Probable routes of exposure are through runoff and drift from adjacent treated areas.

Table 18 was used for chemicals for which a stream model was available. Table 14 was used for all other rangeland chemicals. Table 13 was used for all forest chemicals.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenthion, chlorpyrifos, diazinon, disulfoton, fenitrothion, malathion, methyl parathion, naled, propachor, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species, are: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, dimethoate, fenvalerate, mancozeb, methomyl, oxydemeton-methyl, oxyfluorfen, phosmet, pyrethrin, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenthion, chlorpyrifos, diazinon, disulfoton, fenitrothion, malathion, methyl parathion, naled, propachor, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: atrazine, benomyl, captan, carbofuran, chlorothalonil, diflubenzuron, dimethoate, fenvalerate, mancozeb, methomyl, oxydemeton-methyl, oxyfluorfen, phosmet, pyrethrin, thiophanate-methyl.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels fluctuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Gila trout (<u>Oncorhynchus gilae</u>)

ADDRESSED IN REQUEST PARTS 1, 3 and 5.

SPECIES/HABITAT DESCRIPTION:

The Gila trout is native to the Gila River basin. It is primarily restricted to headwater reaches of several streams in southwestern New Mexico. It has been adversely affected by forest alteration, livestock grazing, erosion and siltation, and competition and hybridization with exotic and nonnative salmonids. Recovery actions include controlling or restricting the use of pesticides within the known range of this species.

In New Mexico, the Gila trout occurs in five streams in the Gila National Forest, including Iron Creek, McKenna Creek, and Spruce Creek in the Gila Wilderness, and Main Diamond Creek and South Diamond Creek in the Aldo Leopold Wilderness. In addition, populations have been established in several other headwater streams in the Gila National Forest. Adjacent land types include aspen, Douglas fir and ponderosa pine forests, pinyon-juniper and southwestern shrubsteppe rangelands.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Trout are predaceous throughout life and require an abundant supply of insect larvae through adults, other invertebrate prey, and small fish. They are also highly sensitive to direct toxicity from pesticides and other pollutants. The Recovery Plan for this species suggests that land management practices be established to control any detrimental effects to the Gila trout resulting from use of pesticides.

In request part 3, the Agency suggests that jeopardy be removed for certain forest and rangeland pesticides because most known populations of Gila trout exist in spruce-fir forest in designated wilderness areas administered by the U.S. Forest Service. Although this land-use designation minimizes the risk of exposure to these chemicals, it does not preclude their use within the watershed of the species. Because the species is principally associated with forest cover types, the Gila trout is likely to be exposed to pesticides registered for use on forests. Probable routes of exposure are through runoff and drift from adjacent treated areas, as well as direct application to water. Jeopardy calls were made with regard only to the registered uses of the chemicals and their hazard ratios based on a direct application model (Table 9) developed by the Agency.

Request part 5 requested a reassessment of jeopardy calls from previous consultations based on loss of food supply. Although the Gila trout is predaceous, its diet is varied, including insect adults and larvae, other aquatic invertebrates, and smaller fishes, and the loss of food supply alone is not expected to jeopardize the species. Jeopardy calls from this and previous consultations were confirmed or reversed based on both direct toxicity to the species and food chain impacts.

BIOLOGICAL OPINION:

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, aminocarb, atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbofuran, carbophenthion, chlorothalonil, chlorpyrifos, diazinon, dichlorprop, disulfoton, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, naled, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: aminocarb, atrazine, azinphos-methyl, benomyl, captan, carbaryl, carbofuran, carbophenthion, chlorothalonil, chlorpyrifos, diazinon, dichlorprop, disulfoton, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, naled, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Greenback cutthroat trout (*Salmo clarki stomias*)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

Historic populations of the greenback cutthroat trout that persisted in Colorado are presently found in Cascade Creek, a tributary of the Huefano River (Arkansas River drainage) in San Isabel National Forest, Huefano County; Como Creek, a tributary of Boulder Creek, Roosevelt National Forest, Boulder County; Hunter Creek and Upper Hutcheson Lake, tributaries of the St. Vrain River, Rocky Mountain National Park; and the uppermost headwaters of the Little South Poudre River, Roosevelt National Forest, Larimer County (the latter 3 sites are in the South Platte drainage).

Through the Greenback Cutthroat Trout Recovery Plan, the greenback has been reintroduced into Black Hollow Creek (tributary of the Poudre River, Roosevelt National Forest, Larimer County); the headwaters of the North Fork Big Thompson River including Lost and Husted Lakes, Hidden Valley Creek, West Creek, Bear Lake, Ouzel Lake and Ouzel Creek, Fern Lake and Fern Creek, Lawn Lake, Roaring River, Big Crystal Lake, and Odessa Lake (all in Rocky Mountain National Park); George Creek, Conelius Creek, Williams Gulch, East and West Forks of Sheep Creek, May Creek, Pennock Creek, and Hourglass Creek (all in the Poudre River drainage, Roosevelt National Forest, Larimer County); Bard Creek, Clear Creek drainage, Pike National Forest, Clear Creek County; and in the Zinn Ranch ponds, headwaters of Jackson Creek (Plum Creek drainage to the South Platte River), Pike National Forest, Douglas County. Greenback cutthroat trout also have been introduced into Lytle Pond, Duck Pond, and Little Turkey Creek on the Fort Carson Military Reservation, and Cottonwood Creek (Arkansas River drainage), Westcliff, San Isabel National Forest, Custer County.

Therefore, the present habitat where greenback cutthroat trout occur is essentially undisturbed headwaters of drainages from 7,000 to 11,000 feet elevation in Rocky Mountain National Park, U.S. Forest Service lands (Pike, Roosevelt, and San Isabel National Forest), and three ponds on Fort Carson (U.S. Army). With the exception of the Fort Carson Pond, all habitats are associated with montane conifer forests and meadows.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The primary use pattern in areas associated with the greenback cutthroat trout would be forest type uses with possibly rangeland uses to a limited extent. Little or no use of pesticides are expected in Rocky Mountain National Park and pesticide use on National Forest and military lands would be primarily for insect control (e.g. spruce budworm) and to control noxious weeds (e.g. leafy spurge).

Table 13 was used to obtain hazard ratios for freshwater fish. Table 14 was used for carbofuran.

Based on the use patterns that may occur near or adjacent to the greenback cutthroat trout habitat, the Service believes that 28 of the pesticides listed on Table 1 and part 5, have a potential to impact this species of trout primarily through drift as well as runoff into the habitat. The Service also believes that the use 9 of the 28 pesticides are likely to jeopardize the continued existence of the greenback cutthroat trout. This determination is based primarily on the species distribution, known use patterns, the hazard ratios on both fish and invertebrates as well as other factors such as persistence and bioaccumulation.

The remaining 33 pesticides in Table 1 and part 5, should not result in exposure to the greenback cutthroat trout since none of the known registered uses of those pesticides considered in this consultation are for uses that occur near this species of trout's habitat.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, diazinon, malathion, methyl parathion, naled, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, diflubenzuron, dimethoate, disulfoton, fenitrothion, fenvalerate, mancozeb, methomyl, oxyfluorfen, propachlor, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, diazinon, malathion, methyl parathion, naled, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an incidental take of 5 to occur annually: atrazine, benomyl, captan, carbofuran, chlorothalonil, chlorpyrifos, copper sulfate, disulfoton, mancozeb, methomyl, oxyfluorfen, propachlor, thiophanate-methyl.

This level of take is anticipated for the following reasons:

1. These pesticides have a hazard ratio above one(1), so loss of this species could occur.

2. Past documented losses of this species by pesticides is not available, so we can only estimate that an incidental take of 1 trout for each of the streams or ponds outside Rocky Mountain National Park or a total of 5 fish annually.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Lahontan cutthroat trout (Salmo clarki henshawi)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The 1987 U.S. Fish and Wildlife Service Lahanton cutthroat trout Recovery Plan restricts the indigenous distribution of the subspecies S.c. henshawi to the Truckee, Carson, Walker, and Quinn River drainages of the Lahanton Basin, and to Summit Lake, an isolated basin between the Lahanton and Alvord Basins in California and Nevada. These include the counties of Sierra, Nevada, and Placer in California, and Washoe in Nevada (Truckee drainage); Alpine, California (Carson drainage); Mono, California and Mineral, Nevada (Walker River drainage); and Humbolt, Nevada (Summit Lake and Quinn River drainages). Populations have become established outside the foregoing areas through authorized and unauthorized transplants in Box Elder and Weber Counties, Utah and elsewhere. Lahontan cutthroat trout are propagated by the states of California and Nevada for stocking into lakes where natural reproduction does not occur. Trout are regularly stocked in lakes with high alkalinity in Oregon and Washington such as Mann Lake, Lake Lenore, and Omak Lake (11).

Until about 100 years ago, S. c. henshawi remained abundant in its native range and supported a commercial fishery. After the introduction of non-native species of trout--rainbow, which hybridize with henshawi; brown trout which displaced henshawi in Lake Tahoe--blocking of spawning runs and general habitat degradation, the Lahontan cuthroat rapidly declined toward extinction. Other reasons cited for the decline of henshawi as a pure population include timber harvest and other timber practices, agricultural development, grazing, urban development, and water pollution from agriculture, industrial, surface mines and urban runoff.

The most significant influence limiting large-scale restoration of this species is the introduction and establishment of non-native species of trout resulting in competition, predation and hybridization.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Prior consultations have focused on forestry uses of chemicals affecting Lahontan cutthroat trout. Little forest use of chemicals occurs in Nevada due to the lack of active timber management programs (McNatt, pers. comm.). In California, we would expect more widespread use of such chemicals. However, distribution of trout throughout the Sierra range, and the programs maintained by the states to propagate and stock these trout in lakes and streams to support a sport fishery, indicates little likelihood that the species could be jeopardized by individual or even broad-scale chemical applications.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, azinphos-methyl, benomyl, bifenox, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, disulfoton, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, methyl parathion, naled, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found and incidental take is anticipated:

For any or all of the following chemicals, the Service anticipates an annual level of incidental take of 200 fish to occur: acephate, atrazine, azinphos-methyl, benomyl, bifenox, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, disulfoton, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, methyl parathion, naled, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon

This level of take is anticipated for the following reasons: The toxicity of many of the chemicals evaluated indicates a potential for fish kills associated with normal use (8). Estimates of the number of trout conceivably exposed to lethal levels of pesticides are difficult given the extended range of the species, and the potentially widespread but infrequent use of chemicals. Available data indicate that Lahontan cutthroat trout exhibit widely varying population densities depending on stream habitat quality and quantity. In Nevada, surveyed streams contained from 50-500 trout per stream mile (22). In California, standing crop ranged from about 15 to nearly 4000 fish per stream mile (23). The approximate median population density appears to be about 200 fish per stream mile. The Service believes that applications of pesticides, according to label instructions, may affect at least one mile of stream and thus anticipates an incidental take of 200 Lahontan cutthroat trout per year for all chemicals evaluated in this consultation. Confirmation of this or other estimates of incidental take will be very difficult. Many streams are in wilderness areas or are otherwise rarely visited by man. Very little, if any, chemical analysis or follow-up occurs during post-treatment phases of forest chemical applications. Thus virtually no mechanism currently exists to confirm accurately the extent of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take.

Should the identified incidental take is exceeded, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individual Lahontan cutthroat trout be incidentally taken and subsequently recovered following application of a chemical, they should be chilled (preferrably frozen) and contact made with the Service's Reno, Nevada Field Office at 702/784-5227 for further instructions on the disposition of remains.

SPECIES PROFILE

SPECIES: Little Kern golden trout (Salmo aquabonita whitei)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

Little Kern golden trout presently occur in about fifty-eight miles of stream habitat and six lakes in the Kern River drainage of Tulare and Kern Counties, California, habitats supporting about 4500 fish (27). The Kern County population is not a natural population, but rather is one maintained by a California State fish hatchery for artifical propagation.

Present known distribution includes nineteen stream sections and six small lakes. All these waters are located in the Sequoia National Forest and Sequoia National Park. The most serious problem with the Little Kern golden trout is the hybridization with exotic species.

Erosion of stream courses is widespread in localized areas throughout the Little Kern River drainage. Much of it is natural and occurs in unstable banks at high flows, in which most of the sediments are carried downstream. More serious are the consequences of man's activities. The grazing of domestic livestock alters the streambank vegetation and soil stability causing erosion and siltation of streams in addition to removing the protective grass covering of meadows. Also, logging operations have removed vegetative cover that also protects the trout's habitat. These factors contribute to the loss of cover for fish, increase water temperatures, and cause the desiccation and erosion of productive meadow and forest streams.

Little Kern golden trout are relatively non-migratory. In streams they remain in a single location for several years. Average movements are usually within 35 feet and rarely exceed 150 feet. They will move to spawning areas for reproduction but the distance is still very limited. Occasionally, individuals will move greater distances, up to 1200 feet or more, especially if disturbed. Trout in lakes must migrate into outlet or inlet streams to find suitable spawning habitat.

Numbers of Little Kern golden trout in a stream depends on the amount of cover present and territoriality. The average number of adults in a small stream is about 500 per mile. Larger streams and those with better habitat conditions may support twice that number.

Little Kern golden trout in suitable habitats are entirely dependent on food for survival. The key to this aspect of their biology is insects, both aquatic and terrestrial. Changes in the abundance and species of insects could result in commensurate changes in trout growth and survival. Suitable habitats are in forested areas of Fresno, Tulare, and Kern Counties, subject to active timber management/harvest and livestock grazing.

The Little Kern River (Tulare County) and certain tributaries therto have been established as critical habitat for this species. The area is virtually entirely incorporated into wilderness status. Livestock grazing is nevertheless allowed (Lorentzen, pers. comm.). Habitats within wilderness areas are subject to chemical pollution as products applied upstream are transported into reaches occupied by the species (Christenson, pers. comm.).
Timber management involves chemical applications for insect control. Salvage sales have been the focus of prior formal consultations between our Service and the Forest Service. The Forest Service is currently preparing a timber sale within drainages supporting Little Kern golden trout (Lorentzen, pers. comm.). Controlling/restricting pesticide uses are identified as management actions required to protect and bring about recovery of the species (Christenson, 1984).

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Forest and range chemicals, with notable exceptions, exhibit high toxicity and high predicted hazards to fish and the invertebrate food supplies (8). Results from toxicity testing are particularly relevant because test species are invariably trout. No available Agency modeling accurately portrays results for the flowing water habitats of trout. Table 19 most closely approximates reality but lacks data for most chemicals and is useful only in partial contrast to other results. Tables 19A/B represent the closest depiction of stream conditions.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, disulfoton, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, methyl parathion, naled, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its critical habitat are: acephate, bifenox, diflubenzuron, dimethoate .

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, azinphos-methyl, benomyl, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, disulfoton, fenitrothion, fenvalerate, malathion, mancozeb, methomyl, methyl parathion, naled, oxydemeton-methyl, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species or destruction or adverse modification of its designated critical habitat. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individual Little Kern golden trout be recovered in the course of, or after, chemical application, they should be chilled immediately and contact made with the California Department of Fish and Game, Kernville, California, (619) 376-6502 for further instructions on disposition of remains.

SPECIES PROFILE

SPECIES: Paiute cutthroat trout (Salmo clarki seleniris)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The present consensus is that the original distribution of S. c. seleniris consisted of about 6 miles of Silver King Creek from some unknown point in Silver King Canyon upstream to Llewellyn Falls, Alpine County, California. All present populations are the result of introductions. Paiute cutthroat trout are presently known from only a few small streams in California: Fly Valley (1 mile of habitat), Four Mile Canyon (2 miles of habitat), and Corral Valley Creek (1 mile), all small tributaries to Silver King Creek in Alpine County, California; also this subspecies now occurs in North Fork Cottonwood Creek (4 miles), Mono County, and in Stairway Creek (2 miles), Madera County, California. In 1983, Paiute cutthroat trout were stocked into Heenan Lake (Lahontan basin, Alpine County) as a brood stock for future propagation efforts. Paiute cutthroat may also occur in Cabin Creek, Mono County, and in the outlet of Sharktooth Lake, Fresno County, California. The latter two localities require verification. All streams are on National Forest lands.

The total number of Paiute trout of 1 year or more in age inhabiting the approximately 10 miles of habitat in these 5 streams is estimated to be less than 2000.

Paiute trout, like all trout, are essentially opportunistic feeders. In their present habitats virtually their entire diet is composed of insects. In lentic water environments they will also consume crustaceans. Food requirements are not a limiting factor for the preservation of Paiute trout or for their successful establishment in new environments. The lack of any real differences in feeding preferences or niche differentiation from other species of trout results in the inability of Paiute trout to coexist with other trout.

The main factor limiting population size is the small habitat size. The small habitat volume may also limit life span. Very few Paiute trout exceed 3 years of age. Populations will be depressed after severe floods or droughts. Stream sections with habitat degraded from livestock grazing could support greater biomass of Paiute trout if habitat improved.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

In previous consultations, the Service evaluated the effects on Pauite cutthroat trout from forest (Biological Opinion, dated 10/25/84) and rangeland chemicals (Biological Opinion, 12/1/84). The Service reaffirms those use categories as the most apprpriate, and has reevaluated those chemicals to the extent covered in the request.

There is little direct information on the extent of forest and range chemical use in the watersheds supporting Paiute cutthroat trout. Range application of chemicals is likely prevalent over forest use of (often) these same chemicals.

Since prior consultations, Silver King Creek has been placed in Wilderness status. Grazing allotments are still active in the drainage of North Fork Cottonwood Creek (Lorentzen, pers. comm.). Little timber management by chemical is known to occur outside wilderness areas in the range of the species.

All rangeland chemicals exhibit significantly high toxicity either to test fish species (trout) or aquatic invertebrates (LD50/trout: 1-100ppb; LD50/invertebrates: 1-5 parts per billion) (8). Examining the potential for movement of chemicals into aquatic ecosystems based on Agency models (8), indicates a significantly high hazard ratio for most chemicals. No model presented in the request exactly matches the ecological characteristics of Pauite cutthroat trout stream habitat. Thus, judgments are rendered on modeling results believed to most closely parallel the actual habitat conditions (tables 19A and 19B).

Moreover, with an estimated population of only 2000 fish, it is important that protective measures eliminate virtually any potential for adverse impact or incidental loss.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): captan, carbaryl, chlropyrifos, diazinon, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, dimethoate, fenitrothion.

The remainder of the pesticides considered are not likely to affect this species because their use is not anticipated to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (captan, carbaryl, chlropyrifos, diazinon, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

Disposition:

Should individual fish be incidentally taken and subsequently recovered, they should be chilled (preferably frozen) and immediate contact made with the Service's Sacramento Endangered Species Field Office at (916) 978-4866 for further instructions on disposition of remains.

SPECIES PROFILE

SPECIES: Woundfin (Plagopterus argentissimus)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

Woundfin currently occur in the Virgin River from the mouth of LaVerkin Creek, Utah, downstream to Mesquite, Nevada. The occupied habitat is in Utah (about 36 miles), Arizona (35 miles), and Nevada (12 miles). The highest quality habitat probably occurs in the Utah portion.

Depths preferred by woundfin appear to range from 5 to 35 centimeters. Larval and post-larval woundfin appear to live inshore after hatching, staying in backwaters and along the shoreline in a few millimeters of water, then moving into deeper water as they grow larger. Little is known about spawning site requirements. Woundfin fry appear in June. Therefore, spawning is assumed to begin in late May. Since fry have been found as late as August, limited spawning may occur throughout the summer, but peak activity is probably late May to early June.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Numerous agricultural uses occur within the vicinity of woundfin habitat including rangeland uses as well as corn and small grains (wheat, barley, and oats). Less than 500 acres of corn were grown in Washington County, Utah in 1987 while a total of 5,400 acres of wheat, barley, and oats also were grown in 1987. Exactly how much of this was grown in close proximity to the Virgin River is unknown. However, an unquantified factor leading to the endangerment of the woundfin may be pollution by chemicals such as pesticides, and fertilizers added to the river from returning irrigation waters. Mosquito larvicides also are used in the area.

Tables 9 (mosquito larvicide) and 13 (rangeland and certain crops) were used to obtain hazard ratios for freshwater fish. Table 14 was used for the granular carbofuran and phorate.

It appears that 47 of the pesticides listed in Table 1 and methoprene in part 5, have a potential to impact the woundfin through drift of the pesticide into the habitat of the woundfin as well as runoff directly into the habitat or through irrigation return water. Applying mosquito larvicides directly to the habitat certainly will have an adverse impact on the woundfin. Of these 48 pesticides, it appears that the use of 34 of them are likely to jeopardize the continued existence of the woundfin. The Service has based this determination primarily on the species distribution, known use patterns, hazard ratios of both fish and invertebrates and a number of other factors including persistance, bioaccumulation, and in some cases, lack of sufficient information on one or more of the above factors.

The registered use of 14 pesticides in Table 1 are not likely to jeopardize the continued existence of the woundfin. The Service also has determined that there would not be exposure to the woundfin from the remaining 12 pesticides in Table 1 and fenitrothion in part 5. This is because none of the known registered uses of those pesticides considered in this consultation are for used that occur near woundfin habitat.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, captan, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fensulfothion, fenvalerate, fonofos, isofenphos, malathion, methidathion, methoprene, methyl parathion, mevinphos, naled, oxydemeton-methyl, permethrin, phorate, phosmet, propachlor, propargite, pyrethrin, terbufos, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, bifenox, carbofuran, chlorothalonil, copper sulfate, dimethoate, diuron, mancozeb, methomyl, nitrapyrin, oxyfluorfen, propazine, thiodicarb, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, azinphos-methyl, benomyl, captan, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, disulfoton, endosulfan, ethion, ethoprop, ethyl parathion, fensulfothion, fenvalerate, fonofos, isofenphos, malathion, methidathion, methoprene, methyl parathion, mevinphos, naled, oxydemeton-methyl, permethrin, phorate, phosmet, propachlor, propargite, pyrethrin, terbufos, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an incidental take of 25 annually to occur: carbofuran, chlorothalonil, copper sulfate, mancozeb, methomyl, oxyfluorfen, propazine, thiodicarb, thiophanate-methyl.
This level of take is anticipated for the following reasons:

1. These pesticides have a hazard ratio above one (1), so some loss of this species could occur.

2. Within quality woundfin habitat (Washington County, Utah), 500 acres of corn are grown. All but copper sulfate are registered for use on that crop.

3. Four of these pesticides are used on 5,400 acres of barley, wheat and oats in Washington County.

4. Until pesticide mortality data are available, we can only estimate an annual incidental take of 25 woundfin.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Flat-spired three-toothed snail (Tridopsis platysayoides)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

This land snail is a geographically restricted species known only from a small area adjacent to the Cheat River Canyon in Monongalia and Preston Counties, West Virginia. The snail inhabits isolated patches of deep leaf litter and sheltered retreats among sandstone boulders in forested areas. The species is thought to feed on leaf litter and on lichens on rock surfaces.

Exposure of this species to diflubenzuron (the only pesticide for which consultation on this species was requested) would occur during spraying of the forests in which its habitat occurs. The snail could be exposed directly or by contamination of its food source. Greatest exposure would probably occur by feeding on the surfaces of leaves lost from trees following spraying.

BIOLOGICAL OPINION:

Based on the information provided in the request and other information indicating low toxicity to snails, the Service concludes that use of diflubenzuron is not likely to jeopardize the continued existence of T. platysayoides.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found and no incidental take is anticipated:

> No incidental take is expected to result from the use of this chemical and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Painted snake coiled forest snail (Anguispira picta)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

The painted snake coiled forest snail is a mollusc found only in Franklin County, Tennessee. It inhabits only rocky limestone crevices with dense forest cover. The section in request part 3 that addresses this species deals with the chemical diflubenzuron (dimilin). This chemical acts only as a chitin inhibitor. Since snails do not have chitin, the Service concurs with the Agency's determination that this chemical can be removed from the list of chemicals jeopardizing the species.

BIOLOGICAL OPINION:

Diflubenzuron is not likely to jeopardize the continued existence of the painted snake coiled forest snail because its mode of action cannot harm the species.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of this chemical and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Virginia fringed mountain snail (_Polygyriscus virginianus_)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

This land snail is a geographically restricted species known only from the wooded bluffs along the New River in Pulaski County, Virginia. It is a burrowing species which rarely comes to the surface and is presumed to feed on organic detritus.

Exposure of this species to diflubenzuron (the only pesticide for which consultation on this species was requested) is unlikely to occur. Any pesticide adhering to fallen leaves would be expected to breakdown before reaching the underground habitat of this species.

BIOLOGICAL OPINION:

Based on the information provided in the request and the low probability of exposure of this species, the Service concludes that use of diflubenzuron is not likely to jeopardize its continued existence.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found and no incidental take is anticipated:

> No incidental take is expected to result from the use of this chemical and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Curtus' mussel (Pleurobema curtum)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

This species is historically reported from the Big Black River, Mississippi and the Tombigbee River, Monroe and Itawamba Counties, Mississippi, and Dickens County, Alabama. It now occurs only in the east fork of the Tombigbee River in a reach near the confluence of Bull Mountain Creek (Monroe and Itawamba Counties). This population was bypassed by the Tennessee Tombigbee Waterway, and is not affected by the operation of that waterway. The major cause for decline is alteration of free-flowing river habitat into a series of impoundments causing suffocation, increased siltation, flow reduction and physical destruction.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, bensulide, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, isofenphos, mancozeb, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, bensulide, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Judge Tait's mussel (Pleurobema taitanum)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Judge Tait's mussel was previously found in the Alabama River at Claiborne (Monroe County) and Selma (Dallas County); the Coosa River (Coosa, Chilton, and possibly Elmore Counties); the mainstem Tombigbee River from near Epes (Sumter and Greene Counties), Alabama to the confluence of Tibbee Creek (Monroe County, Mississippi); and the East Fork Tombigbee River from Smithville (Monroe County, Mississippi) to the confluence of Mill Creek (Itawamba County, Mississippi).

This mussel is presently restricted to a bendway of the Tombigbee River below Gainsville Dam in Sumter County, Alabama; the East Fork Tombigbee River in a reach from Smithville, Mississippi, upstream to the confluence of Mill Creek (Monroe and Itawamba Counties, Mississippi); the Buttahatchie River downstream of Alabama Highway 17 (Lowndes County, Mississippi and Pickens County, Alabama); and in the Sipsey River downstream of Lewiston (Pickens and Greene Counties), Alabama.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Judge Tait's mussel was last collected from the mainstem Tombigbee River in 1972. Habitat remaining in the mainstem Tombigbee is marginal and any remaining mussels must cope with the continuing impacts of siltation, reduced water flows due to water divesion and dams, water quality degradation, and possible loss of their fish host.

Generally the decline is attributed to impoundments, navigation (channelization for barge traffic), flood control in the Alabama river system, and to construction of the Tennessee-Tombigbee Waterway (waterway) on the Tombigbe River. The loacation of the remaining Judge Tait's mussels away from the navigation waterway's channel allowed them to escape the full force of the threats that extirpated it elsewhere in the Tombigbee River.

The Judge Tait's mussel has greatly declined in range and/or numbers in the Tombigbee River. The modification of the free-flowing Tombigbee River into a series of impoundments adversely impacted the mussel, reducing flow, and sufficating juveniles with sediment.

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, bensulide, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, bensulide, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Marshall's mussel (Pleurobema marshalli)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The species is reported historically to have occurred in the mainstem of the Tombigbee River from Columbus, Mississippi downstream to Epes, Alabama. It now occurs in the river only in a Bendway in Greene and Sumter Counties below Gainesville Dam, Alabama. Construction of the Tennessee-Tombigbee Waterway caused siltation created impoundments and modified habitat through dredging and cutoffs. All these factors contributed to the species decline.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos,fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Penitent mussel (Epioblasma penita)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

This mussel historically occurred in the Tombigbee River from near Gainesville, Alabama, upstream to the confluence with Mill Creek (Sumter, Greene, and Perry Counties, Alabama, and Lowndes, Clay, Monroe and Itawamba Counties, Mississippi); in the Alabama River near Claiborne (Monroe County, Alabama); in the Cahaba River Perry County, Alabama) and in the Coosa River (Calhoun, St. Clair, Shelby, and Talladega Counties, Alabama).

The penitent mussel is presently known from the bendway below Gainesville Dam on the mainstem Tombigbee River (Greene and Sumter Counties, Alabama), the Buttahatchie River upstream to the vicinity of State Highway 17 (Monroe County, Mississippi), and the East Fork Tombigbee River from a point near Smithville, Mississippi, upstream to the confluence with Mill Creek (Monroe and Itawamba Counties, Mississippi)

The decline of the penitent mussel (Epioblasma penita) is directly related to habitat destruction or alteration. Habitat in Alabama and Coosa Rivers has been modified by impoundment and channelization for navigation, flood control and hydro-power production. The only specimen taken from the Cahaba River was collected in the 1800's and more recent collections have failed to find this species. With the exception of a bendway below Gainesville Dam in Alabama, the habitat in the mainstem Tombigbee River was destroyed by construction of the Tennessee-Tombigbee Waterway.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory.

Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, bensulide, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, SSS-tributyl phosphorothithioate, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species habitat

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, bensulide, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried

in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Louisiana pearlshell (Margaritifera hembeli)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

This species is thought to have occurred historically in streams throughout the Bayou Boeuf drainage, Louisiana. However, its distribution has now been reduced to 11 streams. Ninety percent of the known population is in four streams: Long Branch Bayou Clear, Loving Creek and Little Loving Creek. Total population is estimated at 10,000 individuals. Impoundments, both natural and man made, have eliminated populations throughout the Bayou. Other threats result from sedimentation, silvicultural practices and domestic runoff.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fishes for many listed mussel species have not been identified, but those which have been include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Alabama lamp pearly mussel (Lampsilis virescens)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The Alabama lamp pearly mussel occurred historically in the Tennessee River system from central Tennessee through northern Alabama. It occurred in the Tennessee River at Tuscumbia, Alabama and in Spring Creek, Tuscumbia and Beech Creek, south of Guntersville, Alabama. This species was collected in the Emory River in Roane and Morgan Counties, Tennessee and in Coal Creek, a tributary of the Clinch River. Anderson County, Tennessee. Records for Bear Creek, Colbert County, Alabama and Little Bear Creek, Franklin County, Alabama as well as the Paint Rock River and Tennessee River, Jackson County, Alabama are available. Shell mounds in Lauderdale County, Alabama also contained this species. A record for Crow Creek, Jackson County, Alabama was reported, but it has not been included in subsequent records of historic distribution.

L. virescens has been recently taken (since 1964) from the Paint Rock River and its tributaries, Hurricane Creek, Estill Fork and Larkin Fork, Alabama. A survey by The Valley Authority in 1980 recorded this species at 3 of 28 collecting sites, 2 in the Paint Rock River and 1 in Hurricane Creek. Of 6 sites sampled on the Paint Rock River in 1965 and 1967, the Alabama lamp was collected from 2 locations in the Paint Rock and 1 in Larkin Ford. This species was also collected live from Larkin Fork in 1969 and in the upstream portion of Estill Fork in Tennessee.

This species appears to show a preference for tributary streams and inhatits sand and gravel substrates in small to medium sized streams.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for

a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Appalachian monkeyface pearly mussel (Quadrula sparsa)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The Appalachian monkeyface pearly mussel is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. This mussel occurs in the Powell River (Clairborne and Hancock Counties) and the Cumberland River (Smith, Trousdale and Wilson Counties) in Tennessee.

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern:</u>

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Birdwing pearly mussel (Conradilla caelata)

ADDRESSED IN REQUEST PART

SPECIES/HABITAT DESCRIPTION:

The birdwing pearly mussel is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. This mussel occurs in the following rivers in Tennessee: Duck River (Bedford, Marshall and Maury Counties), Elk River (Lincoln County), Powell and Clinch Rivers (Claiborne and Hancock Counties), Nolichucky River (Greene County) and Buffalo River (Wayne County). In Virginia it occurs in the Clinch River and Copper Creek (Scott and Russell Counties) and the Powell River (Lee County).

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not

only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish for this species may be the banded darter, Ethestoma zonale (Recovery plan).

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulporfos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Cumberland bean pearly mussel (Villosa trabalis)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The Cumberland bean pearly mussel historically occurred in tributary streams of the Tennessee River and the upper Cumberland River drainage in Virginia, Tennessee, Kentucky, Georgia, and Alabama. It is now restricted to tributary streams of the upper Cumberland River in Kentucky and Tennessee.

This species has been taken (since 1970) from the Little South Fork Cumberland River. Live and freshly dead specimens have been collected throughout a 35 mile section of the Little South Fork and at one location on Kennedy Creek.

The species has also been reported from Buck Creek and Rockcastle River, including its tributaries, Middle Fork Rockcastle River, Horselick Creek, and Roundstone Creek, in Kentucky. One live specimen was collected in 1980 from the Big South Fork Cumberland River at Station Camp Creek, Scott County, Tennessee. This specimen represents the first record of the Cumberland bean in the Tennessee section of the Big South Fork. On December 9, 1985, two living and two dead specimens were found in the Big South Fork, Scott County, Tennessee.

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. A total of 51 impoundments on the Tennessee and Cumberland Rivers has eliminated large sections of riverine habitat within the historic range of the Cumberland bean. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

Coal waste from mining activities has contributed additional particulate matter to natural sediment loads, particularly in the Cumberland drainage. Negative impacts on mussels from coal mining, coal washing, and fly ash waste have been identified as major problems to recovery of this species.

Water pollution is amother major factor that has contributed to the endangered status of V. trabalis. numerous streams in the upper Tennessee drainage were polluted by the early twentieth century, and the mussel fauna was in a decline at that time. The decline of this specie in the upper

Cumberland system has been attributed to pollution from acid mine wastes. The historic population in the Clinch River was likely affected by chemical spills in 1967 and 1970 at the APCO plant in Carbo, Virginia. All of the factors mentioned above (impoundments, siltation, coal mining, and water pollution) are still considered potential threats to remaining populations of V. trabalis. Other factors that may be affecting this species include colloectin by conchologists, the invasion of the Asiatic clam (Corbicula fluminea) into the Tennessee and Cumberland drainages, and the smaller gene pool which may be approaching minimum population size need for sufficient genetic variation to respond to environmental changes.

Substantial mussel die-offs of unknown origin have occurred in the Tennessee and Cumberland River drainages since 1982 also pose a threat to the species' survival.

The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Cumberland monkeyface pearly mussel (Quadrula intermedia)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The Cumberland monkeyface pearly mussel is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. This species occurs in the following rivers in Tennessee: Duck River (Bedford, Marshall and Maury Counties), Elk River (Moore County), Powell River (Clairborne and Hancock Counties) and Big South Fork (Scott County).

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for

a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Curtis' pearly mussel (Epioblasma florentina curtisi)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The species historically occured at scattered locations in the White and St. Francis River basins in southern Missouri and northern Arkansas. Present distribution includes the Castor River, Cane Creek (a tributary of the Black) and Little Black River; it is presently known from six sites (6.1 miles of the upper Little Black and seven miles or less of the Castor River, upstream from the Headwater Diversion Channel). Stream gradients of 0.9 to 8.0 feet per mile and course substrate in riffle areas of small to moderate sized rivers are characterized as the habitat. Dam construction, siltation and possible elimination of host species are causes for population decline.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Principle concerns with pesticides are runoff and drift from forestry, agriculture and rangeland uses.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, ethyl parathion, methyl parathion, naled, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbofuran, carbophenothion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, malathion, methidathion, methomyl, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, diazinon, ethyl parathion, methyl parathion, naled, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, carbofuran, carbophenothion, dicofol, dimethoate, disulfoton, ethion, ethoprop, malathion, permethrin, phosmet, pyrethrin, terbufos.

This level of take is unquantifiable for the following reasons: Because absolute numbers in the population (or subpopulations) are unknown and cannot be determined and there is little likelihood that mortalities of either glochidia or adults will be detected.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Dromedary pearly mussel (Dromus dromus)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The dromedary pearly mussel is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. This mussel occurs in the Clinch River (Scott County, Virginia and Claiborne and Hancock Counties, Tennessee), Powell River (Claiborne and Hancock Counties, Tennessee), Tennessee River (Meigs and Rhea Counties, Tennessee) and Cumberland River (Monroe County, Kentucky).

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters, Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on

the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Green-blossom pearly mussel (Epioblasma tortulosa gubernaculum)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The green-blossom pearly mussel is extremely rare, almost to the point of extinction. It is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System, but is presently known only to occur in the Nolichucky River near Greeneville, Tennessee.

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Higgin's eye pearly mussel (Lampsilis higginsi)

ADDRESSED IN REQUEST PARTS I and 3

SPECIES/HABITAT DESCRIPTION:

The species is presently found in the Upper Mississippi Rivers from Brownsville, Minnesota to Burlington, Iowa and in the St. Croix River between Prescott and Hudson. The primary reasons for decline include changes in water quality resulting from municipal, industrial, and agricultural effluents. Physical changes brought about by navigation systems are also a primary factor for decline.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Service recognizes that the large volume of water associated with the species' habitat creates a situation wherein this species is unlikely to be jeopardized by registered uses of pesticides. However, because one of the principle reasons for decline include water quality deteriation, incidental take terms and conditions for some pesticides are included.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, diflubenzuron, disulfoton, diuron, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, malathion, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

> Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: carbaryl, carbophenothion, chlorpyrifos, diazinon, ethion, ethyl parathion, malathion, methyl parathion, naled, phosmet, trichlorfon
>
> This level of take is unquantifiable for the following reasons: Because absolute numbers in the population (or subpopulations) are unknown and cannot be determined and there is little likelihood that mortalities of either glochidia or adults will be detected.
>
> The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

> No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Little-wing pearly mussel (Pegias fabula)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The little-wing pearly mussel is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. This mussel occurs in the Clinch River (Tazewell County, Virginia), North and Middle Forks of the Holston River (Smyth County, Virginia), and the Rockcastle River (Jackson County), Red River (Logan County), Cumberland River (McCreary, Todd, Wayne and Whitney Counties), Beaver Creek (Wayne County) and Carie Creek (Putnam and Van Buren Counties) in Kentucky.

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not

only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fishes for many listed mussel species have not been identified, but those which have been include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Orange-footed pearly mussel (Plethobasus cooperianus)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

This species is an Interior Basin species (Ohio, Cumberland, and Tennessee River drainage). It is considered an extremely rare species, presently known only from these three rivers and the Greene River in Kentucky (Butler and Warren Counties). The largest concentrations probably occur in the Tennessee River below Pickwick Dam. In the Ohio River, the species was collected in 1982 near Metropolis, Illinois and one freshly dead specimen was found two miles below Lock and Dam 53 in 1981. Factors contributing to the decline include impoundment, siltation and in all likelihood pollution.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

As in the case for other large river species, it is unlikely the species will be jeopardized by registered uses of pesticides. Concern on some chemicals is expressed under the incidental take section.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, diflubenzuron, disulfoton, diuron, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, malathion, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: carbaryl, carbophenothion, chlorpyrifos, diazinon, ethion, ethyl parathion, malathion, methyl parathion, naled, phosmet, trichlorfon

This level of take is unquantifiable for the following reasons: Because absolute numbers in the population (or subpopulations) are unknown and cannot be determined and there is little likelihood that mortalities of either glochidia or adults will be detected.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Pale lilliput pearly mussel (*Toxolasma cylindrellus*)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

This species once occurred in the lower Tennessee River drainage in the following systems: Swamp Creek (Mobile River), Whitfield County, Georgia; Little Pigeon River, Sevier County, Tennessee; Sequatchie and Little Sequatchie Rivers, Marion County, Tennessee; Paint Rock River and Larkin Fork, Jackson County, Alabama; Flint River and Indian Creek, Madison County, Alabama; Elk River, Franklin County, Tennessee; Duck River, Tennessee and Buffalo River, Perry, Wayne, and Lewis Counties, Tennessee.

The pale lilliput pearly mussel is an inhabitant of stream riffles species and is presently known from the Paint Rock River and its headwater streams, Hurricane Creek and Estill Fork. A Tennessee Valley Authority survey of the Paint Rock system in northern Alabama reported this species in the Paint Rock below the confluence with Hurricane Creek (PRRM 59.9) and in Hurricane Creek. In 1978 freshly dead specimens were taken in Estill Fork near Freedom Bridge (EFM 1.1). It has also been reported in recent times (1960's) from Larkin Fork of the Paint Rock, Jackson County, Alabama; and the Duck River from Hickman to Bedford counties, Tennessee. This species is rare and very localized in occurrence.

The mussel fauna in most streams of the Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. Water pollution has probably contributed to the decline of this species. Numerous tributaries in the Tennessee River drainage were polluted already by the twentieth century, and the mussel fauna was in a decline at that time. Coal and mineral mining wastes have contributed additional particulate and chemical pollutants to the tributaries.

In the Duck River, completion of Normandy Dam in 1976 and the proposed Columbia Dam have or will probably eliminate any specimens of *T. cylindrellus* in that river. Completion of Tims Ford Dam on the Elk River probably contributed to the elimination of that historic population. The population in Larkin Fork may have been eliminated by agricultural chemical spraying. Poor land use practices and environmental contaminants are the most likely future threats to the remaining populations of the pale lilliput.

The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, propazine, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Pink mucket pearly mussel (Lampsilis orbiculata)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The pink mucket pearly mussel is an Interior Basin species, historically occurring in 25 river systems. Recent records include the Ohio, Muskingum, White, Wabash, Illinois, St. Francis, Clinch, Powell, Cumberland, Tennessee Nolichucky (Tennessee), Green (Kentucky) and Kanawha (West Virginia) Rivers. Successful reproduction is occurring in the Meramec River in Missouri. The Osage River in Missouri also has known populations and smaller populations are found in the Big, Black, Little Black, and Gasconade Rivers (Missouri).

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Causes for decline include impoundment, siltation, and, in all likelihood, pollution. Usually an inhabitant of medium to large rivers, this species appears to have adapted to life in the river-lake conditions of the upper reaches of impoundments (Recovery plan). As in the case of other large river species, it is unlikely this species will be jeopardized by registered uses considered in this opinion. Concern for some chemicals is expressed under the incidental take section.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, malathion, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: carbaryl, carbophenothion, chlorpyrifos, diazinon, ethion, ethyl parathion, malathion, methyl parathion, naled, phosmet, trichlorfon

This level of take is unquantifiable for the following reasons: Because absolute numbers in the population (or subpopulations) are unknown and cannot be determined and there is little likelihood that mortalities of either glochidia or adults will be detected.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Turbercled-blossom pearly mussel (*Epioblasma torulosa torulosa*)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

Historically this species occurred throughout the Tennessee River system below the Knoxville, Cumberland River, and the Ohio River system. Except for a fresh-dead specimen from the Kanawha River in Fayette County, West Virginia, found in 1969, no recent records exist for this species.

E. t. torulosa is a riverine species typically found in rivers with shallow sand and gravel shoals and rapid current. This species does not occur in the impounded sections of rivers. It is intolerant of silt and water pollution, and requires ample water flow and stable substrate for survival. This species may be extinct (Recovery plan).

Habitat of the glochidia is initially within the gills of the female, then in the water column, and finally attached to a suitable fish host. Any alteration of these life stage-specific habitats during its life cycle would affect the survival of remnant populations. Habitat requirements or associations for the juvenile stage are unknown.

There are no known interspecific differences in feeding among freshwater mussels. Adult mussels are filter-feeders and consume particulate matter suspended in the water column. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The major land use adjacent to the remaining habitat of this endangered mussel is forest/woodland; very little acreage is in crops or pasture. Therefore, only those pesticides used on forest/woodland are expected to affect this species. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinophos-methyl, carbaryl, carbophenothion, chlorpyrifos, dimethoate, malathion, pyrethrin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, benomyl, bifenox, chlorothalonil, diflubenzuron, methomyl, methyl parathion, naled, oxyflourfen, propachlor, thiophanate-methyl, and trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinophos-methyl, carbaryl, carbophenothion, chlorpyrifos, dimethoate, malathion, pyrethrin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species.
Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern:</u>

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: methomyl, methyl parathion, naled.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in

Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Turgid-blossom pearly mussel (Epioblasma turgidula)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The turgid-blossom was widespread in the Tennessee River system and was reported from the following rivers: Tennessee, Elk, Duck, Holston, Clinch, Emory and Shoals and Bear Creeks, Alabama. It also occurred in the Cumberland River, White River, Missouri and Arkansas, and Spring Creek and Block River, Arkansas. According to recent reviews, this species occurred in Spring Creek, Sharp Co., Arkansas, White River, Arkansas; Clinch and Emory Rivers, Roane Co., Tennessee; Holston River, Hawkins and Knox Counties, Tennessee; Bear Creek, Franklin Co., Alabama; Shoals Creek and Tennessee River, Lauderdale Co., Alabama; Elk River, Tennessee; and Duck River, Bedford and Maury Counties, Tennessee.

E. turgidula may be extinct. The last report of this species was in the Duck River near Normandy, Bedford Co., Tennessee in the mid-1960's. Completion of Normandy Dam in 1976 apparently eliminated the last known population. This species prefers fast flowing, shallow water over a sand and gravel substrate.

The mussel fauna in most streams of the Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, pH changes, oxygen depletion, and dewatering of mussel beds below dams. Mussel deaths can occur in substrate on which 0.6-2.5 cm of silt has accumulated, resulting in interference with feeding and suffocation. The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

Water pollution has probably contributed to the decline of this species and other Epioblasma species. Acid mine drainage in tributaries of the Cumberland River has nearly eliminated the most diverse group of Epioblasma. Numerous tributaries in the upper Tennessee River drainage were polluted already by the twentieth century and the mussel fauna was in a decline at that time.

The genus Epioblasma has been considered the most highly developed and recently evolved group of mussel species, at least 8 of which have recently become extinct. The decline of E. turgidula and extinction of other Epioblasma cannot be explained, but appears to be symptomatic of a general synecological problem that exists between Epioblasma and chronic environmental changes that have occurred and apparently are continuing in eastern rivers. Because this species is so rare (possibly extinct), the causes for its decline will remain conjectural.

Substantial mussel die-offs of unknown origin have occurred in the Tennessee River drainage since 1982 and have likely reduced population numbers. Future die-offs pose a direct threat to species' survival.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: White cat's paw pearly mussel (Epioblasma sulcata delicata)

ADDRESSED IN REQUEST PARTS 1 and 5

SPECIES/HABITAT DESCRIPTION:

The species has been recorded within ten river systems from New York to Indiana and Lake Erie. Since 1970, the only specimens collected within the species range are from one location in Fish Creek, Williams County, Ohio. For purposes of this consultation, that location is considered as the present known range.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Fish Creek is relatively small and flows through largely altered habitats with agriculture, urban development and small woodlots interspersed. The primary concern with pesticides include drift and runoff though there are many other factors which may influence the survival of the species.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): carbaryl, chlorpyrifos, diazinon, ethyl parathion, methyl parathion, naled, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbofuran, carbophenothion, chlorothalonil, copper sulfate, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, malathion, methidathion, methomyl, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat, or, in the case of acephate and diflubenzuron, their effect is expected to be minor because of the chemical's low toxicity.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (carbaryl, chlorpyrifos, diazinon, ethyl parathion, methyl parathion, naled, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl. carbofuran, carbophenothion, dicofol, dimethoate, disulfoton, ethion, ethoprop, malathion, permethrin, phosmet, pyrethrin, terbufos.

This level of take is unquantifiable for the following reasons: Because absolute numbers in the population (or subpopulations) are unknown and cannot be determined and there is little likelihood that mortalities of either glochidia or adults will be detected.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: White wartyback pearly mussel (Plethobasus cicatricosus)

ADDRESSED IN REQUEST PART 1 and 3

SPECIES/HABITAT DESCRIPTION:

The white wartyback pearly mussel occurred in the mainstem and several tributaries of the Ohio, Cumberland, and Tennessee Rivers. Historical records exist for the following rivers: Tennessee River, Holston River, and Kanawha River. States included in this historic distribution are Alabama, Tennessee, Kentucky, West Virginia, Indiana, and Illinois. Because many of the records for this species are old, precise data for many collection sites is lacking. A summary of historical records and sources of those records are included in the recovery plan for this species.

This species has become increasingly rare, almost to the point of extinction throughout its known historic range. All recent records of this species are from the original Tennessee River channel. One freshly dead specimen was collected in 1979 from a commercial cull pile below Pickwick Dam (TRM 206.7) near Savannah, Tennessee. Another specimen was taken from the same cull pile in 1982. These were old specimens, perhaps predating some of the dams on the Tennessee River. These two records are the only recent collections made since the mid-1960's. A small, non-reproducing population may still occur below Wilson Dam in northern Alabama. This species is on the brink of extinction.

This mussel is a big river shoal species, living in sand and gravel substrates.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried

in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.
The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Yellow-blossom pearly mussel (Epioblasma florentina florentina)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

This Cumberlandian species was widely distributed in the Tennessee and Cumberland Rivers and was reported from the following systems: Tennessee and Flint Rivers, and Hurricane, Limestone, Bear, and Cypress Creeks, Alabama; Elk, Duck, Holston, Little Tennessee, and Clinch Rivers, and Citico Creek, Tenessee; and Cumberland River, Kentucky. A summary of historical records is in the recovery plan.

This species may be extinct. The most recent records were from Citico Creek, Tennessee in 1957 and from the Little Tennessee River, Tennessee in the mid-1960's. The following records by Herbert Athearn are the most recent for this species (11):

Citico Creek	- Citico Bridge 1.5 miles above confluence with Little Tennessee River

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest and woodland. Therefore, only forest use pesticides were considered to affect this species. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dimethoate, ethion, malathion, pyrethrin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, benomyl, bifenox, chlorothalonil, diflubenzuron, mancozeb, methomyl, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dimethoate, ethion, malathion, pyrethrin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, methomyl, methyl parathion, naled, phosmet.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Fine-rayed pigtoe (Fusconaia cuneolus)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The fine-rayed pigtoe is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. Populations occur in several tributaries of the Tennessee River above Mussel Shoals, Alabama, and in the North Fork Holston River (Hawkins and Sullivan Counties, Tennessee), Clinch River (Anderson, Clairbourne and Grainger Counties, Tennessee and Russell, Scott and Tazewell Counties, Virginia), Powell River (Claiborne, Grainger and Hancock Counties, Tennessee and Lee County, Virginia) Elk River (Lincoln County, Tennessee), Paint Rock River (Jackson County, Alabama), and Little River (Blount County, Tennessee).

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Rough pigtoe (Pleurobema plenum)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The rough pigtoe is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. The species is presently known from the Tennessee (Decatur, Hardin, Meigs, Perry and Rhea Counties), Clinch (Anderson and Hancock Counties), and Barren (Warren County) Rivers in Tennessee and the Green (Edmonson, Green, Hart and Taylor Counties) in Kentucky.

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is probably a shoal species found in a sand and gravel substrate in medium to large rivers. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on

the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Shiny pigtoe (Fusconaia edgariana)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The shiny pigtoe is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. Its present range includes portions of the North Fork Holston (Virginia), Clinch and Powell (Clairbourne, Grainger and Hancock Counties, Tennessee), Elk (Lincoln County, Tennessee) and Paint Rock Rivers (Alabama).

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for

a life cycle to be completed. The host fish(es) for this mussel have been tentatively identified as the common shiner, Notropis cornutus, and the whitetail shiner, Notropis galacturus.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency' 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Fat pocketbook (Potamilus capax)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

Most records for this species are from three river systems, the Mississippi, above St. Louis, Missouri, the Wabash River in Indiana and the St. Francis River in Arkansas. Recent collections within these three systems have found speciments only from the Wabash and White Rivers in Indiana and for the purposes of this consultation, locations within those two systems are consided as current range. The species is also found in the Green and Tennessee Rivers in Kentucky. Reasons for decline of the population include activities related to navigation and flood control, siltation and pollution, although documentation for pollution is lacking.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Water volumes within the rivers make it unlikly that the species will be jeopardized by registered uses of pesticides. Concern on some chemicals is expressed in the incidental take section.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, malathion, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: carbaryl, carbophenothion, chlorpyrifos, diazinon, ethion, ethyl parathion, malathion, methyl parathion, naled, phosmet, trichlorfon

This level of take is unquantifiable for the following reasons: Because absolute numbers in the population (or subpopulations) are unknown and cannot be determined and there is little likelihood that mortalities of either glochidia or adults will be detected.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Tan riffle shell (Epioblasma walkeri)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The tan riffle shell is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. The only recent collection of this species is from the Middle Fork Holston River in Smyth and Washington Counties, Virginia, although it may still occur in the Duck and Red Rivers in Tennessee and the Cumberland River in Kentucky as well.

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

Domestic sewage poses the most serious threat to this species.

This species is a headwater form characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not

only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: James River spinymussel (Pleurobema collina)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Once widely distributed in the James River drainage above Richmond, Virginia, this species is now limited to a few headwater tributaries of the James River in Virginia and West Virginia: Craig Creek, Johns Creek, Catawba Creek, Patterson Creek, and Pott's Creek.

The James spinymussel has been collected on sand and mixed sand and gravel substrates generally in riffles or runs with slow to moderate current and relatively hard water. Like other freshwater mussels, it feeds by filtering food particles from the water, a characteristic that makes it particularly susceptible to detrimental effects of water-borne pollutants. P. collina. also shares with other freshwater mussels a complex reproductive cycle in which the mussel larvae attach for a short time to a fish host. Recent research indicates that several fish of the family Cyprinidae serve as hosts for this mussel.

Threats to the species' habitat (53 FR 27691) include: (1) effluent discharges and accidental discharges of chlorine or raw sewage from sewage treatment plants; (2) erosion and siltation resulting from logging operations in the upper Craig Creek Watershed and other locations; (3) toxic chemical spills, (4) agricultural runoff including pesticides and fertilizers; and (5) channelization.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland and pasture/rangelands; relatively little acreage is in crops. Therefore, no Jeopardy findings were made for pesticides used only on crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by the Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinophos-methyl, carbaryl, carbophenothion, chlorpyrifos, dimethoate, ethyl parathion, malathion, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, diazinon, dicofol, dicrotophos, diflubenzuron, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalarate, fonofos, isofenphos, mancozeb, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinophos-methyl, carbaryl, carbophenothion, chlorpyrifos, dimethoate, ethyl parathion, malathion, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, diazinon, dicofol, endosulfan, ethion, ethoprop, fensulfothion, fenvalarate, fonofos, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, phorate, phosmet, terbufos.

Incidental take in the form of sublethal effects (harm) or the death of individual mussels may occur as these chemicals have significant hazard ratios for mussels or their fish hosts.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Tar River spinymussel (Elliptio steinstansana)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

This species was first postulated to occur in the Carolinas, based on a specimen in an early collection housed at the Smithsonian Institution. Its occurrence was confirmed by Carol Stein, who discovered this species in 1966 in the Tar River, North Carolina at Old Sparta, Edgecombe County. Subsequent to this record, it was collected 2 miles W of Spring Hope, Nash County in 1967 and 1968; at Tarboro, Edgecombe County; and 1.4 miles E of Falkland, Pitt County. As judged by these site records, it can be inferred that this species inhabited the Tar River at least from Pitt County to Nash County, North Carolina. Because no records exist prior to 1966, the actual historic distribution cannot be assessed.

The Tar River spinymussel is endemic to the Tar River, North Carolina, occurring from Old Sparta, Edgecombe County to roughly 2 miles NE of Tarboro, Edgecombe County. Recent survey efforts (1977-1983) have failed to locate this endemic species outside of Edgecombe County. It is an extremely rare species.

Because this species was described only recently, past reasons for the current status are difficult to document. This mussel requires unpolluted, well oxygenated water of substantial volumn over a sandy substrate. The Tar River has above average loadings of nutrients and pesticides, and these pollutants probably affected the spinymussel. Its absence below Rocky Mount indicates that it may be sensitive to municipal sewage.

Habitat loss has occurred in the Tar River since 1967. A dam and reservoir above Rocky Mount in 1972 and the relocation of U.S. Highway 64 in 1977, along with permanent and temporary dams, altered habitat and probably caused the loss of this species in those areas.

Invasion of the Asiatic clam (Corbicula fluminea) into the Tar River recently may be affecting the success of the endemic mussel fauna. Possible competition for food and space may result in higher mortality for both juveniles and adults. Corbicula may also interfere with reproduction by filtering mussel sperm from the water column.

North Carolina law prohibits collecting wildlife, including mussels, without a permit, however, such collections may still be occurring.

Due primarily to pollution and habitat loss, it is estimated that this species has decreased its range by 50 percent since 1966.

Future threats include those previously mentioned as well as a proposed hydropower project at an upstream dam in Rocky Mount. Fluctuating water levels and changes in water quality could affect the downsteam population. Similarly, the withdrawal of large volumes of water from the river during drought conditions could expose habitat typically used by this species. In addition the small gene pool that presently exists may be approaching the minimum population size needed for sufficient genetic variation to respond to environmental changes.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, propazine, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Stirrup shell (Quadrula stapes)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The stirrup shell is known historically from the Alabama River and the Tombigbee River. Museum records indicate the stirrup shell was restricted historically to the lowermost part of the Alabama River (Stansbery 1981). The lack of fresh shells or living specimens from the Alabama River for several decades indicates the likely extirpation of the stirrup shell from this portion of the historic range. This species has been collected from a reach of the Tombigbee River from near Epes, Alabama, upstream to just above the confluence of Tibbee Creek. One specimen was recently collected by Yokley in the lower Sipsey River, and a recent survey by Fish and Wildlife Service biologists found a fresh stirrup shell at the same site. The present known distribution of this mussel is limited to a single Tombigbee bendway and the Sipsey River.

Impoundment of the Tombigbee River has altered water flows and increased siltation on the gravel bars. This alteration suffocated mussels with silt and may have modified habitat so as to eliminate the fish host, if the host is a riverine species that is intolerant of impoundments. The Corps of Engineers (COE) has a channel improvement project for 84.5 miles of the Sipsey River River that includes 32 miles of clearing and snagging (COE 1981). Channel modifications adversely impact mussels by alteration of the substrate, increasing siltations, altered water flows, and direct mortality of mussels from dredging and snagging activities.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by the Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, Diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried

in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.
The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Hay's Spring amphipod (Stygobromus hayi)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Hay's spring amphipod is an eyeless, unpigmented gammaridean amphipod crustacean. The habitat of Stygobromus hayi consists of a small permanent spring, seep-like in appearance, on National Zoological Park property in Washington, DC. The spring appears to issue forth from crevices in Precambrian rocks of the Piedmont province. The amphipods occur in decaying deciduous leaf litter and mud at the spring exit. Little is known about the life history of this species.

Considering its association with decaying deciduous leaves and organically enriched mud, it is assumed that S. hayi feeds on leaves, decaying organic detritus, and decomposer microorganisms (e.g., bacteria and fungi) which occur on the organic material. Most freshwater amphipods are believed to be primarily herbivores, and there is no evidence to the contrary for S. hayi.

It should be noted that only a small percentage of the actual population of this species is probably seen in the spring habitat itself. Given that S. hayi is of stygobiont facies (i.e., eyeless and unpigmented), it probably inhabits cracks, crevices and interstitial spaces of the mantle/bedrock area that forms the recharge zone for the spring.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

No cropland or rangeland occurs in the vicinity of the amphipod's habitat. Mosquito larvicides are very unlikely to be used here. Forest-use pesticides may be utilized in the wooded corridor containing the habitat of this species. Therefore, any pesticide not utilized for forest/woodland applications, was considered to have no effect on the amphipod.

Any contact between the amphipod and pesticides being considered in this opinion is most likely to occur as a result of direct application to the surface of the pool of water at the mouth of the spring inhabited by this amphipod during spraying of the surrounding mixed hardwood woodlands. Therefore, Table 8 of EPA's submittal (Direct Application to water 6 inches in depth) was utilized to evaluate the hazard to the Hay's spring amphipod. For forest-use pesticides, hazard ratios for the amphipod Gammarus were utilized whenever they were available; otherwise, other invertebrate hazard ratios were used.

In most cases where jeopardy was found, the very high hazard ratio for invertebrates was a sufficient basis for this conclusion. For those herbicides found to jeopardize the amphipod, toxicity to the bacteria and fungi on which the amphipod is believed to feed, provided an additional basis.

The Service has a memorandum of understanding with the Smithsonian Institution (operator of the National Zoo) to protect the habitat of this species. That agreement can be amended to protect the amphipod from the effects of pesticide use on zoo property. However, because much of the land within the recommended quarter-mile buffer radius is privately owned, a label restriction would stiil be required.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbophenothion, chlorothalonil, diflubenzuron, dimethoate, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, oxyfluorfen, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbophenothion, chlorothalonil, diflubenzuron, dimethoate, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trifluralin) if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: [Cave] crayfish (Cambarus zophonastes)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Cambarus zophonastes is an albinistic cave crayfish. No common name is known for this species. It has a very restricted range and probably a corresponding low population level. The threats of low gene pool, sedimentation, groundwater contamination, and human disturbance are the primary reasons for the listing of C. zophonastes.

The cave energy source is bat guano from a maternity roost of gray bats, and endangered species. Loss of this energy source would certainly result in a decline of biological life in the cave. The cave is a "solution channel" or "tunnel" cave, most of which is wet year round. This species has been found on the steep rock sides of the deep pool within the cave entrance and on the mud substrate. The primary recharge area consists of approximately 3.5 square miles and is largely privately owned. This crayfish apparently requires clear water since it has been observed crawling away from turbid water.

This crayfish is an opportunistic omnivore, feeding on whatever organic matter washes into the cave system. It feeds on organic detritus, aquatic insects, and small crustaceans such as isopods, copepods, and amphipods. Reproduction begins in late winter and spring when water flows and nutrient levels are high.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Cambarus zophonastes is a albinistic cave crayfish that occurs in only one cave in the Ozark Mountains in Stone County, Arkansas. The population may number fewer than 50 individuals. Agricultural production is not identified as being a factor in the decline of this species, nor does it occur within its watershed. However, forestry practices and cattle production occur within the watershed of this species. Water circulation and recharge in cave habitats occurs at a much slower rate than in spring or stream systems. Pesticides that enter the cave system have a greater potential for remaining long enough to come in contact with the species. Additionally, this species is dependant on bat guano produced by the endangered gray bat for energy source. Of the 60 chemicals being reviewed, only the forestry and rangeland chemicals could potentially impact this crayfish.

Table 19B was used to obtain hazard ratios for freshwater invertebrates.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dimethoate, ethyl parathion, malathion, methomyl, methyl parathion, phosmet, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, disulfoton, fenitrothion, mancozeb, methoprene, naled, oxyfluorfen, propachlor, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dimethoate, ethyl parathion, malathion, methomyl, methyl parathion, phosmet, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, disulfoton, fenitrothion, mancozeb, methoprene, naled, oxyfluorfen, propachlor, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species exists in underground caves. Many of the cave passages are inaccessible to humans. Those that are accessible are entered infrequently in order to prevent disturbance to the fragile cave ecosystem. The likelihood of recovering a specimen is very small. Therefore, we are unable to define a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from

pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Nashville crayfish (Orconectes shoupi)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Nashville crayfish occurs only in Mill Creek and five of its tributaries in Davidson and Williamson Counties, Tennessee. The Nashville crayfish has been observed feeding on dead animal matter and is believed to feed on roots, stems and leaf fragments. Males molt into the reproductive state in late summer. Egg laying occurs in late winter and early spring.

The Nashville crayfish has been found in a wide range of environments including gravel and cobble runs, pools with settled sediment, and under slabrocks and other cover. Cover appears to be a primary limiting factor for the species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The two main agricultural activities affecting the Nashville crayfish are corn and cattle production. Forestry pesticide use does occur within the habitat but is considered minor. Except for those chemicals listed as exclusively forestry or mosquito larvicide chemicals, all other of the 60 chemicals could impact the Nashville crayfish.

Hazard ratios for aquatic invertebrates were obtained from table 18 because it most closely resembled the habitat characteristics for the Nashville crayfish. When data from table 18 was unavailable, table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbophenothion, chlorpyrifos, diazinon, dicrotophos, endosulfan, ethion, ethyl parathion, fensulfothion, methyl parathion, mevinphos, naled, pendimethalin, phosmet, profenofos, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, bensulide, captan, carbaryl, carbofuran, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, methidathion, methomyl, methoprene, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosphamidon, propachlor, sulprofos, thiodicarb, terbutryn, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbophenothion, chlorpyrifos, diazinon, dicrotophos, endosulfan, ethion, ethyl parathion, fensulfothion, methyl parathion, mevinphos, naled, pendimethalin, phosmet, profenofos, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, methidathion, methomyl, methoprene, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosphamidon, propachlor, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, a level of incidental take cannot be estimated.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Madison Cave isopod (_Antrolana lira_)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

This eyeless, unpigmented isopod is the only subterranean freshwater cirolanid found in North America north of Texas. It occurs only in Augusta County, Virginia.

The accessible physical habitat of the Madison Cave isopod (_Antrolana lira_) consists of three lakes of deep phreatic water (i.e., below the level of the water table) which occupy narrow cave passages developed along bedding planes in limestone strata. The surface of these lakes is believed to represent the ground water table beneath Cave Hill. The east and west lake are accessible from the lower level of Madison's Saltpetre Cave and have depths of 21.5 meters and 10.7 meters respectively. The lake in Steger's Fissure is ca. 30.5 meters deep and consumes nearly all of this fissure-cave. The fissure lake is NNE of the cave lakes and is exposed to the surface. All three lakes are believed to share the same body of phreatic water associated with the Cave Hill subterranean aquifer.

Observed physical/chemical parameters of the lake habitats include: fresh water; temperature of 11-14 degrees C; dissolved oxygen of 9.3-9.4 mg/l; nitrate/nitrite of 1.6 mg.; and low turbidity. There is a sinkhole on Cave Hill near the town of Grottoes, VA, above the cave that is believed to be one of several important recharge points for the Cave Hill subterranean aquifer and a principal entry point for nutrients.

Based on gut content analysis, it is believed that this species feeds on decaying organic matter consisting of deciduous leaf litter, twigs and other wood particles. Parts from dead insects, presumably from decomposition of epigean insects that wash into the aquifer, are also eaten. It is also likely that this species feeds on bacteria, fungi and other microorganisms associated with the organic matter.

Data on population biology for _Antrolana lira_ suggest that _A. lira_ may reproduce more or less continually at a low rate without apparent peaks or cycles.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Land use immediately adjacent to the habitats of the Madison Cave isopod include woodland and grassland/pasture. Forest or rangeland pesticides may come into contact with the isopod as a result of (1) direct spraying or drift into Steger's fissure, (2) spraying of leaves which could blow into the fissure or Madison's cave, and (3) contamination of sinkholes in the immediate vicinity of the cave. Table 10 (Direct Application to 6 Feet of

Water) was used to determine the hazard ratio for forest and rangeland pesticides, which could be sprayed directly on the surface of the lake in Steger's Fissure.

Because crops are not grown in the immediate vicinity of the isopod's habitat, direct spraying by any of the crop cluster pesticides would not be expected. Rather, contamination of the isopod's underground lakes would result from runoff into sinkholes or other recharge points feeding the Madison Cave aquifer. Hazard ratios in Table 14 and the Agency's data on potential for leaching into groundwater (Attachment 3 to May 17, 1989, letter) were major factors utilized to predict effects of those crop-use pesticides not also used on forest and rangeland.

When isopod (Asellus) toxicity data were available (Mayer and Ellersieck, 1986), these were utilized to calculate hazard ratios. Otherwise Gammarus or other crustacean hazard ratios were used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, ethyl parathion, methidathion, methomyl, methyl parathion, naled, pyrethrin, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, bifenox, captan, carbofuran, copper sulfate, dicofol, disulfoton, diuron, endosulfan, ethion, ethoprop, fensulfothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, propachlor, propargite, terbufos, terbutryn, thiodicarb, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, ethyl parathion, methidathion, methomyl, methyl parathion, naled, pyrethrin, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Shiny pigtoe (Fusconaia edgariana)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The shiny pigtoe is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. Its present range includes portions of the North Fork Holston (Virginia), Clinch and Powell (Clairbourne, Grainger and Hancock Counties, Tennessee), Elk (Lincoln County, Tennessee) and Paint Rock Rivers (Alabama).

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

This species is characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for

a life cycle to be completed. The host fish(es) for this mussel have been tentatively identified as the common shiner, Notropis cornutus, and the whitetail shiner, Notropis galacturus.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency' 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Fat pocketbook (Potamilus capax)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

Most records for this species are from three river systems, the Mississippi, above St. Louis, Missouri, the Wabash River in Indiana and the St. Francis River in Arkansas. Recent collections within these three systems have found speciments only from the Wabash and White Rivers in Indiana and for the purposes of this consultation, locations within those two systems are consided as current range. The species is also found in the Green and Tennessee Rivers in Kentucky. Reasons for decline of the population include activities related to navigation and flood control, siltation and pollution, although documentation for pollution is lacking.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Water volumes within the rivers make it unlikly that the species will be jeopardized by registered uses of pesticides. Concern on some chemicals is expressed in the incidental take section.

The species exposure scenario was calculated using table 19. In those instances where data were lacking in that table (or table 18), tables 19a and 19b were utilized.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, azinphos-methyl, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, copper sulfate, diazinon, dicofol, dicrotophos, diflubenzuron, dimethoate, disulfoton, diuron, endosulfan, ethion, ethoprop, ethyl parathion, fenamiphos, fensulfothion, fenvalerate, fonofos, isofenphos, mancozeb, malathion, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyflourfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trichlorfon, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: carbaryl, carbophenothion, chlorpyrifos, diazinon, ethion, ethyl parathion, malathion, methyl parathion, naled, phosmet, trichlorfon

This level of take is unquantifiable for the following reasons: Because absolute numbers in the population (or subpopulations) are unknown and cannot be determined and there is little likelihood that mortalities of either glochidia or adults will be detected.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Tan riffle shell (Epioblasma walkeri)

ADDRESSED IN REQUEST PARTS 1 and 3

SPECIES/HABITAT DESCRIPTION:

The tan riffle shell is a member of the Cumberlandian mussel fauna inhabiting the Upper Tennessee River System. The only recent collection of this species is from the Middle Fork Holston River in Smyth and Washington Counties, Virginia, although it may still occur in the Duck and Red Rivers in Tennessee and the Cumberland River in Kentucky as well.

The mussel fauna in most streams of the upper Tennessee River drainage has been impacted by dam construction, channelization, siltation, and water pollution, which directly affect all mussel species. The change from lotic to lentic conditions because of dams has also altered the species composition of the fish community, thus jeopardizing the reproductive success of some mussel species by eliminating required fish hosts. Although siltation has been suggested as the most significant adverse effect of impoundments on mussels, other detrimental factors include lowered water temperatures, p^H changes, oxygen depletion, and dewatering of mussel beds below dams . The siphoning period and metabolic rate of mussels can also be affected by such contaminants as heavy metals and agricultural chemicals.

Domestic sewage poses the most serious threat to this species.

This species is a headwater form characteristically found in shallow riffles or runs in small rivers of moderate gradient. Should runoff of a pesticide into one of these rivers or streams occur, dilution to an acceptable concentration may not be sufficient to eliminate concern for listed mussel species in the immediate vicinity.

Freshwater mussels are filter feeders and consume particulate matter suspended in the water column. There are no known interspecific differences in feeding among mussels. Identifiable stomach contents almost invariably include mud, desmids, diatoms, other unicellular algae, protozoa, and zooplankters. Because freshwater mussels are filter feeders, they are expected to have a marked tendency to bioaccumulate those pesticides which adhere to silt particles washed into their habitats.

The freshwater mussels considered here all exhibit a life cycle that involves a larval form, the glochidium. Glochidia must become attached to the surface, characteristically a gill surface, of a host fish shortly after being released from the adult female mussel. Here they remain encysted on the surface of the host fish for a variable incubation period, after which they drop onto the river bottom. If they chance to fall onto suitable substrate, growth continues as an independent juvenile mussel. Our concern regarding the potential impact of pesticides on mussels is not

only for the direct affect on adults, but also for their toxic affect on the larval glochidia and on the host fish, both of which are essential for a life cycle to be completed. The host fish(es) for this mussel has not been identified, but hosts for other mussels include members of the sunfish, minnow, perch, and sculpin families.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: James River spinymussel (Pleurobema collina)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Once widely distributed in the James River drainage above Richmond, Virginia, this species is now limited to a few headwater tributaries of the James River in Virginia and West Virginia: Craig Creek, Johns Creek, Catawba Creek, Patterson Creek, and Pott's Creek.

The James spinymussel has been collected on sand and mixed sand and gravel substrates generally in riffles or runs with slow to moderate current and relatively hard water. Like other freshwater mussels, it feeds by filtering food particles from the water, a characteristic that makes it particularly susceptible to detrimental effects of water-borne pollutants. P. collina. also shares with other freshwater mussels a complex reproductive cycle in which the mussel larvae attach for a short time to a fish host. Recent research indicates that several fish of the family Cyprinidae serve as hosts for this mussel.

Threats to the species' habitat (53 FR 27691) include: (1) effluent discharges and accidental discharges of chlorine or raw sewage from sewage treatment plants; (2) erosion and siltation resulting from logging operations in the upper Craig Creek Watershed and other locations; (3) toxic chemical spills, (4) agricultural runoff including pesticides and fertilizers; and (5) channelization.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland and pasture/rangelands; relatively little acreage is in crops. Therefore, no Jeopardy findings were made for pesticides used only on crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by the Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinophos-methyl, carbaryl, carbophenothion, chlorpyrifos, dimethoate, ethyl parathion, malathion, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, diazinon, dicofol, dicrotophos, diflubenzuron, disulfoton, diuron, endosulfan, ethion, ethoprop, fenamiphos, fensulfothion, fenvalarate, fonofos, isofenphos, mancozeb, methidathion, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, pendimethalin, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbufos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinophos-methyl, carbaryl, carbophenothion, chlorpyrifos, dimethoate, ethyl parathion, malathion, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, diazinon, dicofol, endosulfan, ethion, ethoprop, fensulfothion, fenvalarate, fonofos, methomyl, methyl parathion, mevinphos, naled, nitrapyrin, phorate, phosmet, terbufos.

Incidental take in the form of sublethal effects (harm) or the death of individual mussels may occur as these chemicals have significant hazard ratios for mussels or their fish hosts.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Tar River spinymussel (*Elliptio steinstansana*)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

This species was first postulated to occur in the Carolinas, based on a specimen in an early collection housed at the Smithsonian Institution. Its occurrence was confirmed by Carol Stein, who discovered this species in 1966 in the Tar River, North Carolina at Old Sparta, Edgecombe County. Subsequent to this record, it was collected 2 miles W of Spring Hope, Nash County in 1967 and 1968; at Tarboro, Edgecombe County; and 1.4 miles E of Falkland, Pitt County. As judged by these site records, it can be inferred that this species inhabited the Tar River at least from Pitt County to Nash County, North Carolina. Because no records exist prior to 1966, the actual historic distribution cannot be assessed.

The Tar River spinymussel is endemic to the Tar River, North Carolina, occurring from Old Sparta, Edgecombe County to roughly 2 miles NE of Tarboro, Edgecombe County. Recent survey efforts (1977-1983) have failed to locate this endemic species outside of Edgecombe County. It is an extremely rare species.

Because this species was described only recently, past reasons for the current status are difficult to document. This mussel requires unpolluted, well oxygenated water of substantial volumn over a sandy substrate. The Tar River has above average loadings of nutrients and pesticides, and these pollutants probably affected the spinymussel. Its absence below Rocky Mount indicates that it may be sensitive to municipal sewage.

Habitat loss has occurred in the Tar River since 1967. A dam and reservoir above Rocky Mount in 1972 and the relocation of U.S. Highway 64 in 1977, along with permanent and temporary dams, altered habitat and probably caused the loss of this species in those areas.

Invasion of the Asiatic clam (*Corbicula fluminea*) into the Tar River recently may be affecting the success of the endemic mussel fauna. Possible competition for food and space may result in higher mortality for both juveniles and adults. *Corbicula* may also interfere with reproduction by filtering mussel sperm from the water column.

North Carolina law prohibits collecting wildlife, including mussels, without a permit, however, such collections may still be occurring.

Due primarily to pollution and habitat loss, it is estimated that this species has decreased its range by 50 percent since 1966.

Future threats include those previously mentioned as well as a proposed hydropower project at an upstream dam in Rocky Mount. Fluctuating water levels and changes in water quality could affect the downsteam population. Similarly, the withdrawal of large volumes of water from the river during drought conditions could expose habitat typically used by this species. In addition the small gene pool that presently exists may be approaching the minimum population size needed for sufficient genetic variation to respond to environmental changes.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, propazine, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.

This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Stirrup shell (Quadrula stapes)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The stirrup shell is known historically from the Alabama River and the Tombigbee River. Museum records indicate the stirrup shell was restricted historically to the lowermost part of the Alabama River (Stansbery 1981). The lack of fresh shells or living specimens from the Alabama River for several decades indicates the likely extirpation of the stirrup shell from this portion of the historic range. This species has been collected from a reach of the Tombigbee River from near Epes, Alabama, upstream to just above the confluence of Tibbee Creek. One specimen was recently collected by Yokley in the lower Sipsey River, and a recent survey by Fish and Wildlife Service biologists found a fresh stirrup shell at the same site. The present known distribution of this mussel is limited to a single Tombigbee bendway and the Sipsey River.

Impoundment of the Tombigbee River has altered water flows and increased siltation on the gravel bars. This alteration suffocated mussels with silt and may have modified habitat so as to eliminate the fish host, if the host is a riverine species that is intolerant of impoundments. The Corps of Engineers (COE) has a channel improvement project for 84.5 miles of the Sipsey River River that includes 32 miles of clearing and snagging (COE 1981). Channel modifications adversely impact mussels by alteration of the substrate, increasing siltations, altered water flows, and direct mortality of mussels from dredging and snagging activities.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Major land uses adjacent to the habitats of this endangered mussel are forest/woodland, pasture/rangelands, and a variety of crops. Table 18 (runoff-pond/stream model-stream 1) was considered to provide the best indication of hazard for the mussels and their fish hosts. Therefore, hazard ratios from this table were used, when available; otherwise Table 12 was used. Unfortunately, with a few exceptions, these tables do not include mollusk toxicity data, necessitating the use of daphnia or other crustacean hazard ratios as the best available. In addition to the hazard ratios provided by the Agency, data on toxicity to oysters was considered when available in the Agency's 1986 publication, "Acute Toxicity Handbook of Chemicals to Estuarine Organisms." While these data are helpful, they are still not reliable for this purpose because of the many differences in the biology of oysters and freshwater mussels, including completely different larval forms and adaptation to very different natural habitats.

For most mussels the host fish or fishes for the glochidia are unknown. For those listed species where the hosts are known, they are not migratory. Therefore, the Service has chosen to protect potential fish hosts within the occupied habitats of the mussels.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fensulfothion, fonofos, malathion, methidathion, mevinphos, pendimethalin, pyrethrin, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, copper sulfate, dicrotophos, Diflubenzuron, disulfoton, diuron, ethoprop, fenvalerate, isofenphos, mancozeb, methomyl, methyl parathion, naled, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

> For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, endosulfan, ethion, ethyl parathion, fenamiphos, fonofos, malathion, methidathion, mevinphos, pendimethalin, profenfos, pyrethrin, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

> Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: benomyl, captan, carbofuran, ethoprop, fenvalerate, methomyl, methyl parathion, naled, nitrapyrin, phorate, phosmet, phosphamidon.
>
> This level of take is unquantifiable for the following reasons: Because mussels are sedentary benthic species which may remain buried

in the substrate with few obvious macroscopic changes upon death, sudden mussel die-offs may escape detection for some time. They have seldom been detected in time to allow contaminant analyses and determination of the causative agent. But, hazard ratios and other information on persistence and bioaccumulation indicate the likelihood that some mussels will be killed by these pesticides.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Hay's Spring amphipod (Stygobromus hayi)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Hay's spring amphipod is an eyeless, unpigmented gammaridean amphipod crustacean. The habitat of Stygobromus hayi consists of a small permanent spring, seep-like in appearance, on National Zoological Park property in Washington, DC. The spring appears to issue forth from crevices in Precambrian rocks of the Piedmont province. The amphipods occur in decaying deciduous leaf litter and mud at the spring exit. Little is known about the life history of this species.

Considering its association with decaying deciduous leaves and organically enriched mud, it is assumed that S. hayi feeds on leaves, decaying organic detritus, and decomposer microorganisms (e.g., bacteria and fungi) which occur on the organic material. Most freshwater amphipods are believed to be primarily herbivores, and there is no evidence to the contrary for S. hayi.

It should be noted that only a small percentage of the actual population of this species is probably seen in the spring habitat itself. Given that S. hayi is of stygobiont facies (i.e., eyeless and unpigmented), it probably inhabits cracks, crevices and interstitial spaces of the mantle/bedrock area that forms the recharge zone for the spring.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

No cropland or rangeland occurs in the vicinity of the amphipod's habitat. Mosquito larvicides are very unlikely to be used here. Forest-use pesticides may be utilized in the wooded corridor containing the habitat of this species. Therefore, any pesticide not utilized for forest/woodland applications, was considered to have no effect on the amphipod.

Any contact between the amphipod and pesticides being considered in this opinion is most likely to occur as a result of direct application to the surface of the pool of water at the mouth of the spring inhabited by this amphipod during spraying of the surrounding mixed hardwood woodlands. Therefore, Table 8 of EPA's submittal (Direct Application to water 6 inches in depth) was utilized to evaluate the hazard to the Hay's spring amphipod. For forest-use pesticides, hazard ratios for the amphipod Gammarus were utilized whenever they were available; otherwise, other invertebrate hazard ratios were used.

In most cases where jeopardy was found, the very high hazard ratio for invertebrates was a sufficient basis for this conclusion. For those herbicides found to jeopardize the amphipod, toxicity to the bacteria and fungi on which the amphipod is believed to feed, provided an additional basis.

The Service has a memorandum of understanding with the Smithsonian Institution (operator of the National Zoo) to protect the habitat of this species. That agreement can be amended to protect the amphipod from the effects of pesticide use on zoo property. However, because much of the land within the recommended quarter-mile buffer radius is privately owned, a label restriction would stiil be required.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbophenothion, chlorothalonil, diflubenzuron, dimethoate, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, oxyfluorfen, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (atrazine, azinphos-methyl, benomyl, bifenox, captan, carbaryl, carbophenothion, chlorothalonil, diflubenzuron, dimethoate, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trifluralin) if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: [Cave] crayfish (Cambarus zophonastes)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

Cambarus zophonastes is an albinistic cave crayfish. No common name is known for this species. It has a very restricted range and probably a corresponding low population level. The threats of low gene pool, sedimentation, groundwater contamination, and human disturbance are the primary reasons for the listing of C. zophonastes.

The cave energy source is bat guano from a maternity roost of gray bats, and endangered species. Loss of this energy source would certainly result in a decline of biological life in the cave. The cave is a "solution channel" or "tunnel" cave, most of which is wet year round. This species has been found on the steep rock sides of the deep pool within the cave entrance and on the mud substrate. The primary recharge area consists of approximately 3.5 square miles and is largely privately owned. This crayfish apparently requires clear water since it has been observed crawling away from turbid water.

This crayfish is an opportunistic omnivore, feeding on whatever organic matter washes into the cave system. It feeds on organic detritus, aquatic insects, and small crustaceans such as isopods, copepods, and amphipods. Reproduction begins in late winter and spring when water flows and nutrient levels are high.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Cambarus zophonastes is a albinistic cave crayfish that occurs in only one cave in the Ozark Mountains in Stone County, Arkansas. The population may number fewer than 50 individuals. Agricultural production is not identified as being a factor in the decline of this species, nor does it occur within its watershed. However, forestry practices and cattle production occur within the watershed of this species. Water circulation and recharge in cave habitats occurs at a much slower rate than in spring or stream systems. Pesticides that enter the cave system have a greater potential for remaining long enough to come in contact with the species. Additionally, this species is dependant on bat guano produced by the endangered gray bat for energy source. Of the 60 chemicals being reviewed, only the forestry and rangeland chemicals could potentially impact this crayfish.

Table 19B was used to obtain hazard ratios for freshwater invertebrates.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dimethoate, ethyl parathion, malathion, methomyl, methyl parathion, phosmet, pyrethrin, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, disulfoton, fenitrothion, mancozeb, methoprene, naled, oxyfluorfen, propachlor, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbaryl, carbophenothion, chlorpyrifos, diazinon, dimethoate, ethyl parathion, malathion, methomyl, methyl parathion, phosmet, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, benomyl, bifenox, captan, carbofuran, chlorothalonil, diflubenzuron, disulfoton, fenitrothion, mancozeb, methoprene, naled, oxyfluorfen, propachlor, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species exists in underground caves. Many of the cave passages are inaccessible to humans. Those that are accessible are entered infrequently in order to prevent disturbance to the fragile cave ecosystem. The likelihood of recovering a specimen is very small. Therefore, we are unable to define a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from

pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Nashville crayfish (Orconectes shoupi)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Nashville crayfish occurs only in Mill Creek and five of its tributaries in Davidson and Williamson Counties, Tennessee. The Nashville crayfish has been observed feeding on dead animal matter and is believed to feed on roots, stems and leaf fragments. Males molt into the reproductive state in late summer. Egg laying occurs in late winter and early spring.

The Nashville crayfish has been found in a wide range of environments including gravel and cobble runs, pools with settled sediment, and under slabrocks and other cover. Cover appears to be a primary limiting factor for the species.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The two main agricultural activities affecting the Nashville crayfish are corn and cattle production. Forestry pesticide use does occur within the habitat but is considered minor. Except for those chemicals listed as exclusively forestry or mosquito larvicide chemicals, all other of the 60 chemicals could impact the Nashville crayfish.

Hazard ratios for aquatic invertebrates were obtained from table 18 because it most closely resembled the habitat characteristics for the Nashville crayfish. When data from table 18 was unavailable, table 12 was used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbophenothion, chlorpyrifos, diazinon, dicrotophos, endosulfan, ethion, ethyl parathion, fensulfothion, methyl parathion, mevinphos, naled, pendimethalin, phosmet, profenofos, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, benomyl, bifenox, bensulide, captan, carbaryl, carbofuran, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, methidathion, methomyl, methoprene, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosphamidon, propachlor, sulprofos, thiodicarb, terbutryn, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbophenothion, chlorpyrifos, diazinon, dicrotophos, endosulfan, ethion, ethyl parathion, fensulfothion, methyl parathion, mevinphos, naled, pendimethalin, phosmet, profenofos, propargite, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, chlorothalonil, copper sulfate, dicofol, diflubenzuron, dimethoate, disulfoton, diuron, ethoprop, fenitrothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, methidathion, methomyl, methoprene, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosphamidon, propachlor, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species inhabits flowing streams. Due to its small size, the likelihood of recovering a specimen is very small. Also, population levels fluctuate throughout the year. Therefore, a level of incidental take cannot be estimated.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Madison Cave isopod (Antrolana lira)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

This eyeless, unpigmented isopod is the only subterranean freshwater cirolanid found in North America north of Texas. It occurs only in Augusta County, Virginia.

The accessible physical habitat of the Madison Cave isopod (Antrolana lira) consists of three lakes of deep phreatic water (i.e., below the level of the water table) which occupy narrow cave passages developed along bedding planes in limestone strata. The surface of these lakes is believed to represent the ground water table beneath Cave Hill. The east and west lake are accessible from the lower level of Madison's Saltpetre Cave and have depths of 21.5 meters and 10.7 meters respectively. The lake in Steger's Fissure is ca. 30.5 meters deep and consumes nearly all of this fissure-cave. The fissure lake is NNE of the cave lakes and is exposed to the surface. All three lakes are believed to share the same body of phreatic water associated with the Cave Hill subterranean aquifer.

Observed physical/chemical parameters of the lake habitats include: fresh water; temperature of 11-14 degrees C; dissolved oxygen of 9.3-9.4 mg/l; nitrate/nitrite of 1.6 mg.; and low turbidity. There is a sinkhole on Cave Hill near the town of Grottoes, VA, above the cave that is believed to be one of several important recharge points for the Cave Hill subterranean aquifer and a principal entry point for nutrients.

Based on gut content analysis, it is believed that this species feeds on decaying organic matter consisting of deciduous leaf litter, twigs and other wood particles. Parts from dead insects, presumably from decomposition of epigean insects that wash into the aquifer, are also eaten. It is also likely that this species feeds on bacteria, fungi and other microorganisms associated with the organic matter.

Data on population biology for Antrolana lira suggest that A. lira may reproduce more or less continually at a low rate without apparent peaks or cycles.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Land use immediately adjacent to the habitats of the Madison Cave isopod include woodland and grassland/pasture. Forest or rangeland pesticides may come into contact with the isopod as a result of (1) direct spraying or drift into Steger's fissure, (2) spraying of leaves which could blow into the fissure or Madison's cave, and (3) contamination of sinkholes in the immediate vicinity of the cave. Table 10 (Direct Application to 6 Feet of

Water) was used to determine the hazard ratio for forest and rangeland pesticides, which could be sprayed directly on the surface of the lake in Steger's Fissure.

Because crops are not grown in the immediate vicinity of the isopod's habitat, direct spraying by any of the crop cluster pesticides would not be expected. Rather, contamination of the isopod's underground lakes would result from runoff into sinkholes or other recharge points feeding the Madison Cave aquifer. Hazard ratios in Table 14 and the Agency's data on potential for leaching into groundwater (Attachment 3 to May 17, 1989, letter) were major factors utilized to predict effects of those crop-use pesticides not also used on forest and rangeland.

When isopod (Asellus) toxicity data were available (Mayer and Ellersieck, 1986), these were utilized to calculate hazard ratios. Otherwise Gammarus or other crustacean hazard ratios were used.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, ethyl parathion, methidathion, methomyl, methyl parathion, naled, pyrethrin, trichlorfon, trifluralin.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, aldicarb, atrazine, bifenox, captan, carbofuran, copper sulfate, dicofol, disulfoton, diuron, endosulfan, ethion, ethoprop, fensulfothion, fenvalerate, fonofos, isofenphos, malathion, mancozeb, mevinphos, nitrapyrin, oxamyl, oxydemeton-methyl, oxyfluorfen, permethrin, phorate, phosmet, propachlor, propargite, terbufos, terbutryn, thiodicarb, thiophanate-methyl.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, carbaryl, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, diflubenzuron, dimethoate, ethyl parathion, methidathion, methomyl, methyl parathion, naled, pyrethrin, trichlorfon, trifluralin), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found and no incidental take is anticipated:

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Socorro isopod (Thermospaeroma thermophilus)

ADDRESSED IN REQUEST PART 1.

SPECIES/HABITAT DESCRIPTION:

The Socorro isopod occurs only in the thermal outflow of Sedillo Spring in the Socorro Mountains of south-central Socorro County, New Mexico. Additional populations of the isopod probably occurred in nearby Cook and Socorro Springs, as well. A refugial population is maintained at the University of New Mexico.

Present habitat of the species is limited to a cement-lined animal watering trough, a smaller pool, and about 40 meters of open iron irrigation pipe. Water temperatures throughout the system occupied by the isopod are fairly constant (88-90 F) with a flow of about three gallons per minute. The floor of the watering trough is composed of sediment into which the isopods burrow. The Socorro isopod feeds on algae and detritus; it is also cannibalistic.

The original spring source has been capped and most of the water is drawn off for municipal purposes. Cook and Socorro Springs have also been capped, and water from these springs is diverted to the City of Socorro. These springs once fed a marsh east of Cook Spring. An unprotected valve at Sedillo Spring can be turned off, completely dewatering the system on which the isopod depends.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The habitat of the Socorro isopod is extremely narrow, fragile and subject to abuse. Surrounding land types suggest potential exposure to pesticides registered for use on rangelands. Most likely routes of exposure would be through drift from adjacent treated areas and percolation to the source aquifer from applications within its recharge zone.

Hazard ratios were taken from Table 13 using the closest available taxa (Daphnia and Gammarus).

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): atrazine, carbaryl, chlorpyrifos, diazinon, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trichlorfon.

Pesticides that may affect but are not likely to jeopardize the continued existence of the species are: acephate, captan.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

<u>Chemicals for which jeopardy was found and no incidental take is anticipated:</u>

For these chemicals (atrazine, carbaryl, chlorpyrifos, diazinon, malathion, methomyl, methyl parathion, naled, propachlor, pyrethrin, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, captan.

This level of take is unquantifiable for the following reasons: This species inhabits flowing water. Due to the small size of certain life stages, the likelihood of recovering a specimen is very small. Furthermore, population levels flucuate seasonally in response to reproductive cycles and environmental conditions. Therefore, it is not possible to determine a specific level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

<u>Chemicals for which no jeopardy was found and no incidental take is anticipated:</u>

No incidental take is expected to result from the use of the remaining chemicals and no incidental take is authorized.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Alabama cave shrimp (Palaemonias alabamae)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Alabama cave shrimp is an obligate cave dweller. The only other species of Palaemonias is the endangered Kentucky cave shrimp. Both species are very similar in habitat characteristics and requirements. Groundwater contamination, low population levels, and collecting represent major threats to this small shrimp.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

The Alabama cave shrimp occurs in only two caves, Shelta and Bobcat in Madison County, Alabama. The only two known populations occur in the Huntsville City limits and on the Redstone Arsenal in Alabama. Therefore, agricultural activities are not expected to occur in the vicinity of this species' habitat. Hazard ratios for aquatic invertebrates were obtained from table 19A as it most closely resembled the habitat characteristics of the cave shrimp.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, benomyl, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dimethoate, ethyl parathion, malathion, methomyl, methyl parathion, naled, oxyfluorfen, propachlor, pyrethrin, thiophanate-methyl, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species are: acephate, atrazine, bifenox, diflubenzuron, disulfoton, mancozeb, phosmet, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, benomyl, captan, carbaryl, carbofuran, carbophenothion, chlorothalonil, chlorpyrifos, diazinon, dimethoate, ethyl parathion, malathion, methomyl, methyl parathion, naled, oxyfluorfen, phosmet, propachlor, pyrethrin, thiophanate-methyl, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

<u>Chemicals for which no jeopardy was found but unrestricted use poses concern</u>:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, atrazine, bifenox, diflubenzuron, fenitrothion, mancozeb, methoprene, phosmet, trifluralin.

This level of take is unquantifiable for the following reasons: This species exists in underground caves. Many of the cave passages are inaccessible to humans. Those that are accessible are entered infrequently in order to prevent distrubance to the fragile cave ecosystem. The likelihood of recovering a specimen is very small. Therefore, we are unable to define a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Kentucky cave shrimp (Palaemonias ganteri)

ADDRESSED IN REQUEST PART 1

SPECIES/HABITAT DESCRIPTION:

The Kentucky cave shrimp occurs in eight groundwater basins in the region of Mammoth Cave National Park, Kentucky.

The Kentucky cave shrimp is a small freshwater decapod crustacean in the family Atyidae. It is a non-selective grazer that feeds on bacteria, microfauna and meiofauna. It exists in large base level cave passages and associated tributaries characterized by slow flow, abundant quantities of organic matter and coarse to fine grain sand and coarse silt sediments. Organic input to the cave ecosystem is through sinking streams, sinkholes, ponors and other geologic features on the surface. The primary input is during flooding events. The primary drainage in the region is through the extensive and interconnected cave system which extends over a wide expanse of geographic area. The shrimp is threatened by contamination of the groundwater flow to its habitat.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

Agricultural practices such as corn, soybeans, tobacco, hay, in addition to cattle production and forestry practices all occur within the watershed of this species habitat. This shrimp is threatened by contamination of the groundwater flow to its habitat. Water circulation and recharge in cave habitats occur at a much slower rate than in spring or stream systems. Therefore, pesticides that enter the cave system have a greater potential for remaining long enough to come in contact with the species.

Table 19B was used to obtain hazard ratios for freshwater invertebrates. All 59 pesticides could potentially impact the Kentucky cave shrimp, either through drift, runoff or direct application.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its designated critical habitat (reasonable and prudent alternatives are listed under each of these chemicals in Section II): azinphos-methyl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, ethion, ethyl parathion, fonofos, methidathion, methomyl, methyl parathion, mevinphos, oxyfluorfen, permethrin, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of its designated critical habitat are: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, isofenphos, malathion, mancozeb, naled, nitrapyrin, oxamyl, oxydemeton-methyl, pendimethalin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

The remainder of the pesticides considered in this part are unlikely to affect this species because their use is not likely to occur in the species' habitat.

INCIDENTAL TAKE

Chemicals for which jeopardy was found and no incidental take is anticipated:

For these chemicals (azinphos-methyl, carbophenothion, chlorpyrifos, diazinon, dicofol, dimethoate, ethion, ethyl parathion, fonofos, methidathion, methomyl, methyl parathion, mevinphos, oxyfluorfen, permethrin, profenofos, pyrethrin, SSS-tributyl phosphorotrithioate, terbufos, trichlorfon), if the reasonable and prudent alternatives listed in Section II are enforced, the Service does not anticipate that the proposed action will result in any incidental take of the species. Accordingly, no incidental take is authorized.

Chemicals for which no jeopardy was found but unrestricted use poses concern:

Given unrestricted use of any or all of the following chemicals, the Service anticipates an unquantifiable level of incidental take to occur: acephate, aldicarb, atrazine, benomyl, bensulide, bifenox, captan, carbaryl, carbofuran, chlorothalonil, copper sulfate, dicrotophos, diflubenzuron, disulfoton, diuron, endosulfan, ethoprop, fenvalerate, isofenphos, malathion, mancozeb, naled, nitrapyrin, oxamyl, oxydemeton-methyl, pendimethalin, phorate, phosmet, phosphamidon, propachlor, propargite, sulprofos, terbutryn, thiodicarb, thiophanate-methyl, trifluralin.

This level of take is unquantifiable for the following reasons: This species exists in underground caves. Many of the cave passages are inaccessible to humans. Those that are accessible are entered infrequently in order to prevent distrubance to the fragile cave ecosystem. The likelihood of recovering a specimen is very small. Therefore, we are unable to define a level of incidental take.

The Service considers the reasonable and prudent measures, with their implementing terms and conditions (both listed for each chemical in Section II), to be actions necessary and appropriate to minimize the take. Moreover, for this species, should any incidental take from

pesticides occur, such a finding would constitute significant new information triggering the need for reconsultation.

Should any incidental take occur where no incidental take is anticipated, the Agency must reinitiate consultation with the Service and provide the circumstances surrounding the taking.

SPECIES PROFILE

SPECIES: Ruth's golden aster (Pityopsis ruthii)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

This species grows only in areas of little shade in the soil filled cracks of boulders in and adjacent to the Ocoee and Hiwassee Rivers, Tennessee. No forestry is practiced in the area. Therefore, the Service concurs with the Agency's determination that this plant is not affected by the 17 forestry chemicals in request part 3.

BIOLOGICAL OPINION

The following pesticides are unlikely to affect this species because their use is not likely to occur in the species' habitat: amitrol, picloram, ammonium sulfamate, cacodylic acid, dichlobenil, dalapon, 2,4-DP, mylone, diphenamid, EPTC, paraquat, atrazine, simazine, glyphosate, fosamine ammonium, hexazinone, azinphos-methyl.

SPECIES PROFILE

SPECIES: Truckee barberry (Mahonia sonnei)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

Despite repeated searches, the Service has not located this species on open range or elsewhere than on private property in Truckee, California. Recovery efforts must focus on direct coordination with landowners including their application of chemicals on their properties. Thus, the species will not be affected by general broadcast application of rangeland chemicals and the Service does not object to removal of label restrictions for this use.

BIOLOGICAL OPINION:

The following pesticides are unlikely to affect this species because their use for this purpose is not likely to occur in the species' habitat: ammonium sulfamate, atrazine, clopyralid, 2-4 D, dicamba, dichlorprop, hexazinone, MCPA-thioethyl, paraquat dichloride, picloram, tebuthiuron, and all rangeland chemicals previously consulted on.

SPECIES PROFILE

SPECIES: Harper's beauty (Harperocallis flava)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

Harper's beauty occurs at three locations, all within the Apalachicola National Forest, in Franklin and Liberty counties, Florida. It is found in open pineland bogs and along moist roadside ditches. Occasional fires are necessary to eliminate competing shrubs and herbs.

This species is considered in the section regarding rangeland pesticides. Grazing does in fact occur in this part of the Apalachicola National Forest, and this species could be impacted by the listed chemicals. It should not be excluded from the jeopardy determinations.

BIOLOGICAL OPINION

Pesticides that are likely to jeopardize the continued existence of the species: atrazine, ammonium sulfamate, clopyralid, dicamba, dimethylamine dicamba, 2,4-D acids, 2,4-D salts and esters, hexazinone, MCPA acid, MCPA salts and esters, 2,4-DP, paraquat, picloram (with potassium picloram and triethylene picloram), silvex, 2,4,5-T, tebuthiuron.

SPECIES PROFILE

SPECIES: San Clemente Island broom (Lotus dendroideus ssp. traskiae)
San Clemente Island bush-mallow (Malacothamnus clementinus)
San Clemente Island larkspur (Delphinium kinkiense)
San Clemente Island Indian paintbrush (Castilleja grisea)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

San Clemente Island species are under the exclusive stewardship of the U.S. Navy which owns and administers the island. The Navy has used, and presumably has continued need to use, rangeland chemicals to support general civil works functions on the island. The plants are widely distributed on San Clemente, thus making protective measures, short of label restrictions appended to the products themselves, difficult to convey and enforce. Thus, the Servicee believes label restrictions should remain in force and San Clemente Island should remain a part of the Agency's bulletin program.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of these species: ammonium sulfamate, atrazine, clopyralid, 2-4 D, dicamba, dichlorprop, hexazinone, MCPA-thioethyl, paraquat dichloride, picloram, tebuthiuron. All other chemicals previously found to jeopardize the continued existence of these species are to be restricted as indicated in pertinent prior opinions.

Reasonable and prudent alternatives specified in prior opinions are hereby reaffirmed.

San Clemente Island would be an excellent candidate area for the development of a memorandum of understanding as suggested in part 2 of the request. As discussed under Generic Questions in the introduction to this opinion, the Service cannot accept the concept of such an approach as an acceptible alternative to avoid jeopardy. However, if the Agency would like to pursue such an idea with the Navy, the Service would be happy to review any executed agreement as an alternative to label restrictions. Also, the Navy can initiate separate consultation with the Service to evaluate specific pesticide applications and thereby secure restrictions that may vary from those on the label.

SPECIES PROFILE

SPECIES: Lee pincushion cactus (*Coryphantha sneedi* var. *leei*)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

The Lee pincushion cactus is completely restricted to limestone substrates on terraces and rimrock in the high Chihuahuan Desert of the Guadalupe Mountains in Eddy County, New Mexico. The present range of this species is resticted to Carlsbad Caverns National Park. The community in which this species resides is dominated by large, almost arborescent shrubs, such as *Dasylirion wheeleri* and *Yucca torreyi*.

The most significant threat to the taxon is over-collection by cactus enthusiasts. The recovery plan calls for the removal of these threats by rigorously enforcing existing regulations and implementing a monitoring program to ensure compliance. The National Park Service is responsible for monitoring the status of its species populations within Carlsbad Caverns National Park, and developing and implementing a habitat management plan for these populations.

Although this species presently is found only within the boundaries of Carlsbad Caverns National Park, suitable habitat exists along the entire length of the Guadalupe Rim. As such, the range of this species could extend into Otero County, New Mexico, including lands managed by the Bureau of Land Management (Roswell District, Carlsbad Resource Area), the U.S. Forest Service (Lincoln National Forest) and the State of New Mexico. While public ownership confers some protection to potential endangered species habitats, current public land management policies allow for the use of certain pesticides and herbicides.

Current National Park Service policy and specific land management practices at Carlsbad Caverns National Park provide the Lee pincushion cactus with a degree of protection. Because of its relative isolation from adjacent rangelands, it is not likely that existing populations of the cactus will be affected by herbicide use on these lands.

BIOLOGICAL OPINION:

Pesticides that are unlikely to affect this species are: atrazine, ammonium sulfamate, clopyralid, 2,4-D (acid, salts and esters), dicamba, dichlorprop, dimethylamine dicamba, hexazinone, MCPA (acid, salts and esters), paraquat, picloram, potassium picloram, tebuthiuron, triethylene picloram.

SPECIES PROFILE

SPECIES: Antioch Dunes evening-primrose (Oenothera deltoides ssp. howellii)
Contra Costa wallflower (Erysimum capitatum var. angustatum)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

The ranges of these species are now known to extend beyond Antioch Dunes, although still restricted to the Delta region of San Francisco Bay. Antioch Dunes National Wildlife Refuge, which supports populations of these species, is operated exclusively for the benefit of endangered species. Additionally, the Service has secured agreements with adjacent owners, whose property also supports these plants, to control pesticide/herbicide applications. However, pending agreements throughout the remainder of the species' range, the Service believes that unrestricted range chemical applications are likely to jeopardize the continued existence of these species. Present label restrictions should remain in force. The map provided for these species under separate cover illustrates the occupied habitat of these species.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of the wallflower's critical habitat : ammonium sulfamate, atrazine, clopyralid, 2-4 D, dicamba, dichlorprop, hexazinone, MCPA-thioethyl, paraquat dichloride, picloram, tebuthiuron.

Previous biological opinions (that address the evening-primrose) for chemicals not reevaluated here are reaffirmed.

Reasonable and prudent alternatives specified in prior biological opinions are hereby reaffirmed.

SPECIES PROFILE

SPECIES: Eureka Valley evening-primrose (Oenothera avita ssp. eurekensis)
Eureka Valley dune grass (Swallenia alexandrae)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

The Service concurs with the Agency's evaluation of the protected status of the Eureka Dunes and the listed plants under Bureau of Land Management (Bureau) purview. The Bureau does not allow chemical applications in any areas occupied by these species. Recent weed control in the vicinity of the plants has emphasized manual labor and excluded herbicide use (Bartel, pers. comm.).

BIOLOGICAL OPINION:

The removal of label restrictions will not affect the continued existence of these species.

SPECIES PROFILE

SPECIES: Blue Ridge goldenrod (Solidago spithamaea)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

Blue Ridge goldenrod is restricted to high elevation rock outcrops in the central region of the Southern Appalachians. Its three extant populations are within a 15 mile radius. These rock outcrops are exposed, with no canopy cover. Habitat surrounding the sites can be characterized as eastern spruce/fir forest. Although this species occurs on barren rock outcrops, forestry does occur adjacent to its habitat. Additionally, this species is so critically endangered that even the slightest impact to any of its populations could result in extirpation of the species. Therefore, the Service does not concur with the Agency's assessment, and recommends that this species remain in the jeopardy category.

BIOLOGICAL OPINION

The following pesticides are likely to jeopardize the continued existence of the species: amitrol, picloram, ammonium sulfamate, cacodylic acid, dichlobenil, dalapon, 2,4-DP, mylone, diphenamid, EPTC, paraquat, atrazine, simazine, glyphosate, fosamine ammonium, hexazinone, azinphos-methyl.

SPECIES PROFILE

SPECIES: Miccosukee gooseberry (Ribes echinellium)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF ALTERNATIVE:

The Miccosukee gooseberry is known from two locations, one in Jefferson County, Florida and one in McCormick County, South Carolina. Both sites are on steeply sloping forested ravines containing stands of deciduous hardwood trees. The South Carolina site is managed as a heritage preserve. The Florida site is in private ownership. This species was addressed in both the forestry and rangeland portions of request part 3. The Service concurs with the Agency's determination that this species is not impacted by rangeland herbicides but forestry does occur in the area and has the potential for impacting the Florida population.

BIOLOGICAL OPINION

Pesticides that are likely to jeopardize the continued existence of the species: amitrol, picloram, ammonium sulfamate, cacodylic acid, dichlobenil, dalapon, 2,4-D, mylone, diphenamid, EPTC, paraquat, atrazine, simazine, glyphosate, fosamine ammonium, hexazinone, azinphos-methyl.

Pesticides that may affect, but are not likely to jeopardize the continued existence of the species when used as rangeland pesticides are: clopyralid, dicamba, dimethylamine dicamba, 2,4-D, MCPA acid, MCPA salts and esters, 2,4,5-T, silvex, tebuthiuron.

SPECIES PROFILE

SPECIES: Solano grass (Tuctoria mucronata)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

The Nature Conservancy, owner of the Jepson Preserve habitat of the Solano grass, allows grazing on its property during the dry season, removing livestock before spring rains fill the vernal pool habitats of the plant. However, they prohibit any application of rangeland chemicals on their property. It is also their opinion that neighboring landowners make very little use of rangeland chemicals (Griggs, pers. comm.).

BIOLOGICAL OPINION:

Removal of label restrictions is not likely to jeopardize the continued existence of the Solano dune grass.

SPECIES PROFILE

SPECIES: Mountain golden heather (Hudsonia montana)

ADDRESSED IN REQUEST PART 3:

CONSIDERATION OF PROPOSED ALTERNATIVE:

The mountain golden heather is endemic to Burke County, North Carolina. It is found on rocks and ledges in remote mountain top habitats. All sites are on land managed by the U.S. Forest Service in Linville Gorge Wilderness Area. No forestry is practiced in the area. Therefore, the Service concurs with the Agency's determination that this plant is not affected by the listed forestry pesticides.

BIOLOGICAL OPINION

The following pesticides are unlikely to affect the species because their use is not likely to occur in the species' habitat: amitrol, picloram, ammonium sulfamate, cacodylic acid, dichlobenil, dalapon, 2,4-DP, mylone, diphenamid, EPTC, paraquat, atrazine, simazine, glyphosate, fosamine ammonium, hexazinone, azinphos-methyl.

SPECIES PROFILE

SPECIES: Santa Barbara Island liveforever (Dudleya traskiae)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

Recovery planning efforts in recent years have culminated in completion of a recovery plan for this species that includes agreement on chemical management.

BIOLOGICAL OPINION:

The removal of label restrictions will not affect the species.

SPECIES PROFILE

SPECIES: Presidio manzanita (Arctostaphylos pungens var. ravenii)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE

Recovery efforts for the manzanita have concentrated on coordination of civil works activities on the Presidio of San Francisco, the only known location of the species, to avoid adverse effects. Pesticide/herbicide programs have been integral to these efforts. The Service does not expect such programs to proceed ignorant of sensitivity to the species.

BIOLOGICAL OPINION:

The removal of label restrictions will not affect the continued existence of the Presidio manzanita.

SPECIES PROFILE

SPECIES: Longspurred mint (Dicerandra cornutissima)

ADDRESSED IN REQUEST PART 3:

CONSIDERATION OF PROPOSED ALTERNATIVE:

The longspurred mint is presently known only from a privately owned area in Marion County, Florida. This species is found only in open areas in sand pine scrub or oak scrub, and in the ecotones between these and turkey oak communities. No forestry is practiced in the area. The Service concurs with the Agency's determination that this plant is not affected by the listed forestry pesticides.

BIOLOGICAL OPINION

The following pesticides are unlikely to affect the species because their use is not likely to occur in the species' habitat: amitrol, picloram, ammonium sulfamate, cacodylic acid, dichlobenil, dalapon, 2,4-DP, mylone, diphenamid, EPTC, paraquat, atrazine, simazine, glyphosate, fosamine ammonium, hexazinone, azinphos-methyl.

SPECIES PROFILE

SPECIES: Four-petal pawpaw (Asimina tetramera)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVES:

The four-petal pawpaw is found near the Atlantic coast in Martin and northern Palm Beach Counties, Florida. It inhabits sand pine scrub on old dunes inland from the present coast line. This species was considered in the prior opinions regarding rangeland pesticides. No grazing occurs in the species habitat. The Service concurs with the Agency's determination that this species is not impacted by the use of the listed rangeland herbicides.

BIOLOGICAL OPINION

The following pesticides are unlikely to affect the species because their use does not occur within the species' habitat: picloram, potassium picloram, triethylene picloram, ammonium sulfamate, clopyralid, dicamba, dimethylamine dicamba, 2,4-D acids, salts and esters, MCPA acid, salts and esters, 2,4-DP, paraquat, atrazine, 2,4,5-T, silvex, tebuthiuron, hexazinone.

SPECIES PROFILE

SPECIES: Hairy rattleweed (Baptisia arachnifera)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

Hairy rattleweed occurs in Wayne and Brantly Counties in southeastern Georgia. It is found in open pine woods on low sandy ridges. Individual plants occur as ground cover under pine species. This species was addressed in prior opinions concerning rangeland pesticides. No grazing occurs in its habitat. Therefore, the Service concurs with the Agency's determination that this species is not impacted by the use of rangeland pesticides.

BIOLOGICAL OPINION

The following rangeland pesticides are unlikely to affect the species because their use does not occur within the species' habitat: picloram, potassium picloram, triethylene picloram, ammonium sulfamate, clopyralid, dicamba, dimethylamine dicamba, 2,4-D acids, salts and esters, MCPA acid, salts and esters, 2,4-DP, paraquat, atrazine, 2,4,5-T, silvex, tebuthiuron, hexazinone.

SPECIES PROFILE

SPECIES: McDonald's rock-cress (Arabis mcdonaldiana)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

The restricted location of this species is managed by the Bureau of Land Management which allows some livestock grazing. However, the Service has separately reviewed the Habitat Management Plan for this area which excludes chemical applications in the vicinity of the plant.

BIOLOGICAL OPINION:

The removal of label restrictions will not affect the continued existence of the rockcress.

SPECIES PROFILE

SPECIES: Sacramento Mountains thistle (Cirsium vinaceum)

ADDRESSED IN REQUEST PART 3.

SPECIES/HABITAT DESCRIPTION:

Cirsium vinaceum is known only from the southern and central portions of the Sacramento Mountains in Otero County, New Mexico. Specifically, its known range is described by a crude rectangle approximately 12 miles wide and 18 miles long extending from Elk Silver on the north to Sacramento Peak on the south. This taxon has been collected at 64 sites since its discovery and description in 1913. These sites are confined to six major drainages and are concentrated in the larger drainages where springs and seeps are common. Recent surveys have documented that the total area of all known populations is about 77 acres.

Most of the known sites of the Sacramento Mountains thistle occur on land managed by the U.S. Forest Service (Lincoln National Forest). It also occurs on the Mescalero Apache Indian Reservation as well as on private landholdings near the town of High Rolls.

The Sacramento Mountains thistle is primarily found in sunny exposures in the immediate vicinity of springs issuing from limestone and gypseous rock outcrops. It also is found along the moist banks of streams and in wet meadows. The wetland habitat of this species can be described as palustrine emergent montane springs. Vegetation surrounding Cirsium vinaceum sites can be typified as mixed conifer forest, dominated by ponderosa pine, Douglas fir, white fir, New Mexico locust and Gambel's oak. Sites range in elevation from 8,000 to 9,000 feet.

This thistle is a perennial species which forms conspicuous basal rosettes that persist from year to year. Although sexual reproduction is generally the rule in this species, vegetative reproduction is possible. The thistle flowers primarily in mid-summer and sets seed in August, but these are not dispersed until after the first frost. Pollinators include bees, beetles, other insects and hummingbirds. There are presently no data on seed production, viability or germination requirements.

It has been estimated that gene flow from pollen vectors probably falls off at about one-half mile. Many of the sites, however, are scarcely 0.1 miles apart and are as small as 5 meters square. Based on this distance, the 64 known sites of this thistle represent about 20 discrete populations.

The primary limiting factor for this species is the availability of habitat. Its reliance on surface water in the form of springs and seeps, wet meadows and streambanks, make it vulnerable to impacts from water depletion or contamination. Cattle grazing has adversely affected the species through the development of springs for livestock watering, and trampling and soil compaction by cattle. Recreational activities, timber harvesting operations

and road construction to a lesser extent have adversely affected the species. Invasion of exotic plant species which compete for habitat is another factor in the decline of the Sacramento Mountains thistle.

Due to its association with coniferous forests, the Sacramento Mountains thistle potentially could be exposed to any herbicide or pesticide registered for use on forests. However, for this consultation, the Agency has requested that consideration be restricted to those forestry use chemicals identified in request part 3.

This montane plant species is susceptible to direct impacts from the use of herbicides within its occupied range, including the recharge zones of springs and seeps where the species is found. Probable routes of exposure would be through direct application or drift for foliar and systemic herbicides. Contamination of surface water and groundwater by systemic herbicides also present a potential exposure risk to this obligatory hydrophyte.

Indirect impacts could occur from the use of pesticides which may kill nontarget pollinator species such as bees and other insects. The only insecticide in this group, azinphos-methyl, is highly toxic to bees, birds and aquatic species and has relatively long environmental persistence. Although this thistle is a perennial species capable of vegetative reproduction, its primary means of dispersal is sexual reproduction, which allows for the exchange of genetic material through cross-pollination and promotes genetic diversity. Therefore, it would be prudent to apply this chemical only after pollination.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): amitrol, ammonium sulfamamte, atrazine, azinphos-methyl, cacodylic acid, dalapon, dazomet, dichlobenil, dichlorprop, diphenamid, EPTC, fosamine-ammonium, glyphosate, hexazinone, MCPA-thioethyl, paraquat dichloride, picloram, simazine.

SPECIES PROFILE

SPECIES: San Mateo thornmint (Acanthomintha obovata ssp. duttoni)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

This species occurs only on Edgewood Park, San Mateo County, California. Edgewood Park is currently a wholly undeveloped property featuring open space and passive recreation. As such, it could be subject to rangeland chemical management. Recovery efforts have not proceeded to the point where the Service is confident of alternate protections from chemical applications.

BIOLOGICAL OPINION:

The Service continues to support the need for label restrictions, and reaffirms its previous biological opinion, including the reasonable and prudent alternatives therein.

Edgewood Park might be a candidate for development of a memorandum of understanding along the lines of the Agency's suggestion in part 2 of the request. (This park is not operated by a Federal agency, but rather by San Mateo County.) As discussed under Generic Questions in the introduction to this opinion, the Service cannot accept the concept of such an approach as an acceptible alternative to avoid jeopardy. However, if the Agency would like to pursue such an idea with the County, the Service would be happy to review any executed agreement as an alternative to label restrictions.

SPECIES PROFILE

SPECIES: Last Chance townsendia (Townsendia aprica)

ADDRESSED IN REQUEST PART 3

CONSIDERATION OF PROPOSED ALTERNATIVE:

The last chance townsendia occurs in portions of Emery, Sevier, and Wayne Counties, Utah. Most of the plants are on public lands managed by the Bureau of Land Management, with a few on private lands. There also is one small population in Capitol Reef National Park.

This species occurs in silty soils of the Marcos Formation and is associated with the pinyon-juniper vegetational community. The Agency has stated that there is no apparent threat to this species from forest herbicides because no forestry in practiced in the area, without providing the source of that information.

A definition of what is included in forestry uses is needed. A common practice is to eliminate or educe pinyon-juniper woodland communities to improve forage for livestock and to use herbicides to control noxious weeds. Therefore, the Service believes that pesticides registered for forestry and rangeland uses are likely to jeopardize the continued existence of the last chance townsendia.

BIOLOGICAL OPINION:

Pesticides that are likely to jeopardize the continued existence of the species (reasonable and prudent alternatives are listed under each of these chemicals in Section II): ammonium sulfamate, atrazine, azinphos-methyl, cacodylic acid, dalapon, dichlorobenil, EPTC, glyphosate, hexamine, paraquat dichloride, picloram, simazine.

According to the the Agency, amitrole, dazomet, dichlorprop, diphenamid, fosamine-ammonium) are not registered for forestry or rangeland uses. Given that fact, the Service concurs that there will be no exposure to, and thus no affect on, the last chance townsendia.

SPECIES PROFILE

SPECIES: Hawaiian vetch (Vicia menziesii)

ADDRESSED IN REQUEST PART 3

SPECIES/HABITAT DESCRIPTION:

The species has a very limited distribution on the slopes of the island of Hawaii, between about 5,000 and 6,000 feet elevation.

PESTICIDE EXPOSURE/HAZARD POTENTIAL:

While forested areas surround the plant colonies, forest chemicals are not applied to these forest areas. Threats to the species are from sources other than chemicals.

BIOLOGICAL OPINION:

The Agency asked that this species be added to the Forest Cluster consultation dated October 25, 1984, presumably as a species considered jeopardized by forest use chemicals. The Service has evaluated the current condition of the species and sought the advice of specialists in the field and does not believe the vetch will be affected by any forest chemicals.

SECTION IV - MAPS

As requested by the Agency, maps of the occupied habitat or recharge areas for those species addressed in this opinion were provided independently of this document on April 26 and May 12, 1989. Maps were provided for the following species:

Falcon, northern aplomado
Plover, piping
Stork, wood
Tern: California least, interior least
Vireo, least Bell's
Woodpecker, red-cockaded
Rattlesnake, New Mexican ridge-nosed
Snake, eastern indigo
Salamander: San Marcos, Santa Cruz long-toed, Texas blind
Toad: Houston, Puerto Rican crested, Wyoming
Catfish, Yaqui
Cavefish: Alabama, Ozark
Chub: Chihuahua, humpback, Hutton tui, slender, Sonora, spotfin, Yaqui
Dace: blackside, Kendall Warm Springs
Darter: amber, bayou, boulder, fountain, leopard, Maryland, Niangua, Okaloosa, slackwater, snail, watercress
Gambusia: Big Bend, Clear Creek, Pecos, San Marcos
Logperch, Conasauga
Madtom: Scioto, smoky, yellowfin
Minnow, loach
Pupfish: Comanche Springs, desert, Leon Springs, Owen's
Shiner: beautiful, Cape Fear, Pecos bluntnose
Silverside, Waccamaw
Spikedace
Spinedace, Little Colorado
Squawfish, Colorado
Stickleback, unarmored threespine
Sucker: June, Lost River, Modoc, shortnose, Warner
Topminnow: Gila, Yaqui
Trout: Apache, Gila, greenback cutthroat, Lahontan cutthroat, Little Kern golden, Paiute cutthroat
Woundfin
Mussel: Curtus', Judge Tait's, Marshall's, penitent
Pearlshell, Louisiana
Pearly mussel: Alabama lamp, Appalachian monkeyface, birdwing, Cumberland bean, Cumberland monkeyface, Curtis', dromedary, green-blossom, Higgin's eye, little-wing, orange-footed, pale lilliput, pink mucket, tubercled-blossom, turgid-blossom, white cat's paw, white wartyback, yellow-blossom
Pigtoe: fine-rayed, rough, shiny
Pocketbook, fat
Riffle shell, tan
Spinymussel: James, Tar River
Stirrup shell

Amphipod, Hay's spring
Crayfish, [cave], Nashville
Isopod: Madison Cave, Socorro
Shrimp: Alabama cave, Kentucky cave
Beauty, Harper's
Broom, San Clemente Island
Bushmallow, San Clemente Island
Evening-primrose, Antioch Dunes
Goldenrod, Blue Ridge
Gooseberry, Miccosukee
Larkspur, San Clemente Island
Paintbrush, San Clemente Island Indian
Thistle, Sacramento Mountains
Thornmint, San Mateo
Townsendia, last chance
Wallflower, Contra Costa

SECTION V - PESTICIDE DATA SHEETS

The following section includes the pesticide data sheets, which, with the hazard data provided in the reinitiation request, were used in the evaluation method to assess risk to listed species. The pesticide data sheets are presented in alphabetical order by common chemical name.

REFERENCES USED IN THIS SECTION

1. Environmental Protection Agency. Chemical/pesticide fact sheet (by chemical)

2. Environmental Protection Agency. Qualitative use assesment (by chemical)

3. Royal Society of Chemistry. 1988. The agrochemicals handbook. (2nd edition w/update). The University, Nottingham, England.

4. Smith, G. J. 1987. Pesticide use and toxicology in relation to wildlife: organophosphorus and carbamate compounds. U. S. Fish and Wildlife Service Resource Publication 170.

5. Thomson, W. T. 1983-1986. Agricultural Chemicals - Books I - IV. Thomson Publications. Fresno, CA.

6. Windholz, M., S. Budavari, R. Blumetti, E. Otterbein (eds.) 1983. The Merck Index. Merck and Co., Inc. Rahway, NJ.

7. Environmental Protection Agency. Restricted use list of May 3, 1988.

8. Environmental Protection Agency. Letters of September 30 and October 12, 1988.

9. Sine, C. (ed.) 1987. Farm chemicals handbook. Meister Publishing Co. Willoughby, OH.

10. Environmental Protection Agency. Registered use printouts (by chemical).

11. Environmental Protection Agency. File of field wildlife kill reports.

12. Office of Science and Technology. 1971. Ecological effects of pesticides in non-target species. U. S. Government Printing Office.

13. Prior biological opinions listed on page 2 of this opinion.

14a/b Environmental Protection Agency attachment A (bioaccumulation); B (degradation products). December, 1988.

15. Environmental Protection Acency. 1989. Comments on draft biological opinion.

EPA = 1, 2 and/or 13.

CHEMICAL NAME: Acephate **TYPE:** Systemic insecticide

TRADE NAME: Orthene, Ortho 12420, Ortran, Ortril, Tornado

METHOD OF APPLICATION: Cotton-foliar application primarily by aircraft (2) Generally 1 to 2 applications. Forests-aircraft (2)

FORMULATION: Tech 85 percent, 80 percent and 75 percent soluble concentration solids; 85 percent cartridge; 15.6 percent and 9.4 percent soluble concentrate liquids; 3 percent pressurized liquids; and 1.5 percent granular

LC50 (Fish and/or Aquatic invert.): Rainbow trout (8) 1100ppm, fathead minnow 100 ppm, brook trout 100ppm, daphnia 62.9ppm, shrimp 9.5ppm, oyster larvae 3.28 ppm.

LD50: Acute oral-mouse 361mg/kg, rat 945mg/kg, junco 106mg/kg, mallard 350mg/kg, ring-necked pheasant 140mg/kg (4).

PERSISTENCE: Moderate persistence with some residual systemic activity(2) Half-life 11 days in soil. Much longer in water particularly at cool temperatures and low ph (1987 APHIS opinion). Relatively low persistence, 6 to 15 days (4). Half-life estimates in plants and water range from 5 to 10 days.

BIOACCUMULATION: Very low predicted bioconcentrate factor. (4) Low potential for bioaccumulation (14a)

SOLUBILITY: 65,000ppm (8)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3) Studies demonstrate postspraying cholinesterase inhibition in birds (4)

EPA REGISTERED USES: Cotton, forest, soybeans, wheat, vegetables, fruit, nuts, tobacco, turf, ornamentals, pasture/rangeland, noncrop (10)

BREAKDOWN PRODUCTS: Degradation products include methamidophes (5 - 10 %). Methamidophos is an order of magnitude more toxic than acephate to avian species (14b). LD50 values ranged from 7.5 to 14mg/kg for mammals to 8 to 25mg/kg for birds. LC50 values for birds 90-110ppm.

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Federally registered for use in cotton in AL, AR, FL, GA, LA, MS, and TX (2). Orthene is also State registered (24C) for use in CA, MO, NM, OK and TN. 80 to 85percent of acephate used in US is applied to cotton, tobacco and ornamentals.

CHEMICAL NAME: Aldicarb

TYPE: Systemic insecticide, acaricide, nematicide

TRADE NAMES: Temik, Ambush

METHOD OF APPLICATION: (1) soil incorporated at time of crop planting-beside row (onto or below surface)

FORMULATION: (8) granular

LC50 (Fish and/or Aquatic invert.): (8) Coldwater fish 0.56ppm
Warmwater fish 0.63ppm
Invertebrates 0.41ppm
Shrimp 0.016ppm

LD50: rats 0.65-0.8 mg/kg (4)
quail 2.58mg/kg; mallard 3.4mg/kg; bobwhite 2.0-2.5 mg/kg; red-winged blackbird 1.78mg/kg (4)

PERSISTENCE: (4) Half-life in soil 1-28 weeks; rapidly degraded in pond water

BIOACCUMULATION: (1) accumulation in non target organism minimal
Low potential for bioaccumulation (14b)

SOLUBILITY: (1) water soluble; (3) 6gm/l at 25C

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3) Five European studies document nontarget birds an injest lethal doses [granules] during normal feeding activities. U. S. kills of quail/pheasants from CA and NC (11) Terrestrial field study: birds and mammals killed even with in-furrow and covered application. (15)

EPA <u>REGISTERED</u> USES: Vegetables, cotton, fruit, nuts, sorghum, soybeans, sugar beets, sugarcane, tobacco, turf, ornamentals (10)

BREAKDOWN PRODUCTS: Harmless residues. However, sandy and acidic soils w/moderate to heavy rainfall and irrigation, 3# or more/ac below 50 C may retard breakdown and promote movement into groundwater

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Other hazards - accident history (7)

OTHER PERTINENT INFORMATION: Mobile in soil, may reach groundwater. Not expected to move from bare sloping field.
Complete incorporation into soil important to reduce wildlife exposure (4)
<u>Do not</u> apply - Del Norte Co. CA; do not apply more than 5 lbs/ac in FL and apply only between 1-1/4-30
(4) Most toxic of carbamate and organophophate pesticides

CHEMICAL NAME: Aluminum phosphide **TYPE:** Insecticide, fumigant

TRADE NAME: Rotox, Fumitoxin, Phostoxin

METHOD OF APPLICATION: Surface application

FORMULATION: (7) gas, tablets, pellets, fumigant

LC50 (Fish and/or Aquatic invert.):

LD50:

PERSISTENCE: (Applicator's manual - Phostoxin): high temperature and humidity - 3 days; lower temperature/humidity - 5 days

BIOACCUMULATION:

SOLUBILITY: Insoluble (Industry material safety data sheet)

MORTALITY OF NON-TARGET SPECIES: EPA Reg amendment 1-22-87: 29 incidents between 1966-1981 (human)

EPA <u>REGISTERED</u> USES: (Applicator manual) animal feed, raw agricultural commodities, processed and nonprocessed foods, rodents

BREAKDOWN PRODUCTS: Reacts readily with water to produce phosphine, which is highly toxic (6). Mammals: powerful respiratory poison, at 10mg/m3 can cause death in 6 hours; (3) toxic to fish

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Inhalation hazard to humans (7)

OTHER PERTINENT INFORMATION: (App. manual) Product highly toxic to wildlife. Nontarget organisms exposed to gas in burrows will be killed

CHEMICAL NAME: Aminocarb **TYPE:** Insecticide, acaracide

TRADE NAME: Matacil, Metacil, Bay 44646

METHOD OF APPLICATION: (4) Spray-aerial

FORMULATION: (3) wettable powder (4) oil-soluble concentrate

LC50 (Fish and/or Aquatic invert.): (12) Gammarus 39ppb

LD50: (3) rats 30-50mg/kg
(12) muledeer 7.5-15 mg/kg
mallards 22.5mg/kg; pheasants 42mg/kg; r-w blackbird 50mg/kg (4)

PERSISTENCE: (4) Reported to degrade rapidly and have low environmental persistence

BIOACCUMULATION:

SOLUBILITY: (3) slightly soluble in water

MORTALITY OF NON-TARGET SPECIES: (3) toxic to bees (4) at 1 oz/acre had little or no effect on most forest songbirds; no significant cholinesterase activity

EPA REGISTERED USES: (3) cotton, fieldcrops, forestry (Canada -4))

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (4) High to extreme acute toxicity to mammals and birds

CHEMICAL NAME: Aminopyridine

TYPE: Avicide
(Frightening agent)

TRADE NAME: Avitrol

METHOD OF APPLICATION: ground, sometimes aerial (15)

FORMULATION: (7) pulverized feed, chops, powder

LC50 (Fish and/or Aquatic invert.):

LD50: Toxic to birds when eaten in sufficient quantities (5)

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY:

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (7) corn, sorghum, mixed grains, sunflowers
(5) Used to repel seagulls around airports

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Hazard to fish and nontarget birds (7)

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Amitrole **TYPE:** Herbicide

TRADE NAME: Weedazol, Amizol, Cytrol, Azolam, Herbizol

METHOD OF APPLICATION: (3) Pre-sow, pre-plant

FORMULATION: (3) water soluble powder, soluble concentrate

LC50 (Fish and/or Aquatic invert.): (3) nontoxic to fish
(12) Salmon 3250ppm

LD50: (3) Nontoxic to birds (12) mallard >2000mg/kg
(6) rats 25g/kg mice 14.7g/kg

PERSISTENCE: (3) In soil, 2-4 weeks; in plants readily metabolized. (12) water: applied at rate of 1.0ppm, persisted more than 201 days with significant quantities detected in hydrosoil

BIOACCUMULATION:

SOLUBILITY: (3) 280g/l at 25C

MORTALITY OF NON-TARGET SPECIES: (3) Nontoxic to bees

EPA <u>REGISTERED</u> USES: (3) Fruit, ornamental, cereal stubble, noncrop, including aquatic weeds

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Oncogenic potential (7)

OTHER PERTINENT INFORMATION: (3) Total control of annual and perennial grasses and broad-leaved weeds, aquatics

CHEMICAL NAME: Ammonium sulfamate **TYPE:** Herbicide

TRADE NAME: Ammate, Amcide, Ikurin, Sulfamate, Silvicide

METHOD OF APPLICATION:

FORMULATION: (3) Crystals, water-soluable powder

LC50 (Fish and/or Aquatic invert.): (3) carp 1000-2000 mg/l

LD50: (3) rats 3900mg/kg
quail 3000mg/kg

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: (3) 684g/l at 25C

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (3) Noncrop, crop, forestry

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Control of woody plants and trees, herbaceous perennials, most annual broad-leaved weeds and grasses

CHEMICAL NAME: Atrazine **TYPE:** Systemic herbicide

METHOD OF APPLICATION: Tractor mounted spray boom major type. Small % applied either aerially, hand-held spray guns, and granular drop-type spreader.[2]

FORMULATION: Granules, wettable power, flowable[2]

LC50 (Fish and/or Aquatic invert.): 4.5ppm. Rainbow trout, 8.0ppm. Bluegill, 115ppm Daphnia[8]

LD50: (3) rat 3080 mg/kg mice 1750mg/kg rabbits 750mg/kg mallard 19,650mg/kg bobwhite 5,760mg/kg

PERSISTENCE: Half-life = 140 days in aerobic soil conditions[2]
159 days in aerobic soil conditions
578 days in water

BIOACCUMULATION: In mammals, atrazine is rapidly metabolized. More than 50 percent of dose is eliminated in urine and 33 percent in feces within 24 hours.[3]

SOLUBILITY: 28mg/l at 20C (3)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA <u>REGISTERED</u> USES: Corn (83 percent) wheat, rye, millet, sugarcane, tobacco, pastures/rangeland, sorghum (10 percent), nuts, fruit, vegetables, turf, noncrop, fallow land, forests, ornamentals . (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Atrazine is being reviewed by EPA for ground water concerns. It was recommended that registrants conduct a groundwater monitoring program.[2]

CHEMICAL NAME: Azinphos-methyl **TYPE:** Insecticide, acaricide

TRADE NAME: Guthion, Methyl Guthion, Gusathion, Cotnion-methyl, Carfene, Bay 17147, Bay R 1582

METHOD OF APPLICATION: Foliar by ground or aerial equipment

FORMULATION: Dust, granular, wettable powder, emulsifiable concentrate, flowable concentrate, soluble concentrate, ULV

LC50 (Fish and/or Aquatic invert.): 4 ppb brown trout (12)
0.56 ppb gammarus (12)

LD50: 18 mg/kg rats (12) 4.4 mg/kg rat (1)
75 mg/kg pheasant (12); starling 27mg/kg, mallard 136mg/kg,riw
blackbird 8.5mg/kg (4)

PERSISTENCE: Half-life of 21 days in non-sterile soil [emulsifiable concentrate = 12 days; granules = 28 days (4)]
68 days under anaerobic conditions, 355 days [on oranges (4)] under sterile conditions
traces on insects after 2 years (4)

BIOACCUMULATION: 95% eliminated with 2 days
Low potential for bioaccumulation (14a)

SOLUBILITY: 29 mg/l (3)

MORTALITY OF NON-TARGET SPECIES: 1 bird kill and 29 incidents of aquatic toxicity Toxic to bees (3)

EPA <u>REGISTERED</u> USES: Cotton, cottonseed, forest including tree seedlings, oats, rye, wheat, soybeans, sorghum, barley, sugarcane, alfalfa, clover, tobacco, fruit, nuts, vegetables, ornamentals, irrigation supply systems (10)

BREAKDOWN PRODUCTS: Benzazimide, hydroxymethyl benzazimide

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Hazard to avian, mammalian, and aquatic species, human inhalation hazard

OTHER PERTINENT INFORMATION: Molluscicide (1)
Highly toxic to aquatic species
(4) can be extremely toxic to mammals and birds; has relatively long environmental persistence; highly active with cholinesterase

CHEMICAL NAME: Benomyl   TYPE: Systemic fungicide

TRADE NAME: Benlate, Tersan 1991, Arboral, Correx, Elmosan, Grex, Lignasan, Ultra-Sofril

METHOD OF APPLICATION: Foliar or dormant (dip, flood, spray), soil, seed dip, injection - Aerial and ground(3)

FORMULATION: technical chemical, formulation intermediate, granular, pelleted/tableted, wettable powder, flowable concentrate, soluble concentrate/liquid(3)

LC50 (Fish and/or Aquatic invert.):

LD50: NOEL rats: 30 mg/kg/day; mice: 50 mg/kg/day (EPA)
rat >10,000mg/kg (4)

PERSISTENCE: Benomyl dissipates (95%) in a variety of soils from fine sand to silty loan soils in less than 3 months (EPA)
(4) bare ground 6-12 months; turf 3-6 months

BIOACCUMULATION: Low potential for bioaccumulation (14a)

SOLUBILITY: EPA: benomyl and MBC do not leach significantly in soil
(4) 3.8mg/l

MORTALITY OF NON-TARGET SPECIES: (4) reduces earthworm numbers

EPA REGISTERED USES: Fruit, nuts, vegetables, rice, corn, soybeans, wheat, barley, sugarcane, forests, ornamentals, turf, irigation supply systems (10)

BREAKDOWN PRODUCTS: Methyl-2-benzimidazole carbamate (MBC) and (4) includes 2-AB, isocyantc (an irreversible cholinesterase inhibitor).
MBC is very highly toxic to channel catfish, with LC50 values of 7-19ppb.
Toxicity of MBC to rainbow trout fingerlings is 370ppb. (14b)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:
NOTE: EPA labeling information identifies the 2 madtoms as requiring restricted use

OTHER PERTINENT INFORMATION:
"Benomyl and MBC are extremely toxic to freshwater fish and aquatic invertebrates" (EPA). A possible human oncogen. Based on 5 environmental fate studies, EPA has concluded that benomyl and MBC have low potential for ground water contamination.

CHEMICAL NAME: Bensulide TYPE: Herbicide

TRADE NAME: Betasan, Pretar, Disan, Exporsan, Pre-San

METHOD OF APPLICATION: Broadcast, pre-emergent, pre-plant, soil incorporation, aerial

FORMULATION: Technical chemical, granular, emulsifiable concentrate

LC50 (Fish and/or Aquatic invert.): rainbow 0.72 mg/l (3)
goldfish 1.2 mg/l

LD50: rats 770 mg/kg (3)
rabbits 3950 mg/kg

PERSISTENCE: Duration of residual activity in soil 4-12 months (3)

BIOACCUMULATION: (4) (14a) Predicted bioacc. factor indicators moderate potential to bioconcentrate

SOLUBILITY: 25 mg/l (3)

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Cotton [soil treatment], vegetables, turf (esp. golf courses), ground covers, ornamentals (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Bifenox **TYPE:** Herbicide

METHOD OF APPLICATION: ground and aerial

FORMULATION: Suspension concentrate, emulsifiable concentrate, granules, wettable powder (3)

LC50 (Fish and/or Aquatic invert.): Rainbow trout 11.000ppm, bluegill 13.7000ppm, daphnia 2.3000 ppm, fish 44.000ppm, shrimp 0.0409ppm (8)

LD50: rats >6400mg/kg LC 50 ducks & pheasants >5000mg/kg (3)
mice 4556mg/kg

PERSISTENCE: half-life in soil 7-14 days (3)

BIOACCUMULATION:

SOLUBILITY: 0.35ppm

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Barley, oats, corn, sorghum, soybeans, wheat, rice, forests, ground covers, ornamentals (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Bifenthrin **TYPE:** Insecticide, acaricide

TRADE NAME: Brigade, Talstar, FMC 54800

METHOD OF APPLICATION:

FORMULATION: (3) Emulsifiable concentrate, suspension concentrate, wettable powder

LC50 (Fish and/or Aquatic invert.): (3) bluegill 0.00035mg/l
rainbow 0.00015 mg/l
daphnia 0.00016 mg/l

LD50: (3) rats 54.5mg/kg
bobwhite 1800 mg/kg
mallard > 4450mg/kg

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: (3) 0.1mg/l

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (15) cotton

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Bufencarb **TYPE:** Insecticide

TRADE NAME: Bux

METHOD OF APPLICATION: Soil treatment (4)

FORMULATION: Emulsifiable concentrate, granules (4)

LC50 (Fish and/or Aquatic invert.):

LD50 (Other): Rat 87-170mg/kg (4)
mallard 10.5mg/kg; pheasant 88mg/kg

PERSISTENCE: Halflife in soils 1-4 weeks aerobic; 2-6 weeks anaeribic (4)

BIOACCUMULATION: Predicted bioconcentration potential low (4)

SOLUBILITY:

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Production ended in 1975, but still being applied at least as late as 1982 (4) corn,rice

BREAKDOWN PRODUCTS: Hydroxylated metabolites less toxic than parent (4)

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Cacodylic acid (Dimethylarnic acid) TYPE: Herbicide

TRADE NAME: Phytar, Bolls-Eye, Rad-E-Cade, Salvo

METHOD OF APPLICATION: (3) post-emergent, spray?, injection

FORMULATION: (3) Soluble concentrate

LC50 (Fish and/or Aquatic invert.): (12) gambusia, taillight shiner 1000ppm
Bufo tadpoles 100-1000ppm
(Eastern oyster 40ppm = no effect)

LD50: (3) rats 700mg/kg
(6) mice 1.25g/kg

PERSISTENCE: (3) Inactivated on contact with soil

BIOACCUMULATION:

SOLUBILITY: (3) 2kg/kg at 25C

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (3) noncrop, turf, cotton, "unwanted trees"

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) control weeds, trees
defoliant and desicant
(6) Human toxicity: More toxic by mouth than injection due to rapid release of inorganic arsenic by gastric acid.

CHEMICAL NAME: Camphechlor **TYPE:** Insecticide, rodenticide acaricide

TRADE NAME: Toxaphene

METHOD OF APPLICATION:

FORMULATION: Emulsifiable concentrate, dustable powder, wettable powder (3)

LC50 (Fish and/or Aquatic invert.): Young rainbow 0.2mg/l (3)
young pike 0.1mg/l
Frog/ toad tadpoles 1.7/0.6ppm, oysters 0.1ppm, amphipod 0.18ppm, daphnia 0.15ppm, mayfly 0.047ppm (12)

LD50 (Other): rats 40-90mg/kg, mice 80-110mg/kg rabbits 75-100mg/kg (3)
mallard 70.7mg/kg, pheasant 40mg/kg, bobwhite 85.4mg/kg (12)

PERSISTENCE: Soil: Highly resistent to leaching, half-life 70 days to 12 years. (3) Applied to soil at 140ppm persisted >6 years; at 50 ppm persisted 11 years; at 100ppm, 14 years (12)

BIOACCUMULATION: mammals: ".. accumulates temporarily on body fat, but is rapidly eliminated.." (3) Big Bear Lake, CA: at rate of 0.2ppm, plankton 73ppm, goldfish 200ppm, pelican fat 1700ppm. Oysters exposed at 0.05ppm concentrated 2920 times (12) Fish bioaccumulation factors up 52,000x (15)

SOLUBILITY: 3mg/l at room temperature (3)

MORTALITY OF NON-TARGET SPECIES: Low toxicity to bees (3)
In marsh treated at 2lb/ac, sora, coot and black tern produced no young. Reproduction limited by 25% in bobwhite and pheasant on diet containing 50ppm and 25 ppm respectively (12) High mortalities in fish-eating birds at Tule Lake/ lower Klamath due to applications of large quantities of toxaphene in surrounding ag lands (12) Phytoplankton exposed 4 hrs to 1ppm reduced production 91 %.(12)

EPA REGISTERED USES: Cotton, maize, soybeans, fruit, vegetables, clover, rodent control, animal ectoparasites (3)

BREAKDOWN PRODUCTS: dechlorinated metabolites (3)

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Non-systemic insecticide - stomach and contact action; rodenticide - stomach action. (3)

CHEMICAL NAME: Captan TYPE: Fungicide

TRADE NAME: Merpan, Orthocide, SR-406, Vancide 89

METHOD OF APPLICATION: Dusting, spraying, misting, dipping, mixing and low pressure bomb aerosols. (1) Including aerial or tractor mounted. (2)

FORMULATION: Dusts, wettable powders, aqueous suspensions, and granules

LC50 (Fish and/or Aquatic invert.): Brook trout 0.0340ppm, bluegill 0.0720ppm, brown trout 0.0262ppm, daphnia 8.4000ppm (8)

LD50: rats 9000mg/kg
mallards and pheasants >5000mg/kg (3)
bobwhite 2000-4000mg/kg

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: Practically insoluble in water (1); 3.30ppm (8)

MORTALITY OF NON-TARGET SPECIES: Not dangerous to bees when used as directed. (3)

EPA REGISTERED USES: Corn, cotton, soybeans, barley, rye, sorghum, wheat, vegetables, fruit, rangeland, alfalfa, clover, tobacco, ornamentals, turfs, pets (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Characterized as "very highly toxic" to both cold and warmwater fish. (1)

CHEMICAL NAME: Carbaryl **TYPE:** Contact insecticide

TRADE NAME: Sevin, Carbamine, Carpolin, Cekubaryl, Denapon, Devicarb, Hexavin, Karbaspray, Nac, Ravyon, Septene, Tercyl, Tricarnam

METHOD OF APPLICATION: ground and aerial

FORMULATION: Baits, dust, granules, wettable powders, flowables and aqueous dispersions (1)

LC50 (Fish and/or Aquatic invert.): Rainbow trout .0026ppm, bluegill 14.00ppm, daphnia .0056ppm, gammarus 0.0260ppm

LD50: Rabbit 710mg/kg, rat 850 mg/kg, 500mg/kg, red-winged blackbird 56mg/kg, mallard >2564mg/kg, sharp-tailed grouse <1000mg/kg (4)

PERSISTENCE: Half-life appears to range from 7 to 28 days in aerobic and anaerobic soils, respectively (1) persistence enhanced in oil carrier (4)

BIOACCUMULATION: Preliminary data indicated that these may be a potential for carbaryl and its residues to accumulate in catfish, crayfish, snail, duckweed, and algae (1). Rapidly excreted in animals, mainly in urine (1). Low potential for bioaccumulation (14a)

SOLUBILITY: 120ppm(8)

MORTALITY OF NON-TARGET SPECIES: Extremely toxic to bees and beneficial insects (1,3) Some studies report decrease in bird numbers, but actual causes not established (4) at 1.25lb/ac toads, frogs, salamanders and snakes appeared unaffected (4)

EPA REGISTERED USES: Alfalfa, clover, fruit, nuts, vegetables, forests, shelterbelt trees, pasture/rangeland, noncrop, barley, oats, rye, corn, cotton, sorghum, soybeans, wheat, rice, tobacco, sugar beets sunflowers, forage grasses, ornamentals, turf, poultry, mammals, irrigation supply systems (10)

BREAKDOWN PRODUCTS: less toxic than parent (4)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Highly toxic to aquatic invertebrates.(1) Moderately toxic to both warmwater and coldwater fishes and has only low toxicity to birds. (1) Possible acetylcholinesterase problems.

CHEMICAL NAME: Carbofuran

TYPE: Systemic insecticide, acaricide, nematicide

TRADE NAME: Furadan, Curaterr, Yaltox

METHOD OF APPLICATION: Ground (furrow or band) or aerial

FORMULATION: Granule, spray, ULV

LC50 (Fish and/or Aquatic invert.): 94ppb fish, 9.8ppb invertebrates.[1]
.008ppm bluegill, 0.038ppm daphnia[8]

LD50: 2.5 mg/kg cat [1]; rat 11mg/kg, dog 19mg/kg (4)
0.4 mg/kg mallard [17]; fulvous whistling duck 0.24mg/kg, house sparrow 1.3 mg/kg, bobwhite 5 mg/kg r-w blackbird 0.42mg/kg (4)

PERSISTENCE: Half-life of 1-8 weeks in soil, less stable under alkaline conditions, more stable in anaerobic conditions [1]
soil half-life 2 - 50 weeks (4)

BIOACCUMULATION: (4) potential, based on water solubility, is low
(14a) low potential for accumulation

SOLUBILITY: 700ppm[1][8]

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)
4 reports of wigeon die-offs, 1 Canada geese; many others including coots, mallards, pintails, g-w teal, frogs, fish crayfish, earthworms (4) eagles, horned larks, waterfowl, cattle egret, raptors, shorebirds, songbirds, longspurs, sparrows [up to 3.6 birds/acre in corn] (11)

EPA REGISTERED USES: Corn, cotton, barley, oats, sorghum, soybeans, wheat, rape, sunflowers, forest [white pine], rice, alfalfa, clover, sugarcane, sugar beets, fruit, vegetables, tobacco, ornamentals (10)

BREAKDOWN PRODUCTS: 3-hydroxy carbamate and 7-phenol products[1]
less toxic than carbofuran
Major degradation products range from slightly toxic to highly toxic (to birds) (14b)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute inhalation toxicity (7)

OTHER PERTINENT INFORMATION: Very highly toxic to fish and invertebrates and birds. High leaching potential[1] Cholinesterase inhibitor (6)
Proposed for cancellation in granular formulations Feb 1989.

CHEMICAL NAME: Carbophenothion **TYPE:** Insecticide

TRADE NAME: Trithion, Dagadip, Endyl, Garrathion, Lethox, Nephocarp

METHOD OF APPLICATION: Foliar application by ground or aerial equipment(1)

FORMULATION: dust, wettable powder, emulsifiable concentrate, granular, pellets(1)

LC50 (Fish and/or Aquatic invert.): 13ppb bluegill,
1.2ppb Palaemonetes(1)(8)
0.47ppm pink shrimp(1)

LD50: 0.02ppm in rats(1)
320ppm bobwhite(1)
canada goose 29-35 mg/kg(4)
red-wing blackbird 7.5mg/kg (4)
mallard 121mg/kg, grouse 76-170mg/kg (4)

PERSISTENCE: (4) soils, longer than 6 months

BIOACCUMULATION: Preliminary data indicate potential to accumulate in fish(1) High potential for bioaccumulation (14a)
Factor exceeds 1000 - one of highest of organophosphates (4)

SOLUBILITY: 0.34ppm(1) 2.00ppm(8)

MORTALITY OF NON-TARGET SPECIES: Moderately toxic to bees (3) Goose deaths from ingestion of treated seed - Scotland (4)

EPA REGISTERED USES: Mostly used on citrus; alfalfa, corn, soybeans, cotton, sorghum, alfalfa, clover, sugar beets, forest, vegetables, fruit, nut, turf, ornamentals (10)

BREAKDOWN PRODUCTS: parent and metabolites have cholinesterase acitvity (4)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Very highly toxic to aquatic and marine organisms Cholinesterase inhibitor (6)

CHEMICAL NAME: Chlorothalonil

TYPE: Fungicide, bactericide, nematicide

TRADE NAME: Bravo

METHOD OF APPLICATION: Suspension concentrate, wettable powder, fogging concentration

FORMULATION:

LC50 (Fish and/or Aquatic invert.): Rainbow trout 0.0470ppm, bluegill 0.0510 ppm, channel catfish 0.0430ppm, daphnia 0.0700ppm, shrimp 0.1650ppm (8).

LD50: rats >10,000 mg/kg
LC 50 bobwhite 5200mb/kg, mallard duckling >21,500 mg/kg (3)

PERSISTENCE: Foliar half-life: 30 days (2).

BIOACCUMULATION:

SOLUBILITY: 1.20ppm (8)

MORTALITY OF NON-TARGET SPECIES:

EPA <u>REGISTERED</u> USES: Corn, soybeans, sugar beets, fruit, vegetables, forests, turf, ornamentals. (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Chlorpyrifos **TYPE:** Insecticide, acaricide

TRADE NAME: Dursban (household), Looseban (agriculture), Brodan, Dowco 179, Eradex, Killmaster, pyrinex

METHOD OF APPLICATION: ground, aerial spray and dust

FORMULATION: Baits, dust, granules, wettable powders, impregnated plastic, sprays

LC50 (Fish and/or Aquatic invert.): .0071ppm-trout(8)
.0024ppm-sunfish(8)
.01ppm-stonefly

LD50: 163ppm-rats(1) Calif. quail 68.3mg/kg (4)
76ppm-duck(1) Canada goose 40-80mg/kg (4)
17ppm-pheasant(1) Sandhill crane 25-50mg/kg (4)
House sparrow 21mg/kg (4); Bullfrog >400mg/kg (4)

PERSISTENCE: Low to moderate persistence (4); when applied to soil, buildings may retain activity for several weeks; on crops 1-20 days(4)

BIOACCUMULATION: High potential for bioaccumulation (14a)

SOLUBILITY: 2ppm at 25C (6)

MORTALITY OF NON-TARGET SPECIES: Moderate mammalian toxicity (1)(4); toxic to bees(3) Goose dieoffs on golfcourses (4)

EPA REGISTERED USES: Alfalfa, fruit, nuts, corn, cotton, sorghum, soybeans, wheat, oats, barley, rye, millet, buckwheat, rice, herbs, vegetables, tobacco, sugar beets, safflower, sunflowerspasture, clover, turf, ornamentals, forests, noncrop, mosquito larvicide, domestic animals, ponds and other wetlands, irrigation supply systems (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

Humans excluded from treated areas for 24 hours; drift or runoff hazardous to aquatic organisms(2) wildlife die off at rates at or below label rates(4); considered toxic to fish, crustaceans and bees (4)

CHEMICAL NAME: Cloethocarb

TYPE: Systematic insecticide nematicide

TRADE NAME: Lace

METHOD OF APPLICATION:

FORMULATION: (3) Wettable powder, granulars, liquid seed treatment, briquette, suspension concentrate

LC50 (Fish and/or Aquatic invert.): (3) Moderately toxic to fish

LD50: (3) rats 35.4mg/kg

PERSISTENCE: (3) Residual activity 3-7 weeks

BIOACCUMULATION:

SOLUBILITY: (3) 1.3g/kg at 20C

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (8) Crops

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Copper sulfate, basic **TYPE:** Algicide

METHOD OF APPLICATION: aerial and ground (water)

FORMULATION: Technical chemicals, granular, pelleted/tableted, crystalline, soluble concentrate/liquid, liquid-ready to use. Fungicide and algicide (2).

LC50 (Fish and/or Aquatic invert.): Rainbow trout 0.1300ppm, bluegill 1.3920ppm, daphnia 0.1760ppm, palemonetes, 17.0000 ppm, shrimp 16.0000ppm (8).

LD50: (12) mallards > 2000mg/kg

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: 101.00ppm

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Cotton, cotton, soybeans, barley, wheat, fruits, nuts, rice, tobacco, sugar beets, vegetables, alfalfa, ornamentals, irrigation supply systems (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Appears to be used primarily to control aquatic weeds. (12) the marine of safety for fish...for aquatic weed control is small. Less toxic to fish in hard water than soft

CHEMICAL NAME: Clopyralid **TYPE:** Herbicide

TRADE NAME:

METHOD OF APPLICATION:

FORMULATION: Soluble concentrate

LC50 (Fish and/or Aquatic invert.): (96hr) Rainbow 103.5 mg/l
Bluegill 125.4 mg/l

LD50: Rats >4300 mg/kg
Mice >5000 mg/kg
Mallard 1465 mg/kg

PERSISTENCE: Microbial degradation in soil; not metabolized in plants; in rats (oral) rapid and almost quantative elimination in the urine.

BIOACCUMULATION:

SOLUBILITY: In water at 25C 9g/l

MORTALITY OF NON-TARGET SPECIES: Non-toxic to bees

EPA REGISTERED USES: Sugarbeets, fodder beets, oilseed rape, maize, brassicas, onions, leeks, strawberries, flax and rangeland

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)

OTHER PERTINENT INFORMATION: Selective systemic herbicide, absorbed by roots and leaves with translocation and accumulation in meristematic tissue. Acts on cell elongation and respiration. Used for post-emergent control of many annual and perennial broad-leaved weeds.

SOURCE OF DATA: The Agrichemical Handbook, 2nd edition, Update 3, June 1989

CHEMICAL NAME: Cuprous oxide **TYPE:** Fungicide

METHOD OF APPLICATION:

FORMULATION: (3) Water dispersible granules, wettable powder, emulsifiable concentrate

LC50 (Fish and/or Aquatic invert.): (3) goldfish 60-150mg/l
(13) catfish 0.850-4.17mg/l

LD50: (3) rats 470mg/kg

PERSISTENCE: (3) Oxidizes in the presence of moisture

BIOACCUMULATION:

SOLUBILITY: (3) Practically insoluble in water

MORTALITY OF NON-TARGET SPECIES: (3) Nontoxic to bees

EPA <u>REGISTERED</u> USES: (3) vegetables, fruit

BREAKDOWN PRODUCTS: (3) black copper oxide, copper carbonate

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Acts as an enzyme inhibitor

CHEMICAL NAME: Cypermethrin **TYPE:** Insecticide

TRADE NAME: Ripcord, Barraicade, Ambush

METHOD OF APPLICATION:

FORMULATION: (3) Emulsifiable concentrate, granules, wettable powder, ULV liquid

LC50 (Fish and/or Aquatic invert.): (3) brown trout 0.0020-0.0028 mg/l

LD50: (3) rats 200-800mg/kg
mice 138mg/kg
chickens > 2000mg/kg

PERSISTENCE: (3) In soil, hydrolysis occurs in about 16 weeks

BIOACCUMULATION:

SOLUBILITY: (3) 0.01mg/l at 20C

MORTALITY OF NON-TARGET SPECIES: (3) toxic to bees

EPA <u>REGISTERED</u> USES: (3) Fruit, vegetables, corn, soybeans, cotton, rice, ornamentals, forestry, mosquitos

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Oncogencity; hazard to nontarget organisms (7)

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: 2-4 D acid/salts and esters **TYPE:** Systemic herbicide

METHOD OF APPLICATION:

FORMULATION: (3) Emulsifiable concentrate, soluble concentrate, water-soluble powder, granules

LC50 (Fish and/or Aquatic invert.): (3) Esters toxic to fish, other formulations are not. Rainbow 1.1mg/l (acid), 100mg/l (salt)

LD50: (3) rats 375mg/kg salt, 700mg/kg ester
wild ducks > 1000mg/kg
Jap. quail 668mg/kg, pheasants 472 mg/kg

PERSISTENCE: (3) Residual activity in soil - 6 weeks

BIOACCUMULATION: (3) Rats - elimination is rapid

SOLUBILITY: (3) 620mg/l at 20C - esters insoluble in water

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA <u>REGISTERED</u> USES: (3) Cereals, corn, sorghum, grassland, turf, fruit, rice, sugar cane, forestry, noncrop, aquatic weeds

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Growth inhibitor. Controls annual and perennial broad-leaved weeds, aquatics

CHEMICAL NAME: Dalapon-sodium **TYPE:** Systemic herbicide

METHOD OF APPLICATION:

FORMULATION: (3) wettable powder, granules, water-soluble powder

LC50 (Fish and/or Aquatic invert.): (3) Rainbow, channel catfish >100mg/l
Carp > 500mg/l
(12) Brown shrimp, stonefly nymph 1.0ppm

LD50: (3) rats 7570-9330mg/kg chickens 5660mg/kg
mice >4600mg/kg mallards, Jap. quail >5000mg/kg

PERSISTENCE: (3) Residual activity in soil about 3-4 months. No significant degradation in plants. Mammals 65-70 percent eliminated in 2 days.

BIOACCUMULATION:

SOLUBILITY: (3) 500g/kg at 25C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (3) Noncrop, fruit, forestry, vegetables, soybeans, corn sorghum, cotton, ornamentals, aquatic plants

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Controls annual and perennial grasses, weeds, sedges, rushes, helophytes, and semi-aquatic grasses.

CHEMICAL NAME: Dazomet

TYPE: Nematicide, fungicide, herbicide, insecticide

TRADE NAME: Mylone

METHOD OF APPLICATION: (3) soil fumigant(pre-plant)

FORMULATION: (3) Granules, dustable powder, wettable powder

LC50 (Fish and/or Aquatic invert.): (3) Toxic to fish

LD50: (3) rats 520mg/kg
mice 430mg/kg
rabbits 320-620mg/kg

PERSISTENCE: (12) soil persistence 4 days

BIOACCUMULATION:

SOLUBILITY: (3) 3g/kg at 20C

MORTALITY OF NON-TARGET SPECIES: (3) not toxic to bees when used as directed

EPA REGISTERED USES: (3) Crops

BREAKDOWN PRODUCTS: (3) Methyl isothiocyanatc (evaporates), formaldehyde, hydrogen sulplide, methylamine

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Phytotoxic to all green plants
soil sterilant - controls fungi, nemtodes, weeds seeds, and soil insects

CHEMICAL NAME: Demeton **TYPE:** Insecticide, acaricide

TRADE NAME: Systox, Systemox, Bay 10756, Demox, Mercaptophos

METHOD OF APPLICATION:

FORMULATION: Emulsifiable concentrate (3)

LC50 (Fish and/or Aquatic invert.): Rainbow 1-10mg/l (3)
Carp 15.2mg/l

LD50 (Other): rats 2.5-6.2 mg/kg (3); mule deer <10mg/kg (4)
quail 10.6mg/kg, house finch 2.38mg/kg, mallard 7.19mg/kg;
sharp-tailed grouse 4.76mg/kg (4)
bullfrog 562 mg/kg (4)
[dermal toxicity high for birds/mammals (4)]

PERSISTENCE: Metabolites persisted to 14 days (4); in soil to 23 days (4)

BIOACCUMULATION:

SOLUBILITY: 60mg-2g/l at room temperature (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA <u>REGISTERED</u> USES: Fruit, nuts, vegetables, field crops, ornamentals (3)

BREAKDOWN PRODUCTS: In plants: sulphoxide, sulphone (3)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Systemic - contact and stomach action; cholinesterase inhibitor (3)

CHEMICAL NAME: Diazinon **TYPE:** Insecticide, acaricide

TRADE NAME: Spectrocide, Basudin, Dazzel, Diagram, Dianon, DiaterrFos, Diazajet, Diazide, Diazol, Dizinon, Dyzol, Gardentox, Kayazinon, Kayazol, Knox-Out, Neocidal, Nipsan, Nucidol, Sarolex

METHOD OF APPLICATION: Ground, aerial, aerosols[1]

FORMULATION: Granular, wettable powder, dust, emulsifiable concentrate, soluble concentrate, microencapsulate, oil solution.

LC50 (Fish and/or Aquatic invert.): 0.079ppm bluegill, 0.522ppb daphnia[1] 0.042ppm bluegill [8] 0.014ppm daphnia [8]

LD50: rat 250mg/kg, rabbit 130 mg/kg, mouse 80-135 mg/kg (4)
mallard 3.54mg/kg, bobwhite 8-10mg/kg, r-w blackbird 2mg/kg,
pheasant 4.33 mg/kg bullfrog >2000 mg/kg (4)

PERSISTENCE: Fairly stable[3] but disappeared from treated water within 144 hours of treatment[17] persistent in soil[17]
soil 4-6 weeks (4)

BIOACCUMULATION: Freshwater mussel concentrated 2X environmental level, fish conc, 10X, biological half-life in fish less than 1 week.[17]
Low potential for bioaccumulation (14a)

SOLUBILITY: 40ppm[8]

MORTALITY OF NON-TARGET SPECIES: Diazinon confirmed or implicated in bird kills (23spp.)[1] throughout the country and throughout the year (11) heron, waterfowl, coot, killdeer, raptor, doves, woodpecker, passerines

EPA REGISTERED USES: Corn, cotton, rangeland, sorghum, soybeans, oats, barley, wheat, rye, millet, buckwheat, rice, forest [pine], pasture/rangeland, alfalfa, clover, sugar beets, safflower, sunflowers, fruit, nut, turf, herbs, vegetables, tobacco, noncrop, ornamentals, domestic animals, ponds and other wetlands, (10) mosquito control at domestic dwellings (15)

BREAKDOWN PRODUCTS: Diazoxon - toxic (4)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Very high avian and aquatic toxicity.
Highly toxic to bees

CHEMICAL NAME: Dicamba/Potassium dicamba **TYPE:** Systemic herbicide

TRADE NAME: Banvel, Mediben

METHOD OF APPLICATION:

FORMULATION: (3) Granules, soluble concentrate

LC50 (Fish and/or Aquatic invert.): (3) Rainbow 28mg/l
Bluegill 23mg/l
(12) Gammarus 10,000ppb

LD50: (3) rats 1707mg/kg (Potassium = 6764mg/kg)
mallards 2080mg/kg (12) pheasants 673-800mg/kg

PERSISTENCE: (3) Soil: half-life <14 days
Mammals - rapidly eliminated in urine

BIOACCUMULATION:

SOLUBILITY: (3) 6.5g/l at 25C
Potassium dicamba = 480g acid equivalent/l

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees
(12) Honeybees extremely sensitive LD50 3.6 micogram/bee

EPA REGISTERED USES: (3) Cereals, corn, sorghum, sugar cane, asparagus, turf, rangeland/pasture, noncrop

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Most legumes are sensitive
Control of annual and perennial broad-leaved weeds and brush

CHEMICAL NAME: Dichlobenil **TYPE:** Systemic herbicide

METHOD OF APPLICATION: Pre- and post-emergent

FORMULATION: (3) Granules, wettable powder

LC50 (Fish and/or Aquatic invert.): (3) guppies 18mg/l
(12) bluegill 17-48ppm
Gammarus 1.5-16ppm

LD50: (3) rats > 3160 Jap. quail > 5000mg/kg
guinea pigs 501mg/kg pheasants 1500mg/kg

PERSISTENCE: (3) In soil, half-life about 1-12 months depending on soil type

BIOACCUMULATION: (12) Esters accumulated in sunfish after exposure to sublethal concentrations in both lab and field

SOLUBILITY: (3) 18mg/l at 20C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (3) Fruit, nuts, ornamentals, noncrop, forests, aquatic plants

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Inhibits cellulose synthesis, actively dividing meristems and germination of seeds. Deep rooted plants are tolerant. Controls annual and perennial weeds, aquatic plants

CHEMICAL NAME: Dichlorprop (2,4 DP) **TYPE:** Systemic herbicide, growth regulator

METHOD OF APPLICATION:

FORMULATION: (3) Soluble concentrate, emulsifiable concentrate

LC50 (Fish and/or Aquatic invert.): (3) Bluegill 165mg/l (salt)
Bluegill 1.1-16mg/l (ester)

LD50: (3) rats 800mg/kg
mice 400mg/kg

PERSISTENCE: (12) soil application of 25ppm persisted >103 days

BIOACCUMULATION:

SOLUBILITY: (3) 350mg/l at 20C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA <u>REGISTERED</u> USES: (3) Cereals, grassland, noncrop, aquatic weeds

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Control annual and perennial broad-leaved weeds, aquatics

CHEMICAL NAME: Dichlorvos (DDVP) **TYPE:** Insecticide, acaricide

METHOD OF APPLICATION: fogging, livestock applications (4)

FORMULATION: emulsifiable concentrate, aerosol, granules, hot-fogging concentrate, cold-fogging concentrate, impregnated strip, oil-misible liquid (3)

LC50 (Fish and/or Aquatic invert.): (3) Bluegill 1.0 mg/l, (12) hermit crab 0.150ppm, grass shrimp 0.39ppm, gammarus 0.002ppm, daphnia 0.001ppm stonefly 0.010ppm, sand shrimp 0.018ppm

LD50: (3) rats 56-80 mg/kg
rabbits 107 mg/kg
dogs 10-300mg/kg
(12) mallards 7.8mg/kg
pheasants 11.3mg/kg
mallard 8mg/kg, r-w blackbird 17mg/kg (4)

PERSISTENCE: (3) non-persistent in the environment, with rapid decomposition in the atmosphere
(12) detectable in atmosphere at 62 days in water at 20C

BIOACCUMULATION: Low predicted bioconcentration potential (4)

SOLUBILITY: 10 gm/l at 20C (3)

MORTALITY OF NON-TARGET SPECIES: Highly toxic to bees (3)
One report of mallards dying of eating treated horse feed (4)

EPA <u>REGISTERED</u> USES: (8) Mosquito larvicide
household and public health pests (4)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (4) Extremely toxic to birds, moderately toxic to mammals. Toxic to fish

CHEMICAL NAME: Dicofol **TYPE:** Acaricide

TRADE NAME: Kelthane

METHOD OF APPLICATION: Foliar spray[1] aerial application

FORMULATION: Emulsifiable concentrate, wettable powder, dusts,[1] ready-to-use liquids, aerosol sprays.

LC50 (Fish and/or Aquatic invert.): 1.86ppm Rainbow trout
3.85ppm Bluegill
0.01ppm Shrimp

LD50: Rat 820-960ppm
Rabbits 1870ppm[3]
Avian 1237-3100ppm (upland game birds)[1]

PERSISTENCE: Dicofol persists in soils for at least 4 years.

BIO ACCUMULATION: Yes, in some rotational crops & aquatic organisms.[1]

SOLUBILITY: 0ppm[8]

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees. Thins ring dove eggshells as much as DDE (15)

EPA REGISTERED USES: Alfalfa, clover, fruit, vegetables, nuts, corn, cotton, sugar beets, turf, ornamentals (10)

BREAKDOWN PRODUCTS: DDT metabolites

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Dicofol impairs the reproductive physiology of fish and aquatic invertebrates.

CHEMICAL NAME: Dicrotophos **TYPE:** Systemic insecticide, acariade

METHOD OF APPLICATION: foliar (aerial and ground), injection

FORMULATION: Technical chemical, soluble concentrate/liquid, liquid-ready to use (2)

LC50 (Fish and/or Aquatic invert.): Rainbow trout 0.3000ppm, channel catfish 7.7000ppm, stonefly 0.4200ppm (8)

LD50: Mouse 11-16mg/kg, rat 21 mg/kg, mule deer 12.5-25mg/kg, California quail 1.89 mg/kg, Canada goose 2.28mg/kg, mallard 4.3mg/kg, house finch 2.83mg/kg, r-w blackbird 1.6mg/kg, s-t grouse 2.3mg/kg, bullfrog 2000mg/kg (4)

PERSISTENCE: Half-life in foliage range from 1 to 4 days and, under moist aerobic conditions in soils, are less than 6 days (4).

BIOACCUMULATION: Low potential for bioaccumulation (14a)

SOLUBILITY: 0.00ppm. Water soluble and is readily located through soil (4)

MORTALITY OF NON-TARGET SPECIES: A die-off of approximately 30 great-tailed grackles was attributed to either intentional poisoning or gross misuse of dicotophos (4)

EPA REGISTERED USES: cotton, soybeans, ornamentals (10)

BREAKDOWN PRODUCTS: Major degradation product is monocrotophos; somewhat more toxic to birds than dicrotophos, with LC50 values of 3-32ppm to various species. (14b)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal toxicity; residue effects on avian species (7)

OTHER PERTINENT INFORMATION: Highly toxic to bees (2) (6) Cholinesterase inhibitor (4) Starling nestlings more than twice as sensitive as adults. Applications should consider bird reproduction and possible sublethal effects.

CHEMICAL NAME: Diflubenzuron **TYPE:** Insecticide (larvicide)

TRADE NAME: Dimilin

METHOD OF APPLICATION: aerial or ground

FORMULATION: 25 percent wettable powder(1)

LC50 (Fish and/or Aquatic invert.): 25ppm yellow perch(1)
135ppm bluegill(8)
30ppm Gammarus(1)
15ppm daphnia(8)
>130ppm Oyster larvae(1)
1ppm shrimp(8)

LD50: >5000 ppm mallard/bobwhite(1)

PERSISTENCE: less than 2 weeks half-life under aerobic conditions(1)

BIOACCUMULATION:

SOLUBILITY: 0.2mg/l (1)(8)

MORTALITY OF NON-TARGET SPECIES: no data-none expected to verts.(1) Not dangerous to bees and predatory insects (3) Kills of aquatic invertebrates (15)

EPA <u>REGISTERED</u> USES: Cotton, soybeans, forests, pasture (flood irrigated pastures in CA only), ornamentals.(EPA)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: lack of environmental hazard data (7)

OTHER PERTINENT INFORMATION: low toxicity to birds, fish and bees; highly toxic to aquatic inverts. Mode of action: chitin inhibitor

CHEMICAL NAME: Dimethoate

TYPE: Systematic insecticide, acaricide

TRADE NAME: Cygon

METHOD OF APPLICATION: Foliar spray by air, but mostly ground.

FORMULATION: Emulsifiable concentrate, wettable powder, dust, granules, ULV

LC50 (Fish and/or Aquatic invert.): 5.95ppm - Rainbow
5.80ppm - Bluegill
0.0001ppm - Grammarus

LD50: Rats - 215ppm(9) Mallard - 40ppm(3)
Pheasants 20mg/kg, House sparrow 22 mg/kg, r-w blackbird 6.6mg/kg (4)

PERSISTENCE: Half-life on oranges = 19 days(4)
Soil = 2-4 days

BIOACCUMULATION: Dimethoate has relatively short environmental persistence.(4) Low predicted bioaccumulation(4) (14a)

SOLUBILITY: 25g/l at 25C (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3) Sage grouse in alphalfa fields - ID (11)

EPA REGISTERED USES: Alfalfa, clover, cotton, corn, sorghum, soybeans, wheat, vegetables, tobacco, safflower, fruits, nuts, ornamentals, forests, pasture, noncrop, livestock (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (6) Cholinesterase inhibitor

CHEMICAL NAME: Dinoseb

TYPE: Herbicide (some insecticide activity)

METHOD OF APPLICATION:

FORMULATION: (3) Soluble concentrate, emulsifiable concentrate, aqueous solution, water-in-oil emulsion

LC50 (Fish and/or Aquatic invert.): (3) Highly toxic to fish
(12) goldfish 0.1ppm = no effect
goldfish 0.4ppm 100 percent kill

LD50: (3) chickens 26mg/kg rats 58mg/kg
Jap. quail (LC50) 409mg/kg rabbits (LC50) 80-200mg/kg
Ring-necked pheasant (LC50) 515mg/kg

PERSISTENCE: (3) In soil 2-6 weeks

BIOACCUMULATION:

SOLUBILITY: (3) 52mg/kg at 20C

MORTALITY OF NON-TARGET SPECIES: (3) Toxic to bees, very toxic to man

EPA <u>REGISTERED</u> USES: (8) Crops (use discontinued for corn, small grains, but not tobacco)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Product being bought up by EPA

CHEMICAL NAME: Diphennamid **TYPE:** Systemic herbicide

METHOD OF APPLICATION: (3) pre-emergent

FORMULATION: (3) Wettable powder, granules

LC50 (Fish and/or Aquatic invert.): (3) slightly toxic to fish

LD50: (3) rats 1050mg/kg
mice 600mg/kg
rabbits 1500mg/kg

PERSISTENCE: (3) In soil (warm, damp conditions) 3-6 months

BIOACCUMULATION:

SOLUBILITY: 260mg/l at 27C

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (3) Cotton, vegetables, soybeans, tobacco, fruit, ornamentals, forest nurseries

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Control annual grass, some broad-leaved weeds

CHEMICAL NAME: Diquat dibromide **TYPE:** Herbicide

TRADE NAME: Reglone, Reglox, Midstream, Reqlex

METHOD OF APPLICATION:

FORMULATION: Aqueous solution, soluble concentrate, gel (3)

LC50 (Fish and/or Aquatic invert.): "Not toxic to fish" (3)

LD50 (Other): Rats 231mg/kg; mice 125 mg/kg; rabbits 187 mg/kg;
dogs 100-200 mg/kg; cows 37 mg/kg (3)
hens 200-400 mg/kg

PERSISTENCE: "Rapidly and completely inactivated on contact with soil" (3)

BIOACCUMULATION: "..completely eliminated in the urine and faeces within 4 days" (3)

SOLUBILITY: 700g/1 at 20C (3)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Cotton, flax, clover, soybeans, sunflowers, maize, rice, sugar beets, vegetables, fruit , sugar cane, ornamentals, control of aquatic weeds, noncrop (3)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Contact herbicide - damages cell membranes and cytoplasm (3)

CHEMICAL NAME: Disulfoton TYPE: Systemic insecticide, acaricide

TRADE NAME: Disyston, Dimax, Dithiodemeton, Dithiosystox, Frumin AL, Solvirox, Thiodemeton

METHOD OF APPLICATION: Soil incorporation of granules, granular broadcast, ground/aerial spraying(1)

FORMULATION: emulsifiable concentrate, granules, pelleted, liquids[1]

LC50 (Fish and/or Aquatic invert.): 39ppb bluegill[1] 27ppb Gammarus[8]
40ppb stonefly[12] 18ppb rainbow[8]

LD50: rat 2-12mg/kg, mule deer 2.5-5mg/kg (4)
6.54 mg/kg mallard, bobwhite 12-29mg/kg, r-w blackbird 3.2mg/kg
pheasant 11.9mg/kg (4)
[rapidly absorbed through skin w. low acute dermal toxicities]

PERSISTENCE: 4 weeks in soil[12] on/in citrus 70-100 days (4)
In rats, rapidly absorbed, metabolized and excreted in urine

BIOACCUMULATION: Low potential for bioaccumulation (14a)

SOLUBILITY: 9 9ppm[8] 25mg/l[3]

MORTALITY OF NON-TARGET SPECIES: mortality to non-target species expected due to high toxicity. Toxic to bees (3)

EPA REGISTERED USES: Corn, cotton, sorghum, wheat, oats, soybeans, barley, alfalfa, vegetables, forests (plantings), ornamentals (EPA)

BREAKDOWN PRODUCTS: metabolites may enhance cholinesterase inhibition[1]
Thionate oxidation of disulfoton produces demeton, which is very highly toxic to bluegill (LC50 = 42ppb)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal/inhalation toxic (7)

OTHER PERTINENT INFORMATION: Highly toxic to aquatic, terrestrial and avian species.

CHEMICAL NAME: Diuron **TYPE:** Systemic herbicide, algicide

METHOD OF APPLICATION: Broadcast or banded on soil surface by ground and aerial equipment

FORMULATION: Wettable powder, suspension concentrate, granular, flowable, pelleted/tableted

LC50 (Fish and/or Aquatic invert.): rainbow 5.6mg/l (3)
bluegill 5.9mg/l

LD50: rats 3400mg/kg bobwhite 1730mg/kg Mallard >5000mg/kg (3)
rabbits >20,000mg/kg jap quail >5000mg/kg

PERSISTENCE: duration in soil 4-8 months (3)

BIOACCUMULATION:

SOLUBILITY: 42mg/l at 25C (3)

MORTALITY OF NON-TARGET SPECIES: not toxic to bees (3)

EPA REGISTERED USES: Fruit, barley, oats, wheat, corn, cotton, sugar cane, soybeans, noncrop, ornamentals, grass (seed) (EPA)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (6) Repeated doses cause anemia in rats

CHEMICAL NAME: Endosulfan **TYPE:** Insecticide, acaricide

METHOD OF APPLICATION: Aerial and ground

FORMULATION: Granules, soluble concentrates, emulsifiable concentrate, wettable powder, dustable powder, ULV liquid(3)

LC50 (Fish and/or Aquatic invert.): 0.0008ppm - Rainbow(1)
0.1660ppm - Daphnia
0.0017ppm - Bluegill
0.0062ppm - Gammarus
0.0009ppm - Fathead minnow

LD50: Rats - 70ppm
Rabbits - 359ppm (3)
Mallard - 205-245ppm

PERSISTENCE:

BIOACCUMULATION: In rats, metaboltics excreted in urine no accumulation in milk, fat, muscle (3) BCF is 28-day study of striped mullet was 2249 in edible tissue, 2755 in whole body. No detectable residues could be found after 48 hours (15).

SOLUBILITY: 0.60ppm (1)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: 60-80% is uses on fruit trees (2). Alfalfa, nuts, barley, corn, cotton, soybeans, oats, rye, wheat, vegetables, tobacco, sugar beets, sugarcane, sunflowers, ornamentals (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Endrin **TYPE:** Insecticide, rodenticide

TRADE NAME: Endrex, Hexadrin

METHOD OF APPLICATION:

FORMULATION: Emulsifiable concentrate, wettable powder, dustable powder, granules (3)

LC50 (Fish and/or Aquatic invert.): "extremely toxic to fish and other aquatic life" (3)

LD50 (Other): Rats 7-15mg/kg (3)
"Extremely toxic to birds"

PERSISTENCE:

BIOACCUMULATION: rapidly metabolized to hydrophilic meatbolites which are excreted (3)

SOLUBILITY: practically insoluble in water (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA REGISTERED USES: Cotton, maize, sugar cane, rice cereal grains, ornamentals, noncrop (grasshoppers), orchards (voles) (3)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Useage radiply declining, owing to high toxicity (3) Persistent insecticide - contact and stomach action (3)

CHEMICAL NAME: EPN **TYPE:** Insecticide, acaricide

TRADE NAME: EPN

METHOD OF APPLICATION: Soil incorporation (3)

FORMULATION: Granules, wettable powder, emulsifiable concentrate, dust

LC50 (Fish and/or Aquatic invert.): Bluegill 0.37 mg/l (3)
rainbow 0.21 mg/l

LD50 (Other): Rats 7.7-36mg/kg; mice 43mg/kg (3); dog 100-200 (4)
Cal quail 36.3mg/kg, mallard 3-7mg/kg, r-w blackbird 3.2mg/kg
pheasant 53 mg/kg, rock dove 5.9mg/kg (4)

PERSISTENCE: Half-life in loam soil 15-30 days (3)
Oranges/lemons = 50/80 days (4)

BIOACCUMULATION: More bioaccumulative than ethyl parathion; bioconcentrates in some estuarine animals (4) Although EPN is mildly bioconcentrated, it is also rapidly depurated. Significant accumulation is unlikely unless EPN is present continuously (15)

SOLUBILITY: practically insoluble in water (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA <u>REGISTERED</u> USES: Vegetables, sugar beets, clover, cotton, safflowers, sunflowers, fruit, nuts, ornamentals, pineapples (3) mosquito larvicide (4)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Humans: very poisonous swallowed or inhaled; extreme hazard by skin contact (3) Cholinesterase inhibitor (3)
Causes delayed neurotoxicity in some birds/mammals; potientiates toxicity of malathion and dimethoate (4)

CHEMICAL NAME: EPTC **TYPE:** Systemic herbicide

TRADE NAME: Eptan, Alirox, Miptan, Witox, Eradicane

METHOD OF APPLICATION: (3) Pre-planting by soil incorporation

FORMULATION: (3) Emulsifiable concentrate, granules

LC50 (Fish and/or Aquatic invert.): (3) Rainbow 19mg/l
Bluegill 27mg/l

LD50: (3) rats 1652mg/kg
mice 3160mg/kg
LC50: bobwhite 20,000mg/kg [blackbird 100mg/kg (4)]

PERSISTENCE: (3) In soil, rapid microbial degradation
(4) 1 week moist soil, more persistent in dry soil
(3) In plants, rapid metabolization

BIOACCUMULATION: (4) Predicted bioacc. factor low

SOLUBILITY: (3) 375mg/l at 25C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees when used as directed

EPA REGISTERED USES: (3) Vegetables, sugar beet, clover, cotton, safflowers, sunflowers, fruit, nuts, ornamentals, pine nurseries, corn
BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Controls annual and perennial grasses, some broad-leaved weeds (4) plants: inhibits meristematic growth

CHEMICAL NAME: Ethion TYPE: Acaricide, insecticide

METHOD OF APPLICATION: Foliar application by airblast sprayer and furrow treatment w/granular formulations during planting. (2) aerial (10)

FORMULATION: Dusts, wettable powders, granules, emulsifiable concentrates (2)

LC50 (Fish and/or Aquatic invert.): 0.073 ppm bluegill (8)
0.5 ppm rainbow (8)
5.6 ppb gammarus (12)
.01 ppb daphnia (12)

LD50: 96 mg/kg rats (12)
mallard >2560mg/kg (4) red-winged blackbird 45mg/kg (4)

PERSISTENCE: Half-life in/or citrus 30-42 days (4)

BIOACCUMULATION: Predicted bioconcentration factor (flowing-water systems) in moderately high (>400) (4) High potential for bioaccumulation (14a)

SOLUBILITY: 2ppm (8)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA REGISTERED USES: Corn, cotton, sorghum, nuts, fruit, vegetables, alfalfa, clover, turf, ornamentals (10)

BREAKDOWN PRODUCTS: monoxon and dioxon (4)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute toxicity (7)

OTHER PERTINENT INFORMATION: Also caused teratogenic effects, esp. when combined with malathion (12)

CHEMICAL NAME: Ethoprop **TYPE:** Nematicide

TRADE NAME: Mocap, Ethoprophos, Prophos, Rovokil, VC 9-104

METHOD OF APPLICATION: Soil incorporation., spray, watering cans, mainly applied to soil with immediate incorporation

FORMULATION: Granules

LC50 (Fish and/or Aquatic invert.): 1-2ppm-trout(1)
13-25ppb-insects(1)
1ppm-trout(8)

LD50: rat 61.5 mg/kg (4)
mallard 12.6mg/kg, pheasant 4.2 mg/kg (4)
[rapidly absorbed thru skin, dermal LD50's low; dietary LD50's of high to moderately high subacute toxicity in young birds]

PERSISTENCE: Half-life 3-56 days in soil(1); moderately long residual-8 weeks(4); Half-life 14-87 days in soil(4)

BIOACCUMULATION: Low potential for bioaccumulation (14a)

SOLUBILITY: 700ppm

MORTALITY OF NON-TARGET SPECIES: Not dangerous to bees when used as directed (3) Robins, on lawn treated 30 days earlier (ChE inhibited 74% in brain) (4)

EPA REGISTERED USES: Tropical fruits, corn, soybeans, potatoes, peanuts, vegetables, tobacco, turf, ornamentals (EPA)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal toxicity

OTHER PERTINENT INFORMATION: Highly toxic to birds, marine crestaceous fish(1); bird die-offs or losses(4) Shoukd be carefully, fully incorporated into soil to avoid wildlife exposure (4)

CHEMICAL NAME: Ethyl parathion

TYPE: Insecticide, acaracide, tadpole shrimp control

METHOD OF APPLICATION: Ground, broadcast, aerial(1)

FORMULATION: Emulsifiable concentrate, granular, dust, baits, wettable powders, impregnated materials.(1)

LC50 (Fish and/or Aquatic invert.): 0.864ppm Rainbow, 0.018ppm Bluegill
0.0004ppm Daphnia(1)

LD50: Rats 3.6-13ppm, rabbit 10mg/kg, mouse 6-25mg/kg, mule deer 22-4mg/kg, dog 3mg/kg; Cal quail 16.9 mg/kg, f. whistling duck 0.125-0.250 mg/kg, house sparrow 3.36 mg/kg, mallards 1.4-2.4mg/kg, bobwhite 6-13 mg/kg, r-w blackbird 2.5mg/kg, s-t grouse 5.66mg/kg (4)
[readily absorbed thru skin, low LD50's]

PERSISTENCE: Moderately persistent. Loss of biological activity occurs within 2-4 weeks. Applied to water at 20 C it persisted for 690 days.(4)

BIOACCUMULATION: Using continuous-flow system, parathion bioconcentrated in tadpoles an average of 64 times.(4) Moderate potential for bioaccumulation (14a)

SOLUBILITY: 24ppm (8)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees. Numerous records of deaths. At 2-3lb/ac 0.5-5.2 dead birds per hectare found in study. Lab: tadpoles exposed at 5 and 1 mg/l fed to mallard ducklings resulted in death after eating 1 tadpole. Lab: cricket frogs dosed at 10ppm, Am kestrels died ater eating 5 frogs (4) Bald eagle 1987 (Madison)

EPA <u>REGISTERED</u> USES: Corn, cotton, oats, barley, wheat, sorghum, soybeans, rye, rice, safflower, alfalfa, clover, sugar beets, fruit, nuts, vegetables, forage grasses, pasture, mosquito larvae control, tobacco, ornamentals (10)

BREAKDOWN PRODUCTS: Paraoxon - a potent cholinesterase inhibitor.(4)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Inhalation hazard to human; acute dermal toxicity
Aquatic, mammalian, and avian residual effects.
Other hazards - accident history

OTHER PERTINENT INFORMATION: Parathion has been implicated the causative agent more often in unintentional wildlife die-offs than any other organophosphate. (4) Impairs reproduction and cold tolerance - bobwhites (4)

CHEMICAL NAME: Fenamiphos **TYPE:** Systemic nematicide

TRADE NAME: Nemacur, Phenamiphos

METHOD OF APPLICATION: Broadcast, in band, by drench before or at planting to control nematodes (2)

FORMULATION: Emulsifiable concentrate, granular (2)

LC50 (Fish and/or Aquatic invert.): 16 ppb bluegill (8)
rainbow 0.0721 mg/l (3)

LD50: 8.1-25mg/kg rat, mouse 8.3mg/kg, dog 19mg/kg (4)
1.0-2.4mg/kg bobwhite, pheasants 0.5-1.0mg/kg, mallard 1.68mg/kg (4)
[dermal toxicity high]

PERSISTENCE: Active in soil for about 4 months.

BIOACCUMULATION: Rapidly excreted in animals (3)
(3) Predicted bioaccumulation factor low (4) (14a)

SOLUBILITY: 400 ppm (2) (8)

MORTALITY OF NON-TARGET SPECIES: (4) 400-500 Cedar waxuwings killed feeding on sprayed berries and blossoms

EPA REGISTERED USES: Cotton, soybeans, fruit, vegetables, tobacco, turf, ornamentals, roadways/parkways (10)

BREAKDOWN PRODUCTS: In plants, fenamiphos is oxidized to sulfoxide and sulfone metabolites, and is hydrolized to desisopropyl sulfoxide. These metabolites are cholinesterase inhibitors and are relatively persistent. Birds feeding on treated vegetation would be exposed to these metabolites (14b)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Avian acute oral toxicity (7)
Acute inhalation toxicity

OTHER PERTINENT INFORMATION: Nematocide, also formulated w/Dasanit insecticide (15 percent granular) (7)

CHEMICAL NAME: Fenitrothion **TYPE:** Insecticide

TRADE NAME: Sumithion

METHOD OF APPLICATION: ground; aerial (spruce budworm)

FORMULATION: wettable powder, emulsifiable concentrate, soluble concentrate/liquid (EPA)

LC50 (Fish and/or Aquatic invert.): very highly toxic to aquatic invertebrates (3ppb gammarus); moderately toxic to warmwater/coldwater fish (1.7ppm brook trout; 3.8ppm bluegill) (EPA)

LD50: 330-800mg/kg rats (EPA)
mallard 1190-1662mg/kg, bobwhite 23.6-32mg/kg, s-t grouse 53.4 mg/kg (4)

PERSISTENCE: "Degrades fairly rapidly in soil with a half-life of less than a wide in non-sterile much and sandy loam soils (EPA)

BIOACCUMULATION: Low potential for bioaccumulation (14a)

SOLUBILITY: 30mg/l at 20C (3)

MORTALITY OF NON-TARGET SPECIES: Highly toxic to bees (3) Studies in Canadian forests have documented avian mortality, typically of small canopy birds, possibly at a rate of 2-3 birds per acre. (15)
Forests: application rates of 3-4oz/ac may produce nesting mortality, over 4 oz/ac may produce adult mortality. Range: 3 and 6 oz/ac resulted in bird mortality and decrease in bird numbers (4)

EPA REGISTERED USES: Forests [spruce, fir], nuts, ornamentals (10)
EPA: Used exclusively on ornamentals; forestry use markets lost because of birdkills

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: For forestry uses, due to avian and aquatic invertebrate hazards (not included in 14)

OTHER PERTINENT INFORMATION: EPA: In 1985, used in GA, IN, KS, MO, MN, NY and PA

CHEMICAL NAME: Fenoprop **TYPE:** Herbicide, growth inhibitor

TRADE NAME: Kuron, Kurosal, Fruitone T, AquaVex

METHOD OF APPLICATION:

FORMULATION: Emulsifiable concentrate, soluble concentrate (3)

LC50 (Fish and/or Aquatic invert.): Rainbow 14.8mg/l (3)
bluegill 9.6mg/l

LD50 (Other): Rats 650 mg/kg (3)
Dietary: mallards/bobwhite >12,800mg/kg diet

PERSISTENCE: Soil: degraded to 2,4,5-trichlorophenal, which is resistant to further degradation (3)

BIOACCUMULATION:

SOLUBILITY: 176mg/l at 25C (3)

MORTALITY OF NON-TARGET SPECIES: Low toxicity to bees (3)

EPA REGISTERED USES: Miaze, sugar cane, rice, turf, pastures, noncrop, aquatic weed control, apples (3)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Systemic hormone-type herbicide; inhibits cell differentiation (3)

CHEMICAL NAME: Fensulfothion **TYPE:** Nematicide, insecticide

TRADE NAME: Dasanit, DMSP, Terracur-P

METHOD OF APPLICATION: aerial, cultivators, planters

FORMULATION: granular, technical chemical, emulsifiable concentrate

LC50 (Fish and/or Aquatic invert.): rainbow trout 7.5000ppm, bluegill 0.1070ppm

LD50: rat 2-10.5mg/kg, California quail 1.68-12mg/kg, mallard 2.86 mg/kg, bobwhite 0.8-1.19mg/kg, s-t grouse 0.5-1.0 mg/kg (4)

PERSISTENCE: Degraded in soils under aerobic conditions with half-life of 3-28 days due to microbial degradation. Half-life rapid in silt clay loan and organic soil (3-7 days) and fairly rapid in sandy loan, silt loan, and loam soils (around 28 days). Degrades rapidly in water and silt of a simulated pond with half-life of 10 and 12 days, respectively. *One of most persistent organophosphates; residues beyond 900 days (4)

BIOACCUMULATION: Has low potential to bioaccummulate in bluegill
Low potential for bioaccumulation (14a)

SOLUBILITY: 101.00ppm

MORTALITY OF NON-TARGET SPECIES: Canada geese, mourning doves, rock doves, and several species of duck were among unnumbered birds killed in a die-off. Incident involved treatment of a golf course resulting in a death of at least 25 Canada geese (4). Toxic to bees (3) Mynas, plovers, doves, sparrows, robins black-backed gull, harrier hawk (11)

EPA <u>REGISTERED</u> USES: Corn, cotton, sorghum, soybeans, sugar beets, sugarcane, fruit, tobacco, vegetables, ornamentals, turf. (10)

BREAKDOWN PRODUCTS: (4) Sulfone, oxygen analogs: at least as toxic as parent

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal toxicity, acute inhalation toxicity (7)

OTHER PERTINENT INFORMATION: An acetylcholinesterase inhibitor. Toxicity to terrestrial and aquatic non-target organisms very high. Birds feeding in treated areas may be killed. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas (1).

CHEMICAL NAME: Fenthion **TYPE:** Insecticide, acaricide

METHOD OF APPLICATION: Aerial and ground, dermal treatment to cattle

FORMULATION: (3) Emulsible concentrate, wettable powder, ULV liquid, granules, dustable powder, fogging concentrate, pour-on

LC50 (Fish and/or Aquatic invert.): (3) Bluegill 0.75mg/l, Rainbow 0.76mg/l, Carp 2.5-3.3mg/l, goldfish 1.9mg/l, (12) catfish 1.68ppm

LD50 (3) rats 290-375mg/kg (4) rabbits 150mg/kg
(4) Canada geese 12.0mg/kg, bobwhite <4mg/kg, house finch 10.6mg/kg, mourning dove 2.5-2.68mg/kg, r-w blackbird 1.8 mg/kg

PERSISTENCE: (4) low to moderate environmental persistence

BIOACCUMULATION: (4) Predicted bioaccumulation factor indicates low potential (<100)

SOLUBILITY: (3) 54-56mg/l at 20C

MORTALITY OF NON-TARGET SPECIES: (3) Toxic to bees. (4) Magpie mortality at feed lots 4-5 months after catle dip; 5,000-25,000 birds following mosquito control; significant cholinesterase inhibition in wading birds.

EPA REGISTERED USES: (8) Mosquito larvicide (15) Avian control agent.

BREAKDOWN PRODUCTS: (3) Sulphoxide, sulphone (both have insecticide properties)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (6) Cholinesterase inhibitors
Am black ducksfed 21ppm had brain and salt gland AChE activities inhibited (44-61% and 14-36%) (4)

CHEMICAL NAME: Fenvalerate **TYPE:** Insecticide, acaricide

TRADE NAME: Pydrin

METHOD OF APPLICATION: aerial or ground

FORMULATION: emulsifiable concentrate, liquids, ULV concentrate (1)

LC50 (Fish and/or Aquatic invert.): 0.42ppb bluegill,
1.4ppb pink shrimp(1)

LD50: 9,932 mg/kg mallard(1)
1000 mg/kg rat(1)

PERSISTENCE: half-life of 41 days in water expose to sunlight; in soil, 65 days-8 months under aerobic conditions. Relatively immobile in soil.(1)

BIOACCUMULATION: 400x in rainbow trout after 30 day exposure; 40-60 percent residual after 33 days, virtually all as parent compound.(1)

SOLUBILITY: <1mg/l (1)(3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees(3)

EPA REGISTERED USES: corn, cotton, soybeans, barley, oats, wheat, sunflowers, forest [douglas-fir], fruit, vegetables, nuts, ornamentals, domestic animals (EPA)

BREAKDOWN PRODUCTS: stable(1)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: possible adverse effects on aquatic organisms (7)

OTHER PERTINENT INFORMATION: low toxicity to mammals/birds, highly toxic to fish/inverts.

CHEMICAL NAME: Fluchloralin **TYPE:** Herbicide

TRADE NAME: Basalin

METHOD OF APPLICATION: Preplant incorporation

FORMULATION: Emulsifiable concentrate (9)

LC50 (Fish and/or Aquatic invert.): "Toxic to fish" (9)

LD50 (Other): rat 1550 mg/kg, low order toxicity to wild fowl (9)

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: 10ppm (5)

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Cotton, soybeans, rice, vegetables, sunflowers (9)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Discontinued 1985 (9)

CHEMICAL NAME: Flucythrinate **TYPE:** Insecticide

TRADE NAME: Cybolt, Pay-off, AC 222,705 -

METHOD OF APPLICATION:

FORMULATION: (3) Emulsifiable concentrate, ULV liquid, water-dispersible granules

LC50 (Fish and/or Aquatic invert.): (3) Bluegill 0.71ppt
Channel catfish 0.51ppt
Trout 0.32ppb

LD50: (3) rats 67-81mg/kg
mice 76mg/kg bobwhite 2708mg/kg
mallards >2510mg/kg

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: (3) 0.5mg/l at 21C

MORTALITY OF NON-TARGET SPECIES: (3) toxic to bees, but has a repellent effect LD50 bees 0.078ppt/bee

EPA <u>REGISTERED</u> USES: (3) Cotton, fruit, vegetables, soybeans, cereals, corn, sugar beets, sunflowers, tobacco, ornamentals

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Possible adverse effects on aquatic organisms (7)

OTHER PERTINENT INFORMATION: (3) Efficiency at high temperatures is greater than for several other pyrethroid insecticides

CHEMICAL NAME: Fonofos **TYPE:** Insecticide

TRADE NAME: Dyfonate

METHOD OF APPLICATION: Mostly ground application, aerial application to hybrid seed corn (1)

FORMULATION: granules, emulsifiable concentrate (3)

LC50 (Fish and/or Aquatic invert.): 50 ppb rainbow (3) 20 ppb (8)
24 ppb daphnia (8)

LD50: 3.16 - 18.5 mg/kg (rat) (1)
bobwhite 12-14mg/kg (4)
mallard 12 mg/kg, red-winged blackbird 10mg/kg (4)

PERSISTENCE: Half-life 3-16 weeks in aerobic soils, moderately persistent, immobile in sandy loam/silt loam soils, mobile in quartz sand (1)

BIOACCUMULATION: High potential for bioaccumulation (14a) Maximum accumulation occured in three days and was 150x in edible tissue, 1050x in non-edible tissue. Depuration was rapid in clean water, with only 20% of the residues remaining after three days. (15)

SOLUBILITY: 13 mg/l (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA REGISTERED USES: Corn (95% of use) (2), sorghum, soybeans, strawberries, vegetables, sugarcane, tobacco, turf, ornamentals (10)

BREAKDOWN PRODUCTS: phosphonothionate (3)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal toxicity (7)

OTHER PERTINENT INFORMATION: Mixed formulations w/Disulfoton (3) highly toxic to birds, freshwater and marine organisms (1)

CHEMICAL NAME: Fosamine-ammonium **TYPE:** Contact herbicide

TRADE NAME: Krenite, DPX 1108

METHOD OF APPLICATION:

FORMULATION: (3) Soluble concentrate

LC50 (Fish and/or Aquatic invert.): (3) Bluegill 670mg/l, Rainbow and fathead minnow >1000mg/l

LD50: (3) rats 10,200mg/kg
mallard and quail >10,000mg/kg

PERSISTENCE: (3) In soil, half-life of 10 days

BIOACCUMULATION:

SOLUBILITY: (3) 179g/100ml at 25C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (3) Noncrop, pastures, confier plantations

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Inhibits bud development
Controls woody plants, trees, birdweed, bracken

CHEMICAL NAME: Gas cartridges **TYPE:** Rodenticide

METHOD OF APPLICATION: hand placement into burrows

FORMULATION: cartridge

LC50 (Fish and/or Aquatic invert.):

LD50: label - this product is highly toxic to wildlife

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY:

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (label) noncrop, rangeland, reforested areas, turf

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Glyphosate **TYPE:** Systemic herbicide

TRADE NAME: Kleenup, Roundup

METHOD OF APPLICATION:

FORMULATION: (3) Soluble concentrate, water-soluble powder

LC50 (Fish and/or Aquatic invert.): (3) Trout 86mg/l
Bluegill 120mg/l

LD50: (3) rats 5600mg/kg
bobwhite >3850mg/kg

PERSISTENCE: (4) Half-life - water 7-10 weeks
- soil 3-19 weeks
(3) not metabolized in plants.

BIOACCUMULATION: (4) low predicted bioconcentration factor, confirmed by animal feeding studies

SOLUBILITY: (3) 12g/l at 25C

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: (3) Fruits, (including plantation crops), vegetables, soybeans, cereals, cotton, noncrop, aquatic weeds, pasture, forests.

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Interferes with formation of amino acids. Controls great variety of annual, biennial and perennial grasses, sedges, broad-leaved weeds and woody shrubs.

CHEMICAL NAME: Hexazinone **TYPE:** Contract herbicide

METHOD OF APPLICATION:

FORMULATION: (3) Soluble concentrate, water soluble powder, granules

LC50 (Fish and/or Aquatic invert.): (3) Rainbow 320-420mg/l
fathead minnow 274mg/l
bluegill 370-420mg/l

LD50: (3) rats 1690mg/kg
bobwhite 2258mg/kg

PERSISTENCE: (3) Soil half-life 1-6 months

BIOACCUMULATION:

SOLUBILITY: (3) 33g/kg at 25C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (3) Noncrop, conifer plantations, sugar cane, pineapples (5) sugacane, alfalfa, forests.

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Inhibitors photosynthesis
Phytoxic to deciduous trees. Control of annual, biennial and most perennial weeds and woody plants

CHEMICAL NAME: Isofenphos **TYPE:** Systemic insecticide

TRADE NAME: Oftanol, Amaze

METHOD OF APPLICATION: Foliar and soil

FORMULATION: granular, emulsifiable concentrate, wettable powder (3)

LC50 (Fish and/or Aquatic invert.): goldfish 2.0mg/l (3)
rudd 1.0mg/l

LD50: rats 28.0-38.7mg/kg Jap quail 5.0-12.5mg/kg (3)
mice 91.3-127.0mg/kg
bobwhite 13-19mg/kg (4)

PERSISTENCE:

BIOACCUMULATION: Low potential for bioaccumulation (14a)

SOLUBILITY: 23.8mg/kg at 20 C.(3)

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Corn, turf (esp. golf courses), noncrop (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Linuron **TYPE:** Herbicide

TRADE NAME: Afolan, Lorox, Prefalon, Sarclex, Linex

METHOD OF APPLICATION: ground, aerial (5)

FORMULATION: Wettable powder, suspension concentrate, emulsifiable concentrate (3)

LC50 (Fish and/or Aquatic invert.): Bluegill/ rainbow 16mg/l

LD50 (Other): rats 1500-4000 mg/kg; dogs 400 mg/kg; rabbits 2250 mg/kg (3)
mallard duckling 3083 mg/kg; pheasant 3438 mg/kg;
Japanese quail >5000 mg/kg (3)

PERSISTENCE: Half-life under field conditions 2-5 months (3)

.BIOACCUMULATION:

SOLUBILITY: Stable in neutral media (3) 75ppm (5)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Vegetables, soybeans, cereal grains, maize, cotton, sunflowers, sugar cane, rice, fruit ornamentals (3)

BREAKDOWN PRODUCTS: Demethylation, demethoxylation (3)

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Systemic herbicide - inhibits photosynthesis (3)

CHEMICAL NAME: Magnesium phosphide **TYPE:** Rodenticide, fumigant

TRADE NAME: Magtoxin, Fumi-cell, Fumi-strip

METHOD OF APPLICATION: Direct application to grain/feed

FORMULATION: (7) pellets, tablets, fumi-cel plate

LC50 (Fish and/or Aquatic invert.): humans 190ppm in 1 hour

LD50: (Application manual) "product is very highly toxic to wildlife

PERSISTENCE: (Application manual) high temperature/moisture - 2 days, lower 4 days

BIOACCUMULATION:

SOLUBILITY: Insoluble, reacts (Material safety data sheet)

MORTALITY OF NON-TARGET SPECIES:

EPA <u>REGISTERED</u> USES: Stored grain/feed, processed food/nonfood, beehives, burrowing rodents

BREAKDOWN PRODUCTS: Hydrogen phosphide (toxic gas) LD50 rats 11ppm 4 hours

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Inhalation hazard (7)

OTHER PERTINENT INFORMATION: (Application manual) Magnesium phosphide is considerably more reactive that aluminum phosphide, will liberate gas more rapidly.

CHEMICAL NAME: Malathion **TYPE:** Insecticide, acaricide

METHOD OF APPLICATION: Aerial, ground, hand pump

FORMULATION: Granular, powder(2), ULV (10)

LC50 (Fish and/or Aquatic invert.): Trout - 0.0041 ppm
cutthroat trout - 0.28 ppm
Bluegill - 0.02 ppm (2)
Gammarus - 0.0008ppm (2)

LD50: 1000-1375mg/kg rats, pheasants 167mg/kg, mallard 1485mg/kg, horned lark 403 mg/kg (4)

PERSISTENCE: Instable at high pH - 0.1 day; stable at low pH - 18 days generally rapid breakdown in alkaline soils (15) "does not persist in soils"(15)

BIOACCUMULATION: (4) (14a) predicted biaccumulation factor is low

SOLUBILITY: 145 ppm

MORTALITY OF NON-TARGET SPECIES: Highly toxic to insects, including bees (3) (4) wildlife mortality not observed, but bird numbers reduced under some conditions. Aerial application to forested watershed: Birds reacted for 2 days without lasting effects, no effects on reptiles/amphibians, but 30% reduction in mouse/ chipmunk populations.

EPA <u>REGISTERED</u> USES: Mosquito control, corn, cotton, oats, barley, soybeans, sorghum, wheat, rye, alfalfa, clover, fruit, herbs, vegetables, nuts, sugarcane, safflower, sunflower, tobacco, ornamentals, turf, noncrop, rice, domestic animals, forests, forage grasses, pasture/rangeland, ponds and other wetlands (10)

BREAKDOWN PRODUCTS: (4) Malzoxon - more toxic than parent, but is very transient

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Saltmarsh studies (15) show little accumu'ation in soils, plants after separate application. 5.2ppb in water

CHEMICAL NAME: Mancozeb **TYPE:** Fungicide

TRADE NAME: Dithane M-45, Fore, Mancofol, Manzeb, Manzin, Nemispor, Polycar, Ziman-Dithane

METHOD OF APPLICATION: Foliar by aerial (dust) or ground equipment, air blast or boom sprayers (wettable power/flowable concentrate) [1] also used to treat seed[1]

FORMULATION: Dust, wettable powder, flowable concentrate, granules 80% AI[1]

LC50 (Fish and/or Aquatic invert.): 0.46ppm rainbow, 0.58 daphnia[1]
1.86ppm rainbow [8]

LD50: English sparrow 1500mg/kg/day[1]
rat >8000mg/kg (4)

PERSISTENCE: Half-life of 1-2 days[1]

BIOACCUMULATION: Almost totally excreted by 96.h.[1]
Low potential for bioaccumulation (14a)

SOLUBILITY: 0.00ppm[8]; practically insoluble in water[3]; moderately soluble in water[16]

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Cotton, corn, barley, wheat, sorghum, rye, oats, fruit, tobacco, safflower, sugar beets, vegetables, forests [conifers], turf, irrigation supply systems, ornamentals (10)

BREAKDOWN PRODUCTS: Ethylene thiourea (ETU)[1] solubility = 2g/100ml[16]
ETU has potential antithyroidd, carcinogenic and teratigenic effects (4)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Mancozeb and ETU have potential to leach[1]
Label restrictions: Toxic to fish, not for use on water or wetlands (exc. taro, rice, cranberries)[1] or where runoff is expected

CHEMICAL NAME: MCPA-thioethyl **TYPE:** Systemic herbicide

METHOD OF APPLICATION:

FORMULATION: (3) Aqueous solution, soluble concentrate, water-soluble powder, emulsifiable concentrate (5) granules

LC50 (Fish and/or Aquatic invert.): (3) Rainbow 232mg/l

LD50: (3) rats 700mg/kg
mice 550mg/kg

PERSISTENCE: (3) residual activity in soil 3-4 months, similar in plants

BIOACCUMULATION:

SOLUBILITY: (3) 825mg/l at room temperature

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (3) Cereals, rice, vegetables, turf, noncrop, forestry, grassland, aquatic weeds

BREAKDOWN PRODUCTS: ETU (ethylene thiourea) is one of the many metabolites. No information, however, on wildlife toxicity (14b)

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Control of annual and perennial broad-leaved weeds (including thistles and dock)

CHEMICAL NAME: Methidathion **TYPE:** Insecticide, acaricide

TRADE NAME: Supracide, Somonic, Somonil, Ultracide

METHOD OF APPLICATION: ground and aerial

FORMULATION: 24.4 percent active ingredient emulsifiable concentrate, 95 percent technical, 50 & 60 percent formulating intermediates (2).

LC50 (Fish and/or Aquatic invert.): 9.0ppb for bluegill, 14.0ppb for rainbow trout. Indicate highly toxicity to warm and coldwater fish (2). Rainbow trout 0.0090ppm, bluegill 0.0140ppm, smallmouth bass 0.0078ppm, daphnia 0.0072ppm (8).

LD50: rat 44-65mg/kg, mouse 25-68 mg/kg; Canada goose 8.41mg/kg, mallard 23.6 mg/kg, pheasant 33mg/kg (4)

PERSISTENCE: Degrades rapidly in soil with half-life of 2-3 weeks. In fumigated soils, 50 percent of initial insecticide remained after 16 weeks.(4)

BIOACCUMULATION: Bioconcentration potential reported as "low" (14a) and its predicted BCF, calculated from water solubility, is small (4).

SOLUBILITY: 240ppm at 20 C (2)

MORTALITY OF NON-TARGET SPECIES: Highly toxic to bees (2,3)

EPA <u>REGISTERED</u> USES: Cotton, sorghum, forage and grain, citrus (67 percent), alfalfa (16 percent), nuts, tobacco (EPA)

BREAKDOWN PRODUCTS: The oxygen metabolite, more acutely toxic than the parent compound, but it is not the major metabolite (14b), and has not been identified in animals (4).

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Residue effects on avian species (7)

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Methomyl **TYPE:** Insecticide, acaricide

TRADE NAME: Griffen Nu-Bait II, Lannate, Nudrin

METHOD OF APPLICATION: Foliar spray both ground and aerial applications.

FORMULATION: Water soluble liquid and powder. ULV

LC50 (Fish and/or Aquatic invert.): 1.6ppm - Rainbow (8)
0.6ppm - Bluegill
0.032ppm - Daphnia

LD50: Rats 17-24mg/kg, mule deer 11-22mg/kg (4)
Mallard 15.9mg/kg, r-w-blackbird 10mg/kg, pheasant 15mg/kg

PERSISTENCE: 1.8% of initial amount applied to soil remained after 1 month.[4] Biological activity (applied to soil) disappeared after 16 weeks.[4] Residues of foliar treatments may be depleted within 8 days.[4]

BIOACCUMULATION: Predicted very low.[4] low (14a)

SOLUBILITY: 58000ppm[8] (57.9gm/l at 25C (3))

MORTALITY OF NON-TARGET SPECIES: Published accounts of methomyl causing adverse effect on wildlife are lacking.[2] Toxic to bees before chemical dries (3)

EPA REGISTERED USES: Barley, forage grasses, corn, cotton, forestry, oats, rye, sorghum, soybeans, wheat, alfalfa, clover, fruit, vegetables, sugar beets, tobacco, pastures, forests, turf, ornamentals, domestic animals (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Residue effect on mammalian species [14]

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Methroprene **TYPE:** Insect growth regulator

METHOD OF APPLICATION: Spray - aerial or ground

FORMULATION: Suspension concentrate, emulsifiable concentrate, brisquethic, soluble concentrate, bait concentrate

LC50 (Fish and/or Aquatic invert.): bluegill 1.52ppm, trout 4.4mg/1(3)
Daphnia 80ppb; amphib larvae 1-10ppm

LD50: rats > 34,600mb/kg
rabbits 3500 mg/kg
mallard > 2000mg/kg

PERSISTENCE: In soil, half-life of 10 days

BIOACCUMULATION: crayfish 66x
bluegill 550-950x in lab, 93-95percent excreted in 14 days

SOLUBILITY: 1.4mg/1

MORTALITY OF NON-TARGET SPECIES: Nontoxic to bees

EPA REGISTERED USES: [Mosquito larvicide]: rice, pastures, ornamentals, ponds and other wetlands, noncrop, livestock (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Moderately toxic to warmwater fish; moderately to slightly toxic to amphibians larvae, to crabs, shrimp - highly toxic -- could pose risk to Houston toad (EPA)

CHEMICAL NAME: Methoxychlor **TYPE:** Insecticide

TRADE NAME: Marlate, Higalmetox

METHOD OF APPLICATION:

FORMULATION: Wettable powder, emulsifiable concentrate, dustable powder, granules, aerosol (3)

LC50 (Fish and/or Aquatic invert.): Rainbow 0.052 mg/l (3)
bluegill 0.067 mg/l
Daphnia 0.00078 mg/l

LD50 (Other): mallards >2000 mg/kg (3)
rats 6000 mg/kg

PERSISTENCE: Half-life in water 46 days (3)

BIOACCUMULATION: [organochlorine] (3)

SOLUBILITY:

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Field crops, forage crops, fruit, vegetables, forestry, industrial and domestic insect pests (3)

BREAKDOWN PRODUCTS: Phenol, diphenol, 4,4"-dihydroxybenzophenone (3)

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Insecticide with contact and stomach action

CHEMICAL NAME: Methyl parathion TYPE: Insecticide, acaricide

METHOD OF APPLICATION: Aircraft and ground equipment; usually foliar(1)

FORMULATION: Dusts, wettable powders, micro-encapsulated, emulsifiable concentrates and ready-to-use liquid(1) ULV (10)

LC50 (Fish and/or Aquatic invert.): Rainbow trout: 1.85ppm
Grammarus:0038ppm(8)
Bluegill 4.38ppm

LD50: rat 9-25 mg/kg, mouse 32 mg/kg (4)
Am kestrel 3mg/kg, mallard 6.6-60.5mg/kg, r-w blackbird 10-23.7mg/kg, pheasant 8.21 mg/kg (4)

PERSISTENCE: Relatively low environmental persistence(4)
-still detectable after 30 days(4)
-persistence longer in lakewater than soil water(4)

BIOACCUMULATION: Moderate potential for bioaccumulation (14a)
-predicted bioconcentration factor less than 100(4)

SOLUBILITY: 55-60mg/l at 25C(3)

MORTALITY OF NON-TARGET SPECIES: Especially to bees in encapsulated form(4)
1200 geese following treatment with ethly and methyl parathion (4)
Brain ChE depressed 9-68% in bobwhite, 7-32% in cottontails (4)
Reported toxic to fish, shrimp, crabs and other aquatic arthropods (4)

EPA REGISTERED USES: Corn, cotton, wheat, tobacco, forests, mosquito control, noncrop, forage grasses, alfalfa, clover, fruit, nuts, vegetables, pasture/rangeland, oats, barley, rye, sorghum, ornamentals, rice, soybeans, safflowers, sunflowers, sugar beets, aquatic food crops, (10)

BREAKDOWN PRODUCTS: Methyl paraoxon, a potent acecholinesterase inhibitor (4)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Based on residue effects on mammalian and avian species; hazard to bees; acute dermal toxicity(14)

OTHER PERTINENT INFORMATION: -not believe to contaminate groundwater(1)
-the most widely used organophosphate pesticide in the U.S.(7)
-the most widely used agricultural chemical in terms of areas treated(4)
Generally less hazardous than ethyl parathion (4)

CHEMICAL NAME: Metolachlor **TYPE:** Herbicide

TRADE NAME: Dual, Humextra, Pennant, CGA 24705

METHOD OF APPLICATION:

FORMULATION: Emulsifiable concentrate

LC50 (Fish and/or Aquatic invert.): Rainbow 2 mg/l (3)
carp 4.9 mg/l
bluegill 15 mg/l

LD50 (Other): rats 2780 mg/kg (3)
bobwhite/mallards >10,000 mg/kg (3)

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: 530 mg/l at 20C (3)

MAOTALITY OF NON-TARGET SPECIES: Non-toxic to bees (3)

EPA REGISTERED USES: Maize, sorghum, cotton, sugar beets, sugar cane, potatoes, soybeans, safflowers, sunflowers, vegetables, ornamentals (3) noncrop (5)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Selective herbicide - inhibits gernimation of annual grasses and some broad-leaved weeds.(3)

CHEMICAL NAME: Mevinphos

TYPE: Systemic insecticide, acaricide

TRADE NAME: Phosdrin, Duraohos, Gesfid, Menite, Phosfene

METHOD OF APPLICATION: aerial or ground application (2)

FORMULATION: Technical chemical, dust, emulsifiable concentrate, wayer soluble concentrate, RTU-L (2), aerosol (4)

LC50 (Fish and/or Aquatic invert.): Rainbow trout 0.0110pmm, bluegill-0.0220ppm, bass-0.1150ppm, daphnia-0.0002ppm, gammarus 0.0028ppmm (8).

LD50: rats 3.7-6.1mg/kg, mice 7-18 mg/kg(4)
mallard 4.63mg/kg, pheasant 1.37mg/kg, s-t grouse 0.75-1,5mg/kg, starling 4.63mg/kg (4)

PERSISTENCE: Half-life in soils generally less than 24 hours (4)

BIOACCUMULATION: High water solubility suggests low predicted bioconcentration potential and does not accumulate in tissues (4)

SOLUBILITY: 101.00ppm(8), highly soluble in water and in most organic solvents (4)

MORTALITY OF NON-TARGET SPECIES: 54 incidences of wildlife deaths resulting from mevinphos use in Scotland from 1973 to 1979. All incidences attributed to misuse (4). Toxic to bees (3) Blackbirds, starlings - CA (@!0

EPA REGISTERED USES: Corn, sorghum, barley, oats, wheat, alfalfa, clover, vegetables, fruit, ornamentals (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal toxicity, residue effects on mammalian and avian species (7).

OTHER PERTINENT INFORMATION: Cholinesterase inhibitor (3) Extremely toxic to birds and mammals through both acute oral and dermal exposure. One of most acutely toxic organophosphates marketed, but no evidence of teratogenic, carcinogenic, reproductive or delayed neurotoxic affects associated with exposure (4)

CHEMICAL NAME: Naled **TYPE:** Insecticide, acaracide

TRADE NAME: Dibrom, Bromchlophos, Bromex, Hilbrom

METHOD OF APPLICATION: Fog/mist sprayers aerial (10)

FORMULATION: emulsifiable concentrate, dustable powder, ULV liquid (3)

LC50 (Fish and/or Aquatic invert.): 160-900 ppb-fish(1)
.3ppb-invertebrates
.175ppm-trout(8)

LD50: 222-389ppm-rats(1)	mallard 52.2mg/kg(4)
160ppm-mice	pheasant 120mg/kg(4)
37-65ppm-avian(1)	S-tailed grouse 64.9/gm/kg(4)

PERSISTENCE: Half-life <8hrs-soil
<25hrs-water

BIOACCUMULATION: High based on low solubility
Low potential for bioaccumulation (14a)

SOLUBILITY: Practically insoluble in water (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA <u>REGISTERED</u> USES: Alfalfa, vegetables, cotton, soybeans, rice, tobacco, safflower, sugar beets, forests, fruit, nuts, turf, pastures/rangeland, soybeans, rice, ornamentals, domestic animals, ponds and other wetlands, noncrop (10)

BREAKDOWN PRODUCTS: Degradation product, DDVP [dichlorvos], is more acutely toxic than is Naled (mallard LD50 = 7.78 mg/kg). Additionally, DDVP is highly toxic to fish (lake trout LC50 = 183ppb; bluegill, 869ppb)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

Toxic to fish and aquatic inverts(1)

CHEMICAL NAME: Nitrapyrin

TYPE: Bacteriostat (nitrogen stabilizer)

METHOD OF APPLICATION: broadcast or band with soil incorporation

FORMULATION: emulsifiable concentrate, soluble concentrate (90 percent)

LC50 (Fish and/or Aquatic invert.): 5.8mg/l Daphnia (EPA)
7.876mg/l bluegill
9/19mg/l rainbow trout

LD50: >2708mg/kg mallard (EPA)
>7829mg/kg Jap. quail

PERSISTENCE: Preliminary data indicates rapid hydrolysis, the rate increasing with temperature. In soil: half-life of <3 to 35 days, depending on soil type (EPA)

BIOACCUMULATION: In bluegill: maximum bioconcentration factors are edible (33x) and visceral (60x) tissues. (EPA)

SOLUBILITY: 0.004g/100g water (EPA)

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Cotton (90 percent), corn, sorghum, wheat, rice, strawberries (CA only), bulbs (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: EPA: EEC of 0.1ppm in water (due to runoff) = minimal expected to aquatic organisms. However, use in rice, in floodwater could reach 0.4ppm. This level may impact fat pocketbook pearly mussel, which is a bottom dweller and would be exposed in both water and sediments.

CHEMICAL NAME: Oxamyl

TYPE: Systemic insecticide, acaracide, nematicide

TRADE NAME: Vydate

METHOD OF APPLICATION: Foliar, soil, broadcast, irrigation water drip, aerial and ground application(1)

FORMULATION: Soluble concentrate, granular(1)

LC50 (Fish and/or Aquatic invert.): 4.26ppm rainbow(8)
5.7ppm daphnia(1)

LD50: rats 5.4-37mg/kg (4)
mallard 2.6mg/kg, bobwhite 9.4mg/kg, Jap. quail 4.3mg/kg (4)

PERSISTENCE: Rapidly degraded in soil(3) 6-15 days (4)

BIOACCUMULATION:

SOLUBILITY: 280 g/l at 25C (3), 10ppm(8)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA REGISTERED USES: Cotton, soybeans, sorghum, ornamentals, fruit, spices, vegetables, tobacco (10)

BREAKDOWN PRODUCTS: Oxime(1)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: acute oral, inhalation toxicity; avian oral toxicity (4)

OTHER PERTINENT INFORMATION: Oxamyl and oxime have been shown to leach easily to groundwater.(1)
Subacute toxicity is moderate to high for birds; reported toxic to bees, fish and wildlife (4)

CHEMICAL NAME: Oxydemeton-methyl **TYPE:** Insecticide, acaricide

TRADE NAME: Metasystox-R, Demeton-S-methyl sulfoxid, Metasystemox, Metilmercapto fosoksid

METHOD OF APPLICATION: broadcast spray, injection, ground boom and aerial

FORMULATION: emulsifiable concentrate, soluble concentrate

LC50 (Fish and/or Aquatic invert.): moderately toxic to isopods (1400ppb), mod high amphipods (190-1000ppb), moderate to high coldwater fish (rainbow: 0.72-6.4ppm); slight to moderate warmwater fish (1.22to 31.5ppm); 8.6ppm fiddler crab, moderate to estuarine crustaceans (1.2ppm pink shrimp) (EPA)

LD50: rats 47-125mg/kg, mice 30mg/kg (4)
Cal quail 47.6mg/kg, house sparrow 70.8mg/kg, mallard 53.9mg/kg, rock dove 14-14.9mg/kg (4)

PERSISTENCE: (4) Half-life - residues on leaves 7 days
- soil 6 days

BIOACCUMULATION: (4) (14a) Available data suggest low potential to bioaccumulate

SOLUBILITY: Miscible in water at 20 C. (EPA)

MORTALITY OF NON-TARGET SPECIES: moderate to high toxicity to bees on direct exposure (EPA)

EPA REGISTERED USES: Vegetables, fruit, nuts, corn, sorghum, cotton, alfalfa, clover, sugar beets, ornamentals, forests [douglas-fir], turf (10)

BREAKDOWN PRODUCTS: dimethyl phosphide, 2-sulfonic diethyl sulfoxide, 2-sulfonic diethyl sulfone and oxydemeton-methyl suflone: cholinesterase-inhibiting metabolites

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Potential for reproductive effects in humans(7)

OTHER PERTINENT INFORMATION: EPA: A comparison of the acute toxicity values with estimated pesticide residues on food items indicate that birds will not be exposed to lethal concentrations...at highest rate currently registered. In 1984, 2/3rds of use on crops in California.

CHEMICAL NAME: Oxyfluorfen **TYPE:** Contact herbicide (Dicots)

TRADE NAME: Goal

METHOD OF APPLICATION: Aerial
Granular applications

FORMULATION: Emulsifiable concentrate (9)
Granular

LC50 (Fish and/or Aquatic invert.): Rainbow trout - 0.4 ppm
Daphnia - 1.5 ppm
Bluegill - 0.20 ppm(8)
Catfish - 0.40 (8)

LD50: Rat: >5000 mg/kg (3)
Toxic to game birds, but not waterfowl
Rabbit >10,000 mg/kg (9)
Very low avian toxicity (15)

PERSISTENCE: Half-life in soil 30-56 days (3)
Photodecomposition in water is rapid (3)
Not readily oxidized in plants (3)

BIOACCUMULATION:

SOLUBILITY: 0.1 mg/l (3)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Corn, cotton, soybeans, forests, rice, fruit, nuts, vegetables, alfalfa, clover, summer fallow land (ID, OR, WA only), noncrop, ornamentals, rivers [levees, banks] (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Region 4 Jeopardy Opinion

CHEMICAL NAME: Paraquat dichloride **TYPE:** Herbicide

METHOD OF APPLICATION: Spray (widely used in no-till programs) (5)

FORMULATION: (3) Aqueous liquid, soluble concentrate

LC50 (Fish and/or Aquatic invert.): (3) rainbow trout 32mg/l
(12) toad tadpoles 43-54ppm
daphnia 3.7ppp, gammarus 18ppm

LD50: (3) rats 150mg/kg
mice 104mg/kg
cats 40-50mg/kg
sheep 50-75mg/kg
hens 262-380mg/kg
mallards 200mg/kg

PERSISTENCE: (3) Rapidly and completely inactivated on contact with soil (12) in ponds, 2.1-2.5ppm for 6-23 days; no buildup in hydrosoil

BIOACCUMULATION: (3) rats (oral) 76-90 percent excreted in feces, 11-20 percent in urine; (12) bluegills - accumulated after exposure to sublethal concentrations

SOLUBILITY: (3) 700gm/l at 20C

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: (8) Crops, (sorghum), rangeland

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Human toxicological data, other hazards - use and accident history (7)

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Pendimethalin

TYPE: Herbicide
(for broadleaf and grassy weeds)

TRADE ANME: Prowl

METHOD OF APPLICATION: Preplant incorporation, spray aerial (10)

FORMULATION: granular, dispersible granular, emulsifiable concentrate

LC50 (Fish and/or Aquatic invert.): bluegill 0.119ppm ("highly toxic")
rainbow 0.138ppm ("highly toxic")
daphnia 0.28ppm ("highly toxic")

LD50: bobwhite >3,149ppm
mallard >4,640ppm

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: 0.5ppm

MORTALITY OF NON-TARGET SPECIES: 4 human incidents

EPA REGISTERED USES: *soybeans (45 percent), cotton (33 percent), sorghum, rice, tobacco, sunflower, ornamentals, turf, fruit, nuts, vegetables, noncrop (10) *not registered in CA (2,)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: EPA strongly absorbed in soil organic matter and clay, and does not leach through the soil. EPA identifies slackwater and "certain freshwater mussels" at risk from use on cotton. Also, moderately to highly toxic to estuarine organisms.

Label warning: "This product is highly toxic to fish".

CHEMICAL NAME: Permethrin **TYPE:** Insecticide

TRADE NAME: Ambush

METHOD OF APPLICATION:

FORMULATION: emulsifiable concentrate, wettable powder, ULV liquid, fumigant, aerosol, dustable powder, water-dispensable granules (3)

LC50 (Fish and/or Aquatic invert.): brook trout 1.4-7.9 (3)
rainbow trout 5.4
bluegill 1.8

LD50: chickens >3000mg/kg (3)
Jap.quail >13,500mg/kg
rats, mice, rabbits, ca 4000mg/kg

PERSISTENCE: In soil and water degradation is rapid (3)

BIOACCUMULATION:

SOLUBILITY: 0.2mg/l (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3)

EPA <u>REGISTERED</u> USES: Fruit, vegetables, corn, cotton, cereal, grains (EPA)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Possible adverse effects on aquatic organisms (7)

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Phorate **TYPE:** Systemic insecticide, acaracide

TRADE NAME: Thimet, Timet, Rampart, Granutox, Vegfru Foratox

METHOD OF APPLICATION: Granular application equipment, aircraft

FORMULATION: Granules, emulsifiable concentrate (1)

LC50 (Fish and/or Aquatic invert.): Trout - .0013ppm (8)
Bluegill - .0020ppm (8)
Daphnia .0380 ppm (8)
Gammarus - 0.0040ppm (8)
Shrimp - .0019ppm (8)

LD50: Rat: 1.4 to 3.7 mg/kg (1)
Mallard: 0.62-2.55mg/kg, bobwhite 7-21mg/kg r-w blackbird 1mg/kg, pheasant 7.12mg/kg; bullfrog 85.2mg/kg(4)

PERSISTENCE: (4) 16 weeks in silt loam; insectical activity 4-12 weeks; 14-21 days in corn/grass. More persistent under flooded conditions

BIOACCUMULATION: (4) (14a) Predicted bioaccumulation factor low

SOLUBILITY: 50 ppm (1)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (3) Gull, waterfowl, raptor kills (4) A recent kill of about 60 snow geese and 13 eagles feeding on snow geese. (15)

EPA <u>REGISTERED</u> USES: Cotton, corn, sorghum, soybeans, wheat, barley, rice, sugar beets, sugarcane, alfalfa, fruit, nuts, vegetables, ornamentals (10)

BREAKDOWN PRODUCTS: Phorate sulfone, Phorate o-analog sulfoxide (1)
"Certain oxidation products are more toxic than phorate itself." (1)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal toxicity
Residue effects on avian and mammalian species (Foliar application only) (7)
Potent irreversible cholinesterase inhibitor (parent and oxidates) (4)

OTHER PERTINENT INFORMATION: Very highly toxic to birds, fish, inverts. (1)
Re: Endangered Species, there is a potential risk to the Aleutian Canada goose, Attwater's greater prairie chicken, and the Kern primrose sphinx moth. - Phytotoxic to apples and tobacco.

CHEMICAL NAME: Phosmet TYPE: Insecticide, acaracide

TRADE NAME: Appa, Imidan, Kemolate, Phthalophos, PMC, Prolate

METHOD OF APPLICATION: Foliar, aerial, animal treatments, stored commodity and impregnated material.(1)

FORMULATION: Dust, wettable powder, impregnated resins, emulsifiable concentrate.(1)

LC50 (Fish and/or Aquatic invert.): 0.23ppm Rainbow trout
0.12ppm Bluegill (1)
5.6ppb Daphnia

LD50: rats 113-160mg/kg (4)
mallard 1830mg/kg, red-winged blackbird 18mg/kg, pheasant 237->250mg/kg(4)

PERSISTENCE: (3) In plants, rapidly broken down in animals, rapid metabolism (4) half-life in soil 3-19 days

BIOACCUMULATION: 78 percent eliminated from urine within 72 hours in rats (1) (4) (14a) low predicted bioaccumuluation potential

SOLUBILITY: 25mg/l at 25C (3)

MORTALITY OF NON-TARGET SPECIES: Reports of mortality to dogs and cats from the use of phosmet as a flea dip (Paramite).(1) Highly toxic to bees (3)

EPA REGISTERED USES: Corn, cotton, alfalfa, fruit, nuts, vegetables, forest [pine], ornamentals, noncrop, domestic animals (10)

BREAKDOWN PRODUCTS: phthalamic acid, phtalic acid (3) imidoxon (4)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Phosmet has been classified as "tentative" category 2 carcinogen.

CHEMICAL NAME: Phosphamidon **TYPE:** Systemic insecticide, acaracide

TRADE NAME: Dimecron, Dixon, Famfos

METHOD OF APPLICATION: Ground, aerial

FORMULATION: Emulsifiable concentrate, wettable powder

LC50 (Fish and/or Aquatic invert.): 7.8ppm-trout(8)
3.4ppm-sunfish(8)
0.01ppm-Daphnia, Gammarus

LD50: rats 11-30mg/kg, mice 9-11.2mg/kg, dog 50mg/kg, mule deer 44-88mg/kg mallard 3.05-3.81mg/kg, pheasant 4.24mg/kg, white-winged dove 2.34-2.93mg/kg, s-t grouse 1.5-3mg/kg (4)
[rapidly absorbed thru skin - mod. to high dermal toxicity]

PERSISTENCE: hydrolyzes(1); short-lived in soils(1)
Half-life in seawater 2 weeks, soil - less than one month (4)

BIOACCUMULATION: (4) High solubility in water suggests low potential to bioaccummulate (14a) low

SOLUBILITY: 101ppm

MORTALITY OF NON-TARGET SPECIES: Toxic to bees, other inserts(1); toxic to mammals -- (4) Grouse, other bird kills reported. at 1lb/ac bird activity in sprayed areas dropped to 25% of prespray level. Jack pine (0.25lb/ac) had apparant reduction of birds, esp. warblers. Same rate may be hazardous to birds, esp. with fine atomization of spray. Other: 0.9lb/ac resulted in large numbers of dead birds, esp. insectivorous passerines.

EPA REGISTERED USES: fruit, nuts, vegetables, cotton (10)

BREAKDOWN PRODUCTS: metabolites of comparable toxicity to parent, but rapidly degrade (4)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Acute dermal toxicity--Residue effects on mammalian and avian species (7)

OTHER PERTINENT INFORMATION:

Highly toxic to aquatic insects(1)

CHEMICAL NAME: Picloram **TYPE:** Systemic herbicide

METHOD OF APPLICATION: Ground and aerial (5)

FORMULATION: (3) Soluble concentrate, pellets, granules, aqueous solution

LC50 (Fish and/or Aquatic invert.): (3) Rainbow 19.3mg/l
(12) Fathead minnow 65ppm
Catfish 16.4-70.5ppm (depends on formulation)

LD50: (3) rats 8200mg/kg Chicks 6000mg/kg
rabbits 2000mg/kg
mice 2000-4000mg/kg

PERSISTENCE: (3) Degraded rapidly in soil or clear water. Residual activity 7-14 months
(12) in soil 20 percent persisted up to 1 year

BIOACCUMULATION: (3) Rapidly excreted in mammals

SOLUBILITY: (3) 430mg/l at 25C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (3) Rangeland, noncrop, forests

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Hazard to nontarget organisms (nontarget plants, crops) (7)

OTHER PERTINENT INFORMATION: (3) Control most annual and perennial broad-leaved weeds (except crucifers) including woody weeds, bracken, ferns, docks

CHEMICAL NAME: Profenofos **TYPE:** Insecticide, acaricide

TRADE NAME: Curacron, Polycron, Prothiofos, Selecron

METHOD OF APPLICATION: Foliar (air or ground)

FORMULATION: emulsifiable concentrate

LC50 (Fish and/or Aquatic invert.): (3) rainbow 0.08 mg/l
bluegill 0.03 mg/l
carp 0.09 mg/l

LD50: (3) Toxic to birds
rats 358 mg/kg
rabbits 700 mg/kg

PERSISTENCE:

BIOACCUMULATION: (4) Predicted bioaccumulation factor is moderately high indicating the possibility for some bioconcentration. (14a) moderate

SOLUBILITY: (3) 20 mg/l at 20oC

MORTALITY OF NON-TARGET SPECIES: (3) Toxic to bees

EPA REGISTERED USES: Cotton

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Corrosive to eyes

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Profluralin **TYPE:** Herbicide

TRADE NAME: Tolban, Pregard, CGA 10832

METHOD OF APPLICATION:

FORMULATION: Emulsifiable concentrate (3)

LC50 (Fish and/or Aquatic invert.): Bluegill 0.023 mg/l (3)
trout 0.015 mg/l

LD50 (Other): rats 10.000 mg/kg (3)
bobwhite/mallards 1000 mg/kg

PERSISTENCE: Degraded by soil micoorganisms. No significant leaching through the soil (3)

BIOACCUMULATION:

SOLUBILITY: 0.1 mg/l at 20C (3)

MORTALITY OF NON-TARGET SPECIES: Toxic to honey bees (3)

EPA REGISTERED USES: Cotton, soybeans, vegetables (3)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Selective herbicide - may interfere with photosynthesis and respiration (3)

CHEMICAL NAME: Propachlor **TYPE:** Herbicide (dicots)

TRADE NAME: Ramrod, Bexton, CP31393

METHOD OF APPLICATION: Broadcast spray, banded ground application[1]
One application per year aerial (10)

FORMULATION: Granular, wettable powder, flowable liquid[1]

LC50 (Fish and/or Aquatic invert.): Daphnia: 7.75ppm[8] Trout: 0.17ppm(8)
Chironomus: 6.9ppm[8] Bluegill 2.5ppm
channel catfish 0.23ppm(8)

LD50: Rats: 710mg/kg[16]
Rats: 1800mg/kg[3]
Bobwhite 91mg/kg[3]

PERSISTENCE: Half-life of 4 to 6 weeks; longer in soil high in organic matter.[1]

BIOACCUMULATION:

SOLUBILITY: 613ppm[8]

MORTALITY OF NON-TARGET SPECIES: No incidents reported[1].
Not toxic to bees (3)

EPA REGISTERED USES: Corn, sorghum, cotton, barley, oats, rye, wheat, millet, sugarcane, tobacco, vegetables, nuts, fruit, pasture/ rangeland, forest, turf, noncrop, fallow land (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: "Exposure of human to propachlor through contamination of groundwater and runoff contamination of surface water after heavy spring precipitation is probable."[1]
-FWS indicates jeopardy for use on corn, sorghum, soybeans to: Slackwater darter, 11 freshwater mussels, woundfin, solano grass.

CHEMICAL NAME: Propargite **TYPE:** Acaricide

TRADE NAME: Omite

METHOD OF APPLICATION: Spray aerial (10)

FORMULATION: wettable powder, concentrated liquid

LC50 (Fish and/or Aquatic invert.): 0.12ppm-trout; 0.1ppm-sunfish(3)
.092ppm-daphnia(1)

LD50: 2200ppm-rats
>4640ppm-mallards(1)
3401ppm-quail(1)

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: 0.5ppm

MORTALITY OF NON-TARGET SPECIES: Not dangerous to bees; highly toxic to freshwater fish

EPA <u>REGISTERED</u> USES: Fruit, nuts, vegetables, corn, cotton, sorghum, soybeans, alfalfa, clover, ornamentals (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

Toxic to fish

CHEMICAL NAME: Propazine TYPE: Herbicide (grasses/broadleaf weeds)

METHOD OF APPLICATION: Broadcast (ground or aerial), band

FORMULATION: technical chemical, wettable powder, flowable concentrate soluble concentrate/liquid

LC50 (Fish and/or Aquatic invert.): (3) rainbow 17.5 mg/l
bluegill >100 mg/l
goldfish >32.0 mg/l

LD50: (3) rats >3100
rabbits >19200 mg/kg
bobwhite and mallard >10,000 mg/kg

PERSISTENCE: (EPA) In soils 200-400 days/6-10 months in NC
(3) In mammals (oral) 42-46% eliminated in 24 hrs

BIOACCUMULATION:

SOLUBILITY: (EPA) 8.6 ppm at 20oC

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (EPA) Sorghum (about 100%), corn, cotton, soybeans, vegetables, safflower, fruits, nuts, ornamentals, noncrop (not used in U.S.) (2, 20)

BREAKDOWN PRODUCTS: (3) Hydroxypropazine

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Pyrethrin **TYPE:** Insecticide, acaricide

METHOD OF APPLICATION: Ground equipment aerial (10)

FORMULATION: Dustable powder, emulsifiable concentrate, aerosol, fogging concentrate, wettable powder, ULV liquid.

LC50 (Fish and/or Aquatic invert.): 0.024ppm Rainbow(8)
0.05 ppm Bluegill
0.0025 ppm Daphnia

Highly toxic to fish(3)

LD50: Rat 1500 ppm (4)
Mice 273-796 ppm (3)

PERSISTENCE: Rapidly broken down by sunlight. (5)

BIOACCUMULATION: Rapidly degraded in mammal stomachs by hydrolysis of the ester bond to harmless metabolites. (3)

SOLUBILITY: 1.0 ppm (8)

MORTALITY OF NON-TARGET SPECIES: Toxic to bees, but exhibits repellent effect (3)

EPA REGISTERED USES: Forests, corn, cotton, sorghum, wheat, millet, buckwheat, barley, oats, rye, rice, sugarcane, sugar beets, safflower, sunflowers, herbs, vegetables, mosquitos [larvicide], fruit, nuts, tobacco, forage grasses, pasture, alfalfa, clover, domestic animals, ornamentals, turf, ponds and other wetlands, noncrop, fallow land (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Rotenone **TYPE:** Insecticide, acaricide

TRADE NAME: Rotacide, Noxfire, Noxfish, Chem-fish, Cuberol, Sicid

METHOD OF APPLICATION:

FORMULATION: Dustable powder, emulsifiable powder, wettable powder (3)

LC50 (Fish and/or Aquatic invert.): "Very toxic to fish" (3)

LD50 (Other): rats 132-1500 mg/kg, mice 350 mg/kg (3)

PERSISTENCE: Decomposes on exposure to light and air (3)

BIOACCUMULATION:

SOLUBILITY: 15 mg/l at 100C (3)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Fruit, vegetables, mosquito larvae, fish control, domestic pet pests (3)

BREAKDOWN PRODUCTS: animals: methoxyl group (3)

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Non-systemic insecticide - contact and stomach action (3)

CHEMICAL NAME: Simazine   **TYPE:** Systemic herbicide

METHOD OF APPLICATION:

FORMULATION: (3) Granules, suspension concentrate, wettable powder, water-dispersible granules

LC50 (Fish and/or Aquatic invert.): (3) Bluegill 90mg/l, Rainbow >100mg/l
guppies 49mg/l

LD50: (3) rats, mice, rabbits >5000mg/kg
bobwhite 8800mg/kg   mallard 51,200mg/kg

PERSISTENCE: (3) Downward movement or leaching limited by low solubility. Several months after application, most found in surface 2 inches of soil

BIOACCUMULATION: Mammals, 65-97 percent eliminated in 24 hours

SOLUBILITY: (3) 3.5mg/l at 20C

MORTALITY OF NON-TARGET SPECIES: (3) Not toxic to bees

EPA REGISTERED USES: (3) Fruit, nuts, vegetables, corn, turf, ornamentals, forestry, noncrop, aquatic weeds

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Inhibitors photosynthesis - Controls most germinating annual grasses and broad-leaved weeds, algae

CHEMICAL NAME: Sodium cyanide **TYPE:** Fumigant

METHOD OF APPLICATION: Placed by hand

FORMULATION: (7) Briquette, M-44 cyanide capsule

LC50 (Fish and/or Aquatic invert.):

LD50: (6) rats 15mg/kg

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: (6) Freely soluble in water

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (Label) rangeland, forests

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Human inhalation hazard

OTHER PERTINENT INFORMATION: (Label) toxic to wildlife

CHEMICAL NAME: SSS-tributyl phosphorothithioate **TYPE:** Herbicide (defoliant)

TRADE NAME: DEF, Butifos, De-Gren, E-Z-off D, Fos-Fall "A"

METHOD OF APPLICATION: Foliar, spray or broadcast on ground or aerial

FORMULATION: emulsifiable concentrate (3) ULV (10)

LC50 (Fish and/or Aquatic invert.): bluegill 1.0 mg/l (3)
rainbow <5.0 mg/l

LD50: "not a significant hazard to birds" (3) mallard 2,934mg/kg (4)
rats 200-233 mg/kg pheasant 273mg/kg(4)

PERSISTENCE:

BIOACCUMULATION: (4) Because of insolubility, bioconcentration potential is probably high

SOLUBILITY: practically insoluble in water 2.3 mg/l (3)

MORTALITY OF NON-TARGET SPECIES: relatively non-toxic to bees (3)

EPA <u>REGISTERED</u> USES: Cotton (10)

BREAKDOWN PRODUCTS: merphos (defoliant) (4)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:
"leaching and runoff studies show that the possibility of contaminating lakes and streams is extremely slight" (3)

CHEMICAL NAME: Strychnine **TYPE:** Rodenticide

TRADE NAME:

METHOD OF APPLICATION:

FORMULATION: Bait, bait concentrate (3)

LC50 (Fish and/or Aquatic invert.):

LD50 (Other): Lethal dose: rats 1-30 mg/kg; man 30-60 mg/kg (3)

PERSISTENCE:

BIOACCUMULATION:

SOLUBILITY: 143 mg/l (3)

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: Rodents, sparrows, pigeons (3)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Sulprofos **TYPE:** Insecticide, acaricide

TRADE NAME: Bolster, Bay NTN 9306, Helothion, Merpafos

METHOD OF APPLICATION:

FORMULATION: emulsifiable concentrate, ULV liquid

LC50 (Fish and/or Aquatic invert.): (EPA) Daphnia 0.75ppm
Channel catfish 2.9ppm
Bluegill 1.00ppm
Rainbow trout 29.7ppm

LD50: (EPA) bobwhite .47 mg/kg "highly toxic to upland game birds"
mallard 72.1 mg/kg
(4) rats 107-304 mg/kg

PERSISTENCE: (EPA) 25C and pH7 half-life of 6 months
25C and pH11 half-life of 6 days
In simulated pond study, half degraded in 2 hrs, completely in 4 days
In soil: 12-32 days

BIOACCUMULATION: (EPA) Study with channel catfish found most accumulation on scales or in vicera. Half of 28 day accumulation was eliminated in 5 hrs
Moderate potential for bioaccumulation (14a)

SOLUBILITY: (EPA) Low: 0.3 ppm at 20C

MORTALITY OF NON-TARGET SPECIES: Toxic to bees (direct or residues)

EPA <u>REGISTERED</u> USES: (EPA) Cotton, soybeans, chrysanthemums

BREAKDOWN PRODUCTS: (EPA) phenol sulfoxide, sulprofos sulfoxide, phenol sulfone -one of which is a cholinesterase inhibitor

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: wildlife hazard (7)

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: 2,4,5-T **TYPE:** Herbicide

TRADE NAME: Weedone, Esteron, Brushwood Killer, Universal Crop

METHOD OF APPLICATION:

FORMULATION: Emulsifiable concentrate, soluble concentrate (3)

LC50 (Fish and/or Aquatic invert.): Rainbow 350 mg/l; carp 355 mg/l (3)

LD50 (Other): rats 500 mg/kg; dogs 100 mg/kg (3)
Dietary: bobwhite 2776 mg/kg diet

PERSISTENCE: Soil: More slowly than 2,4-D. (3)

BIOACCUMULATION: Mammals: 50% eliminated inurine in 23 hours. There is no accumulation (3)

SOLUBILITY: 278 mg/l at 20C (3)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Woody plant control in grasslands and non-crop. Control of tree shoots and underbrush in forestry. Rice. (3)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: Systemic herbicide with hormone action - similar to 2,4-D (3) Humans: "Avoid long-term exposure, even in small amounts" (3)

CHEMICAL NAME: Tebuthiuron **TYPE:** Systemic herbicide

METHOD OF APPLICATION:

FORMULATION: (3) Wettable powder, granules, pellets

LC50 (Fish and/or Aquatic invert.): (3) Rainbow 144mg/l
Bluegill 112/mg/l

LD50: (3) rats 644mg/kg
mice 579mg/kg
chickens, bobwhite, mallards >5000mg/kg

PERSISTENCE: (3) Half-life in soil of low moisture content considerably greater than high organic soils

BIOACCUMULATION:

SOLUBILITY: (3) 2.3g/l at 25C

MORTALITY OF NON-TARGET SPECIES:

EPA REGISTERED USES: (3) Noncrop, pasture/grassland, sugar cane

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION: (3) Inhibitors photosysthesis -- Total control of herbaceous and woody plants

CHEMICAL NAME: Temephos   **TYPE:** Insecticide (larvicide)

TRADE NAME: Abate, Abathion, Difenthos, Ecopro, Nimitox, Swebate

METHOD OF APPLICATION:

FORMULATION: (3) Emulsifiable concentrate, wettable powder, granules, dustable powder, pour-on

LC50 (Fish and/or Aquatic invert.): (3) rainbow trout 31.8mg/l
(4) toxic to certain aquatic invertebrates, shrimp and crabs

LD50: (4) rats 8600-13,000mg/kg, mice 4000mg/kg
(4) mallards 80-100mg/kg, r-w blackbird 42.2mg/kg, rock dove 50.1mg/l, Cal quail 18.9mg/kg, bullfrog >2000mg/kg

PERSISTENCE: (4) Low persistence under most conditions

BIOACCUMULATION:

SOLUBILITY: (3) practically insoluble in water

MORTALITY OF NON-TARGET SPECIES: (3) Highly toxic to bees by direct contact

EPA REGISTERED USES: (8) Mosquito larvicide (8) Blackfly larvicide

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Terbufos **TYPE:** Insecticide, nematicide

TRADE NAME: Counter

METHOD OF APPLICATION: Soil incorporation (band, furrow)
aerial (10)

FORMULATION: Granular

LC50 (Fish and/or Aquatic invert.): 0.77-3.8ppb-sunfish(1)
0.31ppb-Daphnia(1)
.0091ppm-trout(8)
.0038ppm-sunfish(8)
.0062ppm-Daphnia(8)

LD50: 1.3-1.5ppm-rats(1) highly toxic
1ppm(dermal)-rats(1)
143ppm-avian(1)
bobwhite 15-26mg/kg(4)

PERSISTENCE: (4) Half-life in sandy loam soil 2 weeks

BIOACCUMULATION: No accumulation (3) Relatively low (4) Low (14a)

SOLUBILITY: 4.5mg/l at 27C (3)

MORTALITY OF NON-TARGET SPECIES: Highly toxic to humans, fish and wildlife (1) Not toxic to bees (3) Banded application: dove, snakes, box turtle; passerines affected, not killed. Aerial application: species passerines, 4 species rodents, raccoon, shrew, cotontail, garter snake, several fish (11)

EPA REGISTERED USES: Corn, sugar beets, sorghum (10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

Major data gaps; data due to EPA 1986. 2 fish kills reported(1). Runoff from treated fields.(1)

CHEMICAL NAME: Terbutryn TYPE: Herbicide (grasses/broadleaf weeds)

METHOD OF APPLICATION: foliar or soil incorporation broadcast by ground or aerial equipment

FORMULATION: technical chemical, wettable powder, dry flowable end-use product

LC50 (Fish and/or Aquatic invert.): (EPA) rainbow 2.4ppm
Daphnia 2.66ppm
carp 4.7ppm
bluegill 2.7-4.8ppm

LD50: mallard >640 mg/kg
pheasant >2.000 mg/kg

PERSISTENCE: Applied at recommended rates to ponds, disappeared from water column in 14 days, but may persist in bottom sediments up to 12 months

BIOACCUMULATION:

SOLUBILITY: 58 ppm

MORTALITY OF NON-TARGET SPECIES: relatively nontoxic to honeybees(3)

EPA REGISTERED USES: Barley, sorghum, wheat, noncrop (10)

BREAKDOWN PRODUCTS: more mobil, leachable and persistent than parent

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: Oncogenic risk to applicators -- Dermal exposure risk (7)

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Thiodicarb   **TYPE:** Herbicide (grass/broadleaf weeds)

TRADE NAME: Bolero, Benthiocarb, Saturn, Sàturno

METHOD OF APPLICATION: ground, air

FORMULATION: emulsifiable concentrate, granules (3)

LC50 (Fish and/or Aquatic invert.): 2.55 ppm-trout(1)
1.21 ppm-sunfish(1)(8)
52.6 ppm-Daphnia

LD50: 2023 ppm-quail
66 ppm-rats(3)

PERSISTENCE: Half-life in soil 2-3 weeks (aerobic), 6-8 weeks (anaerobic) (3)

BIOACCUMULATION: Predicted bioconcentration potential relatively low, confirmed by studies of aquatic organisms (4)

SOLUBILITY: 35 ppm

MORTALITY OF NON-TARGET SPECIES: low toxicity to birds, mammals

EPA REGISTERED USES: Corn, soybeans (10)

BREAKDOWN PRODUCTS: Methomyl: LD50 15.9ppm-mallard(3)
Rapidly depards in soil 3-5 days LC50-3.4 ppm trout; 0.9 ppm-sunfish(3)

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION: breakdown at pH>6; sunlight creases breakdown colinesterase inhibitors - Rapid degradation in soil

CHEMICAL NAME: Thiophanate-methyl **TYPE:** Systemic fungicide

METHOD OF APPLICATION: Aerial, broadcast, ground equipment(1)

FORMULATION: Dusts, granular, wettable powder, liquid(1)

LC50 (Fish and/or Aquatic invert.): Rainbow: 8.3ppm(8) Daphnia: 24 ppm(8)
Bluegill: 5.8(8) Shrimp: 35ppm(8)
Bluegill: 15.8ppm(1) Catfish: 0.03ppm(1)

LD50: Rat: 7500 mg/kg(3)
Rabbit: 2270 mg/kg(3)
Jap. quail >5000mg/kg (4)
Virtually nontoxic to avian species; low to moderate toxicity to freshwater fish, except catfish(1).

PERSISTENCE: Data on its environmental fate and toxicity of its metabolites are lacking(4)

BIOACCUMULATION:

SOLUBILITY: 0 (8), 3.5 mg/kg(3)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Nuts, fruit, vegetables, soybeans, sugar beets, sugarcane, corn, cotton, sorghum, wheat, barley, rice, forests, turf, ornamentals (10)

BREAKDOWN PRODUCTS: MBC (methyl-2 benzimidazole carbamate)
carbendazin = Fungicidally active agent

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

"A review by the Agency indicates that two endangered catfish species inhabit areas where soybeans are grown and which may be treated with thiophanate-methyl."(1) -moderately mobile in Lakeland sand and Sultan silt/loan columns. Label: "This pesticide is toxic to catfish. Do not apply directly to water or wetlands). "Drift and runoff from treated areas may be hazardous to catfish in adjacent areas."

CHEMICAL NAME: Trichlorfon **TYPE:** Insecticide

METHOD OF APPLICATION: Aerial and ground

FORMULATION: Technical chemical, dust, granules, pellets/tablets, wettable powder, emulsifiable concentrate, soluble concentrate, liquid. (2)

LC50 (Fish and/or Aquatic invert.): 1.6ppm Rainbow 0.0001ppm Daphnia(8)
2.1ppm Bluegill 0.040ppm Gammarus

LD50: Rat = 150-400ppm(9) Cal quail= 59.3mg/kg(4)
Rabbit = >2100ppm(9)
Mallard = 36.8ppm, bobwhite 22.4 mg/kg, r-w blackbird 37-75mg/kg(4)

PERSISTENCE: Trichlorfon persists in the soil for up to 2 weeks. (3) Because of its hydrophilic properties, it is readily metabolized and excreted by animals, and its environmental persistence and bioconcentration potential are low. (4)

BIOACCUMULATION: Degraded rapidly in the blood. (3) Excretion in urine is more or less complete within 6 hours (3). Has an extremely low bioconcentration factor (4) Low (14a)

SOLUBILITY: 15.40ppm(8)

MORTALITY OF NON-TARGET SPECIES: Humans, cattle, fish kills, poultry
Toxic to bees (4)

EPA REGISTERED USES: Vegetables, fruit, barley, oats, wheat, ornamentals, pastures/rangeland, forage grasses, corn, cotton, soybeans, sorghum, rice, sugar beets, tobacco, safflower, alfalfa, clover, turf, domestic animals. (10)

BREAKDOWN PRODUCTS: Trace amounts of dichlorvos

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then **WHY:**

OTHER PERTINENT INFORMATION: Bird populations studied before and up to 14 days after spraying did not exhibit a significant decrease in numbers.(4) A review of applications to rangelands found no reported effects to wildlife.(4)
Potentiates the toxicity of EPN, malathion and azinphos-methyl (4)

CHEMICAL NAME: Trifluralin **TYPE:** Herbicide (weed seeds)

METHOD OF APPLICATION: Broadcast direct application, (2) Incorporated into the soil(5) aerial (10)

FORMULATION: Technical chemical, granular, wettable powder, emulsifiable concentrate, dust.(2)

LC50 (Fish and/or Aquatic invert.): 0.0410ppm Rainbow, 0.470ppm Bluegill
0.56ppm Daphnia, 2.2ppm Gammarus(8)

LD50: Rats >10,000ppm(3)
Mice 500ppm
Chickens >2000ppm

PERSISTENCE: Absorbed by the soil and is extremely resistant to leaching.(5) Duration of residual soil activity is 6-8 months.(3)

BIOACCUMULATION: Following oral administration, 70 percent is eliminated in the urine and 15 percent in feces within 72 hours.(3)

SOLUBILITY: 0.30ppm (3)

MORTALITY OF NON-TARGET SPECIES: Not toxic to bees (3)

EPA REGISTERED USES: Alfalfa, barley, oats, vegetables, fruit, cotton, corn, sorghum, soybeans, sugarcane, suagr beets, wheat, safflower, ornamentals, forests [hardwood], nuts, turf, noncrop.(10)

BREAKDOWN PRODUCTS:

RESTRICTED USE CHEMICAL: Y or (N)
If Yes, then WHY:

OTHER PERTINENT INFORMATION:

CHEMICAL NAME: Zinc phosphide **TYPE:** Rodenticide

METHOD OF APPLICATION: Placed underground in burrows, mounds, around bulbs or in bait boxes; dust (inside buildings); broadcast (right-of-way) by hand ground devise, sugar cane by air or ground; rafted baits

FORMULATION: (3) grain bait, scrap bait, tracking powder, paste

LC50 (Fish and/or Aquatic invert.): (3) bluegill 0.8mg/l
rainbow trout 0.5mg/l

LD50: (3) rats 45.7mg/kg
mallard 37.5mg/kg
bobwhite 13.5mg/kg

PERSISTENCE:

BIOACCUMULATION: (2P rodent bait product description) Not stored in muscle or other tissue of poisoned animal; "not true secondary poisoning"

SOLUBILITY: (3) practically insoluble in water

MORTALITY OF NON-TARGET SPECIES: Has been extensively used. No evidence that it is a secondary hazard. (15)

EPA __**REGISTERED**__ **USES:** (Label) Rangeland, ornamentals, turf, noncrop, sugar cane, fruit

BREAKDOWN PRODUCTS: Phosphide (toxic gas)

RESTRICTED USE CHEMICAL: (Y) or N
If Yes, then WHY: (3) danger to humans and domestic animals

OTHER PERTINENT INFORMATION: labeled as toxic to wildlife