May 11, 2018

To:
Washington Dept Ecology
Audubon Society
Willapa Grays Harbor Oyster Growers Association
Pacific County Board of County Commissioners

Subject: Ecology of South Coast Tidelands & Burrowing Shrimp Management

Nature is more complex than we can imagine. This complexity has been demonstrated repeatedly. Yet agencies and other organizations persist in the illusion that solutions to ecological problems are simple.

More than two decades ago I began collecting plankton samples to track diatom and dinoflagellate species as they moved in and out of estuarine and nearshore marine waters. I found very quickly that 'perceived wisdom' at the time, about how phytoplankton species arrived in this area, how they spread and how they interacted with the tidelands of Willapa Bay, was incorrect. Even the basics of food sources for filter feeders living on and in the tidelands were not understood.

I found, rather quickly, that harmful algal blooms came from south or north along the coast, depending on the season and nearshore currents, rather than from inside estuaries, spreading outward—the thinking of the time. Working with tribes on the Olympic Peninsula, I developed a surf zone sampling method that was safe to use year round, so that they could do their own sampling and investigation of plankton samples. Collectively, we deduced that the point of origination for many plankton species, spring through fall, was not along this coast, but above it—and indeed, years later a multidisciplinary team on a research ship found the origination point to be around Cobb Seamount during spring through fall. Meanwhile, we did note that harmful algal blooms often did not enter, or pervade if they did enter, Willapa Bay.

Today, 'perceived wisdom' is that productivity in estuarine water columns and tidelands is derived from marine water, e.g. ocean-sourced phytoplankton. Yet I saw two decades ago that samples collected over tideflats often had copious numbers of benthic diatoms among the planktonic species. Primary productivity is driven as much by base geology, mineral-rich ground water flow, and other nutrient sources acting on the benthic surface as by the water column.

Why is this important to point out? This still represents a critical gap in understanding the ecological impacts of allowing Willapa Bay to be overrun by burrowing shrimp, and averting, or promoting, the demise of aquaculture in the bay.

Some of the reasons burrowing shrimp now thrive here have to do with loss of predators, including hugely reduced numbers of surf smelt, chinook salmon, coho salmon, and sturgeon, which collectively eat burrowing shrimp at different life stages. Gray Whales are also significant predators of adults, and the 20th century crash in their population may have helped promote the explosion in shrimp; there is some good news in rebounding whale numbers now. Other reasons include loss of spring freshwater pulses, a direct result of damming the Columbia River. Others may write about the ecological impacts of the loss of so many fish populations to local estuaries, and this bearing on burrowing shrimp.

Agencies take a highly simplistic view of ecological processes, so ignoring predators and changes in hydrology is traditional. They also ignore the complexity of the food web of the intertidal. It's not just about shellfish, burrowing shrimp and water column productivity. There are also other players: hundreds of thousands of shorebirds, millions of salmon and other fishes utilize the tidelands, as do fish-eating birds, many other invertebrates, and eelgrass.

I am an active birder, but no longer a member of Audubon—I gave up on the organization decades ago due to the simplistic science and bad ecological management its various chapters and state organizations promoted, as well as the national organization. But I did not stop birding, nor did I stop observing where birds feed and roost. Others will write about the very rapid turnover of individuals, the production of fatty acids, the productivity of micro-invertebrates and their importance energetically to shorebirds and waterfowl. These are all aspects of tideland productivity that are ignored by the current conveyors of 'perceived wisdom'.

For many years at Leadbetter Point there was a large intertidal population of burrowing shrimp northeast of the main salt marsh which covered several acres and was uniquely accessible due to its proximity to the marsh. This area was difficult to walk through, being extremely soft from shrimp bioturbation. The color of the sediment was very clean gray sand, e.g., there were no benthic diatoms or other algae on the surface. Shorebirds would enter this area, but did not linger to feed. They would touch down, take two or three feeding probes, and fly off. Eelgrass did not grow here. As a birder and naturalist, I concluded that this was not productive feeding habitat for shorebirds. Ducks often feed on invertebrates that live with eelgrass, and with no eelgrass, there were no ducks in this shrimp area. Or geese, particularly Brant, which feed on eelgrass, Zostera marina.

So, when putative ecological agencies and organizations insist on no control of burrowing shrimp, this is what they are promoting: no bird habitat, no eelgrass habitat, and no shellfish habitat. We already have this on thousands of acres. Willapa Bay has about 44,000 acres of intertidal flats. Around 20,000 acres is dominated by shrimp. The shellfish industry now operates on less than 8,000 acres, having lost over 10,000 acres since the 1950s to shrimp. State-owned tidelands were lost years ago to shrimp—and these acres were historically some of the best oyster grounds in the bay.

I wrote this to convey some of the complexity of historic intertidal ecology in Willapa Bay, which is being reduced through simplistic 'ecological management' based on 'perceived wisdom' to a less complex system dominated by burrowing shrimp. As an ecologist, I would prefer to see science-based management, which may include, while we restore historic ecologies, the use of pesticides to maintain commercial shellfish grounds.

Sincerely,

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