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Submitted via online comment form

Thank you for the opportunity to comment on the state biosolids permit. We, the undersigned advocacy organizations, would like to comment on issues related to the presence and management of toxic chemicals including per- and poly-fluoroalkyl substances (PFAS) in wastewater and biosolids in the state's draft general biosolids permit.

In 2018 EPA's Office of the Investigator General raised serious concerns about the presence of harmful, poorly regulated chemicals in sewage sludge and biosolids (USEPA 2018). We see major opportunities for Washington to address these pollutants, specifically PFAS, in the draft permit.

The state of Washington has prioritized action on PFAS in the state's Chemical Action Plan. PFAS are highly persistent and mobile and many are bioaccumulative. PFAS are widely used in industrial and consumer products with little regard to their lifecycle impacts to air, water, and land resources. More than 99 percent of Americans have measurable amounts of PFAS chemicals in their bloodstream.

A recent peer reviewed study by the University of Washington, Toxic-Free Future and Indiana University found 100% of breast milk samples of 50 women in Washington state testing positive for PFAS. The study also found that detections of PFAS currently used in food packaging, textiles and other products are doubling every 4 years. This study is an urgent call for action on PFAS in all media, including biosolids.

There is growing concern that unregulated discharges of PFAS into the wastewater system could pose a hazard to the food supply when biosolids are applied to land, as is common practice in Washington. Case studies demonstrate that highly contaminated biosolids can permanently contaminate agricultural fields and dairies.

A number of states, including Maine, Michigan and Colorado are moving to investigate PFAS levels in biosolids, and Maine tests foods cultivated from treated soils. With the current draft permit, Washington state is missing an important opportunity to reduce the amount of PFAS entering wastewater systems, while it is leading the nation in action to

prevent its use in food packaging, firefighting foam, as well as carpet, rugs, upholstered furniture and aftermarket treatments.

The state of Washington is one of the most committed to land application of biosolids, with 85-90% of the state's biosolids waste on agricultural fields, forest lands, undisturbed lands, and lawns or home gardens as well as public spaces. There is little data characterizing the PFAS levels in Washington state biosolids, but results from a recent Sierra Club and Ecology Center study of commercial biosolids-derived fertilizers and soil amendments, included Tagro Mix, made from biosolids produced that the Tacoma Central Wastewater Treatment Plant, indicated the presence of PFAS.

Our tests of Tagro and 8 other products found significant levels of total inorganic fluorine and of individual PFAS, including PFOA and PFOS, in products marketed directly to home gardeners for use on lawns, ornamental plants and home gardens.

PFOS and PFOA measurements exceeded the state of Maine screening guideline of 2.5 ppb for PFOA, 5.2 ppb for PFOS, at 7.5 and 7.9 ppb respectively. The sum of 33 individual PFAS chemicals was 87 ppb, and those concentrations increased 5.25-fold after the samples were oxidized in the TOP Assay, reflecting one measure of the amount of these PFAS that could be formed in the environment due to “weathering” of longer PFAS precursors into stable end products.

The total amount of unknown organic fluorine chemicals in the Tagro Mix sample was roughly 150 times greater than the sum of specific, identifiable PFAS - in line generally with the magnitude of difference in the other products - indicating a major quantity of unknown or mystery PFAS in these products.

	PFOS	**PFOA**	**Sum of 24 measurable PFAS**	**Sum Post-TOP analysis**	**Total fluorine**	**Total inorganic fluorine**
Tagro Mix	7.9	7.5	87	457	13,000	<1
Range in all products	<1 - 22.1	<1 - 23.8	38 - 223	235 - 457	13,000 - 321,000	<1 - 1000

All units parts per billion
More details in the Sierra Club/Ecology Center report: PFAS in the Garden (2021)

Based on these findings, we are concerned that the concentrations of PFAS in fertilizers and compost made from sludge-biosolids could lead to accumulation in food plants grown in fertilized beds in home gardens. The land application of biosolids generally could pose similar hazards to foods and dairy products produced on treated fields. Applications to forest and undisturbed lands still increase the global cycling of PFAS as the chemicals still wash off of soils into surface and groundwater.

Nationally the EPA is investigating the threat posed by PFAS in biosolids, and data coming from these studies confirm that land application spreads PFAS through the food chain (USEPA 2020). PFAS from highly contaminated sludges from industrial sites have been determined to contaminate local water supplies and agricultural products. The FDA has identified several other PFAS hot spots where water contaminated by biosolids application or industrial sources tainted dairy products or produce (FDA undated). Maine farmer Fred Stone's milk had similar levels of PFOS and PFOA, concentrations that exceeded the state's limit for milk, which is 210 parts per trillion (ppt). Tozier Dairy Farm in Fairfield, Maine, had similar problems, with concentrations of PFAS ranging from 12,000 to 32,000 ppt found in its milk. The remainder of milk sampled in Maine had undetectable levels of PFAS (less than 50 ppt).

In general, newer generation—or "shorter-chain"—PFAS are more mobile in water, less removed by water filtration systems, and more readily taken up by plants than longer-chain PFAS compounds. One study of vegetables that included celery, peas, radishes, and tomatoes grown in PFAS-tainted water found that different PFAS chemicals accumulated in different parts of the plant (Blaine 2014). Another study measured high levels of one chemical, PFDA, in tomatoes and potatoes (Li 2021).

While these studies have focused on highly contaminated biosolids, there are reasons to be concerned about the PFAS in biosolids with lesser levels of contamination. While concentrations of PFAS measured in commercially sold vegetables and dairy products are generally much lower than those from polluted sites, even small amounts still pose a health concern, as they add to the overall burden of exposure to multiple sources.

In general, people are estimated to ingest far more PFAS from their diets than from their drinking water, unless their water has high levels of PFAS. Since the chemicals do not break down in the environment, levels in farm fields will slowly increase every time more biosolids are applied to a piece of land. The fertilizer products we tested are marketed for multiple applications per year to home gardens. The EPA reports that some farm fields have had biosolids continuously applied for up to 20 years.

Recommendations:

While the general draft permit appears to meet the requirements of EPA's Rule 503, this is not acceptable for Washington state, which has been a leader on PFAS. The state should use its ability to impose greater requirements for monitoring and management of PFAS and other chemical contaminants.

EPA has identified a number of industries that discharge PFAS into wastewater systems, but not yet acted to restrict these emissions. In the absence of federal regulation, Washington must move quickly to identify and avert discharges from industries like metal plating, chemical manufacturing, plastics, paper and textile mills, printing, petroleum extraction, mining, paint manufacturing, car washes and industrial laundries.

1. **Ecology must fully assess the hazard posed by PFAS in biosolids by requiring periodic testing**

Testing is essential to identify and control point sources into the wastewater system. While Ecology has done an initial sampling of PFAS levels in surface water and WWTP plant effluent, it hasn't done a systematic study of biosolids, as is happening in other progressive states.

One barrier Ecology identified in its 2019 Chemical Action Plan and 2021 update, is the lack of validated methods to measure the compounds in sludges. This shouldn't be an excuse to stall testing. Other states require an isotope dilution method like Method 537.1, ASTM D7968-17, or CWA Method 1600 for PFAS analysis of biosolids until EPA completes its validated method for biosolids and soil.

Massachusetts' permit language addresses the use of interim monitoring methods with the following language: "If EPA's multi-lab validated method is not available by [date] months after the effective date of this Final Permit, the Permittee shall contact [person] for guidance on an appropriate analytical method."

2. **Washington should take action to limit PFAS discharges to wastewater**

Other states are acting with urgency to identify and abate WWTP polluted with high levels of PFAS chemicals. Washington should be doing the same given its Chemical Action Plan and commitment to addressing these chemicals.

Maine - After discovering high levels of PFAS in milk produced from dairy cattle feeding on contaminated fields, Maine is measuring the amount of PFAS in biosolids and ensuring that the materials do not contaminate agricultural lands. Maine's testing of one contaminated dairy found that the PFOS and PFOA levels in milk exceeded the concentrations it measured in the soils themselves. When biosolids exceed screening levels, the state requires modeling or testing to ensure the repeat application has not pushed agricultural fields over the screening level of 2.5 ppb for PFOA and 5.2 ppb for PFOS (Maine 2021). Unfortunately, Maine still allows contaminated biosolids to be spread on other agricultural lands.

Michigan - The state has taken the most aggressive efforts to prevent PFOS and PFOA in WWTP effluent waters, driven by protective surface water standards. The state has identified a number of wastewater treatment plants receiving high levels of PFOS and PFOA, and requires some upstream industries to change practices or filter wastewater to remove PFAS (Michigan 2021). This is a slow and data-intensive process, yet it is highly effective in removing PFAS from wastewaters and sludge. Interventions at seven highly contaminated wastewater systems reduced PFOS levels in biosolids by 90 to 99 percent. The state didn't study or report the impact these measures had on other PFAS chemicals. Unfortunately Michigan's newly proposed screening levels for PFOS and PFOA in sludge are much higher than Maine's limits, and will be less protective of agricultural fields in the state.

Colorado - The state adopted new "narrative" standards for five categories of PFAS chemicals in 2020 and has surveyed PFAS levels in state surface waters. These standards will allow the state to require wastewater testing in key industries and will ultimately lead to permit restrictions on industrial sources (Colorado 2020). Colorado's recent draft CWA permit for large metropolitan wastewater districts will require monthly sampling for PFAS in effluent water as well as a "source identification study" to be completed by 2024 to identify key dischargers of PFAS into the system. This important step lays the groundwork for cost-effective and permanent reductions of PFAS into wastewater systems and biosolids.

Massachusetts, Vermont, and New Hampshire are testing PFAS levels in biosolids. Massachusetts has the long-term goal of "virtually eliminating" PFAS in biosolids but has not set a screening limit or management plan to achieve this goal (Massachusetts 2021). Vermont will require annual testing of soil, ground water, and plant tissue (Vermont 2020). New Hampshire instructs wastewater systems to test for PFAS using guidelines developed by the industry group the North East Biosolids & Residuals

Association, and not apply sludge with high concentrations to land, but it doesn't clarify the numeric screening level online (New Hampshire 2021).

3. **Washington should modify its General Biosolids Permit to assure that individual permits will allow the state to more actively manage sites to address location-specific contaminant issues.**

Given both the evidence of widespread PFAS contamination of wastewater systems and variability from system to system, we believe that Washington should address chemical contaminant monitoring directly in its General Permit. Every biosolids production site should be required to test at least once for PFAS. While Washington touts the benefits of its "hybrid" system that allows more stringent measures to be added to individual permits, PFAS problems appear to be universal and should be dealt with broadly. Site specific permits grant the state the latitude it needs to mandate more routine monitoring, or source investigation for WWTPs. The state should require special disposal practices or treatment for WWTP effluent to prevent contamination of agricultural lands and receiving waters.

4. **Washington state's Biosolids Program should consider the ecological and health impacts of all disposal methods for contaminated biosolids.**

Measures to prevent PFAS from entering the wastewater system are essential because neither land application, landfilling nor incineration will fully destroy or contain the chemical wastes. Incineration is energy-intensive and will destroy PFAS, which are highly heat-resistant. Instead, incineration can spew a range of harmful breakdown products into the air, ultimately contaminating land and water far from the incineration site (Stoiber 2020). Waste ash from incinerators still needs to be disposed of in landfills and managed in perpetuity.

Sending biosolids to a landfill is space-intensive and expensive. Even lined landfills will eventually leak, and PFAS and other persistent pollutants are commonly measured in the groundwater near landfills. Most landfills contain the liquid wastes or "leachate" but do not have sophisticated systems to remove PFAS and other contaminants. Some landfills send leachate to a WWTP for disposal, which ultimately circulates waste back into the environment. Some landfills have chosen to contain leachate by reinjecting it back into the landfill or by filtering the liquids to concentrate the chemicals onto a polymer or carbon filter material, which itself must be contained for centuries.

5. **Washington must clearly state that biosolids derived from industrial discharges are not allowed in soil amendments that are land applied by facilities that are subject to the draft General Biosolids Permit.**

Washington Ecology must prevent industrial wastewater discharges from being mixed into soil amendments and land applied. The current draft general permit doesn't explicitly do this, nor do prior versions of the permit. Categorical discharges from industrial sites, in particular, as defined in 40 CFR 403, should not be allowed in biosolids that are received, stored, treated, or applied to land in Washington.

The case between Emerald Kalama Chemical, Inc (Emerald) and Fire Mountain Farms (FMF) illustrates the problem. For nearly two decades Emerald sent its industrial biosolids to FMF, who treated and blended it with other materials, and land applied the waste. FMF is also a licensed contractor for wastewater treatment lagoon dredging operations in Washington, Oregon, Idaho and Montana and it is possible that they also receive industrial solids from these sources.

To prevent this from happening again Washington Ecology must review all industrial individual NPDES permits to assure it is clear that that their sludge is not going to land application. Staff should also review NPDES permits and compliance documents for WWTPs that receive industrial sludge to 1) assure it is clear that sludge containing industrial discharges cannot be land applied and to 2) require these WWTPs maintain a list of their industrial users and a list of where/how their (the WWTP) sludge is being managed (i.e. landfilled, incinerated, land applied). Both the NPDES permits and the General Permits should clearly spell out the prohibition of industrial sludge ending up being land applied. While the FMF/Emerald example should have been easily identified by the state permit staff, there are likely other cases where WWTP receiving industrial waste send their solids to beneficial use or compost facilities. Michigan's NPDES permits require facilities to enact a Residuals Management Plan and report annually how and where their biosolids were handled. Ecology should also review all Beneficial Use Facilities to make sure they aren't receiving industrial wastes.

6. **Washington Ecology needs to clarify the interaction between the various permits that regulate the receipt, storage, treatment and land application of biosolids**

Just by nature, having general permits for some portion of the regulated community, NPDES for others and both an NPDES and general permit for yet another segment, complicates and confuses those who must comply. In review of the 2007, 2015 and draft General Biosolids Permit, there is no clear reference or definition in any version that describes the difference between the regulated segment(s) and how applicable discharge permits must be managed. We suggest that clarifying language and/or a flow

chart should be added to the General Biosolids Permit that will clearly show what each regulated segment must do and not do in order to meet all conditions of the applicable permits to which they must comply. An improved permitting framework would greatly benefit and assist the regulated community and improve compliance to applicable requirements.

7. **Washington should aggressively ban PFAS from all products.**

The primary way that PFAS enters these systems is through the products where PFAS is used. Washington has identified certain products for action including carpet, rugs, upholstery textiles and aftermarket treatments which is an excellent start. We urge the agency to identify phase PFAS out of these products and identify new priority products for Washington to phase out on a swift timeline..

Sincerely,

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