



Contaminants of Concern and Wastewater Treatment

Understanding Contaminants of Emerging Concern

Contaminants of Emerging Concern (CECs), are chemicals found in common products, such as pharmaceuticals and personal care products. There are over 40,000 chemicals in commerce, each with the potential to be contaminants of emerging concern.

There are multiple types of CECs, including:

- Pharmaceuticals
- Personal Care Products
- PFAS
- Food Additives
- Flame Retardants
- Microparticles/microplastics

CECs are now found in many, if not all waterbodies. CECs are not as well understood as conventional pollutants and are generally unregulated.

CECs can end up in wastewater treatment plants through common activities like washing clothes, flushing human waste, bathing, and home and yard maintenance. Industrial processes, hospital waste, and recreational activities can also lead to CECs entering the wastewater treatment system.

Why we are addressing CECs

CECs can cause many problems: negative metabolic changes in fish, endocrine disruption and reduced fertility in aquatic life, increased antibiotic resistant bacteria, physical injury, and even death.

CECs pose different risks for each species. Some animals cannot handle CECs that are intended for other species (i.e., mammals like humans and livestock) and can be more impacted by the CECs.

Negative impacts in one part of the food web can cause a ripple effect and endanger the health of larger animals, like orcas.

CECs can effect orcas in two different ways:

- by reducing the population of Chinook salmon, their primary food source, and
- by accumulating in their tissue causing health issues, including death.

While there are multiple reasons for the decline of the Southern Resident Orcas, the Governor Inslee's Southern Resident Orca Task Force concluded that CECs in wastewater are a significant contributing factor.

In June 2021, Ecology published [Contaminants of Emerging Concern and Wastewater Treatment](#)¹, a research paper to explore new and traditional treatment options for wastewater treatment plants when it comes to reducing CECs in wastewater.

The paper outlines the treatment effectiveness of 15 treatment technology types by comparing the percent removal for four common CECs (caffeine, carbamazepine, triclosan and ibuprofen), potential nutrient removal co-benefits and advantages and disadvantages of each technology type.

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<https://apps.ecology.wa.gov/publications/SummaryPages/2110006.html>

Regulatory options

CECs are difficult to regulate through traditional methods. The Clean Water Act's National Permit Discharge Elimination Systems (NPDES) regulates wastewater treatment plant discharges to surface waters. However, this tool is not well suited for regulating CECs due to the sheer amount of potential CECs - both known and unknown - and the lack of toxicological information needed to develop a water quality standard and discharge permit limit.

Ecology is looking at multiple options to reduce the amount of CECs in treated wastewater discharge. It is important to remember that wastewater treatment plants are not the primary source of CECs. These facilities receive CECs from elsewhere. Reducing the amount of CECs that end up at wastewater treatment plants may be a more effective approach.

Nutrient removal technologies can help reduce CECs

Ecology has proposed nutrient controls for wastewater treatment plants discharging into Puget Sound. In many cases, facilities will need to upgrade their treatment technologies.

Some of the technologies that reduce nutrients are also likely to reduce CECs. Technologies that increase the length of treatment time also increase the chances of removing more CECs. Many of the nutrient removal technology options increase the time wastewater is in treatment. This includes treatment technologies like: biological nutrient removal, attached growth systems, and membrane bioreactors.

Not all CECs can be removed with nutrient removal technologies. Wastewater treated with upgraded nutrient removal technologies will still contain CECs. This is why source control remains important to reduce CECs in our water environment.

Future research to combat CECs in wastewater

We are working alongside scientists at the University of Washington and Western Washington University to prioritize a list of CECs found in Washington's waters.

Ecology does not have the ability to fully address all 40,000 chemicals with the potential to be CECs. By focusing on the prioritized chemicals we have the potential to gather enough information to monitor and address the most harmful.

We will continue to monitor the efficacy of new CEC treatments as technology advances. It is important to stay on top of current research to protect Washington's water.

What you can do

- Dispose of medical waste properly
- Refrain from using harsh chemicals while cleaning
- Purchase EPA Safer Choice options



When EPA's Safer Choice Logo is displayed on products it indicates that every ingredient in the product has been evaluated by EPA scientists and contains only the safest possible ingredients.

Related Information

- [Ecology's Full Report on CECs and Wastewater](#)
- [Gov. Inslee's Southern Resident Orca Task Force](#)
- [Ecology's Puget Sound Nutrient General Permit](#)
- [EPA Website on CEC in Wastewater](#)



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To request an ADA accommodation, contact Ecology by phone at 360.407.6600 or email at frances.bothfeld@ecy.wa.gov or visit <https://ecology.wa.gov/accessibility>. For Relay Service or TTY call 711 or 877-833-6341.