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Office of Water
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OPTIMIZING FOR RESULTS IN MONTANA

POTW operators engage with training and onsite assistance

Operators at some publicly owned treatment works (POTWs) have sought to optimize their operations with simple changes, such as cycling aeration on and off, modifying diffuser membranes, and raising mixers. Optimization can reduce nutrient discharges and delay or avoid costly capital expenditures associated with advanced nutrient treatment technologies. Operators may decide to optimize to save money on those expenditures, to save energy, to meet nutrient permitting requirements—and because they take pride in producing high-quality water.

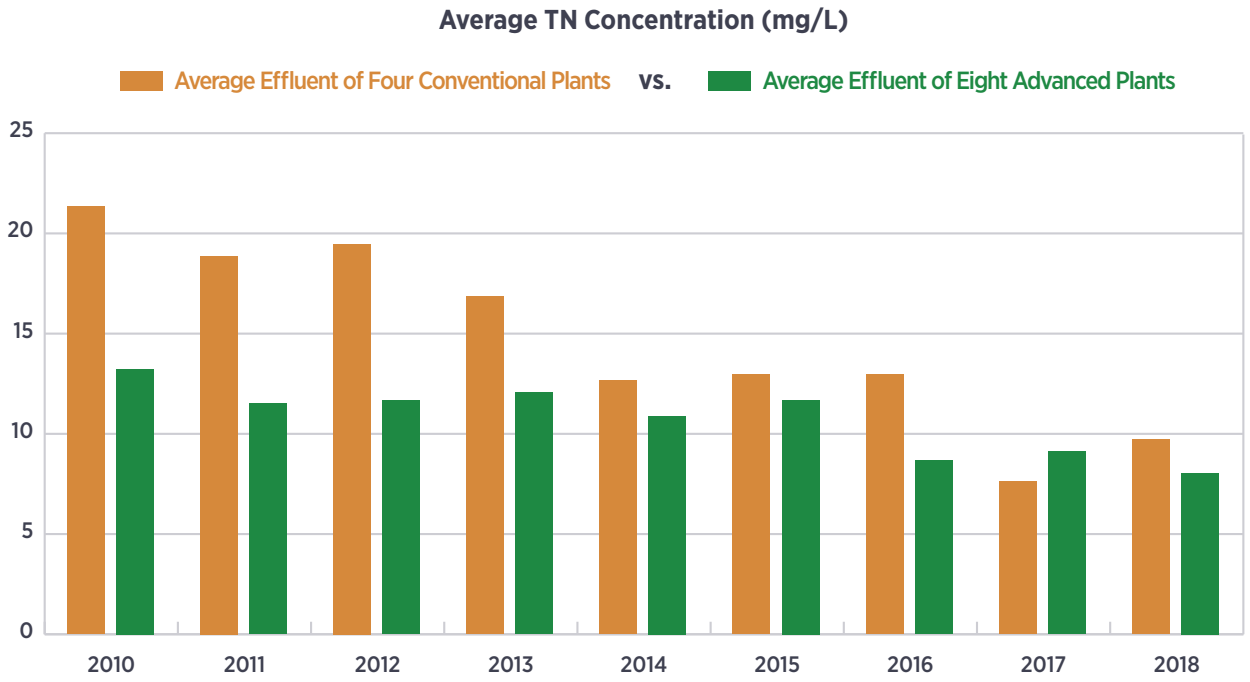
The EPA's **National Study of Nutrient Removal and Secondary Technologies** investigates efforts to reduce effluent nutrient concentrations across the country. This fact sheet shows how a statewide approach succeeded in Montana.

The Montana Department of Environmental Quality (MT DEQ) partnered with POTWs to help improve nutrient removals without costly upgrades to advanced treatment technologies. In 2012, supported by consultant Grant Weaver of CleanWaterOps, MT DEQ assisted POTW staffs through classroom training and onsite consultation. Recommendations emphasized nitrogen removal through low-cost modifications and monitoring adjustments in day-to-day plant operations. MT DEQ has continued to offer annual statewide training on nutrient removal through optimization and onsite technical assistance to POTW staffs since beginning the partnership.

Twelve mechanical POTWs actively engaged with the training and consultation provided in that first year: four conventional mechanical treatment systems, not originally built for nutrient removal, and eight advanced nutrient removal treatment systems. The graph shows how their total effluent nitrogen levels changed, from before the optimization training through the most recent year available (2018). Monitoring data were collected from the EPA's Integrated Compliance and Information System-National Pollutant Discharge Elimination System (ICISNPDES), and treatment system information was gathered via a review of NPDES permits with input from Grant Weaver.

The conventional treatment systems reduced their nutrient discharges, showing that investment in staff training coupled with operational changes produces nutrient removal benefits, even in systems not designed for nutrient removal. Moreover, the conventional mechanical treatment plants achieved effluent total nitrogen levels comparable to those from much more expensive advanced treatment plants. For conventional mechanical treatment systems seeking to remove more nutrients, optimizing can be a less expensive alternative to advanced treatment upgrades.

Effluent Total Nitrogen Levels at Conventional and Advanced Treatment POTWs



Optimization Opportunities and Benefits

Although not required, these attributes can give operators interested in optimizing a head start:

- Ability and motivation to dedicate the time and effort needed to achieve results.
- Participation in local classroom training or onsite consultation services.
- Excess plant capacity or tankage.
- Automatic process control instrumentation and one to two years of standard process monitoring data, including influent and effluent nutrient and organics concentrations.

Capital savings coupled with better effluent quality make optimization a winning strategy for many communities.

Acknowledgements

Monitoring data were collected from EPA's Integrated Compliance and Information System-National Pollutant Discharge Elimination System (ICIS-NPDES) and treatment system type (conventional system or advanced nutrient removal system) was gathered via a review of NPDES permits. This factsheet was prepared in collaboration with Grant Weaver of CleanWaterOps, who provided support to MTDEQ and EPA Region 8 in improving nutrient discharges at POTWs in Montana.

For more information, visit epa.gov/eg/national-study-nutrient-removal-and-secondary-technologies