

Montana's Paradigm Shift: Re-Engineering WWTP Operations to Reduce Nutrients without Capital Expenditures

Montana trains wastewater treatment plant operators to operate their facilities differently than originally designed, facilitating the removal of nutrients. Through this targeted education and some additional on-site, site-specific assistance, wastewater facilities are able to meet nutrient standards without incurring the significant capital costs that would be necessary to upgrade the existing treatment plants.

Funding Mechanism

This project is funded with CWSRF administrative fees only. With little federal funding for operator training available, and operations categorically ineligible for SRF funding, Montana DEQ charged an administration fee of .5% (now .25%) to each SRF loan. This is considered non-program income, and remaining funds can be used for Clean Water Act purposes other than administering the SRF program. Montana's annual budget for this work is only \$35,000.

Solutions to the Nutrient Challenge

Biological nutrient removal, or BNR, is not new. Some states, including Montana, have BNR facilities that have been in place for over twenty years. A lot has been learned in that time, including the fact that the environmental niches necessary for BNR do exist in existing secondary mechanical plants to effectively remove nutrients. In many cases, properly trained operators can manipulate and optimize those niches to achieve a substantial reduction in nitrogen and/or phosphorous and may even save the utility money in energy savings and/or sludge disposal costs. The results can, in some cases, be so dramatic as to eliminate the need to upgrade the plant or, at the very least, minimize the extent and cost of an upgrade.

The potential cost savings to communities and ratepayers are enormous, with the added benefit of the operators typically having much more control of their facilities.

Montana's Approach

In May 2012, the Montana WPCSRF program hired a contractor, Grant Weaver of The Water Planet Company, to provide free classroom training for the operators on BNR biochemistry, operational strategies and case studies. In subsequent years they expanded the training to also include on-site visits to help the operators implement process changes at their facilities. The on-site training is also at no cost to the communities. Some facilities were relatively old, run of the mill secondary activated sludge facilities...



Montana Wastewater Treatment Plant Operators. Photo Credit: Montana DEQ

CWSRF: A Flexible Tool for Advancing Clean Water



ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.

Published in March 2016

Montana's Approach Continued...

...and some were BNR-designed facilities. Because the BNR plants were already removing nutrients, the most dramatic improvements, mathematically, came from the secondary plants. In the summer of 2012, six weeks after the initial training, significant nutrient reductions were achieved.

Sustainable Success

One question often asked is “What happens after the trainer leaves?” Continued positive results are illustrated by discharge monitoring report data for the community of Chinook, MT. The data shows that, after training occurred in May 2012, nutrient reduction continued through June 2014. The operator, Eric Miller, has been able to achieve average total effluent nitrogen of 3.8 mg/l over the last Montana winter. To put Mr. Miller’s accomplishments in perspective, some of their more advanced BNR facilities (that were not involved in the training) are producing closer to 8 mg/l total effluent nitrogen. The current limits of technology for total nitrogen removal are roughly around 3 mg/l.

This innovative, operations-based approach is by far the biggest bang for the buck in terms of pollution reduction.

Possibilities for Broad Application

Some states are considering adopting numeric nutrient standards in the range of 10 mg/l total nitrogen and 1 mg/l total phosphorous. That is about the same range that Montana believes this operations-based approach can achieve in the majority of secondary mechanical plants.

Costs and Benefits

This innovative, operations-based approach costs Montana DEQ less than \$50,000 per year to implement and is, by far, the biggest bang for the buck in terms of pollution reduction. It has allowed them to build positive relationships with the communities while helping them improve water quality. DEQ believes that re-engineering operations is completely scalable, up or down, for suspended growth mechanical plants (the most common type of treatment facility in most regions) and the results can be observed in a relatively immediate timeframe.

More Information

For more information on this program contact:
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This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.