



Effluent Treatment System Planning and Design

*Craig Brook National Fish Hatchery
(East Orland, ME)*

SUMMARY: Craig Brook NFH focuses on the restoration of Atlantic salmon to the rivers of northern New England. The hatchery currently raises salmon fry for the Penobscot River and six other river-specific distinct population segments of federally listed endangered Atlantic salmon. New discharge restrictions mandated by the Maine Department of Environmental Protection resulted in the need to upgrade the existing effluent treatment at the hatchery.

CHALLENGE: The hatchery needed a manageable, cost-effective effluent treatment system to meet its new discharge permit requirements. A centralized treatment system that incorporated full-flow disinfection was also desired to prevent the spread of any fish pathogens that may have been transported to the facility with young salmon captured from the wild, particularly infectious salmon anemia virus (ISA).

SERVICES PROVIDED:

- Alternatives Analysis
- Permitting Assistance
- Conceptual Design
- Final Design
- Construction Administration
- Operational Assistance

SOLUTION: A 2,400 gpm effluent treatment system was designed incorporating full-flow microscreen filtration and ultraviolet (UV) disinfection. Microscreen drum filters utilize screen media with 40 μm openings to exclude particulate matter from entering the UV units, ensuring effective UV treatment. Three open-channel type UV units each provide a dose of 45,000 $\mu\text{-Ws/cm}^2$ at 80% transmittance at the end of lamp life. The UV units utilize a dose-pacing control philosophy, which automatically adjusts lamp output based on the amount and transmittance of flow through the units for operational energy savings. Drum filter backwash cleaning flows are directed to a belt filter treatment system for solids thickening. Thickened solids are pumped to an underground storage tank on demand and removed as needed by a local septic hauler.

RESULTS: Construction of the effluent treatment system was completed in the spring of 2007, allowing the hatchery to meet the compliance schedule in its new discharge permit. The treatment system utilizes best management practices and best available technology to limit the impact of hatchery effluent on the receiving water body and minimize the risk of pathogen transmission to surrounding waters.