

Disinfection



Aquaculture



Manitoba, Canada

Water Biosecurity for Manitoba Conservation Hatchery

Background

The Whiteshell Fish hatchery and Swan Creek seasonal hatchery are operated by the Wildlife & Fisheries Branch, in Winnipeg, Manitoba, Canada. These hatcheries raise fish (including trout, walleye, and other species) from eggs, to replenish native fish stocks across the province.

One of the biggest challenges for conservation hatcheries, including those in Manitoba, is the successful hatching of eggs and survival of young fish fry. Young fish have immature immune systems and are much more vulnerable to pathogens, which can spread quickly in any hatchery if water biosecurity is not maintained.

Aquatic Invasive Species (AIS) are another threat for many conservation hatcheries, such as Zebra and Quagga mussels and New Zealand Mud Snails (NZMS). The presence of AIS has forced some hatcheries in the United States to shut down and has limited the ability of others to stock fish in non-invaded waters.

UV systems have frequently been used in aquaculture to maintain water biosecurity and control pathogens in the incoming water. The older generation of low-pressure UV systems has not achieved this goal.

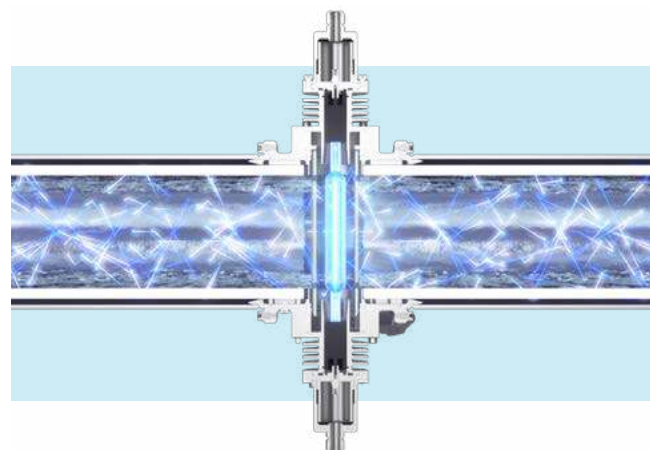
According to Tony Van Oostrom, Water Quality Specialist with RNT Consulting who has worked with Whiteshell and Swan hatcheries, their main reasons for seeking a new UV system were the low survival of egg hatches, poor performance of their existing low-pressure UV systems, and new risks of transfer of Zebra and Quagga mussel veligers to non-invaded waters when stocking fish.

The Solution

To achieve water biosecurity, the Manitoba hatcheries installed Atlantium's medium-pressure, high-intensity HOD™ (Hydro-Optic Disinfection) UV system as the primary disinfectant technology for their recirculation loops.

This HOD UV model incorporates Atlantium's patented TIR (Total Internal Reflection), that HOD UV recycles and concentrates the UV energy through a unique quartz chamber to deliver higher efficacy at lower energy and cost.

The internal reflection allows for the recycling of the light energy within the reaction chamber. This recycled energy delivers multiple doses of UV to every particle within the chamber and helps ensure greater consistency in treatment.



Results

TIR technology recycles UV light energy, ensures homogenous UV dose distribution, provides superior power (kW) efficiency compared to traditional UV, and achieves unprecedented micro-organism inactivation.

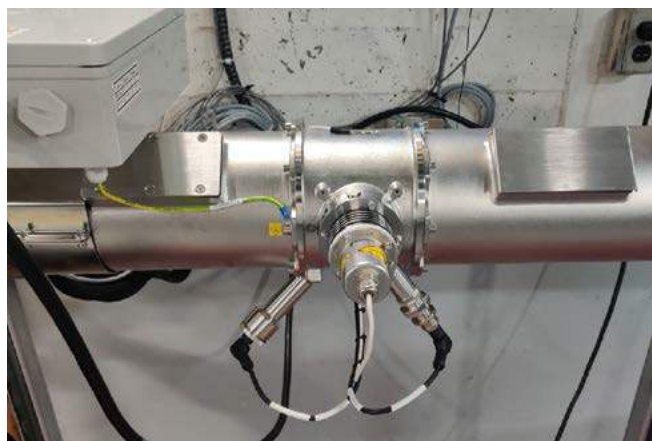
Recent scientific research has shown that successful UV treatment is affected by wavelength span. Effective control of complex organisms, Extracellular Polymeric Substances (EPS), and viruses and prevention of the repair mechanism following treatment relies on a wider UV wavelength span. Our high-performing, medium-pressure UV lamps emit a wide wavelength that causes greater damage and yields more effective disinfection than low-pressure UV lamps.

As a result, less energy and a lower initial dose are needed to successfully control multicellular organisms, as seen with UV technology at Hoover Dam. In addition, some of the smaller HOD UV systems can operate on 110/220 volts — power which is readily available in most conservation hatcheries.

As a result of the HOD UV installation at Swan, during treatment in the first year, the UVT of the raw water rose from 41% to 96% due to eliminating *Saprolegnia* in the water stream. This resulted in a 65% survival of 6 million walleye, a complete reversal of the results from the previous year, before the installation of HOD UV, where the entire hatch was lost.

Overall, the Swan hatchery experienced a two-to-three-fold increase in typical annual productivity through the control of *Saprolegnia* and other pathogens and was able to successfully support fish stocking efforts in Manitoba.

Author: Tony Van Oostrom, Water Quality Specialist, RNT Consulting.



About us

For more than two decades, Atlantium Technologies has helped to ensure water safety with its innovative HOD™ (Hydro-Optic Disinfection) UV technology and novel approach to performance, monitoring, and control. Atlantium's superior, environmentally friendly water treatment solutions ensure stable, efficient, and dependable production.

With thousands of full-scale installations for leading brands in various industries globally, we're committed to consistently meeting our customers' water quality needs, ensuring pure results.

