



Special points of interest:

- Reuse – Platte & White River
- Lahonton NFH update – IMF
- Campbell Scientific
- Fish Grading & Counting
- Hydromentia
- WMT receives UL Listing
- WMT Web page

WMT becomes Authorized Campbell Scientific Aquaculture Integrator



WMT is pleased to announce its association with Campbell Scientific, a leader in environmental monitoring and instrumentation. Combining Campbell's expertise in dataloggers and associated electronics with WMT's aquaculture experience enhances both firms' capabilities to deliver the best solution for your monitoring, control and data logging needs. With recent advancements in radio communication, real time information can now be transmitted to the office or to the palm of your handheld PDA, thus reducing the need for hard wire runs. Please contact WMT and inform us of your needs to monitor outdoor and/or indoor facilities.

Partial Re-use Systems: A practical approach for State and Federal Hatcheries

As water conservation becomes increasingly important with new EPA effluent guidelines for the aquaculture industry, State and Federal fish hatcheries will need to adopt new operational strategies to treat and/or limit the amount of water the hatchery discharges.

Most state and federal hatcheries operate as "flow-through" culture systems, in which new water enters the hatchery, flows through the culture tanks and is discharged from the facility. In numerous cases, this "flow-through" water is discharged from the facility with little or no effluent treatment. As environmental concerns over the amount of discharge water leaving these facilities increases, hatcheries are now evaluating methods to treat their discharge. In many cases, treatment of the "flow-through" water was cost prohibitive due to high water flow rates and low solids loading.

Partial re-use systems have emerged as a viable alternative for hatcheries. Partial re-use systems reduce the dependency of the hatchery on the amount of new water required by re-using a majority of the water through the system. The amount of new water that enters the facility is greatly reduced (by as much as 75%) of the original flow required under "flow-through" conditions. Partial re-use systems usually do not incorporate the use of a biofilter for the removal of nitrogenous wastes. The amount of new water required is calculated as the amount needed to maintain acceptable ammonia and nitrite levels through flushing. This reduction in the amount of new water required each day reduces the footprint and capital costs of effluent treatment systems.

Re-use water is generally subjected to solids filtration (for the removal of fecal waste and un-eaten food) and gas transfer systems for the removal of Carbon Dioxide (CO₂) and the re-injection of Oxygen (O₂).

White River National Fish Hatchery:

Water Management Technologies installed Hydrotech Drum filters and Low Head Oxygenators (LHOs) at the recently renovated White River National Fish Hatchery (Vermont). The hatchery converted eight of their 30' diameter tanks into two (2) 4-tank partial re-use systems for the production of Atlantic salmon (*Salmo salar*).



WMT LHO (foreground) shown coupled to CO₂ degassing tower

Each system utilizes a 2,120-gpm flow rate, with a 1,800-gpm re-use rate and 320 gpm of new water (85% recirculation on a per flow basis). The culture tanks were re-outfitted as Cornell dual drain tanks, with the 320 gpm of discharge water leaving the bottom center drain (containing the majority of solids) and directed to a solids handling area. The 1,800 gpm of re-use water exits via the side drain and is directed to the re-use filtration system. The re-use system consists of a rotary micro screen drum filter, pumping station, CO₂ stripping tower and Low Head Oxygenator (LHO).

Water Management Technologies provided the micro screen drum filters and LHOs for the project. The drum filter was a Hydrotech model HDF 1603 IA, fabricated in 304SS and outfitted with 60um screens. The A model series incorporates a self-leveling weir pan that is integral to the drum structure, thus removing the need to provide a full length concrete weir within the sump. An open inlet channel, formed from two wing walls provided by WMT and attached to the drum and concrete sump, provides for emergency bypass in case of drum failure.

The LHOs were designed to meet the specifications, size and connections required of the system. Each unit was constructed in 5052 marine grade aluminum and are 6' x 6' x 5.5'. An inlet flange was designed to meet up with an FRP transfer channel (from the CO₂ stripper) and had integral cradle arms to support the LHO over the effluent sump.



Hydrotech 1603 IA Drum filter with open inlet channel

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Trout Grading at Chattahoochee NFH

U.S. Fish & Wildlife Employs Automatic Fish Grading to Reduce Stress and Labor

Chattahoochee NFH recently purchased an FGM 4 Automatic Fish Grader from WMT. Glenn Snapp personally delivered the grader and worked with Chattahoochee's staff to train them on set up and operation. At this time Glenn also demonstrated the Aquascan Fish Counter which counts the fish after they are graded. Here is what Deborah Burger, Chattahoochee's Hatchery Manager, has to say about the grader:

"The Automatic Fish Grader has certainly cut down on the amount of time and manpower that it takes to grade fish properly. Since our hatchery is stream-fed, we are very dependent on rainfall for adequate water flow. We have extremely low water levels with high water temperatures for the past several years which discouraged fish

grading during critical times of the year.

"However, the new fish grader allows us to maximize our grading opportunities by requiring fewer people to perform the job and will actually take a lot less time to complete the job, which increases the overall efficiency of the hatchery." In addition to lowering fish stress and mortality, the grader saves on manpower. In fact, the hatchery did not grade fish in the summer because they would lose too many fish to stress. The FGM 4 grader features a large inlet hopper that accepts fish from a net or live fish pump such as the Matsusaka Z 100 L pin pin pump. The grader employs a 4 foot long belt with 3 grade size outlets. The grader is capable of grading from 2 gram to 200 grams and runs on 115 VAC power.

Reuse - Platte & White River (Continued from page 1)

Platte River State Fish Hatchery Installs Hydrotech Disc Filters and LHOs as part of Upgrade:

Recently, the Platte River SFH (MI) completed an upgrade to its main rearing facilities. The existing Burroughs pond raceways were removed and replaced with linear raceways in banks of 6. Due to the stringent effluent quality parameters enforced on the facility, a more effective water filtration system was required. Traditionally, solids management has been accomplished through the use of settling solids in quiescent zones and periodically cleaning and dumping the solids. Bio-degradation of solids in the quiescent zones leads to elevated levels (by mass loading) of phosphorous, BOD and TSS. The new filtration system incorporates three main components. The first is the addition of raceway baffles designed to keep solids moving through the culture vessel. Second, quiescent zones are utilized at each raceway, however they are designed with a much smaller hydraulic retention time than normal quiescent zones, thus targeting the largest of the solids. The last step, microscreen filtration, is designed



to remove the fine suspended solids.

To prevent accumulation of solids and water quality degradation in the downstream raceway banks, Hydrotech Disc filters (model 2108-2H) were incorporated in-between raceway



series to filter the solid waste that was carried through the system. The Disc filter, designed for fine filtration (<30 um) of large process flows, was chosen to meet the project requirements. To maintain removal efficiencies and meet effluent guidelines, the filters were outfitted with 20 um screens. To date, the disc filters have maintained effluent TSS levels below the 5 mg/l threshold.

Backwash water from the disc filter is sent to a clarifier for subsequent settling and treatment prior to discharge. Supernatant water from the sludge clarifier is sent through the existing settling pond for final treatment prior to discharge.

Low Head Oxygenators (LHOs), also supplied by WMT, were utilized to help maintain proper dissolved oxygen (DO) levels in the rearing tanks. The LHOs, constructed in 5052 marine grade aluminum, were custom fabricated to the new raceways. Three (3) individual distribution plates were provided for the LHOs to match the three process flow rates designed into the project.

Hydromentia Selects Hydrotech's Disc Filter

Hydromentia, located in Ocala, Florida, is an aquatic plant-based technology company that employs water hyacinths and algae to remove phosphorus. Historical and ongoing phosphorus loading into Lake Okeechobee have resulted in increased eutrophication. Currently, phosphorus loading into the lake can be attributed to internal and external sources. Phosphorus-rich sediments are responsible for most of the internal loading, while most of the external loading is associated with phosphorus runoff from the lake's watershed. Hydromentia chose the Hydrotech Disc Filter with 10 um filter

elements because of its compact, robust design. The Disc Filter acts as a polishing filter at the end of the process. Samples taken up and downstream of the Disc filter indicate a reduction in phosphorus as well as prevention of water hyacinth seeds from escaping into the environment. Water hyacinth is harvested weekly from the system, and fed to livestock in the area. Pictured is a prototype system which is performing extremely well. Hydromentia will likely be installing full scale systems like this one in the near future.



Hyacinth beds are harvested on average twice a month. Inclined algae beds are fed nutrient rich water from head boxes located at the head end of the bed. A Hydrotech Disc Filter Model HSF 1704 is located between the hyacinth and algae as the final filtration step in the process.



Head boxes feed the inclined algae beds.



Hydromentia's system requires very little labor.



A conveyor and chopper process the hyacinth to a form that can be fed to local area livestock.



Algae is another product that is recycled and fed back to local livestock.



Hydrotech Disc Filters are designed for High flows and fine filter openings. Hydromentia employs 10 micron filter elements to reduce phosphorus and prevent hyacinth seeds from escaping the system.

IMF-Style UV units up and running at Lahonton NFH:

Water Management Technologies installed three (3) IMF-style UV systems at the Lahonton NFH for the treatment of Ich (*Ichthyophthirius multifiliis*) and Furunculosis. The hatchery cultures the endangered Lahonton Cutthroat trout for stocking in the surrounding area.

The hatchery culture area consists of 32 – 8' x 80' culture raceways. Under normal operating conditions the facility is run as a partial re-use system utilizing a re-use flow rate of 3600 gpm and a new water flow rate of 750 gpm. The re-use system consists of a 6-bay clino (gravity bed) filter for solids capture and biofiltration.

Over the past several years, outbreaks of Ich have impacted the normal operation of the facility by requiring formalin treatment. To further control the outbreaks, the hatchery was forced to discontinue utilizing the re-use system and run the facility as straight "flow through" system utilizing all four (4) wells, normal operation required two (2). Due to the inability to run the re-use system, the hatchery on several occasions had to stock the fish early. Outbreaks would appear in the system 2-3 weeks after running the re-use system indicating that Ich had established itself within the system despite repeated chlorine and drying treatments between production runs.



Side view of biofilter inlet UV with lamp field visible

In the spring of 2003, USF&W commissioned a design built project for the installation of UV treatment at the hatchery for control of Ich. Due

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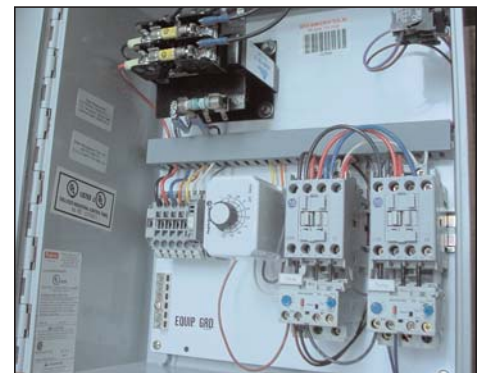
Web Page Upgrade

Next time you visit WMT's web page you will notice a new product's page template. Now the right-hand side bar features:

- Links section:
- Product literature section.
- Testimonial / Reference section.
- Press Release section.
- Photo gallery section.

WMT Receives UL Listing

WMT recently completed the UL listing requirements. Effective January 2004 all electrical control panels from WMT shall be UL approved. The UL sticker appearing inside the enclosure signifies that the design and all electrical components are UL approved. The UL listing ensures a higher level of safety and quality for WMT and its customers.



IMF-Style UV units *(Continued from page 3)*

to the low head loss requirements and the prohibitive costs of manifolded barrel-style contactors for a 5,000 gpm system, WMT's open channel IMF-style UV system was chosen. Three IMF systems were installed in a built-to-suit building. These systems include a biofilter inlet UV, biofilter outlet UV and new water UV. Each system was rated for 5,000 gpm at a UV nominal dose rate of 35,000 uw-sec/cm².

Each system was comprised of two contact chambers and inlet and outlet channels. Contact chambers and channels were constructed in FRP by CF Maier (Gemini tanks) and had integral flanges that allowed for assembly of the units in the field. Each contact chamber had a 21 lamp UV insert, consisting of 190 watt, low pressure, high output lamps in a 3x7 matrix.

The systems were installed in the summer of 2003 and the re-use system was flushed and chlorinated per the normal procedures. The UV system was activated in mid-July and let run in a closed loop (not on fish) until early August to allow for run through of the system on the UV. In

early August the re-use system was ramped to full flow and put through the culture raceways. As of this writing (December 2003) there have been no confirmed outbreaks of Ich and the hatchery has been able to stay on the re-use system since August.

Two intake filtering systems, utilizing similar IMF UV contactors are scheduled for installation in 2004. These systems, for state hatcheries in the western U.S., are coupled with Hydrotech Drum and Disc filters to form a complete packaged intake filtration system.



Overhead view –
2,500 gpm flow