

## Bozeman FTC Staff

### Fish Technology Center

Jeff Powell, Center Director

Zach Conley, General Biologist

Cal Fraser, Fish Biologist

Dr. Gibson Gaylord, Physiologist  
(Lead Researcher-Diet and  
Nutrition)

Jon Gilleen, Maintenance  
Mechanic

Jason Ilgen, Biological Science  
Technician

Kevin Kappenman, Research Fish  
Biologist (Lead Researcher-Fish  
Passage)

Sharri Lunde, Administrative  
Officer

Dr. Wendy Sealey, Physiologist  
(Lead Researcher-Diet and  
Nutrition)

Matt Toner, Fish Biologist (MGMT)

Dr. Molly Webb, Research Fish  
Biologist (Lead Researcher-  
Reproductive Physiology)

Kyle Moon, Seasonal Biological  
Science Technician

# Bozeman Fish Technology and Health Complex



## December-January FTC Highlights:



Above, Jim McFall (Ennis NFH, MT) double checking measurements plate location.

Below, finished column in place over the early rearing tanks.



Following the Ennis NFH asbestos abatement project and other various hurdles, construction of a new degassing system has begun in the early rearing area of the hatchery. With assistance from Bozeman FTC staff, as well as Jim McFall and Steve Nelson, the tedious, mass-production of 38+ columns has started. The new vacuum columns are being installed to improve over-all fish quality and survival of RBT fry and fingerlings prior to being transported to broodstock grow-out raceways. These custom columns will accomplish three things: lower the source spring water's TGP to 98-99%, substantially reduce high levels of water-borne radon, and lessen fish pathogens by reducing biofilm surface area and/or biofouling. The new vacuum columns will utilize a new splash plate design versus using traditional Koch ring media and have been found to be more efficient in the same elevation head and footprint.

**Contact Us:**

**Bozeman Fish Technology Center**  
4050 Bridger Canyon RD  
Bozeman, MT 59715  
(406) 994-9900

**Bozeman Fish Health Center**  
1805 S. 22nd Ave Suite #1  
Bozeman, MT 59718  
(406) 582-8656



Picture left: BFTC's thermal system utilizes the cold and warm spring in conjunction with a closed loop heat exchanger to provide 12 culture temperatures ranging from 8° C to 22° C to determine optimal growth, incubation, and/or spawning temperatures. Pallid & shovelnose sturgeon, June sucker, woundfin, grayling and even stonefly species are a few of the aquatic animals that have been in the system.



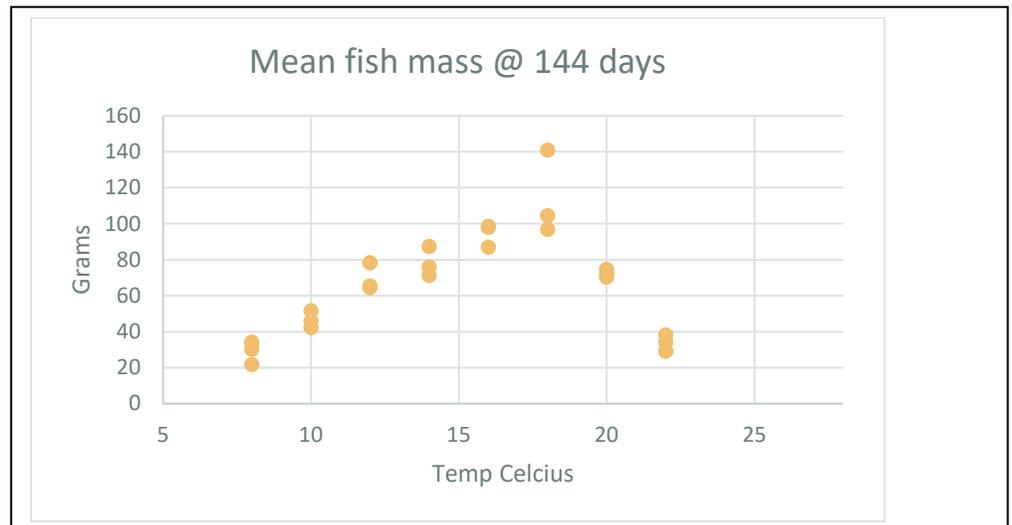
Pictured above is a fouled quartz tube being replaced with a new, clean tube. The quartz tubes house UV lamps which sterilize the water used for aquaculture.

A fouled quartz tube will inhibit UV light penetration diminishing any sterilization effects and put fish at risk for disease transmission.



Above, measuring grayling diets for the thermal system

BFTC completed a Headquarters System-wide funded Artic Grayling Thermal Optima trial. Laboratory analysis of whole fish proximate composition and condition indices assessments are currently being finalized. Statistical analysis of upper lethal temperature and optimal culture temperature are completed. Plasma and erythrocyte samples were collected for blood chemistry analysis and expression of thermal stress related genes. Growth and mortality curves have been plotted, see growth data below.

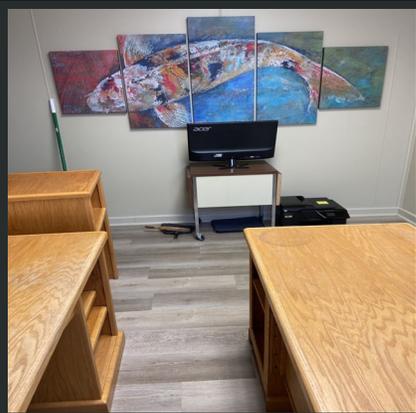




Mountain lion moving through the Tech Center during a snowstorm. The game trail is approximately 200 yards from the facility's shop building.



Maintenance staff installed a new pump control panel to operate the water treatment system for the quarantine building. The system will chlorinate effluent water with a dosage rate 2-3 ppm with a contact time of 1.5 hours. Upon discharge to a septic system, the chlorine is neutralized and water is exposed to UV light at a concentration of 130,000 mw/cm<sup>2</sup>.



During a little slow time at the end of December, Cal Fraser took the time to renovate an old hatchery room with new flooring, paint, and ceiling tiles for an improved office space.

Dr. Wendy Sealey has been working with Oregon State University on a project associated with Chinook salmon and post-release survival. Pictured right is the wet lab where the studies were conducted, see below for details on the project.



The development of experimental diets and rearing regimes that produce juvenile salmonids that more closely approximate the size, growth rate, and lipid levels of their wild counterparts for use in research and for conservation hatcheries has gained interest. Some of the most obvious differences between hatchery and wild fish are larger body size and increased condition factor at age for hatchery fish; hatchery origin juvenile salmonids have higher whole-body lipid content and lower protein and ash content than natural origin fish of the same age. The modulation of growth through reduction in feed rations, utilization of low-lipid diets, and simulation of natural temperature regimes are all aspects of the hatchery environment that can be manipulated. For smaller scale conservation and research hatchery programs, these tactics can also be used to rear fish that are more likely to resemble wild fish in condition, growth trajectories and whole-body lipid content. For the last 8 years, BFTC researcher Wendy Sealey, has formulated and manufactured feeds for the culture of steelhead and Chinook salmon at Oregon State University in order to produce fish that are more lean (lower percent lipid and lower body condition) and smaller compared to fish fed conventional high-lipid diets, while still achieving similar survival. Ultimately, the goal of the research is to reduce the differences between traditional hatchery and wild (natural origin) fish in order to improve post-release survival of hatchery fish and increase the proportion of hatchery juveniles that migrate downstream after release.

# Bozeman Fish Health Center

## December/January, 2020-2021

### Highlights:

#### Fish Health Center

#### Staff:

Lacey Hopper, Project Leader

Molly Bensley, Fish Biologist

Rick Cordes, Fish and  
Wildlife Biologist

Amberly Huttinger, Fish  
Biologist

Tammy Weiss, Fish Biologist

Renee Yamamoto (Martin),  
Fish Biologist

## Contact Us

Bozeman Fish Health  
Center  
1805 S. 22<sup>nd</sup> Ave Suite #1  
Bozeman, MT 59718

#### Laboratory Health Services Supporting Recovery, Restoration and Recreation – Federal Partners:

- Ennis National Fish Hatchery (NFH); Ovarian fluid from 4 rainbow trout strains was collected by BFHC staff and submitted for virology certification testing, 600 fish tested.
- Saratoga NFH; Live brown trout were submitted for virology certification testing, 60 fish tested.

- Utah Fish and Wildlife Conservation Office (FWCO); Submitted rainbow, brown, tiger and cutthroat trout collected from Jones Hole Creek, UT for *Myxobolus cerebralis* (whirling disease) surveillance. *M. cerebralis* was detected in rainbow trout from fish collected in the spring above, and creek below Jones Hole NFH; 130 fish tested.

- Diagnostics and Histopathology; 2 cases submitted for comprehensive diagnostic evaluations and histopathology analysis from one Legacy Region 3 NFH. Requested assistance from BFHC for ongoing, chronic mortality in rainbow trout; 41 fish evaluated.

Diagnosis - persistent, low-level systemic bacterial infection and external parasite infestation due to underlying water quality



*Whirling Disease spores found in rainbow trout from Jones Hole Creek, UT. Credit: USFWS-Rick Cordes.*



*Conducting a fish health diagnostic evaluation. Credit: USFWS-Tammy Weiss*

issues. Water tests showed high hydrogen sulfide, ammonia, nitrate and phosphorus concentrations in hatchery spring water.

- Genetic testing; Ennis NFH- Fin clip samples were collected and submitted for a multi-regional System-wide 1311 funded broodstock genetics project; 400 fish sampled from 6 strains.



- Jones Hole Creek- Water and sediment samples were submitted for eDNA PCR testing for detection and presence of *Myxobolus cerebralis* and *Tubifex tubifex* worm DNA. Numerous *Tubifex tubifex* were visually observed in sediment samples and confirmed by PCR. Water sample results are pending.



Regulated pathogens detected and confirmed in  
December/January:  
*Myxobolus cerebralis*

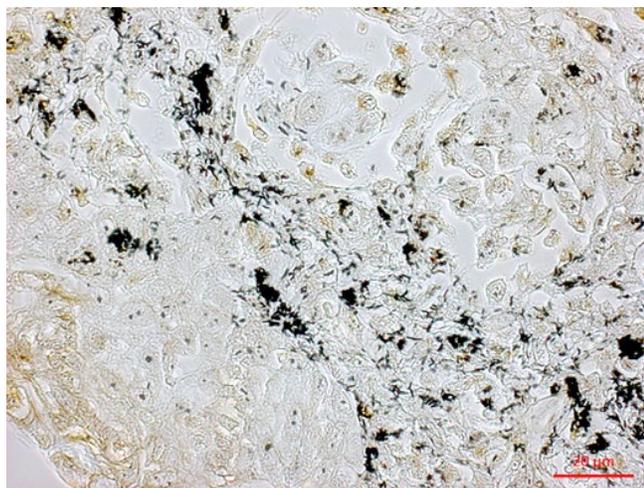
## Laboratory Services Supporting State Partner Recovery, Restoration and Recreation:

- Montana Fish, Wildlife and Parks; Hatchery fish health inspections and certifications completed on rainbow trout, brown trout, brook trout, kokanee salmon, Yellowstone cutthroat trout (LeHardy's Rapids, Yellowstone River source), arctic grayling (Axolotl Lake & Big Hole River, MT sources), and Westslope cutthroat trout from 5 state facilities – 1,123 fish tested.
- Montana Fish, Wildlife and Parks; Diagnostic evaluations and histopathology on wild brown trout and brook trout from the Big Hole River – 5 fish. Rainbow trout (3 fish) and bacterial samples from one State Fish Hatchery submitted for histopathology analyses and bacterial identification by PCR and Biolog microbial ID assay. Six bacterial species identified/confirmed.

Significant pathogens detected and confirmed: *Flavobacterium psychrophilum* (bacterial coldwater disease) at one MT state facility.



Fish biologist, Renee Yamamoto, completing bacteriology assays. Credit: USFWS-Tammy Weiss



*Flavobacterium psychrophilum* (coldwater disease bacterium, stains black) in histological samples. Steiner's stain. Credit: USFWS-Amberly Huttinger



### **Outreach and Education:**

- On hold due to Covid-19 restrictions. Staff is contacting local area schools to plan for future outreach and educational activities.

### **Employee Development, Partnerships and Other News:**

- Staff joined several Asian carp eDNA conference calls and webinars
- Renewed staff telework agreements and completed credit card trainings
- Safety: Completed annual facility radon testing
- Safety: Provided virtual safety trainings to BFHC/BFTC staff on cold stress and fire prevention and avalanche awareness
- Completed FY20 Solid Waste Reporting
- Shipped 12 new Leica microscopes with cameras for real-time fish health diagnostics to NFH facilities within Legacy Region 6
- Began planning and coordinating hatchery Spring health inspections
- Submitted Covid-19 Phased Recovery Operations Documentation for resuming mission-critical travel for hatchery health inspections
- Cultured and provided bacterial isolates to BFTC staff for an experimental feed study
- Submitted a final technical report for a Kendall Warm Springs Dace genetics project titled, "Kendall Warm Springs Dace Genetics-Microsatellite Marker Screening and Genetic Baseline" to the recovery team coordinator



**Final shots...**

**Bozeman FHC fish biologist Renee Yamamoto, had a handsome visitor outside her office window in December!**



*Photo credit: Renee Yamamoto*