

# Fish Health Center

Lacey Hopper, Project  
Leader/Supervisory Fish Biologist

Molly Bensley, Fish Biologist

Tammy Weiss, Fish Biologist

Renee Yamamoto, Fish Biologist

Rick Cordes, Fish Biologist

Jake Veilleux, Veterinary Medical  
Officer



---

Bozeman Fish Health Center  
1805 S. 22<sup>nd</sup> Ave, Suite 1  
Bozeman, MT 59718  
(406) 582-8656

# Bozeman Fish Health Center

## Winter 2024 Highlights:

*2024 has been a busy one for the Bozeman FHC! Our fish health inspection season is underway, in addition to diagnostic cases, laboratory renovations, flow cytometry, and more! Starting April 1<sup>st</sup>, Lacey will be serving a 120-day detail as Acting Deputy Assistant Regional Director for Fisheries and Aquatic Conservation – Region 6. Jake will step in as Acting Project Leader for the BFHC while she is away. Congratulations Lacey!*

### Laboratory Services Supporting Federal Recovery, Restoration and Recreation:

- Since the start of 2024, we have completed the following for federal hatcheries and wild waters in federal jurisdiction: six complete inspections, four virology inspections, and four histology processing cases. There were six troubleshooting cases that required a clinical work-up and sample collection for lab diagnostics.
- We ran seven cases of triploid testing quality control. Using flow cytometry, the BFHC can quantitate what percent of a fish lot was successfully converted to triploid fish by comparing DNA mass. Renee and Tammy have fine-tuned test protocols to make sampling as efficient and accurate as possible.
- The BFHC has been gearing up for the upcoming Lower Clark River Pathogen Survey. This is a wild fish health survey undertaken with MTFWP, Idaho Fish and Game, Avista Corp., and Northwestern Energy every 5 years.
- Lacey, Rick, and Renee continue their work on validating a qPCR for the detection of Alligator Snapping Turtles using eDNA. This is a collaborative effort between the USFWS Whitney Genetics Lab, USGS-NOROCK, and Air Force partners.



**Top left:** Scenic view of a pond used to rear fish at Ouray NFH – Randlett Unit. Photo: USFWS/J. Veilleux.

**Top right:** Rainbow trout with a severe (chronic) lesion caused by *A. salmonicida*. USFWS/J. Veilleux.

**Bottom left:** Rainbow trout with sensory canal abnormalities. Photo: USFWS/J. Veilleux.



2.5-month-old brown trout presenting for an acute mortality event. Photo: USFWS/J. Veilleux.



Example of a biosecurity audit tour. Hotchkiss NFH has excellent signs throughout the facility instructing staff and visitors on procedures. This posting explains their footbath protocols. Photo: USFWS/M. Bensley.



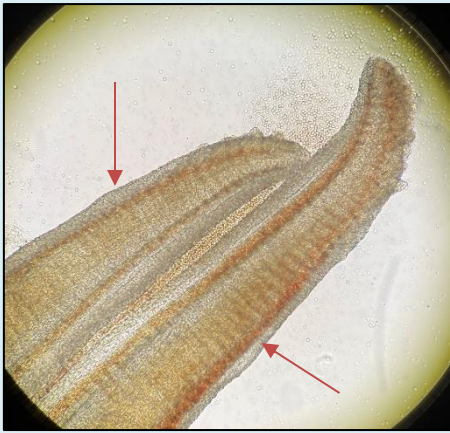
Beautiful Colorado river cutthroat trout from Big Springs Tribal fish hatchery. Just look at those fins! Photo: USFWS/J. Veilleux.

## Laboratory Diagnostic Support to Reduce Hatchery and Wild Fish Losses:

- Progress continues in developing Health Management Plans (HMPs) for each hatchery in the region, as directed by the Aquatic Animal Health Policy (713 FW 2). Four hatcheries have completed final drafts, with five more close behind.
- As part of policy 713 FW 2, we also have started biosecurity audits while visiting hatcheries for annual health inspections. Together, FHC and hatchery staff walk the facility to identify any biosecurity threats to fish health. By making changes prior to a problem occurring, we can save a lot of future headaches. A big thank you to our hatcheries for your support in seamlessly implementing this policy!
- Held the first 'Cutthroat Trout Working Group' meeting to discuss the health obstacles faced when rearing these important fish. We will be working closely with our hatcheries, state and tribal partners, and the BFTC to identify common factors and conduct studies to improve survival and growth.
- Staff participated in numerous calls, email conversations, and site visits with hatcheries and partners regarding fish health diagnostic cases ranging from environmental gill disease and anatomic abnormalities to a wild fish kill caused by a liquid fertilizer spill.
- Provided diagnostic support to the Wyoming Toad colony at Saratoga NFH. Staff reports the colony has been doing fantastic this winter.

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

- Montana Fish, Wildlife and Parks (MTFWP): from tissue samples submitted to the lab, staff conducted eight complete inspections (hatchery and wild fish), one virology case, and three troubleshooting cases. Molly frequently coordinates with the MTFWP health team to ensure we have sufficient virology cell lines and staffing to handle the many cases they send our way. Before samples arrive, virology plates layered with cells need to be prepared several days in advance.
- Lacey has been representing the BFHC in the Big Hole River Working Group. This group of various fish and environmental experts are working to identify possible causes for the decline of brown and rainbow trout in the Big Hole River.
- Processed and analyzed 39 eDNA water samples for silver and bighead carp detection for Kansas Department of Wildlife and Parks. Also completed two virology cases for KDWP.
- Completed our annual fish health inspection at the Big Springs Tribal Fish Hatchery. We always enjoy visiting our friendly partners with the Ute Tribe Fish and Wildlife Department!
- Completed a fish health inspection for 1 lot of fish from a school participating in Colorado's Trout in the Classroom program.
- Tammy processed a plethora of histology slides in collaboration with Molly Webb at the Bozeman Fish Technology Center.



The secondary lamellae (red arrows) of these gills are thickened by hypertrophy and hyperplasia of epithelial cells. It is so severe that they have fused together into the grayish layer you see. Photo: USFWS/J. Veilleux.



*Epistylus* seen on a rainbow trout skin scrape. This parasite can cause issues when present in high numbers. Photo: USFWS/R. Cordes.



The staff at Jones Hole NFH sure do have a great view! They raise Bear Lake cutthroat trout, Bear River cutthroat trout, kokanee, and tiger trout. Photo: USFWS/J. Veilleux.

## Outreach and Education:

- Renee conducted the fish health inspection of the Razorback suckers raised at Palisade High School in Colorado. During her visit, she gave a presentation on fish health to approximately 50 students, then led them through a fish dissection and sampling lab with Mike Gross of the Grand Junction FWCO.
- The BFHC has been working in creating fish health literature and presentations for interested employees in our region. We recently sent out a recorded PowerPoint with instructional videos on how to use light microscopy for diagnostic cases.

## Partnerships, Employee Development & Other News:

- As part of the application submitted for AFS-FHS Quality Assurance Tier 2 program, Rick developed a biosafety manual. Our entire staff has been hard at work in implementing the manual and meeting the training requirements.
- Jake and Rick attended the Rocky Plains Fish Pathologist Meeting.
- Staff trained the new fish health technician for Montana Fish, Wildlife, and Parks covering fish health sampling techniques and histology collection.
- Lacey participated in the USFWS National Broodstock Meeting as the point person for fish health matters.
- Jake and Renee have been actively involved in several Wyoming Toad Recovery Team Research Committee calls. There are some exciting research projects in the pipeline. The bi-annual Wyoming Toad Recovery Team meeting is in April.
- Rick, aka “Rick of all Trades,” recently renovated our bacteriology lab so that it is isolated from a shared lab section. With the help of Matt, Jon, Tyler, and Gibson (BFTC), we moved a 600lb biosafety cabinet into the new room with some Tetris-like maneuvering. Thanks for all the help, guys!



**Top left:** Renee presenting on fish health to Palisade High School. Photo: USFWS/M. Gross.  
**Top right:** The new bacteriology lab biosafety hood at the BFHC. Photo: USFWS/J. Veilleux.  
**Bottom left:** Renee guiding students through necropsy of a razorback sucker. Photo: USFWS/M. Gross.

## What's this?

Each newsletter will have an installment of **Fish Health 101**. It will briefly cover a topic of fish health you may find of interest.

In this edition, we'll talk about chemical use in aquaculture. This is not meant to be an all-inclusive legal review, but a quick rundown clarifying some common questions. There are other categories of drugs, but these are the ones we deal with most. If you have further questions or would like to request a topic, email [Jacob\\_Veilleux@fws.gov](mailto:Jacob_Veilleux@fws.gov).



Fish being treated for columnaris disease with Reward (37.3% diquat dibromide). Using this investigational drug was possible with a T&E form through the Aquatic Animal Drug Approval Partnership Program. Photo: J. Veilleux/USFWS.



Uses for salt in aquaculture include reducing stress and controlling parasites. It is a low regulatory priority drug. Photo: J. Veilleux/USFWS.

# Crash Course on Chemical Use in Aquaculture

## FDA-Approved Drugs:

- Drugs that have gone through extensive studies and received FDA approval specifically for use in fish. As a result, both fish and human safety have been thoroughly evaluated.
- You must follow species, indication, and dosing instructions. For example, formalin can be used on freshwater-reared finfish to control saprolegniasis at 150mg/L for 60 minutes on alternate days for 3 treatments with a 0-day withdrawal time. Without a veterinary prescription, you cannot deviate from that protocol.
- Some approved drugs are prescription products restricted to use by or on the order of a licensed veterinarian (i.e., antibiotics, chorionic gonadotropin)

## Extra-Label Drug Use:

- Some cases require use of an FDA-approved drug outside of its labeled use. For example, fish at a hatchery are infected with *Lactococcus garvieae* and experiencing high mortality. There is no approved drug with an indication for the control of *L. garvieae*. A veterinarian can:
  1. Write an extra-label prescription allowing the use of Terramycin 200 to control of *L. garvieae*, AND
  2. Increase the dosing, if needed. The highest approved dose of Terramycin 200 for bacterial infections is 3.75g OTC/100lb fish per day. To control *L. garvieae*, dosing may need to be as high as 10g OTC/100lb fish per day.

## Investigational New Animal Drugs (INADs)

- Drugs in the approval pipeline that are not approved by the FDA yet.
- A facility can enroll in the AADAP National INAD Program to use these drugs. For federal facilities, there is no fee. There is also a T&E species exemption.
- Must follow INAD study protocols, such as investigational withdrawal times.
- Examples: Reward (Diquat), Slice, AQUI-S 20E

## Low Regulatory Priority Drugs

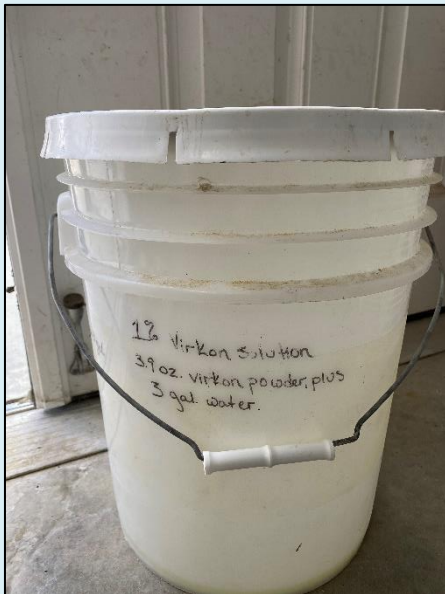
- Drugs NOT approved by the FDA, but unlikely to result in risk to human health if people consume the fish. **Regulatory action when used as a fish treatment is unlikely, but the FDA could change their position in the future.**
- Examples: sodium chloride (salt), carbon dioxide gas, calcium oxide, tannic acid

## Regulatory Action Deferred Drugs

- Per FDA, "Products found not to be low regulatory priority but regulatory action deferred pending further study."
- **Regulatory action is not being taken at this time, hence "deferred," but the FDA could change their position in the future.**
- Examples: Copper sulfate and potassium permanganate



Hydrogen Peroxide (35% Peroxide) already has numerous FDA-approved indications, but there is also an INAD available through AADAP to study efficacy and safety on many different ectoparasites not covered by approved use. Depending on the results of those trials, future indications may be approved by the FDA. Extra-label drug use through a veterinarian's prescription is allowed too. Photo: J. Veilleux/USFWS.



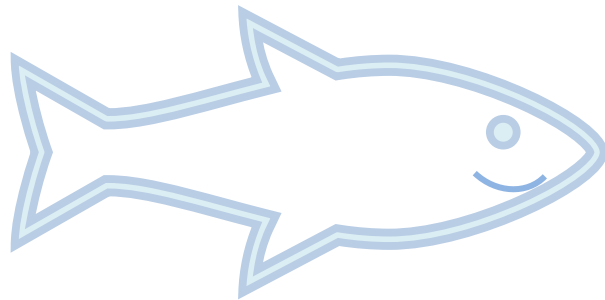
Virkon is an important disinfectant but cannot be used in systems with fish. As a result, care needs to be taken where it is disposed after use. Photo: J. Veilleux/USFWS.

## All the above are for fish treatments, what about pond treatments (control of algae, plants, aquatic pests; disinfectants; other)?

- It depends on the EPA label for the product!!! Read the fine print and when in doubt, reach out to the BFHC or AADAP.
  - Some products are not intended for use as a fish treatment but can still be used for other indications in ponds containing fish. For example, a product may have an EPA label for algal control and states, "No restrictions on water for swimming, fishing or animals drinking the water." When following label use, this could be used safely with fish.
  - Some products may have an EPA label for use as a disinfectant WITHOUT fish present. This means the chemical can be used in water, but only when there are no fish in the system. Pay careful attention to any discharge limitations/requirements.
  - Many products like herbicides and insecticides will have an EPA label that specifically says something along the lines of, "Do not apply directly to water or allow drift to water." **These chemicals cannot be used in aquaculture in any form and may be dangerous to human health.**

## Why is it important to follow these restrictions?

- Drugs approved by the FDA have gone through vigorous trials to determine safety to both animals and humans. INADs are close behind in that pipeline. Withdrawal times have been established to make sure humans consuming any previously treated fish are safe. Low regulatory and regulatory action deferred drugs have been deemed low risk by the FDA.
- **For drugs outside of these groups, we either simply don't know OR have already determined they are harmful. Along with serious human health concerns, this also includes negative effects to wildlife such as migratory birds and aquatic invertebrates like native mussels.**



## References

"Enforcement Priorities for Drug Use in Aquaculture." *Program Policy and Procedures Manual 1240.4200*, Food and Drug Administration Center for Veterinary Medicine, [www.fda.gov/media/70193/download](http://www.fda.gov/media/70193/download). Accessed 21 Mar. 2024.

"Resources for Selecting Aquaculture Medications." *Aquatic Animal Drug Approval Partnership*, U.S. Fish and Wildlife Service, [www.fws.gov/node/267114](http://www.fws.gov/node/267114). Accessed 21 Mar. 2024.