

# Fish Health Section



## FHS NEWS

**Fish Health Section website:** <https://units.fisheries.org/fhs/>

**Fish Health Section Facebook Site:** <https://facebook.com/FishHealthSectionAFS>

## AFS Membership Campaign

In efforts to boost American Fisheries Society (AFS) membership, the AFS is currently holding an “AFS Member-get-a-member” campaign, the details of which can be found at <https://secure.fisheries.org/memgetmem>. Please consider recruiting a new AFS member (or three) who I’m sure would also be interested in joining the Fish Health Section. We have many important and active efforts underway within our section, so the more brain power, the better! Thanks for your continued activity as dedicated AFS-FHS members!

## MEETINGS, WORKSHOPS AND COURSES

### Joint Meeting of the Northeast Fish Health Committee and AFS Fish Health Section

Burlington, VT

July 12<sup>th</sup> – 15<sup>th</sup>, 2021

See attached pdf for more information.

### Calling all Aquaculture America 2021 attendees!

Are you interested in speaking in a special session at Aquaculture America 2021, to be held in San Antonio, Texas from February 21st-24th, 2021? Please see the link below to learn more about the National Aquaculture Association (NAA) special sessions that AADAP is co-hosting with the Aquatic Drug Approval Coalition (ADAC) and the Association of Fish and Wildlife Agencies-Drug Approval Working Group (AFWA-DAWG).

<https://www.fws.gov/fisheries/aadap/Expert-Presenters-Invited-Aquaculture-America-2021.html>

## JOBS/GRADUATE ASSISTANTSHIPS

## FISH HISTOPATHOLOGIST

## **PatoGen**

Oslo, Norway

Closes 1 October 2020

PatoGen is the market-leading supplier of biotechnological analyzes and advice to the aquaculture industry in Norway and the United Kingdom. With the vision "We inspire actions for healthier fish", PatoGen has laid a strong lead in developing the position as a leader in these areas further into the future. Preventive fish health and diagnostics define the company's core business and significant investments are continuously made in the development of knowledge that will benefit fish farmers. PatoGen has 55 employees, headquarters in Ålesund, and branches in Bodø, Oslo, Bergen, Oban (Scotland) and Puerto Varas (Chile). PatoGen is accredited by Norwegian Accreditation according to international standard ISO17025. See [www.patogen.no](http://www.patogen.no) for more practical information.

Based on the good results PatoGen has achieved in the market after starting up in the field of histology, we want to expand our team of skilled histopathologists. We are interested in you who have a relevant professional background, and who have a strong desire to join in further developing the service and the company. PatoGen is looking for both candidates with long experience and candidates with shorter experience.

### Desired qualifications and characteristics

- Relevant education and experience with fish histopathology, preferably with a main focus on salmon and trout
- Experience with digital pathology is an advantage
- Experience from fish health work and communication with fish health personnel is an advantage
- Personal qualities such as accurate, knowledgeable and clear, good oral and written presentation skills in Norwegian and in English
- Ability to work well in a motivated and dedicated team

We can offer interesting work tasks in a good working environment with high professional competence, as well as competitive conditions. The office location is preferably in Oslo, but other locations can also be considered.

Application should be sent to: [career@patogen.no](mailto:career@patogen.no) by 1 October.

### **Postdoctoral Position – Flavobacterium Genetics**

**University of Wisconsin-Milwaukee, Department of Biological Sciences**

Milwaukee, WI

I have funds to hire a postdoctoral scientist to expand our molecular and genetic studies of virulence of the fish pathogens *F. psychrophilum* and *F. columnare*. This research will be conducted in my lab at the University of Wisconsin-Milwaukee, USA. It will build on our studies of the role of the type IX secretion systems in virulence. We plan to identify secreted virulence factors to understand these flavobacterial diseases of fish, and to aid

in development of control strategies. Ph. D. and research experience in microbiology required. Experience with molecular and bacterial genetics preferred, and experience with fish is also desirable. Salary is commensurate with experience and accomplishments. If you know of any good candidates, I would appreciate it if you would forward this message to them. Candidates may apply by sending a statement of interest, cv, and names and email addresses of 3 references by email to Mark J. McBride ([mcbride@uwm.edu](mailto:mcbride@uwm.edu)), Department of Biological Sciences, University of Wisconsin-Milwaukee. Information about the Department of Biological Sciences at the University of WI-Milwaukee can be found at: <https://uwm.edu/biology/>

**Graduate Assistantship in Fish Immunotoxicology**  
**Mississippi State University, College of Veterinary Medicine**  
Starkville, MS

Biological toxins including those produced by Hazardous Algal Blooms impact wild fish and aquaculture systems with increasing frequency. This is associated with global warming and increased fertility in water systems. These toxins can kill fish but immune suppressive effects of sublethal exposure may be more common and important to fish populations. We are studying the effect of known toxins, including microcystin LR, on the susceptibility of channel catfish to infectious diseases.

We are recruiting a PhD student that will study the immunotoxicology of these compounds in fish. This position is available for 4 years (competitive stipend and tuition remission) at the College of Veterinary Medicine, Mississippi State University, Starkville MS.

If interested please contact Dr. Larry Hanson, <mailto:hanson@cvm.msstate.edu>

**Postdoctoral position**  
**The Hong Kong University of Science and Technology**

The Miller lab is seeking a highly motivated, organized and enthusiastic individual to help develop zebrafish as a model system to screen traditional Chinese medicines and novel synthetic compounds as possible therapeutic agents against SARS Cov-2 host-cell infection. Applicants with a PhD and strong background in fish virology are highly encouraged to apply. Salary and benefits are commensurate with relevant experience. The position is for 2 years and is available immediately. Please send your CV, and the name and address of three referees to: [almiller@ust.hk](mailto:almiller@ust.hk).

**Veterinarian – Fish Health**  
**Cermaq Canada, Ltd.**  
Campbell River, B.C.

You will be a member of the Fish Health department in Campbell River, BC. Your team includes a Fish Health Director, a Fish Health Manager, and freshwater and saltwater Fish Health Technicians.

Your goal is to ensure that our operations remain in compliance in the areas of food safety and quality. This requires working with external bodies to ensure timely, accurate and effective information is provided to external bodies. You will be focused on ensuring that a quality product is consistently provided to our customers. Along with those duties you could be involved in all aspects of reporting, data analysis (fish health and production), and fish health management in order to supply information that will optimize fish health for maximum biological performance. You would have a team of fish health technicians to assist you with meeting these objectives when required.

As the Veterinarian, you will receive a competitive salary, a corporate bonus program, company paid benefits and a matching retirement fund.

See attached pdf for more information.

### **Aquatic Pathology Residency and PhD**

**University of Georgia, College of Veterinary Medicine, Department of Pathology**  
Athens, GA

Closes: 9 October 2020

The Department of Pathology, College of Veterinary Medicine, The University of Georgia (<https://vet.uga.edu/education/academic-departments/pathology/>) in conjunction with the Georgia Aquarium has an opening for combined residency in anatomic pathology and PhD training with aquatic animal emphasis beginning July 1, 2021.

The incoming resident will join a team of 10 residents and a diverse faculty, including 1 certified fish pathologist and 20 ACVP diplomates, with expertise in domestic, aquatic, avian, exotic, wildlife, toxicologic and laboratory animal pathology. This intensive, comprehensive, 5-year training program is designed to meet the eligibility requirements for board certification by the American College of Veterinary Pathologists and meets most requirements for Fish Pathologist certification by the American Fisheries Society. Aquatic pathology experience is focused on the extensive collection of freshwater and marine fishes at the Georgia Aquarium and includes work conducted both at UGA and on-site in Atlanta. Exposure to invertebrates, amphibians, turtles, aquatic birds, and marine mammals occurs periodically. Residency training is augmented by necropsy experience in conjunction with the AAVLD-accredited Athens Veterinary Diagnostic Laboratory, surgical biopsy service to the teaching hospital and private veterinary practices, and a large Zoo, Exotic and Avian Pathology Service. Case-based learning is supplemented with several courses in histopathology, general pathology, and specialty areas (e.g., fish pathology). Additional fisheries related coursework is strongly encouraged.

See attached pdf for more information

### **Aquaculture Veterinarian**

**Department of Fisheries and Land Resources – Aquatic Animal Health Division**  
St. John's, Newfoundland and Labrador, Canada  
Closes: 31 March 2021

Reporting to the Chief Aquaculture Veterinarian, this is a highly professional position in aquatic animal health management within the Province. Work involves responsibility for veterinary service to fin (shell) fish producers and researchers in the province including the operation of diagnostic laboratories in St. John's, St. Alban's and Grand Falls-Windsor, the supervision of technical personnel, and participation in the aquatic animal health regulatory program. Key responsibilities include the provision of aquatic animal health service for cultured aquatic animals, response to emergency service needs, conducting active and passive surveillance programs, conducting biosecurity audits and providing evidence-based decision making leading to sound health policy. Preparation and delivery of public presentations will also be required.

See attached pdf for more information.

### **Zebrafish Related Job Announcements**

<https://wiki.zfin.org/display/jobs/Zebrafish-Related+Job+Announcements>

## **RESOURCES/NEWS**

### **California lactococcosis outbreaks**

Many of you have likely heard of the lactococcosis outbreaks (caused by *Lactococcus garviae*) that are unfolding in California. Attached, you will find some pertinent information on those outbreaks contained within a statement that was released by the California Department of Fish and Wildlife late last month. In addition, two clarifying points were released since that time and have been added at the end of the document.

**Aquatic Animal Drug Approval Partnership (AADAP) Updates are now available online:** [https://www.fws.gov/fisheries/AADAP/aadap\\_update.html](https://www.fws.gov/fisheries/AADAP/aadap_update.html)

## **NEW FEATURE – EDITOR'S RANDOM PICS**



Tetrahymena spp. from skin scrape of an adult summer steelhead, Oct. 2017

## Competition Details

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Referral Number	FLR.19.20.R0865
Employment Type	1 permanent position; 1 temporary position
End Date	March 31, 2021
Division	Aquatic Animal Health Division
Department	Department of Fisheries and Land Resources
Locations	St. John's
Closing Date	open until filled
Salary (scale)	\$45.01 - \$53.19 per hour (CG-46)
Allowances	<a href="#">Click here to enter allowances.</a>

## Position Details

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### Context

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<https://www.fishaq.gov.nl.ca/aquaculture/index.html> [Help!](#)

### Duties

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Reporting to the Chief Aquaculture Veterinarian, this is a highly professional position in aquatic animal health management within the Province. Work involves responsibility for veterinary service to fin (shell) fish producers and researchers in the province including the operation of diagnostic laboratories in St. John's, St. Alban's and Grand Falls-Windsor, the supervision of technical personnel, and participation in the aquatic animal health regulatory program. Key responsibilities include the provision of aquatic animal health service for cultured aquatic animals, response to emergency service needs, conducting active and passive surveillance programs, conducting biosecurity audits and providing evidence-based decision making leading to sound health policy. Preparation and delivery of public presentations will also be required. [Help!](#)

## Merit Criteria

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### Screening Criteria *Use numbered lists only.* [Help!](#)

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1. Doctor of Veterinary Medicine
2. Experience with aquatic veterinary medicine
3. Experience conducting biosecurity audits
4. Supervisory experience (asset)

### Assessment Criteria *Use numbered lists only.* [Help!](#)

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1. Knowledge of aquatic veterinary medicine
2. Knowledge of conducting biosecurity audits
3. Knowledge of disease outbreaks

Human Resources Secretariat – Strategic Staffing Division

Form Revised: December 16, 2019

4. Knowledge of aquatic laboratory practices
5. Knowledge of the aquaculture industry
6. Ability to supervise others
7. Ability to make decisions
8. Ability to manage time and tasks
9. Ability to communicate effectively (verbal)
10. Professionalism

## Conditions of Employment

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### Conditions of Offer *Use numbered lists only.* [Help!](#)

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1. Demonstration of Doctor of Veterinary Medicine degree
2. National Veterinary Board Examination Certificate of Completion
3. Eligible for full licensure with the Newfoundland and Labrador College of Veterinarians
4. Proof of Class 5 Drivers License

### Conditions of Acceptance *Use numbered lists only.* [Help!](#)

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1. Acknowledges requirement for travel by vehicle, vessel, snowmobile and UTV
2. Acknowledges requirement for continuous education and training
3. Acknowledges requirement for performing work in variable weather conditions (on-land and marine)
4. Willing to accept emergency and stand-by on call availability
5. Willing to accept overtime

### Applicant Information *Use numbered bullets only.*

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For more information about this opportunity please contact: Dr. Daryl Whelan at (709) 729-0387.

1.
  - The Government of Newfoundland and Labrador values diversity in the work place and is an equal opportunity employer.
  - Disability related accommodations and alternate formats are available upon request at any stage of the recruitment process by contacting [recruitment@gov.nl.ca](mailto:recruitment@gov.nl.ca), 709-729-0130 or toll free at 1-888-729-7690.
  - Preference will be given to applicants who are legally entitled to work in Canada.
  - Applications must be received on or before the closing date stated for this job posting.
  - It is the responsibility of the applicant to submit an application that demonstrates the required merit criteria.
  - Applications that do not clearly demonstrate the required criteria will be screened-out.
  - All applications must contain accurate contact information, including current mailing address, email address and phone number.
  - All information submitted as part of this application must be factual, complete and current to date of submission.
  - This competition may be used to fill future similar vacancies with the Government of Newfoundland and Labrador.

## **Combined Anatomic Pathology Residency and PhD with an Aquatic Animal Emphasis – University of Georgia**

The Department of Pathology, College of Veterinary Medicine, The University of Georgia (<https://vet.uga.edu/education/academic-departments/pathology/>) in conjunction with the Georgia Aquarium has an opening for combined residency in anatomic pathology and PhD training with aquatic animal emphasis beginning July 1, 2021.

The incoming resident will join a team of 10 residents and a diverse faculty, including 1 certified fish pathologist and 20 ACVP diplomates, with expertise in domestic, aquatic, avian, exotic, wildlife, toxicologic and laboratory animal pathology. This intensive, comprehensive, 5-year training program is designed to meet the eligibility requirements for board certification by the American College of Veterinary Pathologists and meets most requirements for Fish Pathologist certification by the American Fisheries Society. Aquatic pathology experience is focused on the extensive collection of freshwater and marine fishes at the Georgia Aquarium and includes work conducted both at UGA and on-site in Atlanta. Exposure to invertebrates, amphibians, turtles, aquatic birds, and marine mammals occurs periodically. Residency training is augmented by necropsy experience in conjunction with the AAVLD-accredited Athens Veterinary Diagnostic Laboratory, surgical biopsy service to the teaching hospital and private veterinary practices, and a large Zoo, Exotic and Avian Pathology Service. Case-based learning is supplemented with several courses in histopathology, general pathology, and specialty areas (e.g., fish pathology). Additional fisheries related coursework is strongly encouraged.

Graduate training utilizes modern scientific methodology and encourages independent thought, with an emphasis on hypothesis-driven applied or basic research in an area of aquatic animal disease, as well as the development of oral and written communication skills. Teaching in the professional curriculum, participation in seminars, presentations at national meetings, and manuscript publication are also expected of the resident. The starting salary is \$32,631 per year plus tuition support and travel support to regional and national meetings, including training courses.

Applicants must possess a DVM or equivalent degree, must be United States citizens or be eligible for lawful admission to the United States, and must provide evidence of academic strength and interest in anatomic and aquatic animal pathology and research. Top candidates may be asked to participate in phone and/or in-person interviews, although any interested applicant is welcome to visit. Applications submitted by October 9, 2020 are assured full consideration.

For further information regarding the aquatic portion of the training, contact Dr. Al Camus, Department of Pathology, College of Veterinary Medicine, The University of Georgia, Athens, GA 30602-7388, phone: (706) 542-5848, FAX: (706) 542-

5828, or E-mail: [camus@uga.edu](mailto:camus@uga.edu). For further information regarding the residency program, contact Dr. Elizabeth Howerth (706-542-5833, [howerth@uga.edu](mailto:howerth@uga.edu)) or Dr. James Stanton (706-542-2853, [jbs@uga.edu](mailto:jbs@uga.edu)).

The following residency application materials must be sent electronically to Ms. Amanda Wages at [awages@uga.edu](mailto:awages@uga.edu): curriculum vitae, statement of professional goals, and unofficial veterinary school transcripts. Each file should be labeled with the applicant's last name and file contents (e.g., Stanton\_CV.pdf). Three letters of reference are also required, but they may be emailed separately.

**For the application to be considered, concurrent application to the UGA Graduate school (including official veterinary school transcripts) for the PhD in Comparative Biomedical Sciences program must also be submitted through the Graduate school website**

**(<https://grad.uga.edu/index.php/prospective-students/domestic-application-information/requirements/>).**

The University of Georgia is located in Athens, a vibrant community of 100,000 located in the wooded Piedmont hills of northeast Georgia. Offering the amenities of a cosmopolitan city, the surrounding area also offers a wide variety of lifestyle choices. Athens is located 1½ hours from Atlanta, two hours from the Appalachian Trail, and four hours from the Atlantic coast. The University of Georgia is an Equal Opportunity/Affirmative Action employer. All qualified applicants will receive consideration without regard to race, color, religion, sex, national origin, disability, gender identity, sexual orientation or protected veteran status.

## **Veterinarian- Fish Health**

At Cermaq Canada Ltd. we strive to be the customer's choice by producing quality salmon in our sustainable aquaculture operations on Vancouver Island. We are ranked #2 globally for sustainability. To prove this, we maintain several international certification standards along with an award winning safety culture.

You will be a member of the Fish Health department in Campbell River, BC. Your team includes a Fish Health Director, a Fish Health Manager, and freshwater and saltwater Fish Health Technicians.

Your goal is to ensure that our operations remain in compliance in the areas of food safety and quality. This requires working with external bodies to ensure timely, accurate and effective information is provided to external bodies. You will be focused on ensuring that a quality product is consistently provided to our customers. Along with those duties you could be involved in all aspects of reporting, data analysis (fish health and production), and fish health management in order to supply information that will optimize fish health for maximum biological performance. You would have a team of fish health technicians to assist you with meeting these objectives when required.

As the Veterinarian, you will receive a competitive salary, a corporate bonus program, company paid benefits and a matching retirement fund.

### **Primary Accountabilities**

- Assist the other veterinarian(s) in managing therapeutants and medicated feed, as well as coordinate imports of drugs and vaccines.
- Participate in the Cermaq Canada's Food Safety & Quality Management Systems to ensure continuous improvement and product safety that ensures we deliver the final product to the highest standards to our customers.
- Conduct fish health and production data analysis then report out the information to the external bodies and internally to the management team and other departments to ensure effective decision making that minimizes risk and expenditures.
- Review fish health protocols to ensure they are up to date and being complied with so that every effort is made to produce optimal stock conditions.
- Participate in internal fish health projects as necessary to continually improve the health and welfare of the fish.
- Participate and provide support to industry fish health and research initiatives that speaks to the sustainability of the operations.
- Participate in regular Fish Health Meetings by contributing expertise and suggesting improvement.

*Frequent regional and provincial travel is required. Some international travel may occur.*

**Cermaq Canada Ltd.**

203-919 Island Highway, Campbell  
River, BC  
V9W 2C2 Canada

+1 250 286-0022

[www.cermaq.ca](http://www.cermaq.ca)

## Your Education and Experience:

- Doctor of Veterinary Medicine (DVM) – licensed in BC or qualified to become licensed in BC
- Experience with salmon production preferred, consideration will be given to those with herd production experience with other species
- Experience with advanced statistical tools and analyzing data is an asset
- Experience coordinating projects, research activities and leading teams is also an asset
- Strong understanding of animal health principles



#### Graduate Assistantship in Fish Immunotoxicology

Biological toxins including those produced by Hazardous Algal Blooms impact wild fish and aquaculture systems with increasing frequency. This is associated with global warming and increased fertility in water systems. These toxins can kill fish but immune suppressive effects of sublethal exposure may be more common and important to fish populations. We are studying the effect of known toxins, including microcystin LR, on the susceptibility of channel catfish to infectious diseases. We are recruiting a PhD student that will study the immunotoxicology of these compounds in fish. This position is available for 4 years (competitive stipend and tuition remission) at the College of Veterinary Medicine, Mississippi State University, Starkville MS. If interested please contact Dr. Larry Hanson, [hanson@cvm.msstate.edu](mailto:hanson@cvm.msstate.edu)

## **FAQ for *Lactococcus garvieae* outbreak in Southern California fish hatcheries July 20, 2020**

Three California Department of Fish and Wildlife (CDFW) hatcheries in Southern California and the eastern Sierra are currently fighting a bacterial outbreak *Lactococcus garvieae* among their fish stocks. The disease was previously unknown in California, and CDFW staff have been trying multiple treatments and strategies to try to resolve the outbreak over the last three months. Efforts have been unsuccessful. Consequently and as a last resort, CDFW pathologists have recommended that the fish be euthanized and the facilities disinfected before repopulating the hatcheries with *L. garvieae*-free fish.

### **What is this bacteria, and how does it harm fish?**

*Lactococcus garvieae* is similar to streptococcus. The bacterium has caused disease in freshwater and saltwater aquaculture facilities around the world, although this is the first time it has been detected in California. *L. garvieae* can cause a blood-borne disease with symptoms including anorexia, bulging eyes with hemorrhaging around the edges, lethargic or erratic swimming, darkening of the skin, swollen abdomens and increased mortality. Infected fish may also show no signs of infection depending on several factors, including water temperature and stress.

### **When was the bacterium discovered, and which CDFW hatcheries are affected?**

The *L. garvieae* bacteria is known to be present in the US but to date has only been identified in a handful of aquaculture facilities. It had not been found in California, either in aquaculture facilities or in the wild, prior to its discovery at the Mojave River Hatchery in late April 2020. That hatchery was immediately placed on quarantine. CDFW pathologists and hatchery staff have been battling the outbreak from late April to the present. CDFW pathologists identified *L. garvieae* in the Fish Springs and Black Rock Fish hatcheries on June 25. Fish Springs and Black Rock Hatcheries were immediately quarantined. Due to its proximity to the positive Eastern Sierra hatcheries, Hot Creek Hatchery was also quarantined. Extensive testing at Hot Creek Hatchery revealed it to be free of the bacteria and the quarantine was lifted on June 25.

### **Do we know the source of the original outbreak? How might it have come to California?**

Pathologists do not know the source of the original outbreak at the three hatcheries, but DNA analysis of the strain shows high similarity to a strain found in the Columbia River Basin. This bacterium is usually spread by movement of fish or eggs, but we do not believe that is the case for the three CDFW hatcheries. Our current belief is that it was carried into the hatchery by birds that picked it up from an environmental source.

### **How quickly, and through what means, is it known to spread?**

Rainbow trout can be infected with the bacteria, but not be diseased by it, at water temperatures up to 59 degrees F. At temperatures above 59 degrees F, the bacteria can become pathogenic for trout. The bacteria can be spread between hatcheries or other water sources through movement of infected fish, fish eggs or even feed produced with fish meal contaminated with the bacteria. Contaminated equipment (nets, buckets, boots, etc.) may also contribute to its spread. The bacteria has also been identified in the feces of birds. Once it has spread into a hatchery and a fish becomes infected, it easily spreads from fish to fish.

### **How many fish are at the hatcheries?**

There are approximately 3.2 million rainbow trout, brown trout and Lahontan cutthroat trout at the three hatcheries, ranging in size from fry and fingerlings to catchable fish.

### **Are bacterial outbreaks common among fish?**

Disease outbreaks of different types are not uncommon in fish hatcheries. Most fish pathogens are present in the lakes and rivers of the state and come into hatcheries with the water. They only cause infection and disease when conditions such as elevated water temperatures or crowding stress tilt in their favor. Hatchery staff are trained to recognize sick fish and consult with CDFW veterinarians to treat illnesses as needed. What's unusual about this particular outbreak is that this pathogen is new in California. Further complicating the treatment of the fish is that the bacteria is resistant to most of the few antibiotics approved by the US Food and Drug Administration (FDA) for treating fish in aquaculture.

### **What treatments were tried prior to making the decision to euthanize the fish?**

CDFW fish pathologists and veterinarians placed fish on a specialized immune system boosting diet and administered multiple rounds of antibiotics. Hatchery staff also attempted to spread fish out as much as possible to reduce stress. Unfortunately, *L. garveae* is resistant to most antibiotics approved by the FDA for use in food fish. CDFW veterinarians treated the fish with the one FDA-approved antibiotic to which the bacteria showed any susceptibility – and that susceptibility was only moderate. In addition, this bacterium can live in a biofilm on raceway walls and other surfaces. Even if the fish were able to rid itself of the bacteria, the chances of reinfection from contaminated surfaces in the hatchery would be significant.

### **Will the fish be euthanized humanely?**

The decision to euthanize animals is not a decision we take lightly. CDFW has strict policies governing euthanization of animals in our care. CDFW will follow recommendations put forward by the American Veterinary Medical Association (AVMA) to ensure the procedure is performed in the most humane way possible.

### **What will be done with the euthanized fish?**

Unfortunately, the bacterial contamination makes these fish unsuitable for use as animal feed, fertilizer, food banks or any other consumptive use. CDFW is still working on a disposal plan, which will follow published CalEPA guidance on emergency disposal of animal carcasses.

### **How will the facilities be disinfected?**

CDFW is developing a comprehensive disinfectant plan. We have partnered with specialists at UC Davis to run experimental treatment scenarios to determine the most effective disinfectant options. We will also pull from knowledge gained at fish farms around the world that have experience with this bacterium, in order to ensure we use the most effective disinfection procedures possible.

### **What is CDFW doing to monitor for outbreaks in other hatcheries?**

CDFW has a comprehensive fish health program. Hatchery staff observe their fish multiple times daily for signs that they are not well. Signs of illness include loss of appetite, darkening of their skin, change in behavior or elevated mortalities. When these signs are observed, the hatchery managers will call the CDFW Fish Health Laboratory to have a fish pathologist or veterinarian come to the hatchery and perform a diagnostic examination to determine the cause of the illness. The Fish Health Lab pathologists also perform routine examinations to confirm the well-being of fish at all CDFW fish hatcheries, even when no illness is apparent. This is how the infections at Black Rock Hatchery and Fish Springs Hatchery were identified (the bacteria were cultured from fish showing no obvious signs of disease).

**What trout hatcheries do not have the bacteria?**

There are currently seven other trout production hatcheries and two planting bases still in operation. These facilities mainly serve waters in the central and northern portions of the state from the westside of the Sierra Nevada mountains to the Pacific coast. One of the seven hatcheries not currently under quarantine, Fillmore Hatchery, does serve some Southern California waters. However, Fillmore is just coming back online after an extended closure due to infrastructure issues. Fillmore is expected to have a limited number of fish to stockable size for the fall planting season in Southern California.

**Where have scheduled fish plants been canceled, due to this outbreak?**

Mojave River, Fish Springs and Black Rock Hatcheries are responsible for stocking the majority of the waterways in the eastern Sierra and Southern California. The counties affected include:

- Los Angeles
- San Bernardino
- Riverside
- San Diego
- Orange
- Ventura
- Santa Barbara Inyo
- Mono

**What waters are being stocked in those counties?**

Hot Creek Hatchery is conducting their normal plants to waters they serve in Inyo and Mono counties. Those waters include:

- Owens River Sections I, II and III
- Crowley Lake
- Pleasant Valley Reservoir
- Bishop Creek Lower
- Lone Pine Creek
- Diaz Lake

**Can CDFW make up for the canceled plants with fish from non-infected hatcheries?**

Currently three of our largest trout production hatcheries in the state are shut down, and two others are coming back online after significant infrastructure problems and not yet at full production. In addition, a catchable size fish takes around two years to get to size. There is no way for the remaining trout hatcheries to make up that level of fish production. CDFW is evaluating the possibility of re-allocating fish destined to be stocked in northern California waters to a small group of high use, easily accessible Eastern Sierra and Southern California waters, but there are still significant logistical details to be worked out including safety of staff and travel under current COVID-19 restrictions.

**When did CDFW stop stocking fish from the affected hatcheries?**

The last plants from the Mojave River Hatchery were on May 1. Stocking operations at Fish Springs Hatchery and Black Rock Hatchery were halted when those facilities were placed under quarantine on June 19.

**Are there concerns that infected hatchery fish could have been planted prior to detection of the bacteria?**

While CDFW does not plant diseased fish, it appears possible some locations were planted with fish carrying the bacteria but not showing any outward signs or symptoms of bacteria from these hatcheries prior to the confirmation of *L. garvieae*. This pathogen is known to occur in the environment in the Pacific Northwest, including in the Columbia River.

**Can humans get sick from this bacteria? Should people take extra precaution if eating fish they catch?**

There is limited evidence *L. garvieae* bacteria has been passed to humans, but fish-to-human transmission is extremely rare. As always, anglers should follow USDA recommendations on cooking fish to an internal temperature of 145 degrees F.

**What's the long-term projection for future year stocking?**

Depending on water temperatures and fish density, rainbow trout can take anywhere from 10 months to two years to get to a catchable size of a half-pound. We typically have rainbow trout eggs available in the state December through March. At the depopulated hatcheries, we won't likely have catchable size fish ready from eggs they hatch until December 2021 or January 2022 at Mojave and the spring of 2022 at Fish Springs and Black Rock hatcheries. There is some potential to jumpstart those facilities by transferring small fish in from other hatcheries, but we will need to be sure the hatcheries test clean prior to doing any fish transfers.

###

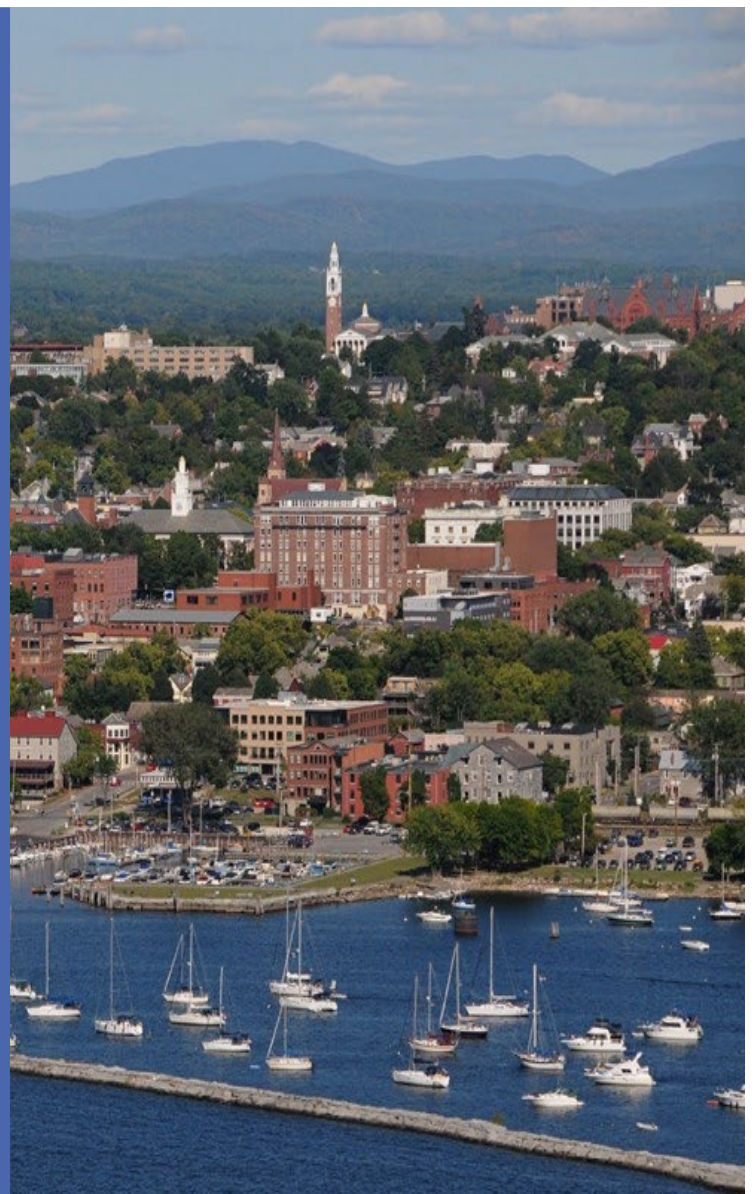
**Additional Information since original release is as follows:**

- Subsequent molecular analysis has shown that the California Lactococcus isolates are different from the Washington isolates.
- Rainbow Trout may experience some elevated losses to the infection when the water temperatures are below 60F. As the temperature increases from 60-65 and above, losses increase correspondingly.

JOINT MEETING OF THE  
NORTHEAST FISH HEALTH  
COMMITTEE AND AFS FISH  
HEALTH SECTION

APPLYING RESEARCH:  
BRIDGING THE GAP  
BETWEEN AQUATIC  
ANIMAL HEALTH  
RESEARCH AND  
INSPECTIONS

JULY 12<sup>TH</sup> – 15<sup>TH</sup>, 2021  
HILTON LAKE CHAMPLAIN  
BURLINGTON, VERMONT



## Tentative Schedule at a Glance:

### July 12<sup>th</sup> & 13<sup>th</sup>

- NEFHC Meeting
- NEFHC Fish Culture Chiefs Meeting
- FHS EXCOM Meeting

### July 13<sup>th</sup>

- FHS Continuing Education Course (TBD)
- Icebreaker Opening Social

### July 14<sup>th</sup> – 15<sup>th</sup>

- Special Sessions
  - “Fish Health Research/Topics in the Northeast US”
  - “Current Status of Fish Health Regulations and Testing Criteria for Aquatic Animal Movements in the Northeastern US & Canada”
- General Sessions and Case Study Reports
- Poster Session
- FHS Business Meeting
- Banquet