



Eastern Region
Leetown Science Center

Fisheries and Aquatic Resources

Fish Health

Fish health research scientists at the Leetown Science Center investigate persistent emergent health issues associated with genetics, pathogens and environmental stressors that undermine conservation and restoration of interjurisdictional populations including depleted, threatened, or endangered fishes and aquatic organisms.



Fish health research at Leetown had its origin in the 1930's when the Leetown Fish Hatchery and Experiment Station was constructed. In 1978, the National Fish Health Research Laboratory, now a component of the Leetown Science Center, was established to solve emerging and known disease problems affecting fish and other aquatic organisms critical to species restoration programs. Center scientists develop methods for the isolation, detection, and identification of fish pathogens and for prevention and control of fish diseases.



Inoculating bacteriological plates

Leetown researchers were the first to describe the life cycle of

the whirling disease parasite. This disease was introduced in North America by fish culture in the 1950's and the disease is now known in cultured and wild trout populations in at least 21 states and it has become a significant problem for federal and state fisheries managers. Center research on the dynamics of infection, species susceptibility, and chronic effects on host fishes has been critical to evolving new management practices for restoring sport fisheries and threatened and endangered populations of fish and other aquatic organisms.

High incidences of ulcerative lesions in menhaden, fish kills attributed to *Pfiesteria*, and potential human health implications have raised public interest in fish health issues in the Chesapeake Bay. Working with the Maryland Department of Natural Resources, Center researchers have found that a pathogenic fungus, *Aphanomyces invadans*, and not *Pfiesteria*, is causing chronic ulcerative lesions

in menhaden, a primary forage fish for striped bass and other species of recreational and commercial interest. *A. invadans* is the same organism that causes major economic fisheries losses throughout South Asia, Philippines and Australia.



Lesions on menhaden

Ulcerative lesions have also been found, sometimes at a high incidence, in Chesapeake Bay striped bass. These lesions have been found to be associated with mycobacteria. Ongoing collaborative research with the Virginia Institute of Marine Science is directed towards molecular identification of species,

Research Application

- The correlation of bacterial species and population dynamics with water quality parameters can increase knowledge of chemical, biological, and resource interactions. Scientists are developing new molecular biology assessment techniques to provide sensitive, early indications of water quality changes that affect the health of aquatic habitats. Using such techniques, scientists are monitoring the prevalence of lesions on fish in tributaries to Chesapeake Bay.
- Infectious hematopoietic necrosis virus (IHNV) and infectious pancreatic necrosis virus (IPNV) are important viral fish pathogens that can cause high mortality in populations of cultured trout and salmon. Both viruses can be readily transmitted between generations and among same age populations. Center scientists are studying susceptibility, mortality, virus carrier status, and the immune response of trout exposed to these viruses to improve federal and state fish hatchery management practices.

infectivity studies, and evaluations of host immune responses.



Fish tumors on a brown bullhead

Center scientists conducted much of the pioneering work establishing the connection between sediment contamination and cancer epizootics in fish populations in the Great Lakes tributaries. Over the last two decades many of these systems have seen point sources eliminated and sediments cleaned by dredging. Scientists are assessing the changes at the community level to see how these correlate with improvements in fish health.

Infectious Salmon Anemia (ISA) is a highly infectious, newly emergent disease of Atlantic salmon in North America. USGS scientists are working to development non-lethal diagnostic tests to enable state and federal agencies to minimize the deleterious effects of introducing the virus into stocks of Atlantic salmon. Partnerships with other federal agencies, such as the U.S. Fish and Wildlife Service and

National Marine Fisheries Service, States and non-government organizations are integral to restoration efforts.

Over 70% of the approximately 300 species of freshwater mussels native to the United States are endangered, threatened or otherwise at risk. The practice of holding native mussels in fish hatcheries as refugia could cause transmission of pathogenic microorganisms from mussels to fish. Research being conducted by Center scientists is evaluating the potential for pathogen transfer and providing federal and state decision-makers with information on the use of fish hatcheries as management tools for mussel recovery.

An Annual Eastern Fish Health Workshop provides a forum for collaboration and review of emerging fish health issues. Approximately 100 research scientists, fishery managers, fish health practitioners, and university students attend this Center sponsored workshop.



Collecting bacterial samples from Atlantic salmon

Location of Center Components



Leetown Science Center (1)
-Fish Health Branch
-Aquatic Ecology Branch
-Restoration Technologies Branch

Conte Anadromous Fish Branch (2)

No. Appalachian Research Branch (3)

So. Appalachian Research Branch (4)

Orono Field Station (5)

Columbus Field Station (6)

Great Smoky Mountain Field Station (7)

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