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Conte Anadromous Fish Research Center renowned for cutting edge research

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-Fran Ryan, 7/12/'17

TURNERS FALLS — Located adjacent to the Connecticut River in Turners Falls, the Silvio O. Conte Anadromous Fish Research Center is one of the world's leading research facilities on the study of migrating fish species and the development of state of the art fish passage systems.

Helping fish navigate past a dam may seem like an easy fix. Build a lift, and when fish start their migration simply lift them up and over the dam and, voilà, problem solved. However, there is nothing simple about it.

Years of research in fish biology, physiology and behavior, and hydraulic engineering goes into creating effective fish passages that help migrating fish to pass over dams that would otherwise prevent their movement.

Researchers must take into account things like river size, temperature, depth, velocity and flow patterns, as well as the various requirements of different species, fish size, speed, reproductive strategies, genetics, energy stores, and population numbers.

Hydraulic engineers must then know how to build a structure that will reproduce a specific environment at the dam in order to attract particular fish species to the fishway and into a device that will get them over the barrier.

This is where the Conte facility excels.

The lab has been involved in a variety of projects and research that has influenced improvements in fish passages at local dams, as well as those across the globe in places like Canada the UK, China, Brazil and the Netherlands.

"During my first visit in 2016, I was overwhelmed by the facilities, knowledge and expertise of the Lab," said Katja Philippart, the senior scientist at the Royal Netherlands

Institute for Sea Research, and associate professor at Utrecht University, in Utrect, the Netherlands, while visiting the lab last month.

What makes the Conte Lab a stand-out facility is its ability to combine in-depth research on fish biology with hydraulic engineering and design.

Bringing the two fields together under one roof improves and streamlines the research, testing and results.

“It doesn’t matter how good a fishway you have; if the fish don’t like the hydraulics, they are not going to use it, and then it is not going to work,” said U.S. Geological Survey research ecologist Alex Haro as he looked down into a huge fishway mock-up, through which shad were being run, from the top floor of the hydraulics lab.

During the shad migration from April to the end of May, the Conte Lab trucks in the fish from the fishway at the Holyoke Dam to help with their research. Shad is one of a variety of anadromous (migrates from salt water to fresh water to spawn) fish that the lab studies. After the testing, the fish are released back into the Connecticut River.

“At the moment, we are looking at these different gate designs to see which one of them performs better,” he said, noting that the way in which the flow changes as it goes over the gates makes a big difference in how the fish respond.

Brett Towler is the regional fish passage engineer with the US Fish and Wildlife Service.

“Engineers know how to move water, not fish. The combination of behavior and hydrology is absolutely critical,” Towler said.

Another strength of the Conte Lab is its strong ties with the University of Massachusetts and the U.S. Fish and Wildlife Service.

“We work with UMass a lot,” said Adria Elskus, USGS acting branch chief supervisor and fish biologist. “They are a big help to us, and collaborating with them insures that we are not duplicating our efforts.”

As well as working with Fish and Wildlife, Towler teaches engineering classes at UMass.

“The concentration of experts in the valley is very, very unique,” Towler said. “There is a center of excellence here that you would be hard pressed to find anywhere else.”

That is why Philippart came to the Conte facility in June.

“The lab is generally known as the prime example of a testing facility for fish migration, where experiments can be performed under semi-natural conditions,” Philippart said.

Philippart is working with USGS research ecologist Ted Castro-Santos on a large project being undertaken by the Dutch government.

Castro-Santos has worked on the development and improvement of fishways around the world and is also part of a large-scale effort to build a laboratory and fishway in Michigan.

“In the Netherlands, we are constructing a so-called Fish Migration River, which will enable migratory fish to swim 24/7 from our coastal waters, to a freshwater lake and the watershed of the river Rhine,” Philippart said.

Castro-Santos said that a large experimental facility similar to the Conte Lab will also be built in association with the fish migration river.

“Basically, we hoped to profit from their expertise and copy their successes,” Philippart said.

Research at the Conte Lab has also made a local impact.

“Many of the improvements at the Holyoke fish way stem from research undertaken at the Conte Lab,” Towler said.

Research done by biologists at the lab has also examined the effects of climate change on a local fish population.

Ben Letcher, a USGS fisheries biologist, and adjunct faculty in environmental conservation at the University of Massachusetts, conducted a 15-year study in Hadley that positively tied warming climate temperatures to the decline of Eastern Brook Trout.

Letcher has also created a website called SHEDS, for Spatial Hydro-Ecological Decision System, at ecoshed.org. The site allows environmental managers and decision makers to access to a wealth of data and information on hydro-ecological resources.

The USGS Silvio O. Conte Anadromous Fish Research Center is a 40,000 square foot research complex that includes a 2400 square foot fish rearing facility; a hydraulics lab with experimental flumes for the design and testing of fish passage structures; and modern equipment for studies of fish physiology, biochemistry, endocrinology, bioenergetics, microscopy and radiotelemetry.