Up in the Sky!

DRONE FINDS HOT SPOTS TO HELP RESTORE FISH TO RIVER

by Lonny Lippsett

Nope, it's not a bird or a plane. It's a drone on a scientific mission to restore a river long impaired by dams and to help bring back populations of prized fish that once flourished in it.

For more than 300 years, dams on the Coonamessett River in Falmouth, Mass., powered mills and created expanses of cranberry bogs. But they also made the river straighter, less pristine, and warmer—conditions that led to the disappearance of sea-run brook trout, also known as "salters," one of the oldest and most revered sport fish.

Sea-run brook trout live in streams that flow into the ocean. They spend winters in salt water, but come spring, they run up the streams to feast on the abundant food and later spawn in saltwater estuaries. But they don't thrive in water warmer than 65° F. As temperatures rise in summer, they seek cool, clear pools tucked into bends in rivers. These refuges all but vanished after the river was dammed.

That's where the drone comes in. On a cold winter day, two scientists from Woods Hole Oceanographic Institution—Matt Charette and postdoctoral investigator Erika Johnson—launched their drone equipped with a thermal imaging sensor. The sensor revealed "hot spots" where groundwater seeps into the Coonamessett. Groundwater on Cape Cod maintains a constant temperature of about 55° F. It is warmer than river water in winter, but when river water heats up in the summer, the groundwater delivers pockets of water cool enough for sea-run brook trout.

The WHOI scientists captured more than 1,500 thermal images that they stitched into a thermal mosaic of the area on both flanks of the river. It will provide a road map for a $3.5 million project to remove the river's dams and restore its natural flow and serpentine path.

"In the process of rerouting the river, they want to incorporate spring-fed tributaries that discharge cooler water into the river," Charette said. Now that the groundwater discharge springs have been located, they can be incorporated into designs to re-create cool pools that may encourage sea-run brook trout to return and expand habitat for other fish. ▲

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WHOI scientist Matt Charette points to a thermal-imaging drone operated by WHOI postdoctoral scholar Erika Johnson as Michael Scherer of the Coonamessett River Trust looks on.

Merrily Cassidy, *Cape Cod Times*

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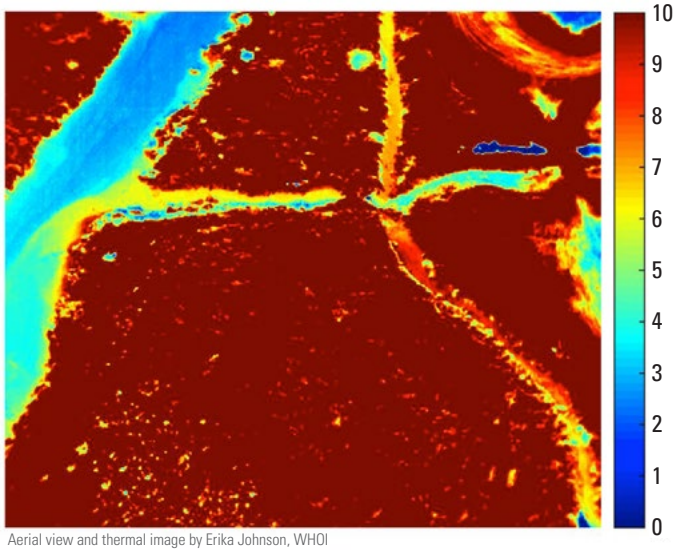

Aerial view and thermal image by Erika Johnson, WHOI

A thermal image of a section of the river watershed reveals red and yellow areas where warmer groundwater is seeping into the colder river in winter.