



Western Fisheries Research Center (WFRC)

## Western Fisheries Science News

### Honors

**WFRC Recognized with two Partners in Conservation Awards:** On Jan. 16, WFRC received two U.S. Department of the Interior Partners in Conservation awards. Scientists from the Klamath Falls field office were recognized for their role in the Klamath tribal leadership development program to integrate science and traditional ecological knowledge. Scientists from the Reno field office were recognized for helping restore threatened and endangered fishes in the Truckee River Watershed. The Partners in Conservation Award is a Department of the Interior Honor Award established to recognize conservation achievements. For more information contact [Eric Janney at ecjanney@usgs.gov](mailto:ecjanney@usgs.gov) or 541-273-8689 or visit <http://goo.gl/hRyFtn>.

**Article Recognized as “Top Papers in 2013”:** An article by WFRC scientists and co-authors titled “A riverscape perspective of Pacific salmonids and aquatic habitats prior to large-scale dam removal in the Elwha River, Washington, USA” was among the top three most viewed papers in 2013 for *Fisheries Management and Ecology*. For more information, contact [Jeff Duda at jduda@usgs.gov](mailto:jduda@usgs.gov) or 206-526-2532.

**Scientist Emeritus Selected to Serve on Independent Scientific Advisory Board and Independent Scientific Review Panel:** WFRC Scientist Emeritus Alec Maule was selected to serve on the Northwest Power and Conservation Council’s Independent Scientific Advisory Board and Independent Scientific Review Panel. For more information, contact [Alec Maule at amaule@usgs.gov](mailto:amaule@usgs.gov) or 509-538-2299.



Otolith (shown in inset) chemistry and tagging shed light on the migration patterns of mountain whitefish like the one pictured here. Photos by USGS.

### The Secret Lives of Mountain Whitefish

Despite being the most widely distributed salmonid in western North America and the most abundant in many parts of its range, until recently, very little was known about whitefish migrations. This type of knowledge gap can pose problems for managers who need to know how fish use different habitats throughout their life to hatch, feed and spawn. Information on fish migrations can be difficult to obtain because fish are not always easy to follow. Recently WFRC scientists Joseph Benjamin, Lisa Wetzel, Kyle Martens, Kimberly Larson and Patrick Connolly took a novel approach to uncovering patterns of mountain whitefish movement and growth by combining passive integrated transponder (PIT) tagging and chemical analysis of otoliths. In January the team published their findings on how and when mountain whitefish use different riverine habitats in the *Canadian Journal of Fisheries and Aquatic Science*. Their results suggest that migrations between distant habitats are important even for fish that spend their whole lives in freshwater, and that maintaining the connectivity of large river networks is critical for successful mountain whitefish management.

Otoliths are small calcium carbonate deposits in the inner ears of vertebrates that aid in hearing and balance. As animals move otoliths reposition themselves in response to gravity. The position of the otoliths relative to the (continued on page 2)

(continued from pg. 1) hair-like sensory cells to which they are attached is translated into nerve signals that help animals orient themselves in space. Like human hair or fingernails, otoliths grow continuously throughout an animal's life as new layers of calcium carbonate are constantly being formed and deposited. Unlike hair or fingernails, otoliths remain intact through a lifetime and can contain geochemical markers that code a record of a fish's age; where and when it spent its time; and how fast it grew during different intervals. As they form, the otolith's calcium carbonate crystals incorporate trace elements from the animal's environment. Laboratory analysis translates these elements or "isotopic signatures" into information about where the fish spent different periods of its life. This information can be critical for successfully managing fish populations and habitats.

WFRC scientists are some of the first to combine PIT tag technology with otolith analysis to investigate fish life history and patterns of migration. By doing so they found that a quarter of the mountain whitefish in their study migrated to the Columbia River from its tributary, the Methow River to overwinter and returned to the Methow in spring, sometimes covering great distances. One tagged fish traveled 114 miles (185 km) into the Columbia River, traversing three dams, before returning in the spring to the Methow. Some fish also undertook migrations into the tributaries of the Methow to spawn in the spring. Understanding these patterns of mountain whitefish life history and habitat use is critical to maintaining populations over time. In this study biologists found otolith analysis to be a useful complement to PIT tagging for studying fish movements and hope this technique may prove useful in other systems. For more information read the article here: <http://goo.gl/Q6vZJX> or contact **Patrick Connolly** at [pconnolly@usgs.gov](mailto:pconnolly@usgs.gov) or 509-538-2299.

## Events

**Workshop Hosts Bivalve Experts:** On Jan. 13-15, WFRC scientists and the Environmental Protection Agency held a bivalve workshop in Newport, OR. The workshop brought together bivalve experts to provide distribution and abundance information on bivalves for the west coast of the United States. The data helps inform the Coastal Biogeographical Risk Analysis Tools (CBRAT), a web accessible database that organizes biological and geographical information for thousands of marine species. Experts include Paul Valentich-Scott, Graham Gillispie, Sara Hinkle, and other scientists. For more information, contact **Deborah Reusser** at [dreusser@usgs.gov](mailto:dreusser@usgs.gov) or 541-867-4045.

## In the News

**Press Inquiry:** On January 7, WFRC biologist, Matt Mesa, was contacted by a writer from *Hatchery International Magazine*, about the possibility of lamprey hatcheries. For more information, contact **Matt Mesa** at [mmesa@usgs.gov](mailto:mmesa@usgs.gov) or 509-538-2299 x246.

## Publications

**Prey Resources for Salmon:** WFRC scientists Ken Tiffan, John Erhardt and Scott St. John published an article in the *Transactions of the American Fisheries Society* titled, "Prey availability, consumption, and quality contribute to variation in growth of subyearling Chinook salmon rearing in riverine and reservoir habitats." The article provides evidence that prey resources are better in riverine habitats and provide better growth opportunity than in reservoir habitats. For more information, visit contact **Ken Tiffan** at [ktiffan@usgs.gov](mailto:ktiffan@usgs.gov) or 509-538-2299 x279.

**Predator-Prey Interactions of Pelicans and Cui-ui Suckers:** In a recent issue of *North American Journal of Fisheries Management*, WFRC scientists used tag recoveries from the pelican colony to determine predation impacts of pelican on Cui-ui. The article titled "American white pelican predation on Cui-ui in Pyramid Lake, Nevada" can be found at <http://goo.gl/cKQBzc>. For more information contact **Pete Rissler** at [Peter\\_Rissler@usgs.gov](mailto:Peter_Rissler@usgs.gov) or 775-861-6393.

**New Publication on Fish Virus:** WFRC investigators compared the relative virulence of four strains of viral hemorrhagic septicemia virus (VHSV) in five species of fish (yellow perch, rainbow trout, Chinook salmon, koi, and Pacific herring) in the *Diseases of Aquatic Organisms* journal December 2013 issue (<http://goo.gl/jQqJsO>). This was the first study to directly compare mortality in fish experimentally exposed to VHS virus strains from the Great Lakes, North American West and East coasts, and Europe. For additional information contact **Evi Emmenegger** at [eemmenegger@usgs.gov](mailto:eemmenegger@usgs.gov) or 206-526-2276.

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