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# ESA-LISTED STEELHEAD EXTINCTION RISK REDUCED WHEN THEIR RESIDENT TROUT MOTHERS CONSIDERED?

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The extinction risk faced by Endangered Species Act-listed Columbia River basin “steelhead” stocks may be overestimated given the fact that the contributions of rainbow trout to species viability is not considered, according to a recently published research article.

Genetic analysis of steelhead “kelt” recovered in the lower Yakima River in 2010 and 2011 show, respectively, that 20 percent and 7 percent of the fish, had resident rainbow trout mothers, according to the study.

Steelhead are indeed rainbow trout, both categorized as Oncorhynchus mykiss.

But the species is called rainbow trout if the fish spends its entire life cycle in freshwater, such as the Yakima River.

Steelhead, on the other hand, are born and later return to spawn in freshwater, but spend much of their life maturing in saltwater.

Steelhead kelt sampled for the study are fish that have spawned once and are trapped near Prosser Dam as they head downstream toward the Pacific Ocean, presumably with the intent of returning later to spawn again. Yakama Nation Fisheries captures the fish so they can be fed and cared for (reconditioned) so they can later be released in a healthier condition to spawn again.

Lower, Mid- and Upper Columbia River, Upper Willamette and Snake River steelhead stocks are listed under the ESA. Rainbow trout are not listed.

The recently published research results confirm suspected strong support for ocean-going “steelhead” trout from freshwater-based resident rainbow trout populations in Washington’s Yakima River.

“Cross-life-history form production may be critical to persistence of anadromous life histories within partially anadromous salmonid populations, particularly in areas where anadromous fish abundance is low due to natural or anthropogenic influences,” according to the research paper published earlier this year.

Lead author for the research article, “Resident rainbow trout produce anadromous offspring in a large interior watershed,” is Ian I. Courter of Cramer Fish Sciences in Gresham, Ore. Contributing authors are of David B. Child of DC Consulting in Yakima, Wash., James A. Hobbs and Justin J.G. Glessner of the Interdisciplinary Center for Inductively Coupled Plasma Mass Spectrometry, University of California, Davis, and Thomas M. Garrison and Shadia Duery of Cramer Fish Sciences.

The article was published by the Canadian Journal of Fisheries and Aquatic Sciences at http://www.nrcresearchpress.com/journal/cjfas

“In streams with ocean access, resident rainbow trout make significant contributions to anadromous steelhead runs,” Courter said. “This is true throughout the Columbia Basin and we demonstrated it pretty clearly in the Yakima. This is an important finding because it verifies that resident trout are important to the viability of ESA-listed steelhead populations.”

“This study represents the first successful attempt to quantify steelhead production rates from female resident rainbow trout across a large watershed. Otolith microchemistry techniques were used to determine the maternal life history (resident or anadromous) of 498 emigrating steelhead kelts in the Yakima Basin, Washington,” the study abstract says.

The otoliths or “ear bones” accumulate a detailed microstructure consisting of bands of opaque and translucent material, like the rings on a tree trunk. Fisheries biologists have discovered that they can assess a fish's life history by looking at changes in these patterns.

“Reproductive exchange between different life-history forms appears to be an important component of partially anadromous fish population biology that likely has an important effect on viability of anadromous life-history forms, such as steelhead,” the paper says.

“Codependence of multiple life-history types makes salmonid populations more resilient (Bisson et al. 2009) and may explain their ability to persist despite detrimental impacts from numerous, compounding sources of mortality. In the same way that a small amount of immigration from source populations can dramatically reduce extinction risk of stream-resident trout (Hilderbrand 2003), a small amount of cross-life-history form production may substantially reduce the probability of steelhead extinction,” the article says.

The year-to-year variation in the percentage of steelhead born to resident trout remains puzzling.

“We plan to continue collecting data in the Yakima watershed, with the vision of demonstrating how environmental variables, such as stream flow and temperature, influence interannual rates of anadromy and residency in partially anadromous O. mykiss populations,” Courter said.

The Yakima basin was chosen for the study for a variety, including its relatively large size (16,000 square kilometers in the interior Columbia Basin watershed that drains the eastern slopes of the Cascade Mountain Range and discharges into the Columbia River) and wide range of habitat types.

Hatchery steelhead supplementation has not occurred in the Yakima Basin since the early 1990s, and hatchery stray rates from other Columbia Basin populations remain low, the research paper says.

“Genetic analysis indicated that resident trout are similar to native steelhead and are quite distinct from the hatchery stocks (Busack et al. 2005). Thus, the lack of present-day O. mykiss hatchery influence makes the Yakima Basin an ideal place to study steelhead production by native resident rainbow trout across a variety of riverine habitat types over a large geographic area.”