USGS
science for a changing world
November 2015 | Issue 3.11

Western Fisheries Research Center (WFRC)

Western Fisheries Science News

Decommissioning of Condit Dam as shown by photos taken by time-lapse cameras by Steve Stampfli of White Salmon, Washington. (A) The initiation of dam removal before the reservoir was drained, (B) 100 percent decommissioned.

Dam Removal and Salmon Response in the White Salmon River, WA

Condit Dam is one of the largest hydroelectric dams ever removed in the U.S. Breached in a single explosive event in 2011, the White Salmon River once again provides habitat that has not been accessible to salmon and steelhead for over 100 years. The dam breaching released hundreds-of-thousands of cubic meters of sediment downstream onto the spawning grounds of a threatened species, Columbia River tule fall Chinook salmon (tule salmon). Over 500 dams have been removed in the U.S. since 2006, but studies that integrate biological and physical responses are rare (O'Conner et al. 2015). With dam decommissioning on the increase, understanding the best approach for removing sediment (for example the instantaneous 'blow-and-go' approach of Condit Dam, compared to the phased 'notch-it-down' approach used on the Glines Canyon Dam located on the Elwha River) and the ecological trade-offs will be important.

In a recent publication of River Research and Applications 10.1002/rra.2982, USGS WFRC scientist Jim Hatten[1] and colleagues from WFRC, USGS Idaho Water Science Center (IWSC), and U.S. Fish and Wildlife Service (USFWS), investigated how dam breaching affects channel morphology, river hydraulics, sediment composition, and tule salmon spawning habitat in the lower White Salmon River (river kilometer 0 – 1.7). In addition, field surveys were used to identify new spawning (Continued on page 2)

[1] Jim Hatten is a research biogeographer in WFRC's Columbia River Research Laboratory. His expertise is cell-based (GIS) predictive modeling, landscape ecology, and remote sensing. His professional experience includes a diverse portfolio ranging from work with Willow flycatchers in Arizona to climate change projects in the Yakima.

Events

WFRC Participates in First USGS Bay-Delta Science Planning Team: On November 29-30, Russell Perry and Steve Waste (WFRC) participated in the first meeting of the USGS Bay-Delta Science Planning Team. The USGS has been collecting key data and providing information to support many agency decisions and directions in the Bay-Delta, where both the state and federal agencies are working intensively to define a science-based strategy to reinforce California's water supply reliability while preserving and restoring the Bay-Delta ecosystem. The science planning team –developed by the USGS Pacific Region Bay-Delta Executive Board — is intended to assist involved USGS science centers and the regional office in coordinating USGS research in the Bay-Delta, and in developing advice and priorities for future studies. For more information, contact Russell Perry, rperry@usgs.gov or 509-538-2299.

USGS Presents Fish Health Science in Congressional Briefing Series: On November 20, 2015, WFRC Director Jill Rolland gave a talk on fish health in a USGS congressional briefing series in Washington, D.C. The briefing "Understanding the Disease: Science in Support of One Health" focused on how scientists are advancing a concept of integrated wildlife, domestic animal, human and environmental health—One Health. Rolland provided a briefing of research and recent advances in fish health at WFRC. For more information, contact Jill Rolland, jrolland@usgs.gov or 206-526-6291.

USGS at Elwha River Science Symposium: On November 18-20, 2015, scientists from WFRC participated in the 2015 Elwha River Science Symposium in Port Angeles, WA. (Continued on page 2)

activities upstream of the former dam site. Collaborating with IWSC and USFWS enabled WFRC scientists to better understand effects of dam removal downstream and upstream of former Condit Dam. As expected, breaching Condit Dam dramatically affected channel morphology and spawning habitat downstream due to a large load of sediment released from Northwestern Lake. New shoreline was created, islands developed, pools filled in, and riffles and glides formed. A two-dimensional habitat model found the mean probability of tule salmon spawning habitat increased almost 50 percent in the lower White Salmon River after dam breaching due to an increase in glides and riffles. In addition, seven kilometers of potential spawning habitat is now accessible upstream of Condit Dam. While the White Salmon ecosystem is still changing, the tule salmon run sizes appear healthy and stable.

The WFRC has been conducting multidisciplinary studies such as this to understand the outcomes of dam removal and guide future decisions. Providing research and data to evaluate the effects of dam removal and how ecosystems recover is an important role of WFRC. The USGS works with natural resource and water managers throughout the region on dam removal evaluations and have been involved with projects on many rivers, including the Elwha, Wind, Hood, and Sprague Rivers. In an effort to examine and synthesize current data, WFRC scientists Jeff Duda jduda@usgs.gov and Patrick Connolly pconnolly@usgs.gov are part of a Powell Center dam removal working group, to provide a better understanding of the multifaceted and interrelated consequences of dam decommissioning.

For more information contact Jim Hatten at jhatten@usgs.gov, or 509-538-2299, ext. 252.

Events (Continued)

Research ecologist Jeff Duda chaired the organizing committee for the symposium. Presentation led by WFRC scientists included "Subtidal community responses to increased sediment load during dam removal" (Steve Rubin); "Using aquatic environmental DNA (eDNA) to track fish recolonization following dam removal on the Elwha River" (Carl Ostberg); and "Sea star wasting observations in the Elwha nearshore" (Nancy Elder). The symposium provides a venue for scientists to gather and share their research results describing the outcomes of dam removal and their plans for future research and monitoring. For more information, contact Jeff Duda, jduda@usgs.gov or 206-526-2532.

USGS Participated in Salmonid Bacterial Kidney Disease Workshop in Chile: On November 10-13, Diane Elliott gave an invited presentation at a workshop on salmonid bacterial kidney disease (BKD), held in Puerto Varas, Chile. The workshop focused on strategies for improved management of BKD in cultured salmonid fishes in Chile. The WFRC is the OIE (World Organization for Animal Health) reference laboratory for this globally important disease, which occurs in both wild and cultured salmonids and causes significant fish losses in Chilean aquaculture. Scientists at WFRC have developed and validated several of the standardized assays used for BKD diagnosis, as well as one of the methods most widely practiced in aquaculture and

Events (Continued)

conservation hatcheries for preventing transmission of the causative pathogen, *Renibacterium salmoninarum*, from parent fish to their progeny. For more information, contact Diane Elliott, dgelliott@usgs.gov or 206-526-6591.

Honors

USGS Scientist Receives Conservation Award from Desert Fishes Council: On November 20, scientist emeritus Gary Scoppettone received the prestigious W.L. Minckley Conservation Award through the Desert Fishes Council. The Award recognizes individuals or organizations whose work has significantly influenced the conservation of desert aquatic ecosystems and/or the native organisms dependent on them. For more information, contact Eric Janney, ecjanney@usgs.gov or 541-273-8689 x202.

Publications

Brieuc, M.S.O., M.K. Purcell, A.D. Palmer, and K.A. Naish. 2015. Genetic variation underlying resistance to infectious hematopoietic necrosis virus in a steelhead trout (*Oncorhynchus mykiss*) population. Dis. Aquat. Org. 117(1): 77-83. DOI: 10.3354/dao02933.

Hatten, J.R., T.R. Batt, J.J. Skalicky, R. Engle, G. J. Barton, R.L. Fosness, and J. Warren. 2015. Effects of dam removal on tule fall Chinook salmon spawning habitat in the White Salmon River, Washington. River Res. Appl. (*Early View*). DOI: 10.1002/rra.2982.

Kock, T.J., J.W. Beeman, A.C. Hansen, H.C. Hansel, G.S. Hansen, T.W. Hatton, E.E. Kofoot, M.D. Sholtis, and J.M. Sprando. 2015. Behavior, passage, and dowstream migration of juvenile Chinook salmon from Detroit Reservoir to Portland, Oregon, 2014-15: U.S. Geological Survey Open-File Report 2015-1220, 30 p., DOI: 10.3133/ofr20151220.

Ostberg, C.O., D.M. Chase, and L. Hauser. 2015. Hybridization between Yellowstone cutthroat trout and rainbow trout alters the expression of muscle growth-related genes and their relationships with growth patterns. PLoS ONE 10(10): E0141373. DOI: 10.1371/JOURNAL.PONE.0141373.

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