

January 17, 2017

For Immediate Release

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Fall pulse flows prompt limited response in migrating salmon on the Stanislaus River, new study finds

OAKDALE, Calif. – It’s no secret that salmon need water, but just how much water brings them the most benefit and when is often a subject of debate. A new study by fisheries researchers at FISHBIO finds that releasing prescribed volumes of water from reservoirs in pulse flows has had a limited effect on stimulating adult salmon migration in the Central Valley’s Stanislaus River. Pulse flows are intended to mimic the natural variability found in undammed rivers, and are often expected to cue fish migration. However, the new study published in the current issue of the North American Journal of Fisheries Management finds that other management actions, such as installing a rock barrier downstream at the Head of Old River, produced a larger positive response in salmon movement than pulse flows.

Although managed pulse flows have been released on the Stanislaus River every October since 1992, this is the first study to examine how Chinook salmon are actually responding to the water releases. The study examines 11 years of salmon migration data collected between 2003 and 2014 at a weir on the Stanislaus River, a major tributary to the San Joaquin River. The weir is a seasonal fish counting station installed every fall to record the number and timing of fish moving through the river, particularly adult fall-run Chinook salmon on their spawning migration.

FISHBIO scientists analyzed how management actions, such as managed pulse flows and the installation of the Head of Old River Barrier, as well as environmental factors such as temperature and dissolved oxygen, affected the timing and patterns of adult salmon migration. They found support that pulse flows stimulated salmon migration in only two of the 11 years studied, and that the response in fish migration was small and short lived, lasting only for a few days. The study also found that flows higher than 700 cubic feet per second (cfs) did not prompt any additional migratory activity, suggesting 700 cfs may be an optimal amount of water to release to achieve a response in salmon movement.

Other factors that had a more pronounced effect on prompting salmon movement in the river included installation of the Head of Old River Barrier, a temporary rock barrier that is periodically installed in the fall to improve the amount of dissolved oxygen in the San Joaquin River. The positive effect of the Head of Old River Barrier suggests a viable management action for improving conditions for salmon migration that could be considered in times of drought when water supplies are limited. A new video released by FISHBIO further describes the results and recommendations of the study.

“This study highlights the importance of long term monitoring to understand fish responses to management actions in highly variable environments”, says Doug Demko, FISHBIO President. “Research findings such as these don’t come in a year or two.” Demko also notes pulse flows began as an experimental management action, but were adopted as a regulatory requirement without any scientific research or monitoring to evaluate or support their effectiveness. The new study is the first to formally

examine the relationship between environmental factors, pulse flows, and Chinook salmon migration on a regulated river in California's Central Valley. The Oakdale and South San Joaquin irrigation districts and the Tri-Dam project provided funding for the long-term salmon monitoring on the Stanislaus River that formed the basis of the study.

About FISHBIO: *FISHBIO is a fisheries and environmental consulting company with offices in Chico, Oakdale, and Santa Cruz, Calif., and Vientiane, Laos. FISHBIO is dedicated to advancing the research, monitoring, and conservation of fishes around the world*

Link to project video: <https://www.youtube.com/watch?v=kRUU1PIZAec>

Link to publication: <http://afs.tandfonline.com/doi/full/10.1080/02755947.2016.1240120>

Photos of salmon monitoring on the Stanislaus River: <https://www.flickr.com/photos/fish-bio/albums/72157660781376826>