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FISHERIES NETWORKS: BUILDING ECOLOGICAL, SOCIAL, AND PROFESSIONAL RELATIONSHIPS

Th-2,3-18 Outmigration Behavior of Juvenile Chinook Salmon in a River Bend in the Sacramento River At Clarksburg California

*Thursday, August 23, 2012: 1:30 PM
Meeting Room 2,3 (RiverCentre)*

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Federally listed Sacramento River Chinook salmon juveniles must survive passage through the Sacramento – San Joaquin River Delta (The Delta) in order to successfully emigrate to the ocean. The combination of physical and biological processes that control the route selection, emigration rate, and survival of juvenile salmon in The Delta are poorly understood. In the winter of 2006/2007 the The U.S. Geological Survey California Water Science Center Hydrodynamics project team conducted an experiment designed to gain additional insight into juvenile salmon outmigration.

Five hundred acoustically tagged juvenile Chinook salmon were released into the Sacramento River in Sacramento, CA, and their behavior was monitored 25 river kilometers downstream at a sharp bend in the river near Clarksburg, California. At the study site the position of tagged fish was tracked in three dimensions using a 1 km long array of 36 hydrophones. In addition to the acoustically tagged salmon, approximately 100,000 juvenile Chinook salmon were released at the same time, and their position in the river cross section was monitored using eight split beam echosounders. In order to understand the effect of water velocity patterns on the outmigrating juveniles, downward looking vessel based ADCP transects were collected continuously for the entire period that fish were present in the study site.

Analysis of observed fish distributions in conjunction with the velocity data show that juveniles utilize different riverine habitat to hold position during daylight hours and to move downstream during crepuscular or dark hours. Observed data also suggests that secondary circulation effects caused by the river bend influence the location of outmigrating juvenile salmon in the river cross-section. Further, analysis of individual tracks shows the importance of velocity heterogeneity for successful holding behavior, and provides insights into the behavior of predators that consumed multiple tagged juvenile salmon.

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