Evaluation of a Waste Water Discharge Plume Using Scanning Split-Beam and 3D Acoustic Tag Tracking Techniques

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As part of a study to assess the thermal impacts of the discharge of waste water effluent, hydroacoustic monitoring was combined with a concurrent 3D acoustic tag tracking study. In the spring of 2012, fixed aspect, scanning, split-beam hydroacoustic techniques were implemented in the Sacramento River, directly downstream of a treated waste water effluent pipe. Hourly estimates were made of fish density, fish target strength, and fish direction of movement utilizing two split-beam hydroacoustic transducers scanned a total of 14 different aiming angles. In addition, 298 Chinook salmon smolts and 99 predatory fish were acoustical tagged and released. An area approximately 100 m upstream and 100 m downstream of the discharge were monitored and the tagged out-migrating Chinook smolts and tagged predatory fish movements were tracked in 3D.

The impact of the thermal discharge plume appeared to have little impact on the Chinook smolts’ downstream outmigration. In addition, densities of predators around the discharge pipe was relatively low. There were indications of predation on the Chinook smolts, however no predation events occurred in the discharge pipe monitoring area. This was a successful implementation of combining fixed location scanning hydroacoustic techniques with 3D acoustic tag tracking techniques.

Key words: Hydroacoustics, Split-Beam monitoring, Fixed Location monitoring, Scanning Hydroacoustic Techniques, Acoustic Tags, 3D Tracking