**Sparkman, Michael D – California Department of Fish and Wildlife**

**Presentation Title: Sonar Estimation of Adult Steelhead: Various Methods to Account for Kelts in Determining Total Escapement**

Abstract for the 2018 Pacific Coast Steelhead Management Meeting

Michael D. Sparkman

CDFW Fisheries Biologist/Environmental Scientist

50 Ericson Court, Arcata, CA 95521

[Michael.Sparkman@wildlife.ca.gov](mailto:Michael.Sparkman@wildlife.ca.gov)

707 601 6057

Advances in sonar technology (DIDSON, ARIS) have enabled accurate and precise estimates of the number of salmon migrating upstream. In general, net escapement equals the number of fish moving upstream through the sonar beams minus the number moving downstream through the beams. Fish moving downstream are considered ‘millers’ and unspawned fish, which will eventually move back upstream. Enumerating winter-run steelhead with sonar is more challenging because not all fish moving downstream are millers, rather, some portion will be kelts that have previously spawned. These kelts, if subtracted from upstream moving fish, would negatively bias the abundance estimate. CDFW AFRAMP has been using sonar to quantify winter-run steelhead for the past five years, and we are investigating various methods to account for the downstream migration of kelts. This presentation will focus on several methods with the aim of scientific feedback and repeatability of a given method over time. The accuracy of each method we propose would be increased with a general knowledge of the life history of steelhead in a given stream, location of sonar within the stream basin, and research (radio telemetry) designed to qualify the timing(s) of kelt migrations.