

Title: Ocean movement and behavior of steelhead kelts revealed by pop-up satellite archival tags

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Abstract

Steelhead (*Oncorhynchus mykiss*) populations have declined along the southern extent of their North America range in the last century. While their freshwater life history is well-studied, their ocean ecology is largely unknown. Unlike most anadromous Pacific salmonids, steelhead are iteroparous. Gaining insights to the oceanic phase of post-spawning adults, or kelts, is therefore critical for maintenance and management of this diverse life history strategy that ensures species persistence. Conventional and acoustic tag technologies have retrieval and data collection limitations in the ocean environment. Thus, in 2018, 2019, and 2020 we tagged outmigrating kelts with pop-up satellite archival tags (PSATs) at nearly opposite ends of the North American range - Scott Creek, CA and Situk River, AK. Here, we report tracks from 5 CA and 16 AK tags that remained attached to steelhead for 3-172 d. Steelhead occupied an average depth of 8.6 ± 23.1 m and average temperature of 12.7 ± 1.1 °C off CA, and 2.2 ± 2.5 m and 11.0 ± 1.3 °C off AK. The farthest distance traveled by an individual kelt was over 2,600 km, from Situk River, AK to the western end of the North American Aleutian Islands and into the southern edge of the Bering Sea. We describe steelhead migratory pathways, diving behavior, and environmental preferences across regions and years. These results provide valuable first steps to understanding steelhead ocean ecology across the Pacific coast.