**Harbor Seal – Steelhead trout interactions in Puget Sound**

**B. A. Berejikian1,\*, M. E. Moore1, and S. J. Jeffries2**

**1Environmental and Fisheries Sciences Division, Northwest Fisheries Science Center, National Marine Fisheries Service, NOAA, 7305 Beach Drive East, Port Orchard, WA 98366**

**2Washington Department of Fish and Wildlife, 600 Capitol Way North, Olympia, WA 98501**

\*Corresponding author: [barry.berejikian@noaa.gov](mailto:barry.berejikian@noaa.gov), Ph: 360-871-8301

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ABSTRACT:

Changes in the Puget Sound ecosystem over the past three decades include increases in harbor seal (*Phoca vitulina*) abundance and declines in a number of their preferred prey species. Steelhead trout (*Oncohrynchus mykiss*) smolts, which suffer high early marine mortality but are not known to be an important prey resource for harbor seals, were implanted with acoustic transmitters. Harbor seals were outfitted with acoustic telemetry receivers and GPS tags to investigate spatial and temporal overlap and evidence for predation by harbor seals on steelhead smolts. A total of 6,846 tag detections from 44 different steelhead trout smolts (from an initial group of 246 smolts released into two rivers) were recorded by the 11 recovered seal-mounted receivers. Central Puget Sound seal receivers detected a greater proportion of smolts surviving to the vicinity of the haul-out locations (29 of 51; 58%) than Admiralty Inlet seal receivers (7 of 50; 14%; P < 0.001). Detection data suggest that none of the tagged smolts were consumed by the 11 monitored seals. Nine smolts were likely consumed by non-tagged harbor seals based partly on detections of stationary tags at the seal capture haul-outs, although we cannot exclude the possibility that some tags could have been deposited near the haul-outs by other predators. Smolts implanted with continuously pinging tags and smolts implanted with tags that were silent for the first 10 days after release were detected in similar proportions leaving Puget Sound (95% CI for the difference between proportions = -0.105 to 0.077) and stationary at harbor seal haul-outs (95% CI = -0.073 to 0.080). This study suggests that harbor seals contribute to mortality of migrating steelhead smolts, and we hypothesize that documented changes in the Puget Sound ecosystem over the past several decades may currently put steelhead smolts at greater risk of predation by harbor seals and possibly other predators.