

Use of PIT Tags to Evaluate Predation by Colonial Waterbirds on Juvenile Salmonids

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Juvenile salmonids (*Oncorhynchus* spp.) tagged with passive integrated transponders (PIT) have been released into the Columbia River Basin since 1987 to answer a variety of research questions. When piscivorous birds prey upon tagged fish, the tag is often regurgitated intact with the bone pellet. The tags are often subsequently deposited in a localized area, such as a nesting colony. Sufficient tags may be present to provide estimates of predation, prey vulnerability, and effects of migration on prey susceptibility. Since 1998, we have detected over 300,000 juvenile salmonid PIT tags on colonial waterbird nests in the lower Columbia River and estuary. Data from these detections have shown juvenile steelhead (*O. mykiss*) to be more vulnerable to avian predation than other juvenile salmonids, with the exception of juvenile salmonids that migrate from streams and rivers that empty directly into the Columbia River estuary. For these fish, fall chinook salmon (*O. tshawytscha*) were more vulnerable than other salmonids. In addition, juvenile salmonids transported and released downstream from Bonneville Dam were generally less susceptible to avian predation in the estuary than their in-river-migrating cohorts. Finally, hatchery chinook salmon were more vulnerable than wild chinook salmon, while hatchery and wild steelhead were equally vulnerable.