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Release of hatchery adult steelhead for angler opportunity increases potential for interactions with endemic steelhead

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Abstract. Translocation is often used to increase local abundance of fish and wildlife populations for conservation or harvest purposes, and effects of releases on recipient populations are context dependent. Release of non-local animals intended for harvest can have negative demographic, genetic, and ecological risks to endemic populations when not harvested. In 2012–2014, we used radiotelemetry to monitor the fate and potential for interactions between non-local hatchery-origin adult summer-run steelhead *Oncorhynchus mykiss* (n = 423) and Endangered Species Act (ESA)-listed native winter-run steelhead (WRS) in two tributaries of the Willamette River, Oregon, USA. Summer steelhead were recycled—collected, translocated downstream, and released—to provide additional angler opportunity as a part of a regional mitigation program. Overall, reported harvest rate of recycled steelhead was low (15%) and a majority of individuals (62%) were last recorded in the release tributary. Furthermore, 14% of radio-tagged recycled steelhead were last detected outside the release tributary (i.e., strayed after release). Expanded estimates indicate the number of recycled summer-run steelhead remaining in the South Santiam River exceeded the WRS spawning population size. Low reported harvest and straying and demographic estimates indicate the recycling program may have negative effects on endemic WRS. Translocation and hatchery supplementation are likely to remain important conservation and mitigation tools in the future, though these results highlight the importance of post-release monitoring and considering both the risks and benefits of translocations to endemic populations and communities.

Key words: endemic; harvest; hatchery; non-local; recycling; steelhead; translocation.

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Introduction

The intentional release of animals (i.e., translocation) to increase abundance for conservation or harvest is a widely applied management strategy for fish and wildlife populations. Releases can buffer imperiled populations from extinction by creating self-sustaining populations (Griffith et al. 1989), reducing the effects of climate change through assisted colonization (Hoegh-Guldberg et al. 2008), and increasing genetic heterogeneity (Deredec and Courchamp 2007, DeMay et al. 2016). Programs may also be production-focused and enhance socially and economically important harvest opportunities (Allen 1956), which can both increase and decrease the risk of mortality to native populations. The release of animals outside their historic native range (i.e., introduction) or restocking of non-local conspecifics (i.e., genetically exotic populations; Armstrong and Seddon 2008, Champagnon et al. 2012) can have direct and indirect adverse effects on endemic biodiversity (Allendorf and Waples 1996, Gebhardt 1996, Westemeier et al. 1998, Christian and Wilson