B.C.'s Keogh steelhead as an indicator and example of the challenges of climate change and species at risk

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Monitoring of steelhead trout (*Oncorhnychus mykiss*) and other salmonines in ecological research at the Keogh River on northern Vancouver Island, B.C., since 1975 has provided key opportunities to generate advances in stock status decision tools and reference points. This now includes advances in technological applications such as electronic escapement enumeration. Meanwhile, watershed-level ecological restoration applied as a recovery tool during the freshwater life stages of salmonid growth has proven successful to offset sudden, dramatic and persistent declines in survival during the oceanic life stage. Recruitment below replacement levels and a local extinction vortex were elevated to the point where the population of steelhead may once again thrive if ocean conditions improve marginally and/or fish adapt quickly. Success with experimental captive rearing for one generation to more fully seed the river also depends on improved survivals in its aftermath and may allow faster rebuilding if hatchery impacts do not further reduce fitness in wild production. Recent monitoring at Keogh suggests no immediate improvement in smolt survival at sea, but there is need for much more intensive monitoring in a network of index systems to verify the extent and magnitude of risk associated with marine survival variance. In time, this and related studies on migration patterns will provide a better understanding of the reasons and future patterns related to changes to oceanic conditions associated with climate change. The recent positive signs of potential recovery at the Keogh have encouraged recovery teams and recovery plans for the streams of the east coast of Vancouver Island; many steelhead populations therein are of similar or poorer status arguably requiring immediate restoration efforts. This need for intensive restoration and monitoring efforts has induced a call for a new partnership approach. However, constraints of time and cost required to implement this new manner of ecosystem management may be too great, at least for several of the smaller and more vulnerable populations of fish.