**Post-smolt growth effects on the pattern of marine survival of Keogh River steelhead**

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*Abstract*

The population of anadromous steelhead trout (*Oncorhynchus mykiss)* in the Keogh River has been studied intensively in part because of their pattern of declining recruitment which is largely attributed to poor marine survival. Climate variability has changed the productivity of salmonid species in all regions of the North Pacific, with areas alternately shifting between periods of enhanced and depressed productivity. The mechanisms governing marine survival and adult recruitment are central to contemporary concerns related to resource management, but are also of concern in regard to the long term prospects of managing biodiversity. We provide evidence that post-smolt growth contributes to the pattern of marine survival of Keogh River steelhead over the period corresponding to the 1977-1999 smolt years. Size at ocean entry does not appear to have sufficient contrast to affect survival significantly. However, assessment of scale growth suggests that the initial growth of the fish at sea is not as important as the sustained growth conditions during the summer and fall of the post-smolt year. The distribution of sea surface temperature (SST) in the ocean domains assumed to provide post-smolt nursery habitat for steelhead show that return rate has been negatively correlated with SST, suggesting that growth is either directly affected by warming conditions or that ocean warming affects the food web steelhead depend upon. Steelhead appear to respond to changing climate and growth regimes in a similar fashion to their North Atlantic analog, Atlantic salmon (*Salmo salar*). These comparative data show that eastern basin populations are negatively affected by a thermal regime of increasing temperature during the post-smolt year, suggesting a relationship between post-smolt growth and survival.