

Is Declining Sockeye Salmon Survival the Result of Competition at Sea and Declining Carrying Capacity?

James R. Irvine¹ and Scott A. Akenhead²

¹*Fisheries and Oceans Canada, Pacific Biological Station, 3190 Hammond Bay Road, Nanaimo, BC V9T 6N7, Canada*

²*The Ladysmith Institute, 11810 Fairtide Road, Ladysmith, BC V9G 1K5, Canada*

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Many sockeye salmon (*Oncorhynchus nerka*) populations in the eastern North Pacific experienced significant productivity declines that began about 1990, but there is no consensus on the mechanisms responsible. We examined the 50-year time series for two age classes of sockeye salmon smolts from Chilko Lake in central British Columbia, Canada. Our new survival time series shows a clear pattern break in smolt survival ~1991, when a trend of increasing survival in 1960-1990 changed to a lower and declining survival trend in 1992-2008. We present a simple model to illustrate how increased competition at sea, related in part to the release of large numbers of hatchery salmon in conjunction with changes in ocean productivity, may have played a significant role in improving sockeye salmon survival while reducing their growth before 1991, and reducing survival while the growth of survivors showed no effect afterwards.