

Title: A Multi-Scale Evaluation of Screened Diversions in the Yakima Subbasin

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Abstract:

There is little quantitative information about the benefits of past restoration projects at improving salmon survival and productivity. The Bonneville Power Administration and Bureau of Reclamation funded construction of improved fish screens at major irrigation/power diversions within the Yakima Subbasin, WA from the mid 1980's to early 1990's (Phase I screens). Localized monitoring has indicated that the screens functioned as intended, roughly doubling the survival of spring chinook smolts at a major irrigation canal. We extended these data into an index of the improving cumulative survival of smolts past all major screened Yakima canals (Sc). To test if improvements in Sc contributed to increased subbasin productivity of spring chinook (adult returns/spawner or smolts/spawner), we developed a series of log-linear regression models based on Ricker-type-stock-recruitment relationships and environmental covariates, using other stocks as controls in a BACI design. Surprisingly, Sc was either not correlated or negatively correlated with chinook productivity. Climate variability in both the freshwater and ocean phases of the life history, as well as possibly other stressors within the watershed (e.g., changed hydrology), appear to have swamped any detectable fish screening benefits to overall productivity. A longer period of pre-implementation monitoring and greater spatial / temporal contrasts in implementation of screens within the Yakima subbasin would have increased the chances of detecting an overall effect on chinook productivity. Lessons learned from the Yakima analysis and other Columbia Basin habitat project evaluations contributed to recommendations for system-wide improvements in monitoring designs outlined in ESSA's recent Multi-Watersheds report, and have helped frame discussions for CBFWA's current Collaborative Systemwide Monitoring and Evaluation Project (CSMEP).