

# How Past Research has Informed Decision-making on Columbia River Estuary Restoration and Future Research Needs

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## Abstract

A comprehensive analysis of available historical data and hydrodynamic models of the Columbia River estuary demonstrate that physical and ecological changes in estuarine habitat, combined with a simplification of salmon population structure and life-history diversity, have contributed to loss of salmon stocks.

NOAA Fisheries' December, 200, Federal Columbia River Hydropower (FCRPS) Biological Opinion identifies a number of estuary related actions as off-site mitigation to improve salmon survival in the Lower Columbia River and estuary. Action 160 (Develop and implement an estuary restoration program with the goal of protecting and enhancing 10,000 acres of tidal wetlands and other key habitats) and Action 161 (fund a monitoring and research program acceptable to NMFS) in particular relate to restoration and research.

Using the FCRPS Biological Opinion as an example of how past research can inform the implementation of these actions, the following restoration and research needs are identified:

- Protect and restore salmon access to forested wetlands and tidal floodplains;
- Expand the phenotypic diversity of salmon;
- Reconstruct historic changes in estuarine rearing opportunities and food-web linkages of Columbia River Salmon and evaluate their implications for managing river flows and restoring estuarine habitats;
- Monitor, on a long-term basis, the variations in salmon life-history diversity, habitat use, and performance in the estuary; and
- Develop the necessary tools to house, manage, and disseminate the data and information.