



# Genetic Identification of Sockeye Salmon in Cook Inlet

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## Historical Studies

The Exxon Valdez Trustee Council funded the collection of genetic data from all major systems in Cook Inlet during the years 1992 to 1998. Allozyme analysis based on proteins revealed a substantial amount of genetic diversity among populations distributed both within and among major drainages. These baseline data were used to estimate the proportion of source populations in upper Cook Inlet fisheries. Results indicated that six regional groups (Figure 1) could be identified in mixtures at a level of precision and accuracy useful for fishery management (Figure 2).

Unfortunately, many factors including changes in instrumentation, increased cost of chemicals, and difficulty in sampling fresh frozen tissues have eroded the utility of allozyme analyses today. However, rapid advances in DNA chemistry have provided new genetic markers that are faster, much cheaper, and provide greater resolution than allozymes.

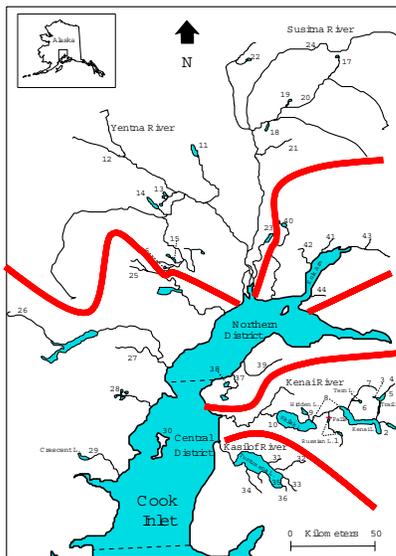


Figure 1. Analysis of 44 populations identified six regional groups that could be identified in mixed stock fisheries: W. Cook Inlet, Susitna, Knik Arm, NE. Cook Inlet, Kenai, and Kasilof.

## New DNA Markers

Alaska Department of Fish and Game, using grants from the North Pacific Research Board, Pacific Salmon Commission, and NOAA Fisheries (as well as general funds from the state legislature) has assembled the most modern DNA markers and instrumentation used anywhere in the world for fisheries studies. These new DNA markers, called single nucleotide polymorphisms or SNPs, have already provided greater resolution than any other markers in similar studies of Bristol Bay sockeye salmon.

## Current Study

ADF&G sought and obtained general funds to update the Cook Inlet baseline data using SNPs (completion due fall 2006). These new data will be used to analyze mixtures collected during the 2005-2007 drift and set gillnet fisheries (due winter 2008). We anticipate providing the Board of Fisheries stock composition information with resolution equal to or greater than that obtained during the 1990s.

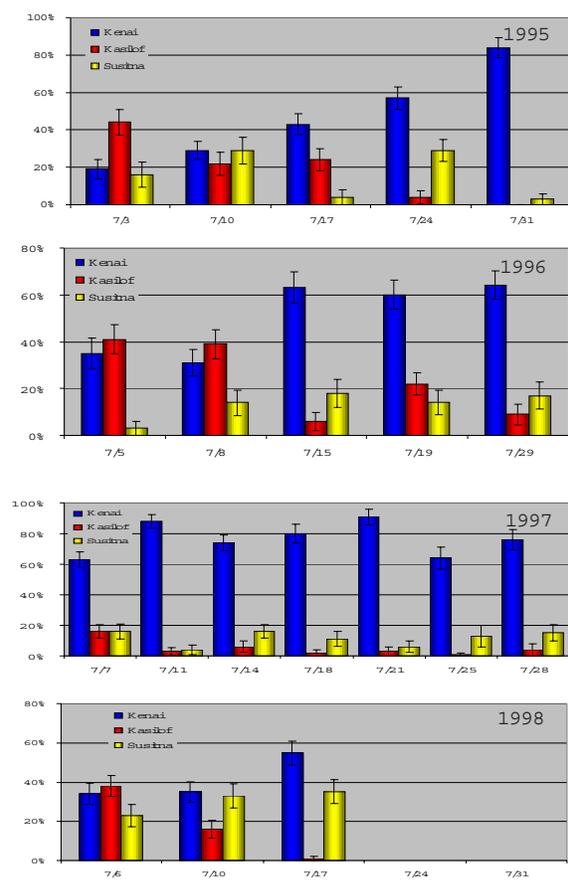


Figure 2. Stock composition of the Cook Inlet drift gillnet fishery 1995 -1998. Only the largest-contributing groups (Kenai, Kasilof, and Susitna rivers) are shown.

## References

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- Smith, C.T., W.D. Templin, J.E. Seeb, and L.W. Seeb. 2005. Single Nucleotide Polymorphisms (SNPs) provide rapid and accurate estimates of the proportions of U.S. and Canadian Chinook salmon caught in Yukon River fisheries. *N. Am. J. Fish. Man.* 25:944-953.