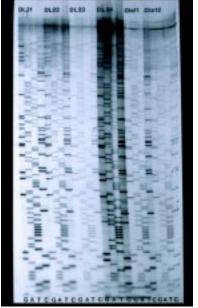
Forensic genetic techniques for enforcement of salmon ESA listings on the West Coast

Problem Statement

In the field, National Marine Fisheries Service (NMFS) Enforcement officers are sometimes unable to distinguish between salmon populations listed under the Endangered Species Act (ESA) and those that are unlisted. In those instances, forensic assistance is required to determine if the ESA has been violated.

Critical Factors

- Individuals from a listed population can frequently be found co-mingling with individuals of a population from the same species that is not protected under the ESA (e.g., wild fish found in the same stream as hatchery fish).
 - In cases where no external, physical characters (e.g., a fin clip) distinguish listed fish from unlisted fish, DNA markers may identify an individual's population of origin.
 - Current fish identification databases are not specific enough for many forensic cases and must be augmented by this kind of genetic data.



DNA sequence of six salmon

Status of Research

Scientists at the Northwest Fisheries Science Center (NWFSC) have developed molecular techniques for rapidly identifying salmon species using DNA markers and are now working to identify individual populations within those species. Genetic databases for individual species make it possible to estimate the level of resolution that these markers can provide in determining the population of origin for a given fish. Researchers are also in the process of compiling genetic data from multiple agencies (e.g., U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, Alaska Department of Fish and Game) in order to expand these species databases for use in pending legal cases and are prepared to collect additional genetic data for those specific cases where necessary.

Future Considerations

Recent ESA listings in the Puget Sound region, where the impact of hu man activities on salmon habitat is high, will lead to increased legal action on the part of the NMFS's Enforcement Division. As a result, the

technical support provided by researchers at the NWFSC will become increasingly important because genetic markers are a major tool for determining the population to which a given fish belongs. Researchers at the NWFSC also assist the NMFS Enforcement Division in documenting evidence of harm to protected salmon populations.

Key Players

Conservation Biology (CB) Division, NWFSC

Enforcement Division, NMFS
National Fish and Wildlife Forensics Laboratory, U.S. Fish and Wildlife Service
Washington Department of Fish and Wildlife
Alaska Department of Fish and Game
U.S. Geological Survey
University of Idaho

Contact: Dr. Peter Kareiva, Director, CB Division (206/860-3403)

