

Six decades of fishery genetics: A retrospective view and a vision for the future

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Sponsored by:
NOAA's Northwest Fisheries Science Center
School of Aquatic and Fishery Sciences, University of Washington

Background

In the 1960s the advent of protein electrophoresis revolutionized the fields of genetics and evolutionary biology, and Dr. Fred Utter, with his team of scientists at the Montlake Laboratory (current headquarters of Northwest Fisheries Science Center), were among the first to adopt these methods for application to natural fish populations for conservation and management. These new methods were used to provide fresh insight into questions such as "How many stocks exist?" and "How can we tell the different stocks apart?", which have been central problems for fishery management for the past century. Dr. Utter also developed a strong relationship with the University of Washington School of Fisheries (now the School of Aquatic and Fishery Sciences) that enabled many students to gain experience with and be trained in the use of genetics and evolutionary biology as applied to fisheries management issues. Many of these students are now prominent figures in the field. The late 1980s and 1990s saw the rapid development of DNA techniques, which initially supplemented and now have largely replaced protein electrophoresis as a fishery management tool. In addition to bringing greater power of resolution and the capability of non-lethal sampling to traditional fishery genetics questions, DNA methods have opened up a vast new range of applications in modern marine biology—from ecosystem assessment and ocean observation to seafood safety.

NOAA scientists and academic colleagues from the University of Washington and other institutions have played a major role in development and use of genetics and molecular biology to address key questions in fishery management. To build on that legacy, we are sponsoring a Symposium, dedicated to Fred Utter and his six decades of contributions to fishery genetics, that will be both retrospective (reviewing applications up to the present day) and prospective (looking ahead to new developments in the next decade).

The Symposium

The two-day symposium will be held at the Museum of History and Industry, a 5-minute walk from the NWFSC and the University of Washington in Seattle. The symposium will trace the history of advances in the fields of genetics, biotechnology and evolutionary biology and will feature three major themes: 1) An historical perspective on development of the field; 2) An assessment of the current state of the art in applying genetic methods to fishery management; 3) Prospects for the future. Major topics covered during the meeting include stock and species identification, mixed-stock fishery analysis, forensics, ecological genetics, hatchery-wild interactions, aquaculture, environmental effects, health and physiology, microbial pathogens, and future applications of molecular tools and approaches to fisheries and ecosystem assessment. Confirmed speakers include leading scientists from Europe, Asia and North America. A poster

session will provide an opportunity for participants to view the wide range of applications of genetic methodology to real-world problems of fishery management relevance. We expect the audience will include academic and agency scientists and managers doing research on (or interested in) genetics, fisheries and ecosystem management, population dynamics, ecology, stock structure, aquaculture, marine enhancement, fish physiology, and microbiology.

The molecular revolution in biology is just getting underway – changing how we conduct research and opening new approaches and tools for management of natural marine resources and large marine ecosystems. The increasing capacity and reduced costs for high-throughput DNA sequencing, comparative genomics, detecting changes in gene expression, and bioinformatics is fueling rapid changes in marine science. A key goal of the final part of the Symposium will be to bring together visionaries in two fields: those with knowledge about technology with a good sense for future developments, and those with the ability to envision how new technologies can be used to address practical questions in applied fishery management.