

NOAA Fisheries Service | National Oceanic and Atmospheric Administration | Department of Commerce

# *Northwest Fisheries Science Center*



# at Newport



# **Making Critical Connections 2007**

*The Pacific Ocean is home to an amazing cornucopia of creatures and habitats, from steep rocky cliffs and sandy bottoms to bright-colored sponges and camouflaged rockfish. These living marine resources are an important part of our region; they affect commerce, livelihoods, and our health and quality of life. The Northwest Fisheries Science Center studies living marine resources and their habitats in the Northeast Pacific Ocean, primarily off the coasts of Washington and Oregon and in freshwater rivers and streams in Washington, Oregon, and Idaho to assist resource managers in making sound decisions that build sustainable fisheries, recover endangered and threatened species, and sustain healthy coasts.*

*The Center is headquartered in Seattle and has five research stations in Washington and Oregon. The Center's Newport Research Station conducts critical research on groundfish, salmon, and the ecosystems in which they live. This station is located at Oregon State University's Hatfield Marine Science Center.*



### About Groundfish

Groundfish are fish that live on or near the bottom of the ocean, hundreds to thousands of feet below the water surface. They include species of rockfish, flatfish, groundfish, sharks, and skates. Many groundfish are long-lived, with some species living upwards of 100 years. It is critical that we continue to monitor these valuable species and their ecosystems.

### What we do

The Newport Research Station is the Center's only ocean-port research facility and is uniquely located in the midst of Oregon's groundfish and salmon industries. While based in Newport, the station's some 70 scientists and staff conduct research throughout the West Coast.

### Groundfish Research

The West Coast groundfish fishery includes some 80 commercially fished stocks off the Washington, Oregon, and California coasts and supports millions of dollars in economic activity and many livelihoods. In recent years the abundance of some of these stocks has seriously declined, affecting fishing communities, consumers, and marine ecosystems.

The Northwest Fisheries Science Center provides state-of-the-art scientific information on groundfish species, their habitats, and the fishery to support management decisions. The Center coordinates NOAA Fisheries' Groundfish Program on the West Coast and has four primary components: groundfish surveys, an observer program, ecosystem and habitat surveys, and stock assessments. Much of the Center's groundfish work is based and staged out of Newport.



### Cooperative Resource Surveys

The Center conducts groundfish surveys from the U.S.-Canada to the U.S.-Mexico borders to target important species using acoustic technologies, fixed gear, and midwater and bottom trawls. These surveys provide information about distribution, abundance, and age structure of groundfish populations. Based out of Newport, the

Center has continued its series of resource surveys in cooperation with the commercial fishing industry. Newport staff has used chartered commercial fishing vessels to survey for Dover sole, sablefish, shortspine and longspine thornyheads, and other groundfish inhabiting the continental shelf and slope. Increasing the number and frequency of surveys will improve our ability to track trends in the abundance of key groundfish species.

### Observer Program

The Center coordinates the West Coast Groundfish Observer Program. As part of this program, fisheries observers are placed on commercial fishing vessels to monitor and record catch data, including species composition of retained and discarded catch. They also collect critical biological data such as fish length, sex, weight, and age. The Center currently deploys observers coastwide on the permitted trawl and fixed-gear groundfish fleet, as well as on some vessels that are part of the open-access groundfish fleet. The Central Coast Observer Coordinator is based at Newport. Observers improve our understanding of fishing activities and help the Center provide accurate accounts of total catch, bycatch, and discard associated with different fisheries and fish stocks.

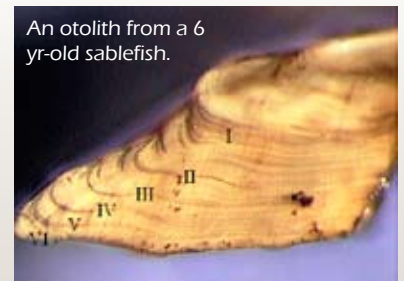


### Ecosystem and Habitat Surveys

Changes in marine ecosystems influence groundfish populations. Newport scientists conduct ecosystem and habitat surveys, using a variety of tools, to help determine how natural fluctuations in marine ecosystems affect fishery productivity, how human-caused stress affects the ecosystem and fishery, and the complex interactions between fish and their habitats. For example, Newport scientists co-lead an expedition to study and compare Astoria Canyon, a submarine canyon off the mouth of the Columbia River, with Heceta Bank, a historical groundfishing location and submarine plateau off Oregon's coast. Scientists mapped, explored, and documented the physical, chemical, and biological systems of the Canyon. Information collected will help answer questions about the distribution of invertebrates and fishes, the differences and similarities between fish and invertebrate populations in Astoria Canyon and Heceta Bank, and more generally, how the structure of the Canyon influences the distribution and abundance of biological life.

### Stock Assessments

Center scientists integrate information from observers, groundfish surveys, ageing studies, and fishermen into mathematical models and draw conclusions from the results. These assessments are one tool used by managers to identify overfished and threatened stocks and set biologically sustainable harvest levels. In 2005, Newport scientists completed stock assessments for sablefish and darkblotched rockfish. In addition, staff in Newport's Cooperative Ageing Unit aged otoliths to assist with assessments on English sole, darkblotched rockfish, Pacific hake, Pacific Ocean perch, and sablefish. Center scientists are expanding the number of assessments that are conducted, as well as refining the certainty of the information that is used in its assessments. For example, Newport scientists recently collaborated with industry, using commercial expertise, vessels, and gear to study the depth distribution of sablefish. This information will improve assessments for this species.



An otolith from a 6 yr-old sablefish.

### Otoliths

Otoliths ("ear stones") are small bony structures found in the heads of most fishes. Otoliths help fish maintain their sense of balance in much the same way as the human inner ear. Otoliths are permanent structures that record age and growth from the date of birth to the time of death. As the fish grows, so does the otolith. By counting how many growth rings are present, scientists can determine how old a fish is.

**“We will always strive to be at the leading edge of fisheries science that is directly applicable to current and future issues facing the Pacific Northwest.”**

**-- Usha Varanasi, Science and Research Director  
Northwest Fisheries Science Center**

#### About Salmon and Steelhead

Salmon are anadromous fish, which means that they live part or most of their lives in saltwater, but return to freshwater to spawn. There are five species of salmon on the West Coast—commonly referred to as coho, pink, chum, sockeye, and chinook. Steelhead are rainbow trout that have spent part of their life at sea. They are related to salmon and are considered a “salmonid.” Salmon and steelhead play a major role in aquatic and terrestrial ecosystems, are a central part of Native American spiritual and cultural identity, and support the Pacific Northwest and nation's economy.

#### Salmon Research

Over the past several decades, wild salmon populations have declined dramatically. These declines have been the result of many factors, including overharvest, hydropower systems, habitat destruction, and overreliance on hatcheries, as well as ocean variability and other environmental factors. Twenty-seven groups of salmon and steelhead populations in the Pacific Northwest are currently listed as threatened or endangered under the Endangered Species Act.

To protect, conserve, and sustainably use living marine resources, like salmon, we must better understand their biology and ecology, as well as the risks they face. Newport scientists are conducting critical research in these areas.

#### Fish Health

Salmon face a number of risks ranging from toxic chemicals in sediments and infectious pathogens to hydropower systems and habitat destruction. Each different life stage (e.g., egg, juvenile, or adult) and species is affected differently. Newport scientists study the characteristics and

impact of contaminants and disease on salmon health. For example, scientists are conducting research to understand how contaminants weaken the salmon immune system. They are also conducting research on how salmon take-up contaminants from the environment. This research is applicable to other marine fish and complements the Center's research in its other laboratories.



### Estuarine and Ocean Ecology

Salmon use a variety of ecosystems from freshwater streams and rivers to estuaries and the ocean. Newport scientists conduct research to better understand these ecosystems and their relationships to salmon. Scientists conduct critical surveys along the Pacific Coast, as well as in specific areas, such as the Columbia River plume and the Oregon upwelling zone. During these surveys, scientists collect a wide variety of data, including basic oceanographic information, as well as samples of juvenile salmon, pelagic fish (salmon predators), and zooplankton (salmon prey). This information is enabling them to develop a better picture of how, when, and to what extent juvenile salmon use estuarine and ocean habitats, and how changes in ocean conditions affect juvenile salmon growth and survival. For example, Newport scientists recently discovered that when waters off Newport are dominated by cold-water zooplankton species, salmon growth and survival is high, whereas when waters off Newport are dominated by warm-water zooplankton species, salmon growth and survival is low.

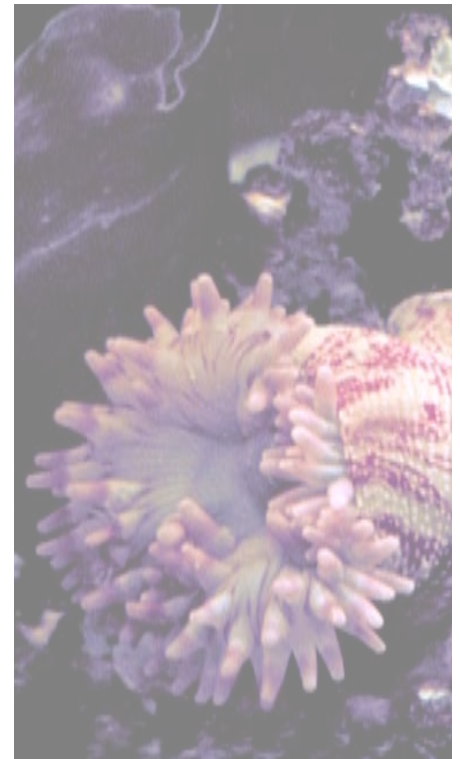


### Salmon Recovery

Newport scientists are directly involved in salmon recovery efforts; they are co-leading the Oregon and Northern California Coast Technical Recovery Team (TRT). This TRT is identifying independent coho populations in the region using genetic, habitat, and behavior information, assessing factors responsible for coho salmon decline (like habitat destruction and climate variability) and developing recovery goals (e.g., how many fish should there be and how should they be distributed in coastal rivers and streams?). Newport scientists are also developing models of coho salmon life history that incorporate habitat, climate, and harvest to help understand how the many factors influencing salmon in freshwater and the ocean interact to affect recovery plans.



Oregon/Northern California Technical Recovery Team



### Critical Ocean Observations

It is critical to better understand the ocean so that we can identify, predict, and mitigate changes in the ocean environment. Newport scientists conduct a variety of biological surveys to better understand how marine resources use and depend on ecosystems, including annual groundfish surveys, oceanographic and zooplankton surveys, surveys to investigate oceanographic conditions, and research efforts to develop and employ advanced and innovative technologies.

**We know the surface  
of the moon better  
than we know the  
surface of the  
seafloor.**

## Who we are

Newport scientists have diverse backgrounds and areas of expertise, but share a common goal—to provide state-of-the-art scientific information on living marine resources to support management decisions. Newport staff are members of the local community and are involved with numerous activities including coaching youth sports and beach cleanups. Many have raised families and retired in Newport.

### Meet a few of our staff:

#### Kym Jacobson

Kym studies the ecology of host-parasite interactions in marine fish communities, including pathogens that can affect fish survival and non-pathogenic parasites that tell us about fish biology. By understanding these interactions, Kym can determine, for example, the type and health of the ecosystem fish live in. “This is my dream job,” says Kym, because “I am able to work on fascinating organisms and conduct research that is directly applicable to species conservation and management.” Outside the office, one of Kym’s favorite activities in Newport is walking on the beach with her family and dog.

#### Pete Lawson

Pete conducts research on coho life cycle models, including the effects of climate and habitat on coho survival. In addition, he co-chairs the Oregon and Northern California Coast Technical Recovery Team and provides scientific advice on salmon populations to support decisions made by the Pacific Fishery Management Council and Pacific Salmon Commission. Since beginning his career in Newport in 1987, Pete has focused on natural populations of Oregon coho salmon. “I enjoy exploring relationships between salmon and various aspects of their environment and value the opportunity to bring sound science to applied management,” states Pete. Pete is a long-time resident of Newport and enjoys the “small-town” feel of the community along with its remarkable science and art.

#### Waldo Wakefield

Waldo has a background in oceanography, marine technology and fisheries, and coordinates research on habitat and conservation engineering. Waldo works with an interdisciplinary group of researchers linking the fields of marine geology and fisheries to study the habitat ecology of commercially important species of fish. He also conducts research on the development of modifications to fishing gears that could reduce bycatch/discard and habitat impacts in commercial fisheries. “I feel fortunate to work at a field station that is part of the Oregon State University Marine Science Center campus where there is such a talented and scientifically diverse group of researchers.”



## Where we work

All Newport Center scientists are based on Oregon State University's Hatfield Marine Science Center campus with about half the staff located in the new Captain R. Barry Fisher Building. The Newport station has a number of critical research facilities, including an ageing lab, a necropsy lab, a large flow-through seawater system, and specialized aquaria to conduct immunological and disease studies. Newport scientists use state-of-the-art tools and technologies, including acoustic technologies, side scan sonar, remotely operated vehicles, and laser line scan imaging. In addition, the Hatfield Marine Science Center's dock is used by NOAA research vessels and cooperative research vessels as a staging area for the Center's at-sea operations.



Captain R. Barry Fisher Building in Newport, Oregon.

## Who we work with

Collaborative research is an important part of what we do. Newport scientists work with a number of collaborators in government agencies, universities, Tribes, and the fishing industry. Collaborators include:

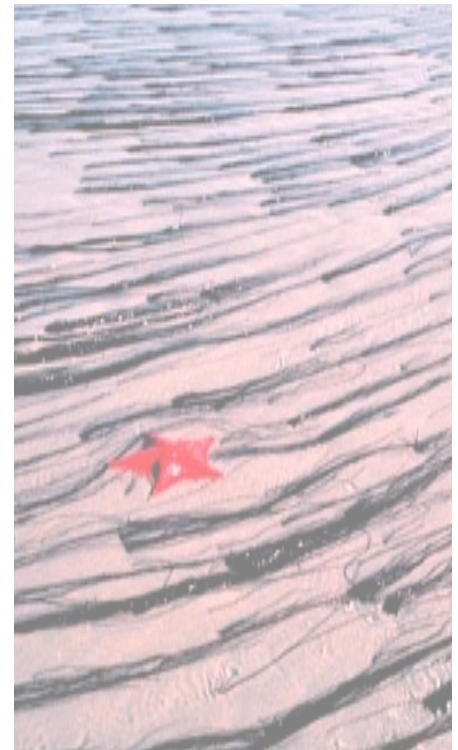
Agencies on the Oregon State University's Hatfield Marine Science Center Campus—Newport scientists collaborate with a number of the 280 scientists and staff from OSU, cooperating federal agencies (EPA, NOAA, and USFWS), and the Oregon Department of Fish and Wildlife.

The Cooperative Institute for Marine Resources Studies (CIMRS)—established in 1982 promotes collaborative research between NOAA and OSU scientists through work on problems of mutual interest in fisheries science, aquaculture, oceanography, marine-resource technology, and related fields. CIMRS also encourages and assists the education and training of scientists by facilitating student projects. Newport scientists collaborate with OSU scientists and CIMRS graduate student research assistants on a variety of research topics.

National and International Academic and Government Scientists—including scientists from the Army Corps of Engineers, Oregon Graduate Institute, Humbolt State University, Bonneville Power Administration, and the Department of Fisheries and Oceans Canada.

Other NOAA Programs—including scientists in NOAA Fisheries Southwest and Alaska Fisheries Science Centers, OAR's Pacific Marine Environmental Laboratory and National Undersea Research Program, and the Office of Ocean Exploration.

The Fishing Industry and Fishery Organizations—including the Pacific States Marine Fisheries Commission, which cooperatively runs the ageing unit and collaborates with the Center on its observer and cooperative research programs.



**Everyone who lives in the Pacific Northwest is somehow linked to marine resources.**

### Cooperative Research Website

Center scientists partnered with the Pacific States Marine Fisheries Commission, Pacific Fishery Management Council, and the Pacific Marine Conservation Council to create a new cooperative research website. This website will serve as a west coast-wide clearing house for information on cooperative fisheries research and is intended to match parties with interests in collaborative research and identify a broad range of funding sources. This website can be found at [www.fishresearchwest.org](http://www.fishresearchwest.org).

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## *Northwest Fisheries Science Center*

The Northwest Fisheries Science Center is one of six regional Science Centers for the National Marine Fisheries Service (NOAA Fisheries). NOAA Fisheries is part of the National Oceanic and Atmospheric Administration, which is part of the U.S. Department of Commerce.

Sharing our work with other scientists, with policymakers, and with the public is important to us. To learn more about what we do, please visit our website at [www.nwfsc.noaa.gov](http://www.nwfsc.noaa.gov) or call 541.867.0500.



# at Newport

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