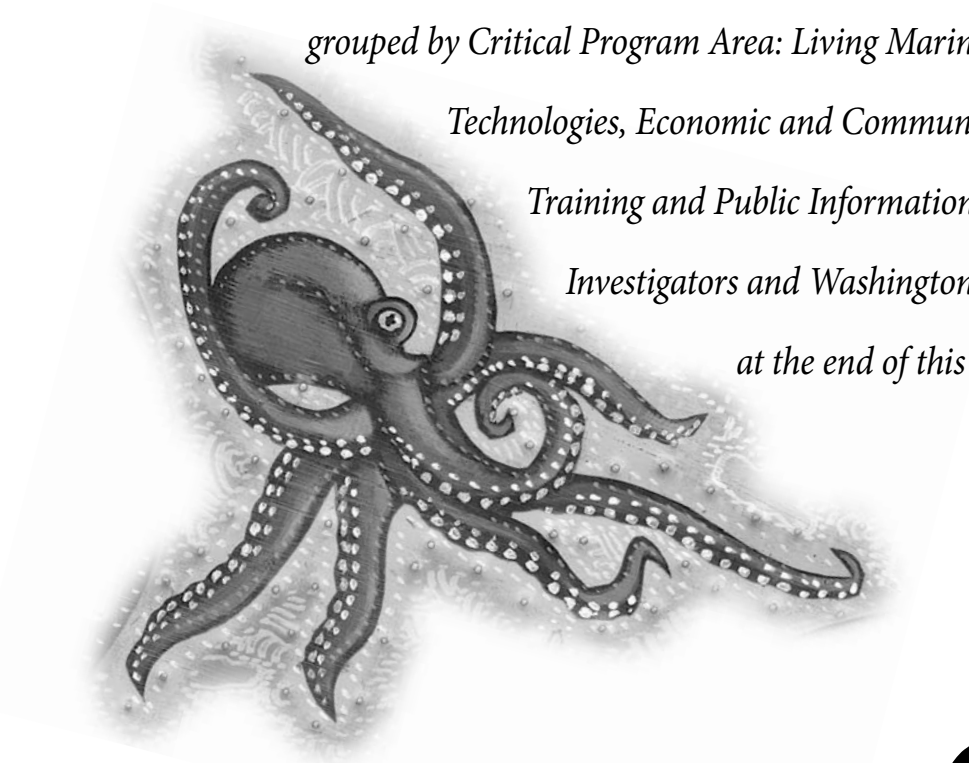
Directory Update

New Research, Outreach and Partnership Projects for 2006 – 2007

The following projects have been initiated since the 2004 – 2007 Research, Outreach and Partnerships directory was compiled and distributed. For ease of access, the projects have been grouped by Critical Program Area: Living Marine Resources, Ecosystem Health, New Technologies, Economic and Community Development and Education, Training and Public Information. Contact information for new Project Investigators and Washington Sea Grant Program staff is presented at the end of this document.



Sea Grant
Washington

Living Marine Resources

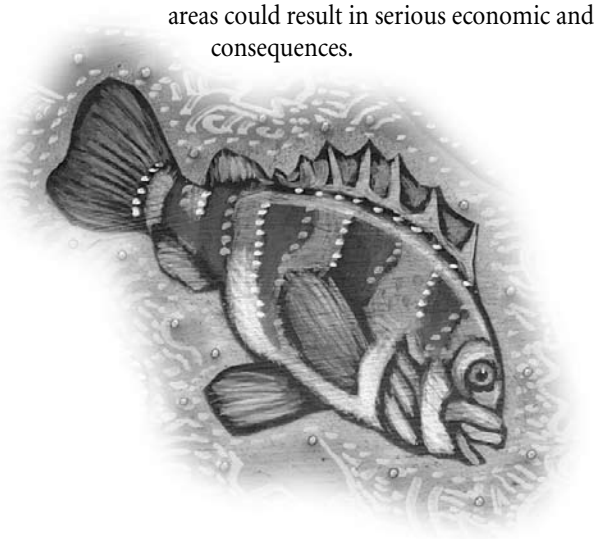
Conserving marine resources while providing for their beneficial use and exploitation, thus ensuring sustainable harvests and healthy populations in the future

Needle Disease in Dungeness Crab: an Emerging Disease in Washington State

Paul K. Hershberger, Biological Resources Division, U.S. Geological Survey, and Jack Ganzhorn, Fisheries Technology Program, Peninsula College

R/F-153

Nadelospora canceri is a microsporidian parasite that causes so-called needle disease — a condition that adversely affects the marketability of infected Dungeness crab and, over time, can kill the crab. Over the past decade, the disease has become more prevalent in Grays Harbor, Washington, which previously represented the northernmost limit of its range. To determine the current geographic distribution of needle disease in Washington, project investigators will conduct an updated survey of Dungeness crab in the Strait of Juan de Fuca, Puget Sound and Hood Canal. Because these areas have supported record harvests in recent years, range expansion of the disease into these areas could result in serious economic and ecological consequences.



Tools to Remediate Summer Mortality Disease Losses

Daniel Cheney and Ralph Elston, Pacific Shellfish Institute, and Carolyn Friedman, School of Aquatic and Fishery Sciences, University of Washington

R/F-154

Pacific oyster summer mortalities are a recurring problem in the U.S., Japan, France and Mexico, causing significant economic hardship for oyster growers in these countries. Through laboratory work and field studies, this project will test the general hypothesis that a relatively small number of genes control resistance to summer mortality disease. It will also evaluate selected environmental parameters and observations that appear to predict increased summer mortality risk and determine how genetic variation may interact with the suite of stress conditions associated with summer mortality. These efforts may lead to the development of mortality-resistant lines of oysters for broodstock use by the shellfish industry on the north Pacific Ocean coast.

Understanding Pathogenesis and Transmission Dynamics of Oyster Herpes Virus

Carolyn Friedman, School of Aquatic and Fishery Sciences, University of Washington, Kimberley Reece and Eugene Burreson, Virginia Institute of Marine Science, and Ralph Elston, Pacific Shellfish Institute

R/F-157

The ability to produce, transport and market healthy disease-free shellfish is crucial to the success of the U.S. oyster industry. The appearance of herpes-like viral infections in Californian, Asian and European oyster stocks is threatening the industry and has jeopardized the existing international market for oyster seed. For this project, team members will devise reliable diagnostic methods for oyster herpes. The differential susceptibility of several oyster species to herpes-like viruses will be evaluated and techniques for identifying infected stocks as well as maintaining and storing cultures of the virus will be examined. Project results will empower resource managers and aquaculturists to make educated decisions on the management and culture of oyster populations.

Ecosystem Health

Understanding the marine environment and protecting it from the deleterious effects of human activities, including contamination from terrestrial and ship-borne sources, degradation of nearshore, upland and open-water habitats, overharvesting of fish, shellfish, algae and invertebrates, and introductions of non-native plant and animal species

Pilot-scale Assessment of a Water Depuration Process for *Vibrio* in Gulf Coast Oysters

Daniel Cheney and Ralph Elston, Pacific Shellfish Institute

R/F-155

Depuration has a long history as a post-harvest treatment process for reducing microbial contamination in shellfish. However, as applied to date, this approach to purging shellfish of bacterial and viral contamination has been ineffective in reducing levels of *Vibrio* bacteria. *Vibrio* bacteria can cause a number of diseases, including cholera. To meet a priority of the federally funded Gulf Oyster Industry Program, this study will develop and evaluate an electrolyzed oxidizing (EO) water depuration process to increase the quality, shelf life and safety of raw oysters for consumption. Study objectives include determining the optimal salinity, temperature and time for an EO water depuration process to reduce *Vibrio* contamination in Gulf Coast oysters.

Redesign and Testing of Water Intake Systems for the Control of Aquatic Nuisance Species using Ozone

Russell P. Herwig and Jeffrey Cordell, School of Aquatic and Fishery Sciences, University of Washington, and William T. Cooper, University of North Carolina at Wilmington

R/ES-55

This project examines the feasibility of an in-line ozone injector (venturi) contact system to prevent introductions of non-indigenous aquatic species — from bacteria to zooplankton and phytoplankton— through discharges of ships' ballast water. Members of the project team will fine-tune this promising technology and determine the minimum ozone level needed to effectively inactivate ballastwater organisms at various trophic levels. Data will be used to design an in-line treatment system to be installed on a commercial ship.

Scuba Divers Monitoring for Aquatic Invasive Species

Andrea Copping, Washington Sea Grant Program

As the "eyes and ears" of Puget Sound, recreational divers are important allies in efforts to control aquatic invasive species (AIS) — non-native plants, animals and microbes that prey on or disrupt the lives of native organisms. Washington Sea Grant Program is working with scuba clubs, resource management agencies, dive shops, the dive charter industry and individual divers to recognize and report AIS. The current effort seeks to focus divers' attentions on two particularly troublesome invasive tunicates, *Didemnum* sp. and *Styela clava*. Both of these marine invertebrates have recently been sighted in Puget Sound and both have caused economic and environmental harm in other places. Tracking their spread is a critical component of control and eradication efforts. Project partners include the Russell Family Foundation, Washington Department of Fish and Wildlife and Puget Sound Action Team.

Virus in Shellfish Studies

J. Scott Meschke, Department of Environmental and Occupational Health Sciences, and Russell Herwig, School of Aquatic and Fishery Sciences, University of Washington

R/A-83

This study will examine whether alternative organisms can provide a more reliable estimate of infectious pathogens in Puget Sound shellfish compared to currently used fecal coliform methods. Evidence suggests that fecal coliform bacteria are inadequate indicators of enteric viruses in shellfish and water. Oysters will be gathered from various commercial growing sites around Puget Sound and tested for enteric viruses and certain indicator species of microbes. Water and sediment samples will also be collected. Data from these samples will help determine whether the amount of a given indicator organism in water can be correlated with the amount of contamination in shellfish tissue — and whether testing the water is sufficient for identifying potentially harmful viruses.

Biological Invasion of Marine Reserves by Aquatic Nuisance Species

Terrie L. Klinger, School of Marine Affairs, University of Washington, and Dianna Padilla, Department of Ecology and Evolution, State University of New York – Stony Brook

R/ES-54

The introduced Pacific oyster (*Crassostrea gigas*) has recently invaded rocky shores and marine reserves in the San Juan Archipelago. Surveys have determined that this species is more abundant in reserves than in areas outside of reserves. Researchers are working to identify the mechanisms responsible for invasions of reserves and to determine whether impacts to intertidal communities are detectable. Field experiments and observations will help identify whether areas with high species diversity are more resistant to invasion by *C. gigas*, whether such invasions negatively impact native species diversity and whether *C. gigas* alters ecosystem functions in rocky areas it invades.

A Study of Intertidal Wetland Restoration

Kern Ewing, Center for Urban Horticulture, University of Washington

R/ES-61

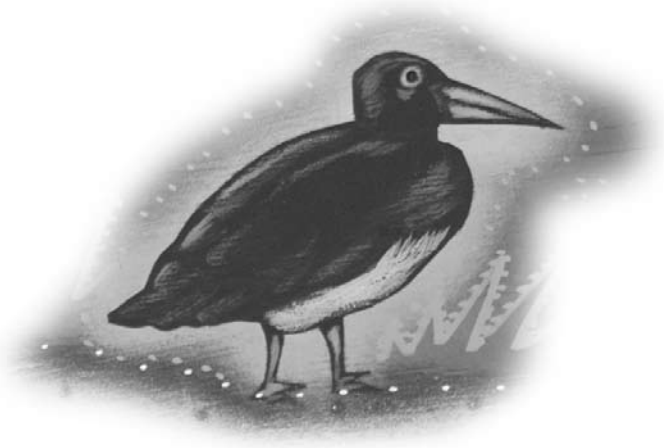
This project will provide recommendations to improve restoration and monitoring of Puget Sound intertidal wetlands. Relevant publications will be reviewed and gaps in our knowledge of intertidal wetland plant distributions, propagation methods, planting procedures and the factors affecting successful establishment of species will be identified. The researchers will compile an inventory of all intertidal wetland restoration sites in the Puget Sound basin where development of intertidal vegetation has been a defined objective. A field sampling strategy will be developed and a statistical evaluation of the effects of environmental gradients on species success will be conducted. The project is sponsored in partnership with the NOAA Fisheries Office of Habitat Conservation's Restoration Center.

Optimizing the Effectiveness of a Biocontrol Agent (*Prokelisia marginata*) against *Spartina* Species in Washington

Fritzi S. Grevstad and Miranda S. Wecker, Olympic Natural Resources Center, University off Washington

R/ES-63

Two species of non-native *Spartina* cordgrass have invaded Washington's estuaries, degrading shoreline habitats and altering sites for shellfish aquaculture. In an effort to control the plants' spread, a host-specific herbivorous insect, *Prokelisia marginata*, has been introduced into *Spartina*-infested areas. This project will compare the performance of four ecotypes of *P. marginata* and determine which is most effective as a biocontrol. The best performing ecotype will made available to resource managers, landowners and school groups for use in the field. The project will also quantify and document the impacts of *P. marginata* on *Spartina* in Willapa Bay and Puget Sound. Through a series of field experiments, the project team will explore the feasibility of combining biocontrol measures with chemical and mechanical strategies for eradicating *Spartina* in Washington.



Effects of Plankton Thin Layers on Plankton Populations and Biological Rates

Suzanne Menden-Deuer, Shannon Point Marine Center, Western Washington University

R/ES-64

The recent discovery of thin, horizontal patches of phytoplankton has potentially profound effects for plankton populations and scientists' abilities to assess them. Data on species abundance are scant, limiting any theoretical assessments of population growth and grazing rates. This project will examine the spatial and temporal extent and connectivity of plankton thin layers in East Sound, Orcas Island, in the San Juan islands, by mapping species composition and biological activity of major phytoplankton and zooplankton species. Data from this study will test the long-standing hypothesis that plankton patches enhance predator growth and production in the ocean.

Simple Techniques Program for Hood Canal Watershed Residents

Teri King, Washington Sea Grant Program

Through the Simple Techniques program, citizen involvement and awareness are key elements in keeping Hood Canal healthy. During this Puget Sound Action Team-funded program, team leaders taught a series of Septic Social workshops and Community Clinics and distributed micro-mesh screens designed to capture food waste in kitchen sinks, before it could flow into septic tanks and enter Hood Canal. Two thousand property owners around the lower portion of the Hood Canal participated in the project and 96 percent of the participants indicated that they would continue to use the screens. Research suggests that micromesh screens could reduce the nitrogen load in Hood Canal by 75.2 kg in one year. A Garbage Grinder Round-Up was held in conjunction with the Taste of Hood Canal and other regional events, netting 35 potentially polluting grinders and preventing them from adding nearly 50 quarts of material to septic tanks each month.

Marine Habitat Studies in the Puget Sound Basin

Jim Brennan, Washington Sea Grant Program

In the 150-year period since European settlement, the shorelines of Puget Sound have been significantly modified. Historic logging of shoreline forests, building of roads and railway lines along beaches, shoreline armoring and development have all contributed to the loss and degradation of nearshore habitats and species. The scale of these modifications and associated impacts have been recognized only in recent decades. Efforts are now being made to reverse this trend in order to preserve what remains and restore or repair degraded habitats. Through working with state and local governments, Native American tribes, community groups and other nearshore technical experts to improve knowledge of nearshore conditions, the project is developing alternatives to conventional development practices and conserving nearshore habitats through education, research and restoration activities.

New Technologies to Enhance Ocean Productivity

Creating and applying technologies that show promise for expanding the horizons of ocean exploration, leading to deeper understanding of marine coastal processes, greater resilience among ocean resources, and the development of new products from the sea

At-Sea Calibration of Airborne LIDAR

John K. Horne, School of Aquatic and Fishery Sciences, University of Washington

R/Ac-14

Light Detection and Ranging, commonly known as LIDAR, is a technology typically used to measure temperature, wind and other atmospheric conditions by transmitting laser signals and amplifying the light that is reflected back through an optical telescope and photomultiplier tube. For this project, the technology will be used to examine the sizes of fish schools and zooplankton aggregations. To accomplish this task, the at-sea LIDAR system must be calibrated to an object with known optical reflective properties. During the project, the LIDAR will be calibrated using a reference sphere that is suspended from a free-floating frame. Calibrated LIDAR backscatter measurements of sardine schools can then be compared to those observed using a scientific echosounder deployed from a survey vessel off the coasts of Oregon and Washington. The goal is to examine the efficacy of LIDAR as a resource management tool and its utility for oceanographic studies.

Economic and Community Development

Assisting marine and coastal-dependent enterprises, agencies and communities in making sound business, planning and development decisions that provide economic benefits to local communities and to the region, while managing resources for sustainability

Sound Tourism – Sound Environment Roadshow

Kathy Fletcher, People for Puget Sound

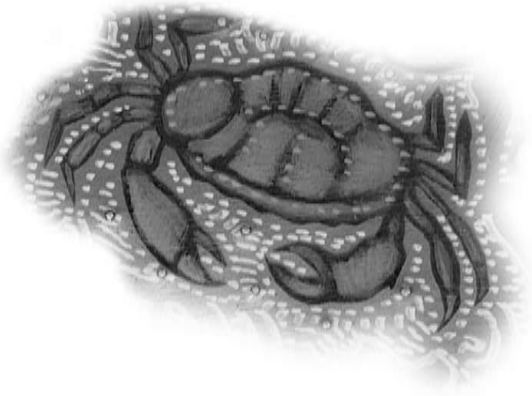
E/T-15

Healthy, pristine natural environments are associated with thriving tourism economies. Conversely, western Washington's declining marine environmental quality has the potential to adversely affect the reputation and economy of the tourism industry. The Sound Tourism – Sound Environment Roadshow shares science-based knowledge about the close relationship between tourism and the environment with the region's convention and visitors bureaus, chambers of commerce, industry associations, regulatory agencies and schools. Key elements of the project include best practices guides for marine tourism, lodging and restaurants, a PowerPoint presentation and interpretive exhibit. The Sound Tourism Web site provides a wide range of supporting supplemental information and a free subscription newsletter. To maximize the project's reach, the roadshow is coupled with outreach to organizations and businesses engaged in wildlife viewing and is available for presentations throughout the year.

Intensive Technical Assistance Program

Pete Granger, Steve Harbell and Sarah Fisken, Washington Sea Grant Program, and John Nelson, Western Center for Risk Management Education, Washington State University

As follow-up to the federal Trade Adjustment Assistance program, salmon fishermen who have been adversely affected by foreign competition and have applied for TAA benefits in 2004 are now eligible for an Intensive Technical Assistance (ITA) program, to be delivered by Washington Sea Grant Program. ITA applicants will be given more in-depth training in business management, direct marketing and financial planning as it pertains to their fishing businesses. WSGP will use U.S. Department of Agriculture funds and collaborate closely with Alaska Sea Grant in delivery of this program.



Education, Training and Public Information

Educating the workforce and informing the public as a means of sustaining the vitality of marine resources and the enviable lifestyle in Washington state and the Pacific Northwest

Northwest Outreach Program on Conservation of Marine Resources

Deborah Illman, Technical Communications, University of Washington

A/B-3

Student writers at the University of Washington will prepare articles for publication in *Northwest Science & Technology Online (*www.nwst.org) and *SciScape*, a companion piece for middle-school readers. From these products, students, teachers and the public will learn about threats to the marine environment in the Northwest, the decline of marine mammals, nearshore habitat degradation and how government, industry, communities and individuals are mitigating those threats. At the same time, UW student writers will gain valuable experience in reporting about complex marine issues.

Marine Birds: Trends and Stewardship

Anne Murphy and Judy D'Amore, Port Townsend Marine Science Center

E/ES-10

As regional populations increase and as people move into remote areas to live and recreate, it is important to find a balance between enjoying nature and protecting marine birds and other vulnerable species from excessive disturbance. This project aims to create greater public awareness of the fragile status of many marine birds in northern Puget Sound and the Juan de Fuca and Georgia straits. It will also identify ways in which marine birds are affected by activities such as dog-walking on beaches, recreational boating and eco-tourism. Seven day-long workshops and additional evening lectures will be conducted by leading scientists and researchers. Each workshop will include a field component. Sessions are tailored to naturalists and professionals in the wildlife-viewing industry and seek to engender discussion of human impacts and stewardship options. At the close of the project, an article discussing outcomes from the sessions will be written and submitted for publication in regional organizations' newsletters.

Gentle Giants of the Salish Sea — Online Curriculum Guide

John Osborne, Marcy Kober and Janus Kober, The Whale Museum

E/ES-9

For this project, the Whale Museum is adapting its *Gentle Giants of the Sea* as an interactive, computer-based format geared for fourth to sixth graders. This will allow museum staff to reach the widest possible audience, enhancing the learning potential of students and the general public. This new curriculum will focus on regional environmental issues in Puget Sound and Georgia Strait, using the six most common species of cetaceans — minke, gray, orca and humpback whales and harbor and Dall's porpoises — to illustrate ecological linkages and conservation issues. It will satisfy state learning standards for science, fulfilling the teacher's responsibility through interactive and engaging lesson plans and activities.

Whale Sighting Network and Education Program

Susan Berta, Orca Network

E/ES-11

Through WSGP's support of the Whale Sighting Network, observations of orcas and other cetaceans will be gathered and disseminated to thousands of people on a daily basis. Data are compiled via a toll-free number, e-mail address and a Web site and dispatched daily through the Whale Sighting Network's e-mail list and Web site. Information is also shared through presentations, displays, naturalist talks aboard Washington State ferries and one-day Ways of Whales workshops. The Sighting Network provides a huge increase in the amount of data currently being collected by researchers, a unique, interactive educational opportunity for citizens and a vehicle for increased communication between researchers, agencies and organizations involved in cetacean research and education.

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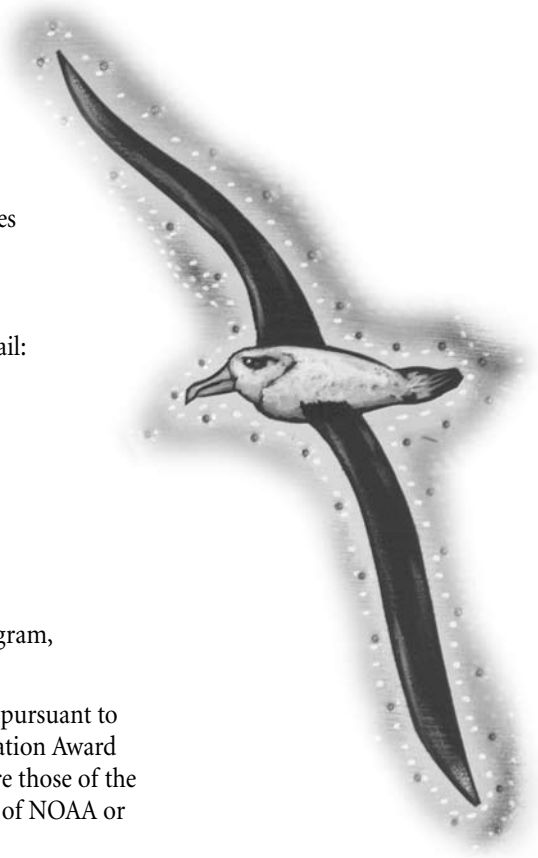

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