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## DIRECTOR'S STATEMENT

Now in its twenty-first year, the OSU/NOAA Cooperative Institute for Marine Resources Studies (CIMRS) develops and offers opportunities for joint research and outreach to a growing community of University and NOAA scientists dedicated to marine science, graduate education, and learning partnerships with regional industries and communities that are dependent on marine resources.

The Institute's main mission is to bring together research partners from a variety of colleges, departments and agency organizations to address complex multidisciplinary issues relating to the living and non-living components of the marine environment. The Institute thrives because of the vision and commitment of leaders from within the laboratories of its NOAA associates and the OSU Research Office. As a result during the past few years external research grant funding has tripled, graduate student opportunities have diversified, and many more investigators from a broad range of disciplines are joining together to address research problems of environmental, economic and social importance.

The collaborative structure of CIMRS facilitates new ways in which basic research can be applied to understand factors impacting marine resources and their management. For example, as is highlighted in this report, geologic oceanographers engaged in seafloor mapping are preparing the first habitat maps for the entire U.S. West coast that will help predict distributions and abundances of living marine resources. These maps may also serve as a foundation for defining boundaries of future marine reserves.

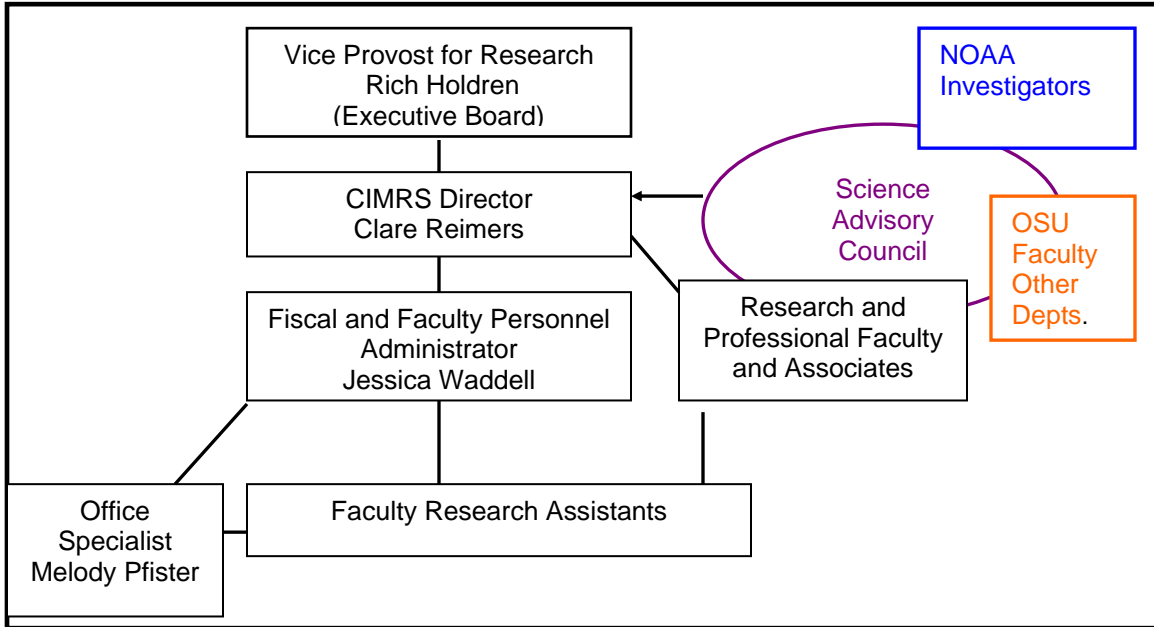
An integral part of the OSU Mark O. Hatfield Marine Science Center (HMSC), CIMRS is now the administrative home for 26 research staff and 3 research faculty working on collaborative projects with NOAA investigators who also serve as OSU courtesy faculty. CIMRS research faculty generated over \$500K in FY 2003 alone for independent research projects funded from a variety of funding sources. No other OSU research institute provides both grant administration and personnel review in the manner of an academic department. In FY 2003, three CIMRS members sought promotion and were advanced in recognition of their excellent records of research and service.

In summary, the scientific accomplishments of CIMRS demonstrate its value to both NOAA and the University. Its purpose is to serve as a bridge between traditional disciplines, a crossroad for fostering new ideas, and a dependable source of new research and analysis. It is anticipated that ongoing efforts in the coming year will continue to raise the profile of the Institute and the partnerships it cultivates. For more information, please contact our website at <http://oregonstate.edu/groups/cimrs>.

Clare E. Reimers  
Director, Cooperative Institute for Marine Resources Studies  
October 1, 2003

## ORGANIZATION

CIMRS is administered through the OSU Research Office with oversight from an Executive Board made up of members from the participating NOAA laboratories and collaborating OSU colleges and programs under the terms of a Memorandum of Understanding between OSU and NOAA/NMFS. A Science Advisory Council gives input on research directions, progress, and policy to the Director. The HMSC business office assists with some administrative actions.



## EXECUTIVE BOARD

Rich Holdren (Chair)  
Vice-Provost for Research, Oregon State University

Usha Varanasi  
Director, Northwest Fisheries Science Center, NOAA

Eddie Bernard  
Director, Pacific Marine Environmental Laboratory, NOAA

Sherman Bloomer  
Dean, College of Sciences, OSU

Erik Fritzell  
Assoc. Dean, College of Agricult. Sci., OSU

Mark Abbott  
Dean, College of Oceanic & Atmos. Sciences, OSU

Robert Malouf  
Director, Oregon Sea Grant, OSU

George Boehlert  
Director, Hatfield Marine Science Center, OSU

Clare Reimers  
Director, CIMRS (Ex Officio), OSU

## SCIENCE ADVISORY COUNCIL

Ed Casillas, Fish Ecology Division, Northwest Fisheries Science Center, NOAA, NMFS, Seattle, WA

Bob Dziak, CIMRS, OSU Hatfield Marine Science Center, Newport, OR

Ian Fleming, Coastal Oregon Experiment Station, OSU Hatfield Marine Science Center, Newport, OR

Steve Giovannoni, Dept. of Microbiology, OSU, Corvallis, OR

Steve Hammond, Ocean Environment Research Division, Pacific Marine Environmental Laboratory, NOAA, OSU Hatfield Marine Science Center, Newport, OR

Selina Heppell, Dept. of Fisheries & Wildlife, OSU, Corvallis, OR

Michael Kent, Center for Fish Disease Research, OSU, Corvallis, OR

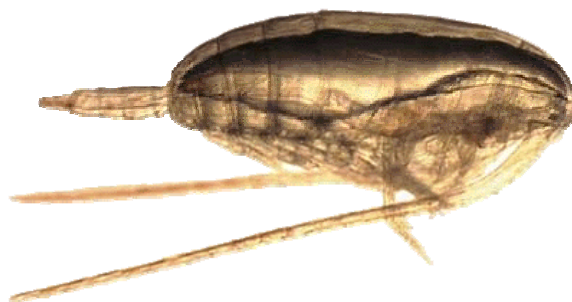
Chris Langdon, Coastal Oregon Experiment Station, OSU Hatfield Marine Science Center, Newport, OR

Dave Mellinger, CIMRS, OSU Hatfield Marine Science Center, Newport, OR

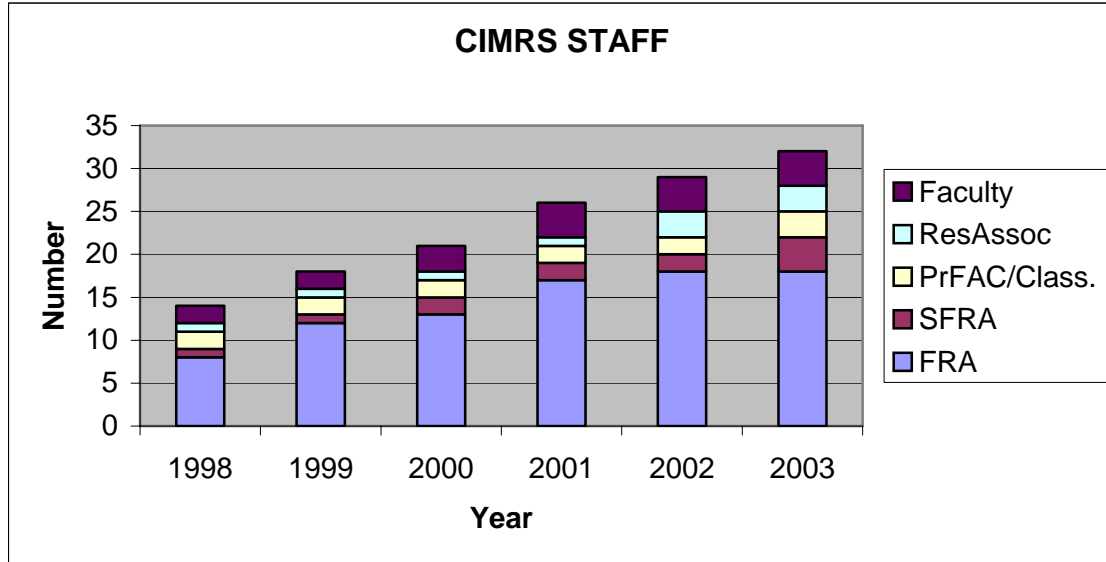
Gil Sylvia, Coastal Oregon Experiment Station, OSU Hatfield Marine Science Center, Newport, OR (**Chair**)

Waldo Wakefield, FRAM Division, NOAA, NMFS, Northwest Fisheries Science Center, Newport, OR

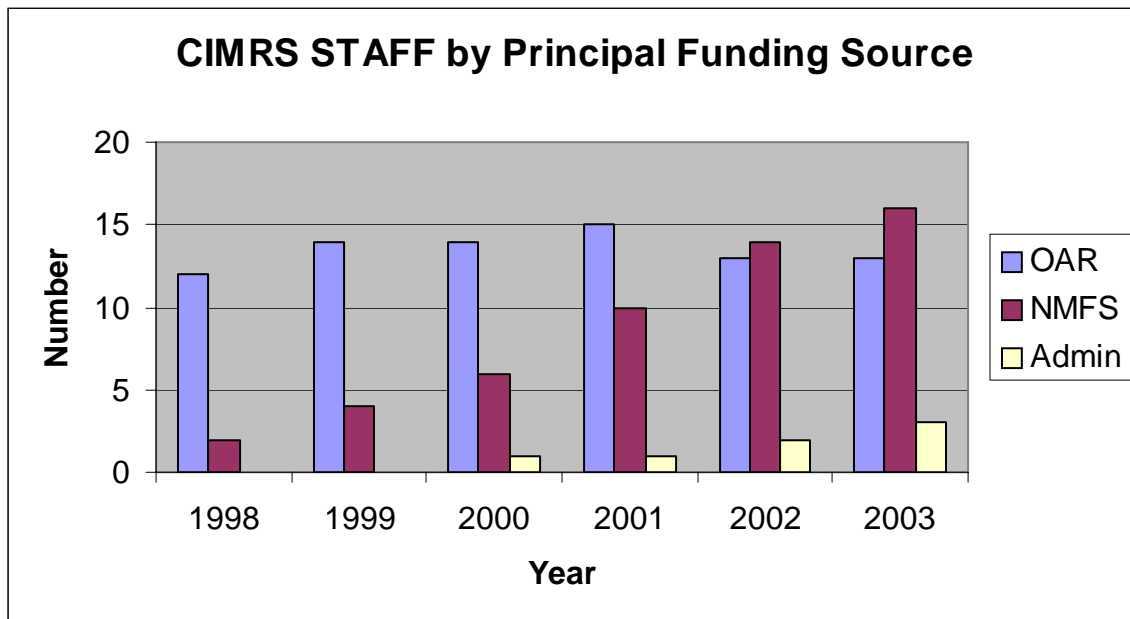
Rob Wheatcroft, College of Oceanic and Atmospheric Sciences, OSU, Corvallis, OR



The number of CIMRS staff has grown steadily over the past 6 years as a result of new research initiatives in fisheries ecology, stock assessment, and marine mammal acoustics. The range of responsibilities and expertise of the staff have also grown and been recognized through promotion.



Faculty =Research Professors and the Director, ResAssoc = Research Associates, PrFac = Professional Faculty, Class= Classified Staff, SFRA=Senior Faculty Research Assistants, FRA= Faculty Research Assistants.

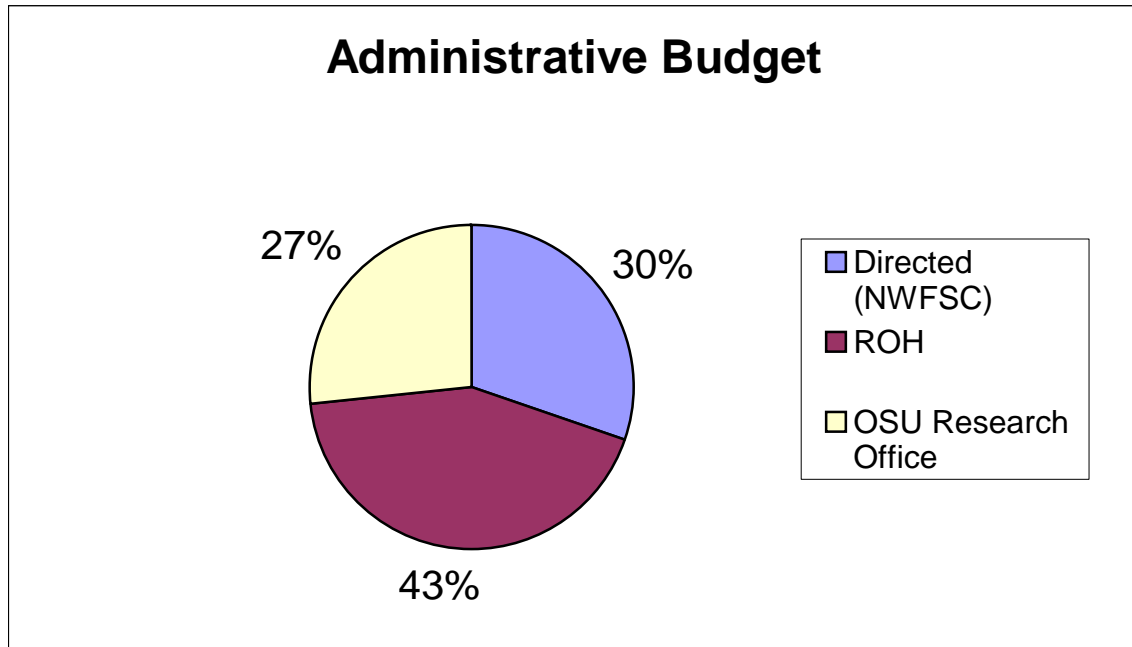


Within the administration of CIMRS, the Director and Office Specialist are 0.5 FTE positions.

## ADMINISTRATIVE SUPPORT

In FY2003 the administrative budget of CIMRS was \$188,000. These funds provided salary and benefits for the Director, Clare Reimers (0.5 FTE), the Fiscal and Faculty Personnel Administrator, Jessica Waddell (1.0 FTE), and a part-time office specialist. Administration funds were also used for routine office supply costs, communication, computer network fees, equipment storage, and the travel and honoraria for two visiting Distinguished Lecturers, Dan Ware, formerly of the Dept. of Fisheries and Oceans Canada, and Dan Fornari, Woods Hole Oceanographic Institution.

The source funds for administration were provided as directed support from the NWFSC for project coordination, and as unrestricted funds from the Research Office and Returned Overhead.



## **PROJECTS SUPPORTED WITH CONTRIBUTED FUNDS FROM NOAA PARTNER LABORATORIES IN FY 2003**

Research funding was awarded to CIMRS by NOAA through the Northwest Fisheries Science Center and the Pacific Marine Environmental Laboratory to support a variety of directed research projects. All projects were approved by the Assistant Administrator and the Grants Management Division of NOAA after independent merit review.

### **Projects under Grant NA17FE2705 Total Award \$2,241,983; 9/1/02-8/31/03**

#### ***“The Effects of Ocean Variability on Marine Survival of Fishes”***

This project supports the active monitoring of ocean conditions, zooplankton distributions, and fish populations off the coasts of Washington, Oregon and California. New field efforts and retrospective analysis of historical data are being undertaken with all efforts emphasizing relationships between ocean conditions and growth and survival of marine fishes. Specific focus areas are *Plume Habitat and Pelagic Fish Ecology*, *Zooplankton Ecology*, *Nekton Distribution*, *Trophic Ecology*, *Pelagic/Demersal Fish Habitat and Bioacoustics Studies*, and *Long-term Indices of Annual Growth of Long-lived Groundfishes*.

OSU Investigators, Research Staff: George Boehlert, Professor, Fisheries and Wildlife, William Percy, Professor-Emeritus, College of Oceanic and Atmospheric Sciences; Vladlena Gertseva and Bryan Black, postdoctoral fellows; Becky Baldwin, Leah Feinberg, Joe Fisher, Julie Keister, Greg Krutzikowsky, Cheryl Morgan, Suzan Pool, Rian Hooff, Todd Sandell, Tracy Shaw, Mitch Vance (all CIMRS)

Collaborating NOAA Investigators: Ric Brodeur, Bob Emmett, Bill Peterson, Tom Wainwright, Kym Jacobson, FE/NWFSC; Mary Yoklavich, SWFSC

#### ***“Watershed and Estuarine Processes”***

Cumulative habitat loss, species introductions, and waste inputs have altered biological communities and reduced the resilience of many Northwest estuaries. This project concentrates on studies of *Estuarine Habitats and Salmonid Life History* and surveys of *Salmon Utilization within the Columbia River Estuary*.

OSU Investigator: Ian Fleming, Associate Professor, Fisheries & Wildlife, COMES

Collaborating NOAA Investigator: Dan Bottom, FE/NWFSC

### ***“Fisheries Habitat Investigations”***

The objective of this work is to integrate many types of oceanographic, biological, geological (e.g., seafloor bathymetry, sidescan sonar images, sediment and rock types, active fault zones, observations and measurements from submersibles) and groundfish fisheries data (including fishery dependent records) into a Geographical Information System (GIS) so that information can be overlain on spatial maps. These maps are then utilized to characterize, classify and predict the distribution of seafloor habitats, to study relationships between habitat type and productive versus unproductive fishing grounds, and to document the consequences of management measures on fishing activities and habitat. See our Research Highlight Section, Page 12.

OSU Investigators, Research Staff: Chris Goldfinger, Associate Prof., College of Oceanic and Atmospheric Sciences, Jack Barth, Professor, College of Oceanic and Atmospheric Sciences, David Sampson, Associate Professor, Coastal Oregon Marine Experimental Station; Anatoli Erofeev, Robert O’Malley, Rondi Robison (all COAS)

Collaborating NOAA Investigator: Waldo Wakefield, FRAM/NWFSC

### ***“Socio-Economics”***

This project recognizes the need for research on the linkages between fisheries and ecosystem management and regional economics. OSU is analyzing methods to alleviate negative impacts of regulation through economic incentives and alternative forms of technology. The immediate focus area is *Using Economic Incentives to Manage Bycatch in West Coast Groundfish Fisheries*.

OSU Investigator: Susan Hanna, Professor, Agriculture and Resource Economics Department

### ***“Cooperative Research”***

Information on West Coast groundfish can be increased through collaboration with the fishing community and other constituents interested in groundfish research and data sharing. Under this project, a program is being initiated to design new collaborative research between scientists and constituents. This and other outreach efforts will increase communications between university scientists, the NMFS, and the fishing community. The program should also greatly enhance transfers of knowledge between scientists and constituents, and between the scientific community and the public.

The main project elements are:

- a) Request for Proposals. An annual solicitation and funding of proposals that contain research in collaboration with the fishing industry. Cooperative proposals are solicited and reviewed. Proposals are ranked based on technical merit as well as the level of collaboration and coordination with the fishing industry.



b) Sea-Truthing Modern Geophysical, and Historic Geologic and Video Data. A pilot project to develop equipment and protocols to use industry boats to collect important habitat information.

c) Outreach and Fisher Involvement. This effort is expanding the Headsup website to provide cooperative research information and general outreach information to fishers. In addition, the project is developing a process to engage fishers directly as port liaisons to assist in collecting scientific information that may lead to informed management decisions for West Coast groundfish.

OSU Investigators: Susan Austin Goblirsch, Oregon Sea Grant Extension Agent, Lincoln Co. Extension Service; Flaxen Conway, Sociology Department; Anthony D’Andrea, Assistant Prof., College of Oceanic and Atmospheric Sciences; Robert Wheatcroft, Associate Professor, College of Oceanic and Atmospheric Sciences

Collaborating NOAA Investigators: Elizabeth Clarke, Waldo Wakefield, John Harms, FRAM/NWFSC



Developed as part of the *Cooperative Research* project, the Oregon State University Seafloor Sampler System (OSUSSS) went to sea in August 2003 and was deployed from the M/V Watchman at stations on the Oregon continental shelf. OSUSSS retrieves cores of sediment and takes digital bottom photographs and video. It is being used to ground-truth seafloor habitat maps (see page 12) and to assess fishing gear impacts.

***“Stock Assessment Improvement”***

The focus of this project is the incorporation and evaluation of environmental parameters into population assessments of West Coast sablefish. Statistical studies are also being performed to establish the suitability of sea level as an independent variable and its control on recruitment trends. Incorporation of recruitment predictions in stock assessment models will be tested.

OSU Research Staff: Jim Colbert, CIMRS

Collaborating NOAA Investigator: Michael Schirripa, FRAM/NWFSC

**Projects under Grant NA17FE1167**

**Total Award \$56,322; 6/1/02-5/31/03**

***“Relationships Between Disease, Natural and Anthropogenic Factors that Influence Disease Prevalence and Survival of Juvenile Salmon in the Estuarine and Nearshore Ocean Environment”***

The overall objective of this project is to identify mechanisms and processes linked to environmental variables that can cause parasites to have an influence on the size and population structure of wild salmonids.

OSU Investigators, Research Staff: Larry Curtis, Professor, Environmental and Molecular Toxicology; Paul Reno, Associate Professor, Microbiology; Coral Stafford, CIMRS

Collaborating NOAA Investigators: Mary Arkoosh, Tracy Collier, EC/NWFSC

**Projects under Grant NA17RJ1362**  
**Total Award \$1,437,940; 7/1/02-6/30/03**

***“Ocean Environment Research”***

This multidisciplinary project seeks to quantify the effects of submarine volcanic and hydrothermal activity on the ocean. Continuous acoustic monitoring of spreading centers in the world’s oceans allows investigators to detect and study the chemical, physical, geological and biological effects of tectonic activity on the global ocean and to follow free-ranging populations of large cetaceans. Specific focus areas are *Ocean Observing Systems, Hydrothermal Venting, Marine Mammal Acoustics, Microbiology of Seafloor Vents and Eruptions, Fisheries Oceanography.*

OSU Investigators, Research Staff: William Chadwick, Associate Prof., Sr. Res., Robert Dziak, Associate Prof., Sr. Res., Haru Matsumoto, Research Associate, David Mellinger, Assistant Prof., Sr., Res.; Andra Bobbitt, Leigh Evans, Matthew Fowler, Ron Greene, Joe Haxel, Sara Heimlich, Andy Lau, Susan Merle, Sharon Nieu Kirk (all CIMRS)

Collaborating NOAA Investigators: Robert Embley, Chris Fox, Stephen Hammond, John Lupton (all PMEL/OERD)

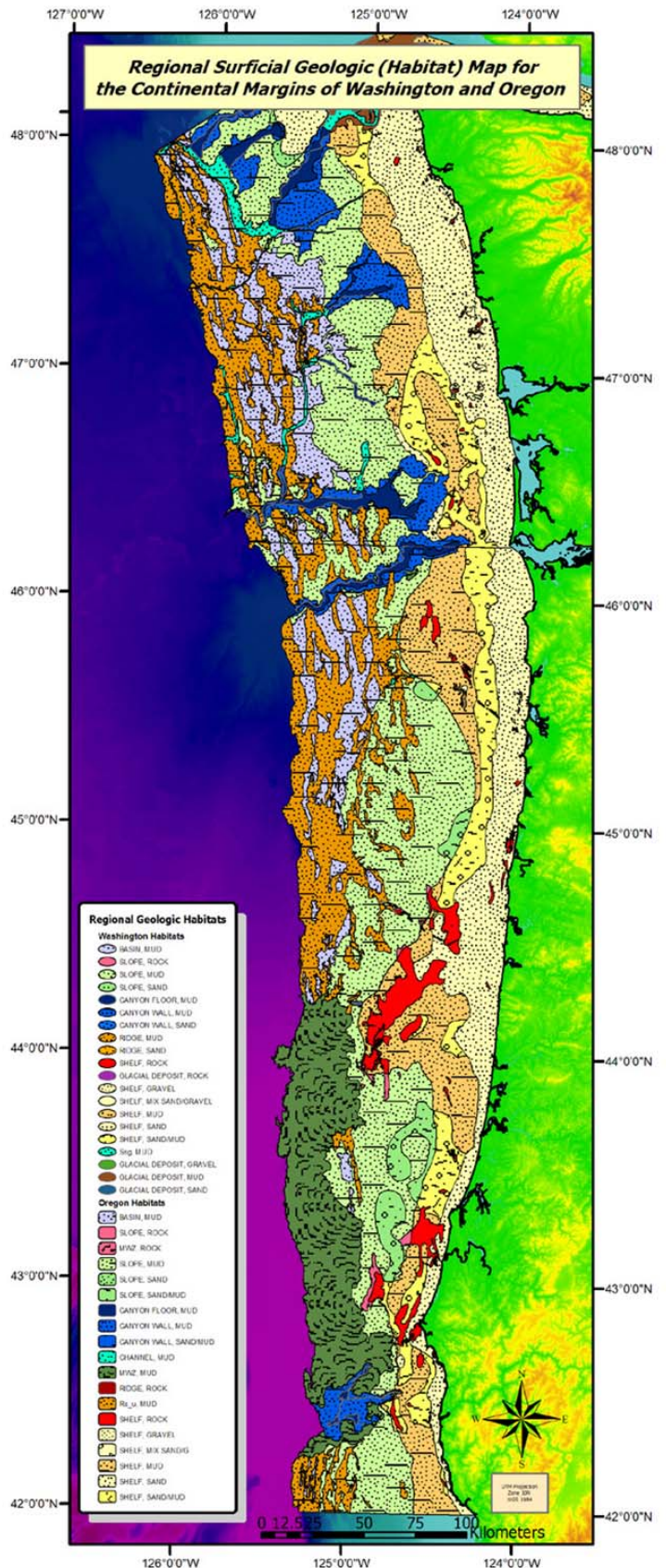


## RESEARCH HIGHLIGHT

### Mapping Geologic Habitats off Oregon and Washington

For the west coast of the United States, there is currently a program underway to create GIS databases of marine habitats. Supported through CIMRS, the initial goal is to create a comprehensive and easily accessible, multi-layered GIS of the geological and geophysical data for the Pacific Northwest coast of North America. A regional surficial geologic habitat map for the continental margins of Oregon and Washington has recently been completed by Chris Goldfinger at Oregon State University (panel to the right). This GIS database capitalizes on many years of data collection, mapping, and numerous data sources. Construction of data-density and data-quality layers will provide a guide to users of this database. The Oregon-Washington database has been linked to a parallel database for California compiled by Gary Greene at Moss Landing Marine Laboratories. The combined databases represent the first coast-wide delineation of rocky and unconsolidated (sediment) substrates. The GIS database is being made available to fisheries scientists and marine resource managers for application in a variety of areas, including design of biological surveys, stock assessments, identification of Essential Fish Habitat (EFH), assessment of risks to habitat from human activities, and siting of marine reserves.

Map source: Goldfinger, Romsos, Robison, Milstein, and Myers, Active Tectonics and Seafloor Mapping Laboratory, Oregon State University, College of Oceanic and Atmospheric Sciences



## NOAA PROJECTS COMPLETED IN FY 2003

Title	Grant #	Duration	Total Funding	PIs
Cooperative Research on U.S. West Coast Groundfish and their Habitats	NA07FE0474	9/01-8/02 with no cost extension to 8/03	\$163,702	Reimers
West Coast Fisheries Analysis, Biological and Economic Assessments	NA17FE1526	9/01-8/02 with no cost extension to 8/03	\$367,392	Reimers, Sylvia, Wheatcroft, Heppell
Ecology of West Coast Groundfish	NA17FE1527	9/01-8/02 with no cost extension to 8/03	\$523,933	Reimers, Goldfinger, Barth, Hixon
Feeding and Growth of Juvenile Salmonids and Associated Taxa off the Northern CA & OR Coasts	NA97FE0382	9/01-8/02 with no cost extension to 8/03	\$315,207	Reimers, Miller, Pearcy
Distribution and Trophic Interactions of Juvenile Salmonids off the Northern CA & OR Coasts	NA07FE0214	8/01-7/02 with no cost extension to 11/03	\$336,826	Reimers, Pearcy

## FY 2003 CONTRACTS

Title	Source	Total Funding	Duration	PI
Mysticete Whale Call Detection	AFSC	\$19,300	8/02-5/03	Mellinger
Seasonal Distributions of Sperm Whales	SWFSC	\$10,700	7/02-11/02	Mellinger
Analysis of Ocean Acoustic Data	SIO	\$10,012	1/01-1/03	Mellinger
Ocean Exploration Workshop	Ocean Exploration Office	\$5,014	8/02-9/03	Reimers
Stock Assessment Graduate	AFSC	\$33,004	8/02-9/04	Reimers
Marine Nekton as Ocean Explorers	Ocean Exploration Office	\$89,999	8/02-9/04	Mate
Acoustic Marine Mammal Assessment: Tools for the Next Level	ONR	\$106,618	11/02-10/05	Mellinger

## FY 2003 GRANTS FROM OTHER AGENCIES

Title	Source	Total Funding	Duration	PI
Hydroacoustic monitoring of Seismicity in the North Atlantic	NSF	\$199,058	1/02-12/02	Dziak, Matsumoto
Ocean Acoustic Observatory	NSF	\$14,921	8/01-1/03	Dziak
COAST	NSF	\$45,928	1/01-12/02	Peterson
US GLOBEC Salmon in North California Current	NSF	\$68,810	5/02-4/03	Pearcy

## INSTITUTE DIRECTOR'S RESEARCH ACTIVITIES

The Institute Director's research was supported in 2003 through several grants through the College of Oceanic and Atmospheric Sciences where she holds a 0.5 FTE faculty appointment at the rank of Professor.

Project Title "Energy Harvesting, Electrode Processes and the Partitioning and Speciation of Solid Phase Iron and Sulfur in Marine Sediments"

Source of Support: ONR

Total Award: \$95,343

Period Covered: 04/15/02-04/14/03

Person Months Committed to the Project by PI: 2

Project Title: "The Seafloor Bio-fuel Cell: Long-term Power and Effects on Sedimentary Organic Matter"

Source of Support: NSF

Total Award: \$510,261

Period Covered: 03/01/03-2/28/06

Person Months Committed to the Project by PI: 7

Project Title: "Cooperative Studies of Seagrass Sediment Interactions"

Source of Support: EPA

Total Award: \$25,000

Period Covered: 10/01/02- 09/30/03

Person Months Committed to the Project by PI: 0

Project Title: "Electrochemical Energy Harvesting and Chemical Fluxes From Gas Hydrate Sediments"

Source of Support: NOAA-NURP

Total Award: \$109,993

Period Covered: 04/01/03-03/31/04

Person Months Committed to the Project by PI: 0.5



## **CIMRS FELLOWSHIP OPPORTUNITIES AND GRADUATE STUDENTS SUPPORTED THROUGH JOINT PROJECTS**

### **Fisheries Oceanography Graduate Fellowships**

The goals of NOAA's strategic plan are to build sustainable fisheries, to recover protected species, and to sustain healthy coasts. These goals require the support of sound scientific research to build the knowledge base for maintaining economically viable fisheries and, at the same time, minimize anthropogenic impacts on marine ecosystems. To accomplish these goals a Fisheries Oceanography Graduate Fellowship program was started within CIMRS in 2003 with funds provided by the Alaska Fisheries Science Center of NOAA/NMFS. This program seeks to recruit highly talented M.S. or Ph.D. students to oceanography, fisheries or wildlife science, resource economics, zoology, environmental science or a related field at Oregon State University, with an intended focus on ecological and natural resource issues in the Northeast Pacific, Aleutian Islands, and Bering Sea. It is anticipated that this program will eventually support 5-7 fellows concurrently. In 2003 three fellowships were awarded after applicant proposals were solicited, reviewed, and ranked according to merit by a 7-member Fellowship Committee.

### **2003 Fellows and Projects**

Cara Fritz	Towards Establishing a Natural Disturbance Mosaic on the Pacific Northwest Margin Major Professor: Rob Wheatcroft, COAS
Julie Keister	Investigations of Variability of Mesoscale Energy off the Coast of Central Oregon and Northern California Major Professor: Tim Cowles, COAS
Rob Suryan	Comparative Foraging Ecology of Five Species of Pacific Seabirds: Multiscale Analyses of Marine Resource Utilization Major Professor: Dan Roby, F&W

## **Graduate Students supported through Joint Research Projects**

A growing number of graduate student projects are being supported with contributed funds through grants from the Northwest Fisheries Science Center. The CIMRS director works to match qualified students with projects and courtesy faculty based at the Hatfield Marine Science Center.

### **Ph.D. Candidates – *Fisheries and Wildlife***



Todd Miller            1999-2005    Trophic Dynamics within Varying Conditions of the Northern California Current  
Major Professor: Hiram Li  
NOAA Fisheries Rep: Ric Brodeur, NWFSC

*College of Oceanic and Atmospheric Sciences*

Douglas Reese        1999-2005    Community Characteristics, Spatial Distributions, and Habitat Preferences of Marine Fauna within the Northern California Current Ecosystem  
Major Professor: William Percy, COAS  
Minor Rep: David Burch, Physics Dept.  
NOAA Fisheries Rep: Ric Brodeur, NWFSC

*Environmental Molecular & Toxicology*

Claudia Bravo        2002-2003    Toxicology of Polycyclic Aromatic Hydrocarbons: Dibenzo [a,l] pyrene (DB[a,l]P) in Rainbow Trout, *Oncorhynchus mykiss*  
Major Professor: Larry Curtis, E&MT  
NOAA Fisheries Rep: Mary Arkoosh, NWFSC

*Agricultural and Resource Economics*

Haixia Lin            2002-2003    Spatial Statistical Analysis of Marine Resource Economic/GIS data  
Major Professor: Susan Hanna, COMES

Monika Ugrinska     2002-2003    Review of Estimation Methodology for Measuring Resource Dependence in Communities  
Major Professor: Susan Hanna, COMES

**M.S. Candidates - Marine Resource Management**

Bridgette Lohrman    2002-2003    Recovery Planning for the Oregon Coast Coho Salmon: Assessing the Informational Needs of Oregon Coastal Watershed Councils  
Major Professor: Bob Frenkel, COAS  
NOAA Fisheries Rep: Tom Wainwright, NWFSC

Chris Romsos            2002-2005      Mapping Physiographic and Lithologic Habitats of the Oregon and Washington Continental Margin for West Coast groundfish Species, and Habitat Analysis of Historic NMFS Trawl Survey Stations  
Major Professor: Chris Goldfinger, COAS  
Minor Rep: Scott Heppell, F&W  
NOAA Fisheries Rep: Waldo Wakefield, NWFSC

Josie Thompson        2002-2005      Life history of the Longnose Skate (*Raja rhina*) from the U.S. West Coast and Vulnerability to Fishery Impacts  
Major Professor: Scott Heppell, F&W  
Minor Rep: Douglas Markle, F&W  
NOAA Fisheries Rep: Michael Schirripa, NWFSC

Vicki Wedell            2002-2003      Participatory GIS for Local Fisheries management in the Community of Port Orford, OR  
Major Professor: Jim Good, COAS  
NOAA Fisheries Rep: Elizabeth Clarke, NWFSC

*Fisheries and Wildlife*

Marlene Bellman       2001-2003      Shifting Groundfish Trawl Efforts: A Case Study to Evaluate Fisheries Management Measures and Effects on Essential Fish Habitat  
Major Professor: Scott Heppell, F&W  
NOAA Fisheries Rep: Waldo Wakefield, NWFSC

Lance Campbell        2002-2005      Life History of Columbia River Salmon  
Major Professor: Ian Fleming, COMES  
NOAA Fisheries Rep: Dan Bottom, NWFSC

Brooke Martin         2002-2004      Purification and Characterization of Vitellogenin, and use for Enzyme Linked Immuno-absorbent Assay (ELISA) for gender and maturity status in Black rockfish (*Sebastes melanops*)  
Major Professor: Selina Heppell  
Minor Rep: Scott Heppell  
NOAA Fisheries Rep: Grant Thompson, AFSC

**Degrees Completed**

**M.S. Marine Resource Management**

Sarah Banta	2001-2003	Tests of a Selective Flatfish Trawl in the U.S. West Coast Bottom Trawl Fishery Major Professor: Dr. Gil Sylvia, COMES Minor Rep: Dr. Bob Hannah, ODFW NOAA Fisheries Rep: Dr. Kevin Piner, NWFSC
Stacey Miller	2000-2003	A Qualitative Assessment of Minor Rockfish Species Major Professor: Dr. Gil Sylvia, COMES NOAA Fisheries Rep: Dr. Rick Methot, NWFSC
Nicole Nasby	1999-2000	Integration of submersible transect data and high-resolution sonar imagery for a habitat-based groundfish assessment of Heceta Bank, Oregon Major Professor: Dr. Dawn Wright Minor Rep: Dr. Mark Hixon NOAA Reps: Dr. Robert Embley, PMEL Dr. Waldo Wakefield, NWFSC
Curt Whitmire	2000-2003	Using Remote Sensing, In Situ Observations, and Geographic Information Systems to Map Benthic Habitats at Heceta Bank, Oregon Major Professor: Dr. Dawn Wright Minor Rep: NOAA Reps: Dr. Robert Embley, PMEL Dr. Waldo Wakefield, NWFSC

## 2002-2003 PUBLICATIONS

FY 02

- Chadwick, W.W., Jr. and M. Stapp. 2002. A Deep-Sea Observatory Experiment Using Acoustic Extensometers: Precise Horizontal Distance Measurements Across A Mid-Ocean Ridge. *IEEE J. Ocean. Eng.* 27(2): 193-201.
- De Ronde, C.E.J., E.T. Baker, G.J. Massoth, J.E. Lupton, I.C. Wright, R.A. Feely, and R.R. Greene. 2001. Intra-Oceanic Subduction-Related Hydrothermal Venting, Kermadec forearc, New Zealand. *Earth & Planet. Sci. Lettr.* 193: 359-369.
- Dziak, R.P. and C.G. Fox. 2000. Evidence Of Harmonic Tremor From A Submarine Volcano Detected Across The Pacific Ocean basin. *J. Geophys. Res.* 107(B5): 1-12.
- Dziak, R.P., H.P. Johnson. 2002. Hydrothermic Systems: Stirring the Oceanic Incubator. *Science's Compass*, 296: 1406-1407.
- Komada T., O.M.E. Schofield, and C.E. Reimers. 2002. Fluorescence characteristics of organic matter released from coastal sediments during resuspension. *Marine Chemistry* 79: 81-97.
- Mellinger, D.K. 2002. Ishmael: 1.0 User's Guide, Ishmael: Integrated System For Holistic Multi-Channel Acoustic Exploration And Localization. *NOAA Tech. Memorandum* OAR PMEL-120.
- Peterson, W.T. and J.E. Keister. 2002. The effect of a large cape on distribution patterns of coastal and oceanic copepods off Oregon and northern California during the 1998-1999 El Nino. *Progr. Oceanogr.* 53(2-4): 389-411.
- Peterson, W.T., J.E. Keister and L.R. Feinberg. 2002. The effects of the 1997-99 El Nino/La Nina events on hydrography and zooplankton off the central Oregon Coast. *Prog. In Oceanogr.* 54: 381-398.
- Smith, D.K., M. Tolstoy, C.G. Fox, D.R. Bohenenstiehl, H. Matsumoto, and M.J. Fowler. 2002. Hydroacoustic monitoring of Seismicity at the Slow-Spreading Mid-Atlantic Ridge. *Geophys. Res. Lettr.* 29(12): 10-29.
- Tender, L.M., C.E. Reimers, H.A. Stecher, III, D.E. Holmes, D.R., Bond, D.A. Lowy, K. Pilobello, S.J. Fertig, S.J., and D.R. Lovley. 2002. Harnessing microbially generated power on the seafloor. *Nature Biotechnology*, 20: 821-825.

FY 03

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## CIMRS OUTREACH ACTIVITIES

Educational and scientific outreach is important in all aspects of CIMRS research. Websites are a venue that reaches an enormous audience. CIMRS investigators feature their collaborative research efforts in the fields of fisheries oceanography, geophysical and acoustic monitoring of spreading centers, ocean exploration, and bioacoustic monitoring of large cetaceans at several sites hosted by NOAA. One award winning website (<http://www.pmel.noaa.gov/vents>) features educational curricula, video clips of in situ seafloor experiments, and animated 3-dimensional fly-through movies of seafloor ridges.

*Sound in the Sea*, a non-profit education program, for middle- and high-school aged students, is offered by CIMRS researchers through OSU's Saturday Academy, at OSU's Hatfield Marine Science Center. It offers a unique two-session hands-on engineering workshop that emphasizes marine biology and acoustics. Students make their own simple underwater hydrophone and then test it in Yaquina Bay.

The Visitor Center at OSU's Hatfield Marine Science Center also lends a convenient outlet for educational displays and programs. *OceanQuest* is a program that connects visiting audiences to real-time shipboard research through the use of interactive websites. NOAA's Teacher-at-Sea Program and the Ocean Exploration Program have helped sponsor educators on land and at sea who together present and interpret research activities for the general public. CIMRS investigators have also collaborated with Sea Grant Educational staff to design and prepare interactive exhibits. At the "ROPOS Exhibit", visitors can pilot a remotely operated vehicle to the seafloor and back with a joystick while viewing computer-generated and real video clips of the seafloor.