<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE OF CONTENTS</td>
<td>1</td>
</tr>
<tr>
<td>DIRECTOR’S STATEMENT</td>
<td>2</td>
</tr>
<tr>
<td>ORGANIZATION</td>
<td>3</td>
</tr>
<tr>
<td>EXECUTIVE BOARD</td>
<td>4</td>
</tr>
<tr>
<td>SCIENCE ADVISORY COUNCIL</td>
<td>4</td>
</tr>
<tr>
<td>ADMINISTRATIVE SUPPORT</td>
<td>7</td>
</tr>
<tr>
<td>PROJECTS SUPPORTED WITH CONTRIBUTED FUNDS FROM NOAA PARTNER LABORATORIES IN FY 2008</td>
<td>8</td>
</tr>
<tr>
<td>FY 2008 CONTRACTS</td>
<td>15</td>
</tr>
<tr>
<td>FY 2008 GRANTS FROM OTHER AGENCIES</td>
<td>16</td>
</tr>
<tr>
<td>INSTITUTE DIRECTOR’S RESEARCH ACTIVITIES</td>
<td>18</td>
</tr>
<tr>
<td>GRADUATE STUDENTS SUPPORTED THROUGH JOINT RESEARCH PROJECTS</td>
<td>20</td>
</tr>
<tr>
<td>2007-2008 PUBLICATIONS</td>
<td>22</td>
</tr>
<tr>
<td>CIMRS OUTREACH ACTIVITIES</td>
<td>27</td>
</tr>
</tbody>
</table>
DIRECTOR’S STATEMENT

The OSU/NOAA Cooperative Institute for Marine Resources Studies (CIMRS) represents a strong, long-term, NOAA-university partnership dedicated to research in marine science, graduate and public education, and cooperation with regional industries and communities that are dependent on marine resources.

An integral part of the OSU’s Hatfield Marine Science Center (HMSC), CIMRS is a model cooperative institute for many reasons. By its co-location with three regional NOAA laboratories representing two NOAA Line Offices, the Institute is able to bring together research partners from a variety of disciplines to address complex multidisciplinary issues relating to the living and non-living components of the marine environment. It is also the administrative home for 31 research staff and 4 research faculty working on collaborative projects with NOAA investigators who serve as OSU courtesy faculty. No other OSU research institute provides both grant administration and personnel review in the manner of an academic department. In FY08 CIMRS celebrated the promotion of one faculty member to full Professor, non-tenured. CIMRS faculty also conduct research with funding from agencies such as NSF and ONR, which extends the impact of the Institute and its value to NOAA.

The research focus of CIMRS addresses living and non-living marine resources and is thus linked to programs that require environmental sampling or observing within the ocean and programs that characterize seafloor habitats. This focus encompasses the broad field of marine fisheries (including fisheries oceanography, habitat research, and ecosystem-based management), geological/chemical oceanography, marine mammal acoustics, and the effects of climate change on marine ecosystems. It thus addresses ecosystem and climate mission goals in NOAA’s 5-year research plan and poises CIMRS research to contribute to NOAA’s 20-year research vision.

The Institute thrives because of the 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 grown, graduate student opportunities have diversified, and CIMRS has entrained many more OSU investigators from a broad range of disciplines to join together and address research problems of environmental, economic and social importance. Media recognition of CIMRS research this year included, but was not limited to Oregon Public Broadcasting, NPR, CNN, and Canadian Broadcasting Company. Over 26 publications appeared in peer-reviewed scientific journals reporting results from CIMRS collaborative research.

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 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. Additional information is available from the HMSC Annual Reports, http://hmsc.oregonstate.edu/overview.html.
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 (SAC) gives input on research directions, progress, and policy to the Director.
2007/8
EXECUTIVE BOARD

John Cassady (Chair)  
Vice-President for Research, Oregon State University

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

Usha Varanasi  
Director, Northwest Fisheries Science Center, NOAA

Robert Malouf  
Director, Oregon Sea Grant, OSU

Eddie Bernard  
Director, Pacific Marine Environmental Laboratory, NOAA

George Boehlert  
Director, Hatfield Marine Science Center, OSU

Sherman Bloomer  
Dean, College of Sciences, OSU

Michael Banks  
Director, CIMRS (Ex Officio), OSU

Larry Curtis  
Assoc. Dean, College of Agricult. Sci., OSU

SCIENCE ADVISORY COUNCIL

Hal Batchelder  
College of Oceanic and Atmospheric Sciences, OSU, Corvallis OR

Kelly Benoit-Bird  
College of Oceanic and Atmospheric Sciences, OSU, Corvallis OR

Bill Chadwick  
CIMRS, OSU Hatfield Marine Science Center, Newport OR

Elizabeth Clarke  
FRAM Division Director, NOAA Fisheries, Northwest Fisheries Science Center, Seattle WA and Newport OR

Tracy Collier  
EC Division/Ecotoxicology, NOAA Fisheries, Northwest Fisheries Science Center, Seattle WA

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

John Ferguson  
FE Division, NOAA, Fisheries, Northwest Fisheries Science Center, Seattle WA

Selina Heppell  
Dept. of Fisheries and Wildlife, OSU, Corvallis OR
David Mellinger  CIMRS, OSU Hatfield Marine Science Center, Newport OR

Alan Mix  College of Oceanic and Atmospheric Sciences, OSU, Corvallis OR

Cliff Ryer  RACE Division, NOAA Fisheries, Alaska Fisheries Science Center, OSU Hatfield Marine Science Center, Newport OR

Ex-Officio – Michael Banks
The number of CIMRS staff has grown steadily over the past 7 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.
ADMINISTRATIVE SUPPORT

In FY08, $175,238 was expended by the University for CIMRS administration. These funds provided salary and benefits for the Director, Michael Banks (0.4 FTE), the Fiscal and Faculty Personnel Administrator, Jessica Waddell (1.0 FTE), and a part-time office specialist (0.5 FTE). Administration funds were also used for personnel training and staffing, routine office supply costs, communication, computer network fees, hosting meetings, and contributing to public events at HMSC. Administrative support provided by the HMSC Business Office is not included in this figure.

Additional directed support from the NWFSC for project coordination provided another portion of the Director’s salary and benefits (0.2 FTE).

“Marine Team” fisheries students experience survival training at HMSC.
This section summarizes directed research projects undertaken by CIMRS with research funding received from NOAA through the Northwest Fisheries Science Center and the Pacific Marine Environmental Laboratory. All projects were approved by the Assistant Administrator and the Grants Management Division of NOAA after independent merit review.

Projects under Grant NA06NMF4550286
Total Award $1,365,791; 9/1/07-6/30/08

“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: Selina and Scott Heppell, Associate Prof. F&W; Bryan Black, Asst. Prof., Sr. Res.; Hongsheng Bi, Hui Liu, Jim Ruzicka, Research Assoc.; Leah Feinberg, Sr. Faculty Research Asst., Toby Auth, , Andrew Claxton, Jennifer Menkel, Jason Phillips, Tracy Shaw, Faculty Research Assistants; Rebecca Baldwin, Graduate Research Assistant

Collaborating NOAA Investigators: Ric Brodeur, Bill Peterson, Tom Wainwright, Kym Jacobson, 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.
OSU Investigators, Research Staff: Chris Goldfinger, Associate Prof., College of Oceanic and Atmospheric Sciences, Jack Barth, Professor, College of Oceanic and Atmospheric Sciences, Steve Pierce, Research Associate, Chris Romsos, Faculty Research Assistant (all COAS)

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

Dosidicus gigas (Humboldt or Jumbo squid)
Although the squid were reported off southern Oregon during an unusually warm water event in 1997, their appearance during four recent summers in Oregon waters suggests that this subtropical predator may now be well established in Pacific Northwest waters. The presence of the squid may be related to a warming Ocean, but it has not been proven yet.
“Cooperative Research”  

Marine Team  
A fisheries internship program that was originally awarded from an RFP under “Marine Team” a student–led research program run through the Department of Fisheries and Wildlife at Oregon State University has continued successfully for several years. Through the efforts of Scott Heppell and Michael Harte (OSU Marine Resource Management) interested students are now able to participate in an industry/agency internship, which will allow them the opportunity to (1) spend time working on commercial fishing vessels and learn the fisheries while interacting with captains and crew, (2) spend time at shore-side support facilities such as gear shops and fish processors, and (3) work with state management agency ODFW) personnel on research, monitoring, and policy projects.

Priorities this year were to:

1. Conduct estuarine and nearshore/intertidal sampling for juvenile groundfish  
2. Create opportunities for students to participate in state and federal fisheries research projects  
3. Conduct fisheries issues forums to facilitate interactions between students and resource scientists, managers, and industry representatives.  
4. Create opportunities for Marine Team students to work with commercial industry partners and agencies through the new internship program.  
5. Represent Marine Team, OSU, and CIMRS at the annual Marine Team Research Poster presentation.  
6. Participate annually in the Oregon Chapter meeting of the American Fisheries Society

Collaborating NOAA Investigators: Elizabeth Clarke, Waldo Wakefield, John Harms, FRAM/NWFSC
“Stock Assessment Improvement”

*Population Dynamics and Stock Assessment of W.C. Groundfish*

Stock assessments and statistical analyses provide the basis for identifying over fished and threatened stocks, guiding and monitoring rebuilding of these stocks, and forecasting biologically sustainable harvest levels for healthy stocks of commercial fish. They are conducted periodically to track changes in abundance and are supported by long-term fishery-dependent and fishery-independent monitoring, and life history studies.

Last year Dr. Gertserva conducted an assessment of the longnose skate, *Raja rhina*. The assessment was approved and accepted by the Stock Assessment Review (STAR) Panel as well as Scientific and Statistical Committee (SSC) of the Pacific Fishery Management Council, and will be used to establish management actions for the longnose skate fisheries. Her research continues on the longnose skate with the goal of explaining size-specific distribution of these organisms along the US West Coast.

Dr. Gertseva also teaches the course “Introductory Population Dynamics”. This course is designed for undergraduate students and is a part of the core curriculum for a Bachelor’s degree in Fisheries & Wildlife. It is delivered exclusively online through OSU Extended Campus and is offered every Fall, Winter and Summer terms. The course introduces the fundamental concepts of population dynamics, exposes students to quantitative analysis of biological data, and illustrates applications of mathematical models for management and conservation of populations in fisheries and wildlife. Currently Dr. Gertseva is developing a new “Fisheries Stock Assessment” course, which will be part of the curriculum for the Fisheries Management Graduate Certificate offered by Oregon State University.

**OSU Research Faculty:** Vladlena Gertseva, Asst. Prof., Sr. Res., CIMRS

**Collaborating NOAA Investigator:** Elizabeth Clarke, FRAM/NWFSC

*Estimating Key Life History Parameters of Selected Rockfish*

The purpose of this research is to investigate the reproductive biology and maternal effects of Pacific Ocean perch in the Gulf of Alaska. Older female rockfish may produce more fit and viable larvae due to greater contribution of lipids to the larvae. By collecting Pacific Ocean perch larvae at sea and then rearing them in the ADF&G/AFSC Kodiak Laboratory Seawater Facilities in Kodiak, larval lipid levels can be quantified and analyzed. This project is vital to maternal effects research and can be utilized by the North Pacific Fisheries Management Council and the National Oceanic and Atmospheric Administration’s Fisheries Agency in order to create management actions to protect a proportion of older age rockfish from commercial fishing.

GRA Emily Washchuk conducted research on Pacific Ocean perch reproductive biology and maternal effects in Kodiak, Alaska from late April to early June 2007. Emily presented preliminary results of her research findings at the Oregon Chapter of the American Fisheries Society in Eugene and the Annual Meeting in San Francisco in August 2007.
OSU Research Faculty: Scott Heppell, Asst. Prof., Dept. of Fisheries and Wildlife
Collaborating NOAA Investigator: Grant Thompson, REFM/AFSC
Projects under Grant NA17RJ1362

Total Award $1,706,266; 7/1/07-6/30/08

“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.

The Acoustic Monitoring Project provides wide-area, continuous seismic monitoring of global ridge systems using low-frequency acoustics. The primary focus of the effort is in using the U.S. Navy SOSUS hydrophone arrays to provide real-time monitoring of the Juan de Fuca /Gorda Ridge systems to queue event response efforts. Additionally, CIMRS investigators maintain and deploy both autonomous and near real-time (via satellite) hydrophone technologies for acoustic characterization of remote regions of the global oceans.

In order to acoustically monitor areas of the world ocean not covered by existing fixed hydrophone arrays, CIMRS scientists have developed autonomous moored hydrophone instruments to record acoustic energy from both underwater seismic activity as well as that from whale calls. These instruments are capable of recording frequencies from 1 - 1000 Hz, and can record data for over a year before servicing is required. The hydrophones are designed to be deployed as an array of independent instruments whose geometry can be determined by the needs of the experimenter in order to localize acoustic sources of interest.

The goal of the Geophysical Monitoring program is to better understand how submarine volcanoes work. Efforts continue to be divided between projects focused on volcano monitoring in the NE Pacific and seafloor mapping and exploration in the Western Pacific.

CIMRS researchers involved in the Hydrothermal Emissions project collect, measure, and analyze trace elemental gases in hydrothermal fluids, particularly helium-3, using ultra-high vacuum mass spectrometry. The objective of this research is to assess the locations, mechanisms, chemical flux rates and ages of active hydrothermal systems along sea floor spreading centers with the eventual end result of quantifying and predicting large-scale spatial and temporal effects of venting on ocean chemical and thermal budgets.

The Coastal Tide Modeling project assesses the effects of increasing the spatial resolution of a coastal tide model on the modeled tides and tidal currents for a variety of sites along
the open coast, island locations and within embayments. The OSU tidal inversion software (OTIS) has been modified and tested for simulating tides at the very high spatial resolution required for tsunami hazard modeling.

**OSU Investigators, Research Staff**: William Chadwick, Associate Prof., Sr. Res., Robert Dziak, Professor., Sr. Res., David Mellinger, Associate Prof., Sr., Res., Haru Matsumoto, Research Associate; Andra Bobbitt, Susan Merle, Sharon Nieukirk, Sr. Faculty Research Assistants; Leigh Evans, Matthew Fowler, Ron Greene, Joe Haxel, Sara Heimlich, Faculty Research Assistants; Andy Lau, Professional Faculty (all CIMRS); Gary Egbert, Prof., S. Erofeev, Research Associate, COAS

**Collaborating NOAA Investigators**: Robert Embley, Frank Gonzalez, Stephen Hammond, John Lupton (all PMEL/OERD)
## FY 2007/8 CONTRACTS

<table>
<thead>
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<th>Agency</th>
<th>Amount</th>
<th>Start Date</th>
<th>End Date</th>
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<tr>
<td>Fish Behavior Analysis</td>
<td>NOAA/AFSC</td>
<td>$60,180</td>
<td>9/07-</td>
<td>9/08-</td>
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<td>Loggerhead TEWG</td>
<td>NOAA/NEFSC</td>
<td>$25,000</td>
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<td>3/09-</td>
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<td>Survival of Juvenile Salmonids…</td>
<td>BPA</td>
<td>$701,486</td>
<td>8/1/07-</td>
<td>8/31/08-</td>
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</table>

15
## FY 2007/8 Grants from Other Agencies

<table>
<thead>
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<th>Source</th>
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<th>Duration</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Real-Time Volcanic Detection</td>
<td>NSF</td>
<td>$133,900</td>
<td>10/06-9/08</td>
<td>Dziak</td>
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<td>Productivity, Biogeochemical Transformations and Cross-Margin Transport...</td>
<td>NSF</td>
<td>$83,043</td>
<td>4/06-5/08</td>
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<td>Monitoring Inflation at Axial Seamount</td>
<td>NSF</td>
<td>$23,927</td>
<td>9/07-8/09</td>
<td>Chadwick</td>
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<td>Odontocetae Datasets</td>
<td>ONR</td>
<td>$270,000</td>
<td>7/07-6/08</td>
<td>Mellinger</td>
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<td>Passive Acoustic Monitoring</td>
<td>IAGC</td>
<td>$110,200</td>
<td>1/07-5/08</td>
<td>Mellinger</td>
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<tr>
<td>Earthquakes and Endangered Whales</td>
<td>NOAA</td>
<td>$106,000</td>
<td>5/08-4/09</td>
<td>Dziak, Mellinger</td>
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<tr>
<td>Harmful Algal Bloom</td>
<td>NOAA</td>
<td>$92,358</td>
<td>9/09-8/08</td>
<td>Peterson</td>
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<td>Acoustic Data from Bering Sea</td>
<td>NPRB</td>
<td>$19,478</td>
<td>7/1-1/09</td>
<td>Mellinger</td>
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<tr>
<td>Marine Bioacoustics</td>
<td>ONR</td>
<td>$31,383</td>
<td>5/07-4/09</td>
<td>Mellinger</td>
</tr>
</tbody>
</table>
Bransfield Strait deployment of portable hydrophones
Antarctica
Institute Director’s Research Activities

The Institute Director’s research was supported in 2007/8 through grants awarded to the Coastal Oregon Marine Station, Dept. of Fisheries and Wildlife where he holds a faculty appointment at the rank of Assistant Professor.

Project Title: Conservation Hatchery Implementation Program: OSU Component for Non-pariel Dam Adult Trap and Genetic Pedigree
Source of Support: Oregon Watershed Enhancement Board
Total Award: $177,000 Period Covered: 7/23/07-6/30/08
Person Months Committed to the Project by PI: .8 (PI)

Project Title: “Real-Time” Genetic Information to Address the Klamath ‘Weak’ Stock Crisis for Oregon’s Ocean Salmon Fishery
Source of Support: Agriculture Research Foundation
Total Award: $127,833 Period Covered: 9/07-12/08
Person Months Committed to the Project by PI: 1.2 (Co-PI)

Project Title: Analysis of DNA Samples to Identify Juvenile Winter and Spring Run Salmon
Source of Support: USDI-FWS
Total Award: $306,211 Period Covered: 5/20/08-7/31/10
Person Months Committed to the Project by PI: 1.0 (PI)

Project Title: Testing Clock Genes, SNPs and Microsatellites for Population Identification Among Central Valley Chinook and Verifying Genetic Transmission of Seasonal Run Time Differences on the Feather River
Source of Support: California Dept. of Water Resources
Total Award: $569,933 Period Covered: 10/1/07-9/30/10
Person Months Committed to the Project by PI: 2-3 (PI)

PUBLICATIONS


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. In 2006, one fellowship (first awarded in 2003) was continued.


Julie Keister  
Investigations of Variability of Mesoscale Energy off the Coast of Central Oregon and Northern California  
Major Professor: Tim Cowles, COAS

Graduate Students supported through Joint Research Projects

A growing number of graduate student projects are being supported with contributed grant funds from the NOAA Fisheries. 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

Rebecca Baldwin 2006-2009  
Using Parasite Community Data and Population Genetics for Assessing Pacific Sardine (Sardinops sagax) Population Structure along the west coast of North America  
Co-Major Professor: Michael Banks/Kym Jacobson  
NOAA Fisheries Rep: Kym Jacobson, NWFSC

Fisheries and Wildlife
Marissa Litz 2005-2008  
Abundance, distribution, and spawning behavior of the northern anchovy, Engaulis mordax, off the cost of Oregon and Washington  
Major Professor: Selina Heppell
Minor Rep: Scott Heppell
NOAA Fisheries Rep: Robert Emmett, NWFSC
Degree completed Winter 2007

Emily Waschuk  2005-2008  Estimating Key Life History Parameters for Selected Species of Rockfish
Major Professor: Scott Heppell
Minor Rep: Selina Heppell
NOAA Fisheries Rep: Grant Thompson, AFSC
(Inactive)

Good luck at UW, Julie!
2007-2008 Publications

FY 08


**Gertseva, V.V.** 2008. The population dynamics of the longnose skate, Raja rhina, in the northeast Pacific Ocean. *Fisheries Research* (in press).

Gomez-Guitierrez, J., **L.R. Feinberg, T.C. Shaw,** and W.T. Peterson. 2007. Interannual and geographical variability of the brood size of the euphausiids *Euphausia*


Proceedings and Technical Reports


**Extramural Publications**


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.

The Visitor Center at OSU’s Hatfield Marine Science Center also lends a convenient outlet for educational displays and programs. 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. The new exhibit “Sensing the Sea” allows visitors to “experiment” with sounds propagating through a salt water tank, simulating physical, biological, and anthropogenic sound that researchers monitor in the global oceans.

SeaFest, the OSU Hatfield Marine Science Center Open House, is an important outreach event that reaches approximately 3000-4000 families introducing them to the science activities at HMSC. CIMRS investigators spend many hours preparing exhibits for and then participating in the day-long event each year.

CIMRS researchers also provide valuable volunteer hours at K-12 Science Fairs and related activities throughout the year.