



OREGON
STATE
UNIVERSITY

2030 S. Marine Science Drive
Newport, Oregon
97365-5296

Telephone
503-867-0100

1989-1990 ANNUAL REPORT
of the
Hatfield Marine Science Center
June 30, 1990

This past year, 1989-90, was marked by a number of significant events and appears to be the one of the most active years we have had at the Hatfield Marine Science Center. The end of year represented the first twenty-five years for the Hatfield Marine Science Center. On June 15 we celebrated the 25 years with a symposium, "Vox Maritima", and a dinner. In addition, we had open house of the entire Center on June 16 and 17. On the Fourth of July we had the dedication of our new library and the new whale sculpture display, and our giant birthday cake.

Physical Plant

Last year the aquarium roof was replaced. This year the roof on the remaining portions of the original building and the ship support building was replaced with a concrete tile roofing. This should put us in good stead as far as the roofs are concerned. Unfortunately, the old building is heavily infested with "wet" termites that have destroyed some of the wooden walls that serve as dividing walls between offices and labs. Funding is being sought to repair and treat the ground below the building for termites and repair of the structure.

The meeting dining room building (1977) was repainted. The wear of 25 years in the public meeting room and auditorium resulted in the necessity of replacing all the chairs in the meeting room, redoing the drapes, and general clean-up. The auditorium had a complete renovation with a new tile floor placed over the old painted concrete, new auditorium seating installed, and a stage curtain was installed to cover the sensitive 18-foot video screen on the stage.

A major thrust this year was to increase our accessibility to the handicapped. An audio loop was installed in the Center's auditorium that allows wearers of hearing aids with telephone switches to directly pick up radio signals from our videos and speakers. Radio receivers for the electronic pick-up can be checked out at the bookstore desk for those hearing aid wearers without a telephone switch. Small pocket transmitters were purchased for use by tour guides in the auditorium, on the nature trail, and in classrooms.

In December 1989 our librarian since 1976, Marilyn Potts Guin, died and donated her house and three acres of swampland near it to OSU. The house needed considerable repair to bring it into safe condition for

renting. A furnace was installed, a bedroom added, and general repair of the electrical system was done. Per her request the house is being used by teaching and research faculty that are visiting the Center. We began renting the house in June 1990. The swamp provides the HMSC with a significant fresh water wetland area for research. The swamp area will be called "Potts' Bottom" per Marilyn's request.

Our sea water system continues to be updated and on June 28, 1990, a major test of the completely automated sea water control system was successfully performed. This allows automatic start-up after power failure, which previously required the physical plant personnel to be called. In addition, the automation allows us to fill our water storage on demand and always at high tide. This will give us an even higher degree of salinity control and will facilitate a much evenner temperature control throughout the year. This, added to our computerized monitoring system, gives us a very fine sea water system. I would particularly like to recognize Mr. Parker Henschman who developed this entire system. It is estimated that for the automation to be engineered and set up would have cost between \$75,000 and \$100,000. Parker Henschman engineered and built the system with \$16,000 of electronic parts. Beyond the savings in engineering and construction, we estimate that when our new sea water system comes on line in the coming fiscal year, we will save as much as \$1,200 a month in electricity because we can pump only during need and not 24 hours a day. This savings alone will enable us to maintain the janitorial service in our new library facility.

June 1, 1990, we moved into the new 21,000 square foot library which will be named the Marilyn Potts Guin Library on July 4. The library is wired with fiber optics and has numerous conduits throughout the facility ready for use and we suspect these will be needed in the coming decades as library systems become more and more automated and electronic information retrieval systems are in place. This library was funded by EPA, but a lease has been completed in time for its dedication to OSU for its operation, maintenance and holdings. Landscaping for the new library was provided by OSU and furnishings for the entire library, totally \$270,000, was provided by soliciting donations from the public through the OSU Foundation.

Also this year we installed a new telephone system at a cost of \$176,000 which will be amortized over the next decade. This new system provided fiber optics to all our buildings (with the exception of the new EPA laboratory) and provides cables through the buildings rather than through the roofs. This will enable us to maintain communication with remaining buildings in case of damage to any one building. We believe with both telephone and modem outlets we will have a cutting edge communication system.

Aquarium

The aquarium has been successful in the highly competitive federal Institute of Museum Services grant programs. Applications were received from 1,368 museums around the country with only 390 museums receiving the \$17 million in

grants. The \$45,563 IMS grant received by the Center will be used to maintain and improve our basic operations and services.

The demands of heavy public attendance continues to put pressure on our aquarium. With the aid of some 70 volunteers we have made a number of improvements. A new touch table area was developed. It allows better control and more aesthetic balance with the rest of the aquarium. A handicapped accessible water fountain has been installed. A new whale sculpture display with an educational theme has been installed and will be dedicated July 4, 1990. The whale sculptures were donated by Captain Barry Fisher and his wife Carol. They also funded construction of the cabinets and lighting for the display. The estimated value of this donation is \$47,000.

We continue to make an effort to streamline our bookstore and we have added exhibit boards that hold movable shelving. We have added a laminating machine to aid with our displays and public information. Exhibit boards were placed over windows which looked into the main EPA and HMSC directors' offices to add to our educational display area.

The aquarium is being recognized as one of the most handicapped accessible facilities in the state and a major meeting is being held this fall at the HMSC covering the topic of accessibility for the handicapped.

Education

The attendance in the winter term fisheries classes were down slightly, but the educational program went well and is on track. The spring term program in marine biology saw a doubling of attendance and we had a very successful term.

Because of changes within the College of Education we have had major conflict and concern with the Master of Education degree program. We, however, believe that much of that has been straightened out and, although our attendance this summer will be quite low, we should see a build up of that program in the coming years. Vicki Osis continues to work very hard to establish a sound educational program.

Our graduate education program appears to be doing well and we have received a number of scholarships. The Reynolds Scholarship was awarded to Karl Brookins in the Department of Fisheries and Wildlife. A Holt Marine Education Fund has been established and will be awarded by July 1, 1990. Captain Barry Fisher has established the Captain Fred Anderson Memorial Award for graduate research in Oregon's open ocean. The first recipient is Gonzalo Castillo, a student of Dr. Henry Li's in Oceanography.

Research

The following new research grants have been awarded this past year:

Seafood Marketing Investigation \$6,000 - Oregon Department of Agriculture - Gilbert Sylvia

Pacific Whiting Marketing \$6,000 - Oregon Department of Agriculture - Gilbert Sylvia

Oyster Broodstock Development and Improvement - \$3,000 - Christopher Langdon

Two new positions have been filled for the Coastal Oregon Marine Experiment Station at the HMSC. Microbiologist/fish disease position is being filled by Dr. Paul Reno. He accepted the job this spring and will coming on board in the fall of 1990. Dr. David Sampson, fish dynamicist, is also coming in the fall. We believe these two candidates will bring significant research programs in their respective fields.

Astoria Seafood Laboratory

This year is the first year of a brief report on the Astoria Seafood Lab with their publications. Dr. David Crawford is retiring January 1, 1991, and the lab reached a low in staffing and activity. A search was made for his replacement and Dr. Michael Morrissey has accepted and will be arriving in August. A search is currently being conducted for an assistant professor position at Astoria. In addition, efforts are being made to develop a Seafood Research and Consumer Center which will provide funding for either completely remodeling or rebuilding the Seafood Lab.

Whiskey Creek Hatchery

This past year Whiskey Creek Hatchery at Netarts Bay was leased to Tillamook Anglers. A major facility improvement is being planned and a public observation area has been established. The Whiskey Creek Hatchery was previously under the direction of the Department of Fisheries and Wildlife and has now come under the COMES leadership. For historical reasons we will continue to include brief comments about the hatchery. It is our hope that as the COMES program develops, we will be able to re-establish graduate research programs with the Whiskey Creek Hatchery.

PERSONNEL CHANGES

HMSC

The Center has lost three staff members in sad circumstances this year: *Marilyn Guin*, the HMSC librarian since 1976; *Cathy Bacon*, the silviculturist with the COPE program; and *Larry Smith*, chemist with the Environmental Protection

Agency. Their deaths were keenly felt by all, especially since they were all in the prime of their life.

Janet Webster has been acting librarian since November, moving from her three-quarter time appointment, ably supported by Susan Gilmont, Lola Franklin, Isis Bond and Danny Ivany. The HMSC librarian search committee hopes to have the new librarian on staff in mid-September.

Kathleen Heide, Marine Education Specialist responsible for the public aquarium, has taken a new position with BIS CAP International in California. Filling in this summer during the search process are *Shawna Harvey*, *Chris Raisbeck*, and *Susan Gaughan Tissot*. Shawna worked this past spring as a Museum Studies intern preparing a display on the driftnet issue. Chris was the seasonal marine educator hired for the spring to assist with the visiting school groups. Susan has been working on various permanent displays over the past few years. The new permanent Public Marine Education Specialist should be at work in mid-September. *Linda Lunow* has taken over for *Barbara Hilp* and *Irene Sussman* and *Sara Wilcox* have joined the public wing staff.

Bruce Koike, Senior Aquarist, has been hired as a curator for the new Aquarium of the Americas in New Orleans, taking with him his new wife, *Mary Gosla*. *Michelle Moore* has moved up to the senior position and has had *Peter Schupp* as her assistant this past spring and summer. *Dan Nichol* has completed his work for his master's degree in fisheries and is a fisheries biologist for NMFS in Seattle. Research assistant *Bill Mahan* has gone to work in Florida.

Bruce Sorte, Business Service Manager on campus, has been hired to work for the Center part-time, handling contracts and administrative procedures. *Beulah Redfield* has replaced Cheryl Smith in the business office as the personnel clerk and inventory control manager. She comes to us from Klamath Falls. *Tammy Frank* is a new post-doctoral fellow working with Don Campbell and comes to us from a post-doctorate at the University of Connecticut Medical School where she was working on invertebrate visual transduction. Toxicologist *Patricia Schmieder* has completed her Ph.D. degree with Lavern Weber and taken her husband *Leo Babeu* and daughter *Lecia* back to the EPA Water Quality Lab in Duluth, Minnesota. *Terry Morse* has picked up the work with Don Campbell formerly done by Leo.

There were a number of changes in Ship Operations. *Tom Kluttz*, chief cook/steward retired and *Mike Hill*, electronics technician, moved to campus. *Linda Oliver*, clerical support, is working half-time for Ship Operations and half-time with Bev Lund in Extension/Sea Grant. Linda took over for *Karen Jones* in Ship Operations when Karen moved with her husband to Seattle.

The COPE Program has had a great number of personnel changes. *John Donahue* has moved to Friday Harbor Marine Lab in Washington to work for San Juan County. *Lisa Melton* will be working at the Pacific Northwest Research Station

in Olympia, Washington as a research assistant. *Jeff Peterson* is moving to Corvallis to work with NSI Technology. Coming to fill these research assistant positions are *Doug Bateman, Eric Horvath, and Steve Garman.*

Jim Bertolini has joined the staff of the Fish Disease and Diagnostic Lab from the University of Mississippi Medical Center in Jackson, Mississippi. He is working on the mechanisms of pathogenesis of bacteria that infect fish.

Seafood processing specialist *Ken Hilderbrand* has returned from his three-year sojourn in the Sultanate of Oman working for the National Fisheries Institute in Muscat. *Steve Berntsen*, who was filling in for Ken during his foreign travels, has gone into business for himself, producing and marketing seafood as Albacore Annie's.

EPA

Don Baumgartner, the former Director of EPA, who had been on an IPA for two years, is now Assistant Director of the Environmental Research Laboratory of the University of Arizona in Tucson. EPA has also brought in several new contract scientists: *Sally Noack, Michele Redmond, John Sewell, and Scott Echols.*

NCRI

Jan Auyong has joined the staff of NCRI as the Deputy Director, replacing Greg McMurray who had been acting deputy director. Greg went to work for Dames and Moore in Alaska. Jan comes to us from Hawaii Sea Grant/Extension at the University of Hawaii, where she was the recreation and tourism specialist. Also joining the staff as accounting assistant is *Janet Skaugset*. *David Palazzi*, project analyst, joins his wife, Lisa Melton, in Olympia, where he is working with the Department of Environmental Quality, overseeing water quality projects.

NOAA-PMEL

Fred Jones has been reassigned to Seattle and *Bruce Hillard*, formerly of Rockville, Maryland, has been assigned as the deputy division leader. *Dennis Seem* has been promoted to Lieutenant Commander of the NOAA Corps. *William Chadwick* is the new research associate. Bill got his Ph.D. at University of California, Santa Barbara, and comes to us from the U.S. Geologic Service, specializing in vulcanology. *Chris Zervas* is a post-doctoral fellow from University of Washington, working in geophysics with all three of the principal investigators.

NOAA-NMFS

Research assistant *Michael Burger* returned to school to get his master's degree at the University of Delaware. Coming from New York, *Deborah Pulikowski* began work as a research assistant after a stint as a spring aquarium interpretative

aide. *Alex Haro* finished his Ph.D. in fisheries ecology at the University of Maine and is a post-doctorate fellow with the fish behavior program.

COMES

The Coastal Marine Experiment Station has increased its faculty by three as of August 1990. Coming on staff are fish population dynamics specialist, *David Sampson*, microbiologist *Paul Reno*, and seafood researcher *Michael Morrissey*. Dave Sampson comes to us from Portsmouth Polytechnic Centre for Marine Resource Economics in Portsmouth, England. Paul Reno was the Director of the Aquatic Animal Health Laboratory at the University of Maine, Orono and is enriching the Center by bringing his wife, *Prudence Caswell-Reno*, as a research assistant for John Rohovec. Michael Morrissey will be stationed at the Astoria Seafood Lab and joins us from the staff of the University of Rhode Island Department of Food Science and Nutrition. Helping Susan Mills with all this new work has been *Maureen Collson*, student worker from the Oregon Coast Community College.

STATISTICS

Student Enrollment

<u>Winter</u>	<u>Class</u>	<u>1989</u>	<u>1990</u>
FW 407M/507M	Seminar: Marine Fisheries	6	11
FW 455	Fish Culture	18	15
FW 470	Water Pollution Biology	13	11
FW 494	Disease & Parasites of Marine Fish & Invertebrates	15	12
FW 495	Molluscan Aquaculture	<u>12</u>	<u>12</u>
Total Student Enrollment		18	15

Spring

Bi 450, 451	Marine Biology	11	22
-------------	----------------	----	----

Summer

FW 508x	Salmonid Disease	NA	20
SEd 599	Aquatic Science*	NA	2
	Environmental Problems*	NA	7
	Estuaries & Wetlands*	NA	3
	Marine Ecosystems*	NA	5
SEd 508	Coastal Indians	NA	7
	Coastal Natural History	25	6
	Marine Invertebrates	17	4
	Marine Biology for Elem. Teach.	NA	9
	Marine Mammals	22	11

*Master's degree courses

Resident Graduate Students: 10

Academic Institutions Utilizing the HMSC

Rogue Community College, Grants Pass OR
 Western Oregon State College, Monmouth OR
 Lane Community College, Eugene OR
 Central Oregon Community College, Bend OR
 Clark Community College, Vancouver WA
 Eastern Oregon State College, La Grande OR
 University of Oregon, Eugene OR
 Morningside College, IA
 Portland State University
 Oregon Coast Community College, Newport OR

Aquarium Visitors

January 1, 1989 - December 31, 1989 = 421,546

Since opening, June 1965 = 7,370,564

Number of school groups = 257 10,283 students K-12

Seatauqua	1989	181,685	
Whale Watch	1989	March	24,729
		December	20,655
	1990	March	27,450

Conferences Held at HMSC

Elderhostel - September 1989

Alumni Weekend, August 1989

VISITING

Gayle Hansen, University of Alaska

Janet Leonard, University of Oklahoma

Kushal Talukdar, URI

Ian Murray, B. P. Oil

Ian Jonasson, Geology Survey of Canada

Verena Tunnicliffe, University of Victoria

Steve Eittreim, U.S. Geologic Survey

C. Chrysostomidis, Director Sea Grant College Program, M.I.T.

Don Hussong, International Seafloor Systems, Seattle

David Clague, U.S. Geologic Survey, Menlo Park, California

David Cushon, U.S. G. S.

Joseph Siebenaller, Louisiana State University

Jill Karsten, University of Hawaii

John Cullen, Bigelow Labs

Eric Bock, Rensselaer Polytechnic

K. Ma, Rensselaer Polytechnic

Jerry Korenowski, Rensselaer Polytechnic

Michael Gregg, University of Washington

Brenda Sanders, California State, Long Beach

Sandra Lindstrom, University of British Columbia

Michele Ridgeway, University of Alaska

Scott Farrow, Carnegie Mellon University

Pieter Folkens, University of California, Santa Cruz

Jorge Reynolds, University of Argentina

A. Tanaka, University of Tokyo

V. Alexyev, TINRO, U.S.S.R.

Don Axilrad, Conservation, Forests and Lands, Victoria, Australia
Harry Briedahl, Conservation, Forests and Lands, Victoria, Australia
Claire Spudie, Conservation, Forests and Lands, Victoria, Australia
Malcolm Turner, Conservation, Forests and Lands, Victoria, Australia
Arne Isaksson, Institute of Freshwater Fisheries, Iceland

SEMINAR SERIES

David Young	A Chemical Index of Trophic Level Separation in Marine Food Webs
Patricia Schmieder	Physiological Mechanism Controlling Xenobiotic Uptake Across Trout Gills
Walter Frick	A Two-Dimensional Numerical Sea Model
Hermann Gucinski*	UV-B and Marine Ecosystems
Aaron Novak*	My Involvement in the Manhattan Project and the Responsibilities of a Scientist Today
Catherine Bacon	Buffer Strips or Bacon Strips?
John Donahue	A Digital Image Approach to Monitoring Surface Deformation
Christopher Fox	Active Volcano Off the Oregon Coast?
Bruce Boese	PCB Bioaccumulation: How Long is Long Enough?
Larry Smith	What's Toxic about PCBs?
John-Eric Levin	What's New at the Zool? Part 2 of the Land-based Polyculture Saga
John Chapman	Survey of Ecological Impacts of the Exxon Valdez Oil Spill along the Shelikof Strait, Alaska
Seppo Soinila	Localization of Molluscan Neurotransmitters
Robert Baker*	How Fish Talk, See and Remember
Gary Taghon	Making It in the Mud: A Worm's Story
Ted DeWitt	Organic Matter Quality and Toxicity of Fluoranthene: Results

George Mpitsos	A View of the Brain as a Darwinian Engine
Rod Fujita*	Global Warming: Ecological Mechanisms and Effects
Philippe Douillet	Effect of Bacteria in Larval Cultures of the Pacific Oyster <i>Crassostrea gigas</i> (Thunberg)
Earle Buckley	Overview of NCRI's Mission
Bruce Appelgate	Side-Scan Sonar Surveys off the Oregon Coast
Christopher Bayne*	The Oxidative Burst in Teleost Leukocytes: Modulation by Neural Products
Bill Barss	Oregon's Hagfish Fishery and ODFW Biological Sampling Observations
Gilbert Sylvia	Economic Policy Models for Marine Resource Management: Can They Make A Difference?
Bruce Mate	Movements and Dive Patterns of Right Whales in the North Atlantic
Tamara Frank	Vision in the Deep Sea: Can They See the Light?
Don Campbell	Switching Channels: The Shocking Truth about Cellular Signalling
Woodrow Monte*	Methanol Toxicity in Humans: The Downside of NutraSweet
Ken Hilderbrand	Fisheries Development in the Sultanate of Oman
Sergio Navarrete*	Interference Competition Among Crabs and the Structure of Rocky Intertidal Communities in Central Chile
Gayle Hansen	Reproductive Strategies in Marine Red Algae: So Many Carpospores
Sylvia Yamada*	Crabby Predators, Scourge of the Intertidal
Steve Ferraro	Level of Taxonomic Identification Needed to Assess Pollution Impacts
John Geller*	Population Genetics of Introduced Species

Rick Everett*	Effects of Oyster Culture Methods on Benthic Communities
Arne Skaugset	Modelling Root Reinforcement in Shallow Forest Soils
Janet Leonard	Sex and the Simultaneous Hermaphrodite
Bob Randall Brenda Saunders*	Biomarkers: Use of Heat-Shock Proteins to Assay Pollution-Induced Stress in Marine Invertebrates
Denise Idler*	Factoring in the Controls: A New Methods for Analyzing Feeding Data
Lynne Krasnow	Life and Times of a Tanaid
Alex Haro	Thermal Preferenda and Behavior of American Eels in Relation to Their Spawning Migration
Tom Quinn*	Current Controversies in Salmon Homing
Perry Anderson*	Behavioral Thermoregulation of Rainbow Trout at Two Different Food Rations
Jill Grover	Larval Sablefish: A Food Habits Guide to Their Universe
Brian Tissot	Geographic Variation Among Populations of Black Abalone
Steve McConnell	Alternative Reforestation Practices
Henry Lee	Clam's Eye View of Sediment Bioavailability
Jim Harvey*	Things that Go Beep in the Night: Nearshore Movements and Diving Patterns in Harbor Seals
Cynthia Trowbridge*	Marine Herbivore-Plant Interactions: The Feeding Ecology of the Sea Slug <i>Placida dendritica</i>

* = Non HMSC

PUBLICATIONS

BACON, CATHERINE G.

Kreh, R. E., S. M. Zedaker, and C. G. Bacon. 1990. Fifth-year response of loblolly pine to eight levels of competition. Proceedings of 1990 Southern Weed Science Society.

Bacon, C. G. and D. B. South. 1989. Chemicals for control of common insect and mite pests in southern pine nurseries. South. J. Appl. For. 13(3):112-116.

Bacon, C. G. 1989. Riparian silviculture: active riparian management for multiple resources. Proceedings of Water Resources Session, Society of American Foresters National Convention, Spokane WA, September 24-27, 1989.

BARSS, WILLIAM H.

Barss, W. H. 1989. Maturity and reproductive cycle for 35 species from the family Scorpaenidae found off Oregon. Ore. Dept. Fish and Wildlife, Info Rpt. 89-7, 36 p.

Barss, W. H. and R. L. Demory. 1989. Movement of lingcod tagged off the central Oregon coast. Ore. Dept. Fish and Wildlife, Info. Rpt. 89-8, 12 p.

BAUMGARTNER, DONALD J.

Baumgartner, D. J. and I. W. Duedall. 1990. Marine pollution processes, their relationship to pollution, and a framework for waste management, Chapter 1. IN *Oceanic processes in Marine Pollution, Vol. 6: Physical and Chemical Processes: Transport and Transformation*. Baumgartner, D. J. and I. W. Duedall (eds.). Robert E. Krieger Publishing Co, Malabar, Fl.

Bodeen, C. A., T. J. Hendricks, W. E. Frick, D. J. Baumgartner, J. E. Yerxa, and A. Steele. 1989. User's guide for SEDDEP: a program for computing seabed deposition rates of outfall particulates in coastal marine environments. EPA Report to OMEP. SCCWRP CR-811182 and OSU CR-815455.

Ozretich, R. J. and D. J. Baumgartner. 1990. The utility of buoyant plume models in predicting the initial dilution of drilling fluids - Chapter 13. IN *Oceanic Processes in Marine Pollution, Vol. 6: Physical and Chemical Processes: Transport and Transformation*. Baumgartner, D. J. and I. W. Duedall (eds.). Robert E. Krieger Publishing Co, Malabar, Fl.

Roberts, P.J. W., W. H. Snyder, and D. J. Baumgartner. 1989. Ocean outfalls: I - Submerged wastefield formation. ASCE Journal of the Hydraulics Division. 115(1):1-25.

Roberts, P.J. W., W. H. Snyder, and D. J. Baumgartner. 1989. Ocean outfalls: II - Spatial evolution of submerged wastefield. ASCE Journal of the Hydraulics Division. 115(1):26-48.

Roberts, P.J. W., W. H. Snyder, and D. J. Baumgartner. 1989. Ocean outfalls: III - Effects of diffuser design on submerged wastefield. ASCE Journal of the Hydraulics Division. 115(1):49-70.

BOESE, BRUCE L.

Boese, B. L., H. Lee, D. T. Specht, R. C. Randall, and M. Winsor. 1990. Comparison of aqueous and solid-phase uptake for hexachlorobenzene in the tellinid clam, *Macoma nastua* (Conrad): a mass balance approach. Environ. Toxicol. Che. 9:221-231.

CAMPBELL, DONALD T.

Campbell, D. T. 1990. Current through single TTX-sensitive and TTX-resistant Na channels in frog DRG cells. Biophys. J. 57:103a.

CHAPMAN, GARY A.

Anadu, D. I., G. A. Chapman, L. R. Curtis and R. A. Tubb. 1989. Effect of zinc exposure on subsequent acute tolerance to heavy metals in rainbow trout. Bull. Environ. Contam. Toxicol. 43:329-336.

Curtis, L. R., W. K. Seim, L. K. Siddens, D. A. Meager, R. A. Charchman, W. H. Carter, and G. A. Chapman. 1989. Role of exposure duration in hydrogen ion toxicity to brook (*Salvelinus fontinalis*) and rainbow trout. Can. J. Fish. Aq. Sci. 46:33-40.

Johnson, S. C., G. A. Chapman, and D. G. Stevens. 1989. Relationships between temperature units and sensitivity to handling for coho salmon and rainbow trout embryos. Prog. Fish Cult.. 51:61-68.

CHAPMAN, JOHN W.

Pearcy, W. G., C. D. Wilson, A. W. Chung, and J. W. Chapman. 1990. Residence times, distribution and production of juvenile chum salmon, *Oncorhynchus keta*, in Netarts Bay, Oregon. Fishery Bulletin 87:553-568.

CRAWFORD, DAVID L.

Chang-Lee, M. V., L. E. Lampila and D. L. Crawford. 1990. Yield and composition of surimi from Pacific whiting (*Merluccius productus*) and the effect of various protein additives on gel strength. J. Food Science 55(1):83-86.

Chang-Lee, M. V., R. Pacheco-Aguilar, D. L. Crawford and L. E. Lampila. 1989. Proteolytic activity of surimi from Pacific whiting (*Merluccius productus*) and heat-set gel texture. J. Food Science 54(5):1116-1119 & 1124.

Pacheco-Aguilar, R., D. L. Crawford, and L. E. Lampila. 1989. Procedures for the efficient washing of minced whiting (*Merluccius productus*) flesh for surimi production. J. Food Science 54(2):248-252.

DAVIS, MICHAEL W.

Olla, B. L. and M. W. Davis. 1990. Behavioral responses of juvenile walleye pollock, *Theragra chalcogramma*, to light, thermoclines and food: possible role in vertical migration. J. Exp. Mar. Biol. Ecol. 135:59-68.

DEWITT, THEODORE H.

DeWitt, T. H., R. C. Swartz, and J. O. Lamberson. 1989. Measuring the acute toxicity of estuarine sediments. Environ. Toxicol. Chem. 8:1035-1048.

FERRARO, STEVEN P.

Ferraro, S. P., H. Lee, R. J. Ozretich, and D. T. Specht. 1990. Predicting bioaccumulation potential: a test of a fugacity-based model. Archives of Environmental Contamination and Toxicology 19:386-394.

FOX, CHRISTOPHER G.

Fox, Christopher G., F. J. Jones and T. K. Lau. 1990. Constrained iterative deconvolution applied to SeaMARC I sidescan sonar imagery. IEEE Journal of Oceanic Engineering 15(1):24-31.

Fox, Christopher G. 1989. Empirically derived relationships between fractal dimension and power law form frequency spectra. Pageoph 131(1/2):211-239.

GROVER, JILL J.

Grover, J. J., B. L. Olla, M. O'Brien and R. I. Wicklund. 1989. Food habits of Florida red tilapia fry in manured seawater pools in the Bahamas. The Progressive Fish Culturist 51:152-156.

LANGDON, CHRISTOPHER J.

Langdon, C. J. 1989. Preparation and evaluation of protein microcapsules for a marine suspension-feeder, the Pacific oyster *Cassostrea gigas*. Marine Biology 102:217-224.

Langdon, C. J. and R. I. E. Newell. 1990. Utilization of detritus and bacteria as food sources by two bivalve suspension-feeders, the oyster *Crassostrea virginica* and the mussel *Geukensia demissa*. *Marine Biology* 58:299-310.

LANNAN, JAMES E.

Lannan, James E. 1990. Editor's introduction: Farming and ranching in aquatic systems. IN J. E. Lannan (ed.), *Food Reviews International* 6(3): 293-298. Marcel Dekker, Inc.

Lannan, J. E., G. A. E. Gall, J. E. Thorpe, C. E. Nash and B. E. Ballachey. 1989. Genetic resource management of fish. *Genome* 31:798-804.

LEE, HENRY

Lee, H. and W. G. Ambrose. 1989. Life after competitive exclusion: an alternative strategy for a competitive inferior. *Oikos*. 56(3):424-427.

Lee, H., B.L. Boese, R. C. Randall, J. Pelletier. 1990. A method for determining gut uptake efficiencies of hydrophobic pollutants in a deposit-feeding clam. *Environ. Toxicol. Chem* 9:215-219.

MATE, BRUCE R.

Mate, B. R. 1989. Satellite-monitored radio tracking as a method for studying cetacean movements and behaviors. *Scientific Reports of the International Whaling Commission* SC/40/0-42:389-391.

Scott, M. D., R. S. Wells, A. B. Irvine and B. R. Mate. 1990. Tagging and marking studies on small cetaceans. IN *The Bottlenose Dolphin*. R. R. Reeves and S. Leatherwood (eds.). Academic Press, pp. 489-514.

MCCRAE, JEAN

McCrae, Jean and L. Osis. 1989. *Plants and Animals of Oregon's Rocky Intertidal Habitat*. Oregon Department of Fish and Wildlife, Newport, Oregon. 32 pp.

MCMAHON, THOMAS E.

McMahon, T. E. and G. F. Hartman. 1989. Influence of cover complexity and current velocity on winter habitat use by juvenile coho salmon (*Oncorhynchus kisutch*). *Can. J. Fish. and Aqua. Sci.* 46:1551-1557.

Holtby, L. B., T. E. McMahon, and J. C. Scrivener. 1989. Stream temperatures and inter-annual variability in the emigration timing on coho salmon

(*Oncorhynchus kisutch*) smolts and fry and chum salmon (*O. keta*) from Carnation Creek, British Columbia. Can. J. Fish. and Aqua. Sci. 46:1396-1405.

McMahon, T. C. and D. S. deCalesta. 1990. Effects of fire on fish and wildlife. Pages 233-250. IN: Natural and Prescribed Fire in Pacific Northwest Forests. J. D. Walstad, S. R. Radosevich, and D. V. Sandberg (eds.). Oregon State University Press, Corvallis.

MCNEIL, WILLIAM J.

Kreeger, Karen and W. J. McNeil. 1989. Estuarine dependence of juvenile chinook as it relates to salmon ranching. Northwest Environmental Journal 5(1):165-167.

McNeil, W. J. 1989. Aquaculture and salmon ranching. IN Ocean Agenda 21: Passages to the Pacific Century. Courtland Smith (ed.). Oregon Sea Grant ORESU-B-89-001.

McNeil, W. J. 1989. Review of *Salmon and Trout Farming* by Lindsay Laird and Ted Needham (eds). IN J. Fisheries 14(2):57-58.

MPITSOS, GEORGE J.

Mpitsos, G. J. 1989. Chaos in brain function and the problem of nonstationarity: a commentary. IN E. Basar & T. H. Bullock (eds.), *Dynamics of Sensory and Cognitive Processing by the Brain* (pp. 521-535). New York: Springer-Verlag.

Mpitsos, G. J. and Burton, R. M. 1989. Converging and diverging connections in neural networks: holography and computational potential of thresholds and synaptic weights. Society for Neuroscience 15:1048.

Soinila, S. & G. J. Mpitsos. 1989. Immunohistochemical and behavioral evidence for sensory function of histamine in molluscan nervous system. Society for Neuroscience 15:235.

OLLA, BORI L.

Olla, B. L. and M. W. Davis. 1990. Behavioral responses of juvenile walleye pollock, *Theragra chalcogramma*, to light, thermoclines and food: possible role in vertical migration. J. Exp. Mar. Biol. Ecol. 135:59-68.

Ernst, D. H., L. J. Ellingson, B. L. Olla, R. I. Wicklund, W. O. Watanabe and J. Grover. 1989. Production of Florida red tilapia in seawater pools receiving prepared feed or chicken manure. Aquaculture 80:247-260.

OSIS, LAIMONS

McCrae, Jean and L. Osis. 1989. Plants and Animals of Oregon's Rocky Intertidal Habitat. Oregon Department of Fish and Wildlife, Newport, Oregon. 32 pp.

ROGERS, JEAN B.

Rogers, Jean B. and E. K. Pikitch. 1989. Life history characteristics of commercially important groundfish species off California, Oregon and Washington. NOAA Technical Memorandum NMFS F/NWC-166.

RYER, CLIFFORD H.

Ryer, C. H. , J. van Montfrans and R. J. Orth. 1990. Utilization of a seagrass meadow and tidal marsh creek by blue crabs *Callinectes sapidus*. II. Spatial and temporal patterns of molting. Bulletin of Marine Science 46(1):95-104.

SOINILA, SEPPO

Soinila, S. & G. J. Mpitsos. 1989. Immunohistochemical and behavioral evidence for sensory function of histamine in molluscan nervous system. Society for Neuroscience 15:235.

SPECHT, DAVID T.

Specht, D. T. and H. Lee. 1989. Direct measurement technique for determining ventilation rate in the deposit-feeding clam *Macoma nastua* (Bivalvia, Tellinaceae). Marine Biology 101:211-218.

STANDLEY, LAUREL J.

Standley, Laurel and B. R. T. Simoneit. 1990. Preliminary correlation of organic molecular tracers in residential wood smoke with the source of fuel. Atmospheric Environment 24B(1):67-73.

TAGHON, GARY L.

Taghon, G. L. 1989. Modeling deposit feeding. In: G. Lopez, G. Taghon, and J. Levinton (eds.), Ecology of Marine Deposit Feeders, pp. 223-246. Springer-Verlag, New York.

Carey, A.G., Jr., G. L. Tagon, D. L. Stein, and P. A. Rona. 1990. Distributional ecology of benthic megaepifauna and fishes in Gorda Ridge Axial Valley. In: G. R. McMurray (ed.), Gorda Ridge: A Seafloor Spreading Center in the United States' Exclusive Economic Zone, pp. 225-240. Springer-Verlag, New York.

Taghon, G. L. , R. R. Greene, and D. Bard. 1990. Effects of food value of artificial and natural sediments on functional response and net rate of energy gain by a deposit-feeding polychaete. NATO Advanced Research Workshop on Behavioural Mechanisms of Food Selection, Gregynog, Wales.

TISSOT, BRIAN N.

Tissot, B. N. 1990. El Nino responsible for decline of black abalone off Southern California. Hawaiian Shell News 38(6):3-5.

WEBER, LAVERN J.

Nichols, J. W. and L. J. Weber. 1989. Oxidation of cardiac myoglobin in vivo by sodium nitrite or hydroxylamine. Arch Toxicol 63:484-488.

Nichols, J. W. and L. J. Weber. 1989. Comparative oxygen affinity of fish and mammalian myoglobins. J. Comp Physiol B 159:205-209.

FY 90
Hatfield Marine Science Center
 est. indirect expense generation
 (000)

HMSC	<u>Expenditure</u>	<u>Indirect Expense</u>
30-050-6501	214	
30-050-0145	32	
-5506	17	
-5518	305	
-5807	19	
-5808	36	
-6611	57	
-7607	405	
30-060-6233	6	
30-163-0001 (Bookstore)	185	
30-165-0014 (Housing)	34	
30-060-6001	17	
COMES	959	
<i>Total HMSC</i>	2,286	
GRANTS & CONTRACTS		
NIH		
30-262-0577	178	66
NSF		
30-262-1488	800	89
-1580	44	0
-1622	631	64
-1627	2	0
-3069	154	0
COPE		
30-262-8074	500	0

DOD

30-262-3059	189	68
-------------	-----	----

NOAA

30-262-5645	33	0
-------------	----	---

-5653	351	88
-------	-----	----

30-267-5608	319	32
-------------	-----	----

OTHER FEDERAL

30-262-4103	21	2
-------------	----	---

-4114	118	26
-------	-----	----

PRIVATE & SUB-CONTRACT

30-262-7353	1	0
-------------	---	---

<i>Total Grants & Contracts</i>	3,341	435
-------------------------------------	-------	-----

COOPERATING AGENCIES

NCRI	1,500
------	-------

EPA	2,500
-----	-------

ODFW	3,073
------	-------

MRRD	1,700
------	-------

NMFS	250
------	-----

<i>Total Cooperating Agencies</i>	9,023
-----------------------------------	-------

<i>Total All Sources</i>	14,650
--------------------------	--------

DISTRIBUTION BY SOURCEExp%

Grants & Contracts	3,341	23
--------------------	-------	----

Cooperating Agencies	9,023	62
----------------------	-------	----

HMSC	2,067	14
------	-------	----

Housing	34	-
---------	----	---

Bookstore	<u>185</u>	1
-----------	------------	---

<i>Total</i>	14,650	100
--------------	--------	-----