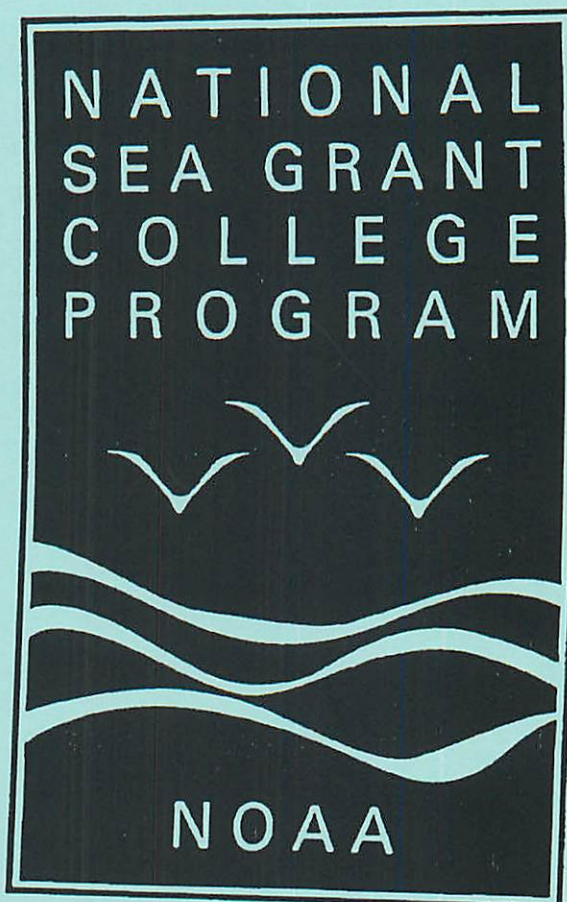


NSGO-Q-91-001

# P rojects '91



U. S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
February 1992

# Table of Contents

<b>Introduction .....</b>	<b>1</b>
List of Sea Grant Directors .....	2
Sea Grant Office Organizational Chart .....	5
List of Sea Grant Technical Staff .....	6
<b>Human Resources</b>	
Marine Advisory Extension Services .....	1-A
Education and Training .....	8-A
Social Science and Marine Policy .....	16-A
Communications .....	22-A
Ocean Law .....	27-A
<b>Environmental Studies Division</b>	
Environmental Studies .....	1-B
Coastal Processes .....	46-B
<b>Technology and Commercial Development</b>	
Ocean Engineering and Marine and Coastal Transportation Systems .....	1-C
Marine Resource Economics .....	11-C
Marine Recreation and Tourism .....	15-C
<b>Living Resources</b>	
Fisheries .....	1-D
Aquaculture .....	23-D
Marine Biotechnology .....	38-D
Seafood Science and Technology .....	46-D
<b>Non-Living Resources</b>	
Diving Physiology and Technical Development .....	1-E
Marine Geological Resources .....	5-E

# I ntroduction

*Projects '91* lists, by subject area, all projects supported by the National Sea Grant College Program during Fiscal Year 1991 (October 1, 1990–September 30, 1991). Information provided with each project includes the title, investigator, program affiliation, and the amount of federal and matching funds. This year, the Sea Grant identification number (SID) is also provided to facilitate project retrieval. The list also identifies projects supported with pass-through funds.

Projects frequently overlap subject areas. Thus, projects listed under one subject may also appear under another. Because of this situation, the sum of individual subject-area lists exceeds the total funds appropriated to Sea Grant during Fiscal Year 1991. The actual number of projects supported was 714, and these were pursued at approximately 130 academic and research institutions. Almost all of these projects were conducted through the network of 29 Sea Grant programs, whose directors are listed on the following pages.

The Sea Grant Directors shape programs to exploit the strengths of participating institutions, to focus on regional and national issues, and to address priorities set for research, education and training, and advisory services by the National Sea Grant Office. Decentralized, day-to-day management results in effective cooperation in marine affairs among academic institutions and federal, state, and local governments. The research programs, while normally dealing with local, state, or regional topics, produce results of generic importance that advance science, solve problems, and exploit opportunities for the wise use and development of the nation's marine and coastal resources. Peer review is used to select projects and reconcile proposals with budgets. Successful proposals often have an applied focus even if application relates to the very long term. The combination of research, education, and advisory services in a single program makes technology transfer more effective. Sea Grant encourages researchers, educators, and advisory personnel to work across institutional and program lines, and such cooperation and collaboration have proven successful.

# Sea Grant Program Directors

## **\*ALASKA**

Mr. Ronald K. Dearborn, Director  
Alaska Sea Grant  
University of Alaska  
138 Irving II  
Fairbanks, AK 99775-5040  
907/474-7086

## **\*CALIFORNIA**

Dr. James J. Sullivan, Director  
California Sea Grant  
University of California, San Diego  
9500 Gilman Drive  
La Jolla, CA 92093  
619/534-4400

## **\*CONNECTICUT**

Dr. Edward C. Monahan, Director  
Connecticut Sea Grant  
University of Connecticut  
Avery Point  
Groton, CT 06340  
203/445-3457

## **\*DELAWARE**

Dr. Carolyn Thoroughgood, Director  
Delaware Sea Grant  
University of Delaware  
College of Marine Studies  
Robinson Hall, Room 111  
Newark, DE 19716  
302/451-2841

## **\*FLORIDA**

Dr. James C. Cato, Director  
Florida Sea Grant  
University of Florida  
Building 803  
Gainesville, FL 32611  
904/392-5870

## **\*GEORGIA**

Dr. Mac Rawson, Director  
Georgia Sea Grant  
University of Georgia  
Ecology Building  
Athens, Georgia 30602  
404/542-7671

## **\*HAWAII**

Dr. Jack R. Davidson, Director  
Hawaii Sea Grant  
University of Hawaii  
1000 Pope Road, Room 223  
Honolulu, HI 96822  
808/956-7031

## **+ILLINOIS/INDIANA**

Mr. Robert D. Espeseth, Coordinator  
Illinois/Indiana Sea Grant  
University of Illinois  
Room 104, Huff Hall  
1206 S. Fourth St.  
Champaign, IL 61820  
217/333-1824

## **\*LOUISIANA**

Dr. Jack R. Van Lopik, Director  
Louisiana Sea Grant  
Louisiana State University  
128 Wetland Resources  
Baton Rouge, LA 70803-7507  
504/388-6710

## **\*MAINE**

Dr. Robert E. Wall, Director  
ME/NH Sea Grant  
University of Maine  
14 Coburn Hall  
Orono, ME 04469-0114  
207/581-1436

**\*MARYLAND**

Dr. Christopher F. D'Elia, Director  
Maryland Sea Grant  
University of Maryland  
1123 Taliaferro Hall  
College Park, MD 20742  
301/405-6371

**\*MASSACHUSETTS**

Dr. C. Chryssostomidis, Director  
MIT Sea Grant  
Massachusetts Institute of Technology  
Technology, Bldg. E38, Room 330  
77 Massachusetts Avenue  
Cambridge, MA 02139  
617/253-7131

**\*MICHIGAN**

Dr. Michael Parsons, Director  
Michigan Sea Grant  
University of Michigan  
4107 I.S.T. Building  
2200 Bonisteel Boulevard  
Ann Arbor, MI 48109-2099  
313/763-1437

**\*MINNESOTA**

Dr. George R. Spangler, Acting Director  
Minnesota Sea Grant  
University of Minnesota  
1518 Cleveland Avenue, North  
Room 302  
St. Paul, MN 55108  
612/625-2765

**\*MISSISSIPPI/ALABAMA**

Dr. James I. Jones, Director  
MS/AL Sea Grant  
P.O. Box 7000  
703 East Beach Drive  
Ocean Springs, MS 39564-7000  
601/875-9341

**\*NEW HAMPSHIRE**

Mr. Brian Doyle, Acting Director  
ME/NH Sea Grant  
University of New Hampshire  
Kingman Farm  
Durham, NH 03824  
603/749-1565

**\*NEW JERSEY**

Mr. William G. Gordon, Director  
New Jersey Sea Grant  
Building No. 22  
Ft. Hancock, NJ 07732  
908/872-1300

**\*NEW YORK**

Dr. Anne McElroy, Director  
New York Sea Grant  
SUNY at Stony Brook  
Dutchess Hall  
Stony Brook, NY 11794-5000  
516/632-6905

**\*NORTH CAROLINA**

Dr. B. J. Copeland, Director  
North Carolina Sea Grant  
North Carolina State University  
Box 8605  
Raleigh, NC 27695-8605  
919/515-2454

**\*OHIO**

Dr. Jeffrey M. Reutter, Director  
Ohio Sea Grant  
Ohio State University  
1541 Research Center  
1314 Kinnear Road  
Columbus, OH 43212  
614/292-8949

**\*OREGON**

Dr. Robert E. Malouf, Director  
Oregon Sea Grant  
Oregon State University  
Administrative Services Bldg. -A320  
Corvallis, OR 97331-2131  
503/737-3396

**\*PUERTO RICO**

Dr. Manuel Hernandez-Avila, Director  
Puerto Rico Sea Grant  
University of Puerto Rico  
Department of Marine Science  
P.O. Box 5000  
Mayaguez, PR 00709-5000  
809/832-3585

**\*RHODE ISLAND**

Dr. Scott W. Nixon, Coordinator  
Rhode Island Sea Grant  
University of Rhode Island  
Marine Resources Bldg.  
Narragansett Bay, RI 02882  
401/792-6800

**\*SOUTH CAROLINA**

Ms. Margaret Davidson, Director  
South Carolina Sea Grant  
287 Meeting Street  
Charleston, SC 29401  
803/727-2078

**+SOUTHERN CALIFORNIA**

Mr. Donald Keach, Acting Director  
USC Sea Grant  
University of Southern California  
Institute for Marine & Coastal  
Studies  
University Park  
Los Angeles, CA 90089  
213/740-1961

**\*TEXAS**

Dr. Thomas J. Bright, Director  
Texas Sea Grant  
Texas A&M University  
College Station, TX 77843-4115  
409/845-3854

**\*VIRGINIA**

Dr. William L. Rickards, Director  
Virginia Sea Grant  
University of Virginia  
Madison House - 170 Rugby Road  
Charlottesville, VA 22903  
804/924-5965

**\*WASHINGTON**

Mr. Louie S. Echols, Director  
Washington Sea Grant  
University of Washington, HG-30  
3716 Brooklyn Avenue, N.E.  
Seattle, WA 98105-6716  
206/543-6600

**\*WISCONSIN**

Dr. Anders Andren, Director  
Wisconsin Sea Grant  
University of Wisconsin-Madison  
1800 University Avenue  
Madison, WI 53705  
608/262-0905

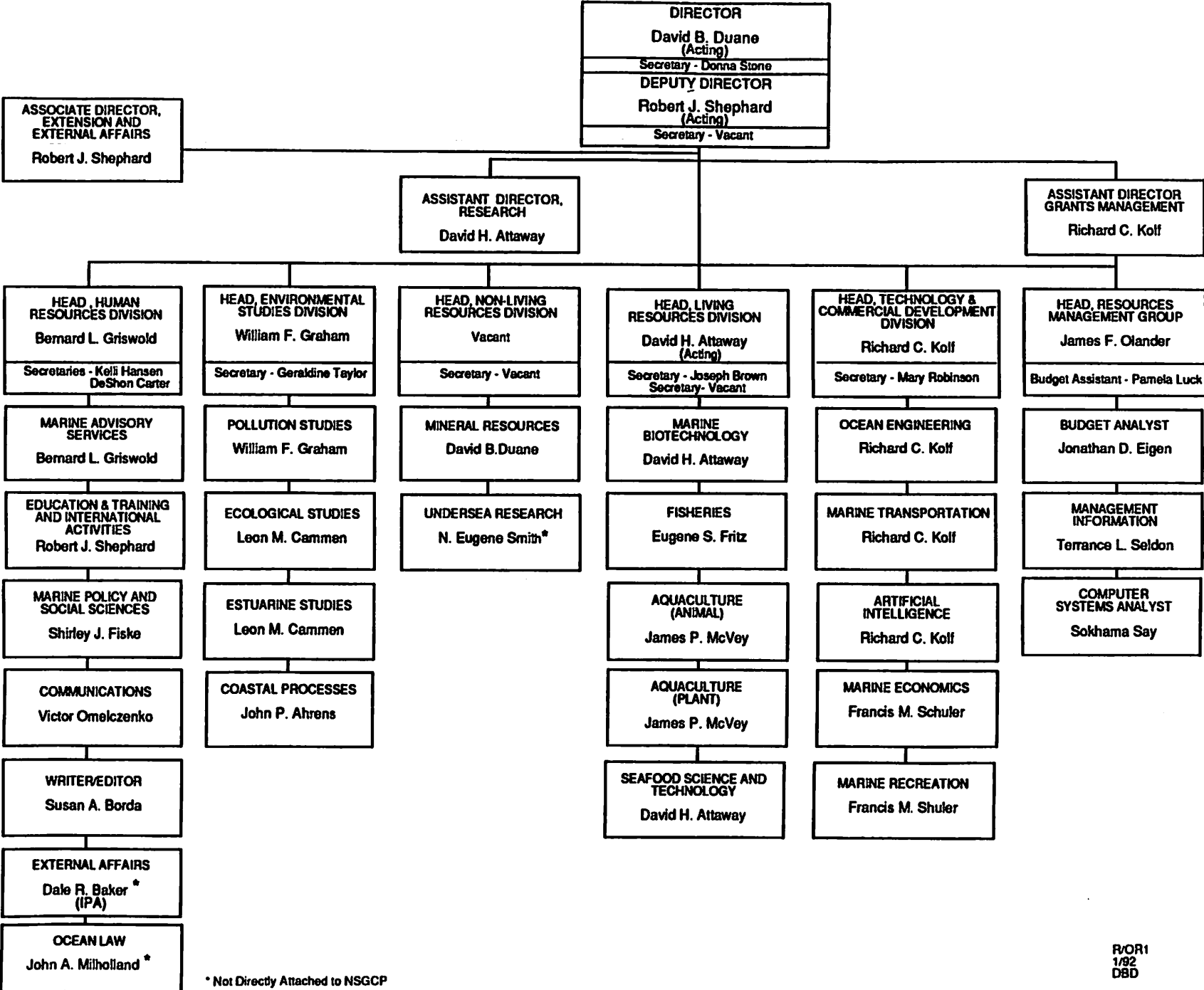
**+WOODS HOLE**

Dr. David A. Ross, Director  
WHOI Sea Grant  
Woods Hole Oceanographic Institution  
Clark Laboratory, Room 260  
Woods Hole, MA 02543  
508/548-1400 ext. 2578

\* Sea Grant College (Total 26)  
(ME/NH=1)

+ Institutional Program (3)

NATIONAL SEA GRANT OFFICE



01

\* Not Directly Attached to NSGCP

# Sea Grant Technical Staff

Following is a listing of Sea Grant's technical staff, their subject area(s), and their phone numbers. They can be reached at the following address:

**National Oceanic and Atmospheric Administration  
National Sea Grant College Program  
1335 East-West Highway  
SSMC1, 5th Floor  
Silver Spring, MD 20910**

**Human Resources.....301/713-2431**

Marine Advisory Extension Services - Dr. Bernard L. Griswold  
Education and Training - Mr. Robert J. Shephard  
Social Science and Marine Policy - Dr. Shirley J. Fiske  
Communications - Mr. Victor Omelczenko  
Ocean Law - Mr. John A. Milholland

**Environmental Studies.....301/713-2435**

Environmental Studies - Dr. William F. Graham  
Dr. Leon M. Cammen  
Coastal Processes - Dr. John P. Ahrens

**Technology and Commercial Development.....301/713-2445**

Ocean Engineering & Marine & Coastal Transportation Systems - Dr. Richard C. Kolf  
Marine Resource Economics - Dr. Francis M. Schuler  
Marine Recreation - Dr. Francis M. Schuler

**Living Resources .....301/713-2451**

Seafood Science and Technology - Dr. David H. Attaway  
Marine Biotechnology - Dr. David H. Attaway  
Fisheries - Dr. Eugene S. Fritz  
Aquaculture - Dr. James P. McVey

**Non-Living Resources .....301/713-2713**

Marine Geological Resources - Dr. David B. Duane  
Diving Physiology & Technical Development - Mr. N. Eugene Smith





# Human Resources

Following is a listing of Sea Grant's Human Resources Division technical staff,  
their subject area(s), and their phone number.  
They can be reached at the following address:

**National Oceanic and Atmospheric Administration  
National Sea Grant College Program  
1335 East-West Highway  
SSMC1, 5th Floor  
Silver Spring, MD 20910**

**Human Resources**.....301/713-2431  
Marine Advisory Extension Services - Dr. Bernard L. Griswold  
Education and Training - Mr. Robert J. Shephard  
Social Science and Marine Policy - Dr. Shirley J. Fiske  
Communications - Mr. Victor Omelczenko  
Ocean Law - Mr. John A. Milholland

# MARINE ADVISORY EXTENSION SERVICES

---

## A. MAS Base Programs

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Advisory Services in Marine Recreation and Tourism Liffmann, Michael 19 Louisiana Sea Grant College Program SID#: 1003	19,280	19,529	0
The University of Michigan/Sea Grant/Industry Consortium in Offshore Engineering Bernitsas, Michael 23 Michigan Sea Grant College Program SID#: 244	50,885	48,061	0
Coastal Engineering Advisory Services Keillor, Philip 25 Wisconsin Sea Grant College Program SID#: 474	21,748	18,674	0
Docks and Marinas Advisory Services Worthley, Allen C. 25 Wisconsin Sea Grant College Program SID#: 476	21,007	19,693	0
Marine Advisory Services Falk, James M. 71 University of Delaware SID#: 176	184,520	220,503	0
Marine Advisory Service Murray, J. 71 University of North Carolina Sea Grant College Program SID#: 27	466,823	367,774	0
Washington Sea Grant Marine Advisory Services Spranger, Michael S. 71 Washington Sea Grant College Program SID#: 72	679,900	401,474	0
Alaska Marine Advisory Program Kramer, D. E. 71 Alaska Sea Grant College Program SID#: 87	406,213	613,419	0

Virginia Sea Grant Marine Advisory Services DuPaul, William 71 Virginia Graduate Marine Science Consortium SID#: 677	593,757	422,632	0
Sea Grant Extension Service Miller, Bruce J. 71 University of Hawaii Sea Grant College Program SID#: 730	472,286	279,718	0
Extension/Sea Grant Program DeYoung, Bruce R. 71 Oregon Sea Grant College Program SID#: 358	46,700	0	0
UPR Marine Advisory Service for Puerto Rico and the U.S.V.I. Chaparro, Ruperto 71 University of Puerto Rico Sea Grant College Program SID#: 149	120,053	126,943	0
U.S. Virgin Islands Marine Advisory Services Coulston, Mary Lou 71 University of Puerto Rico Sea Grant College Program SID#: 150	41,324	65,826	0
Ohio Sea Grant Advisory Service Program Reutter, Jeffrey M. 71 Ohio Sea Grant College Program SID#: 638	254,542	115,679	0
South Carolina Marine Extension Program Goodwin, Melvin H. 71 South Carolina Sea Grant Consortium SID#: 257	214,844	152,452	0
Michigan Sea Grant Extension Schwartz, John 71 Michigan Sea Grant College Program SID#: 273	348,300	184,141	0
Marine Advisory Service Hightower, Mike 71 Texas A&M University Sea Grant College Program SID#: 721	505,847	279,366	0

Extension Sea Grant Program Extension Sea Grant DeYoung, Bruce R. 71 Oregon Sea Grant College Program SID#: 589	694,400	759,800	0
Alaska Marine Advisory Program Kramer, D. E. 71 Alaska Sea Grant College Program SID#: 650	40,531	0	0
Marine Extension Program Pennisi, Christine 71 Illinois-Indiana Sea Grant SID#: 375	117,042	129,464	0
Sea Grant Extension Program Skoog, Ronald O. 71 California Sea Grant College Program SID#: 556	680,557	353,000	0
Marine Advisory Services in Louisiana Cooperative Extension Service Fowler, James F. 71 Louisiana Sea Grant College Program SID#: 1001	214,504	498,831	0
Sea Grant Marine Advisory Program Doyle, B. 73 UM/UNH Sea Grant Program SID#: 490	358,400	457,747	0
Sea Grant Marine Advisory Program Bender, N. 73 Connecticut Sea Grant College Program SID#: 185	140,300	226,300	0
Sea Grant Extension Program Adkins, Ralph 73 Maryland Sea Grant College Program SID#: 52	195,000	649,706	0
MIT Sea Grant Marine Industry Collegium Moore, John Jr. 73 MIT SID#: 308	140,380	97,399	0
Center for Fisheries Engineering Goudey, Clifford A. 73 MIT SID#: 309	77,700	80,000	0

Massachusetts Marine Liaison Service Hall-Arber, Madelein 73 MIT SID#: 310	43,760	16,601	0
Minnesota Sea Grant Extension Program Baker, Dale 73 Minnesota Sea Grant College Program SID#: 137	164,666	235,918	0
Legal Advisory Service Wascom, Michael 77 Louisiana Sea Grant College Program SID#: 1002	76,000	47,630	0
Ports and Waterways Advisory Services Beacham, Christopher 77 Louisiana Sea Grant College Program SID#: 1005	25,249	3,074	0
Florida Sea Grant Extension Program Woeste, J. T. 77 Florida Sea Grant College Program SID#: 563	532,500	267,130	0
Mississippi Sea Grant Advisory Service Program Veal, David C. 77 Mississippi-Alabama Sea Grant Consortium SID#: 505	71,374	187,736	0
Sea Grant Advisory Services - Alabama Component Hosking, William 77 Mississippi-Alabama Sea Grant Consortium SID#: 4	83,805	51,653	0
Rhode Island Sea Grant Advisory Service: Fisheries, aquaculture, seafood processing, and seafood marketing DeAlteris, Joseph 77 Rhode Island Sea Grant College Program SID#: 683	74,119	83,652	0
Communications and Public Outreach Ross, David A. 77 Woods Hole Oceanographic Institution SID#: 641	46,855	40,000	0

Advisory Services Coordination and Field Offices Miller, Allen H. 77 Wisconsin Sea Grant College Program SID#: 473	183,615	158,929	0
Aquaculture Advisory Services Binkowski, Fred P. 77 Wisconsin Sea Grant College Program SID#: 477	12,633	11,625	0
New Jersey Sea Grant Marine Advisory Service Wypyszinski, A. W. 77 New Jersey Marine Science Consortium SID#: 244	156,700	263,509	0
Advisory Services: General Edward Chin 77 Georgia Sea Grant College Program SID#: 575	255,447	157,153	0
Marine Advisory Services and Education Fawcett, James A. 77 Univ of Southern California Sea Grant College SID#: 667	195,609	46,076	0
Sea Grant Extension Program Voiland, Michael P. 77 New York Sea Grant Institute SID#: 110	617,482	1,141,714	0
Rhode Island Sea Grant Advisory Services: Coastal Management Program Lee, Virginia 77 Rhode Island Sea Grant College Program SID#: 614	227,484	99,811	0
Rhode Island Sea Grant Advisory Services: Information and Education Program Jaworski, Carole 77 Rhode Island Sea Grant College Program SID#: 615	255,628	13,705	0
<b>SUBTOTAL:</b>	<b>10,129,769</b>	<b>9,414,047</b>	<b>0</b>

**MARINE ADVISORY SERVICE**

**B. Advisory Services Pass Through & Special Projects**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Pacific Island Network (PIN) Project Initiatives Miller, Bruce J. 71 University of Hawaii Sea Grant College Program SID#: 293	67,187	28,637	154,200
Michigan Sea Grant Zebra Mussel Outreach Program Flory, Mildred 71 Michigan Sea Grant College Program SID#: 234	107,150	55,292	0
Zebra Mussel Outreach Plan for Minnesota: The Great Lakes Sea Grant Network Baker, Dale 73 Minnesota Sea Grant College Program SID#: 236	56,671	28,452	0
Ohio Sea Grant Zebra Mussel Outreach Educational Proposal Hushak, Leroy J. 75 Ohio Sea Grant College Program SID#: 233	104,017	52,092	0
Environmental Education Pertaining to the Gulf of Mexico Veal, David C. 75 Mississippi-Alabama Sea Grant Consortium SID#: 409	0	0	35,000
Long Island Sound Study Public Education and Participation Arnold, C. 76 Connecticut Sea Grant College Program SID#: 424	0	0	108,000
Natural Trail Brochure and Docent Training Program for Kaneohe Bay - NOAA Rappa, Peter 76 University of Hawaii Sea Grant College Program SID#: 171	0	0	25,000



Extension Program Zebra Mussel Outreach Voiland, Michael P. 77 New York Sea Grant Institute SID#: 230	105,000	60,190	0
Observing and Disseminating Information on the Spread and Control of Zebra Mussel in the Upper Great Lakes Miller, Allen H. 77 Wisconsin Sea Grant College Program SID#: 478	104,410	0	0
Evaluation of Dissolved Oxygen and Turbidity as Variables for Use in Habitat Evaluation Procedures (HEP) Applied to Estuarine and Marine Habitats Veal, David C. 77 Mississippi-Alabama Sea Grant Consortium SID#: 241	20,722	0	0
Zebra Mussel Extension Program O'Leary, Joseph 77 Illinois-Indiana Sea Grant SID#: 283	41,997	14,801	0
	<b>SUBTOTAL:</b>	<b>607,154</b>	<b>239,464</b>
	<b>TOTAL:</b>	<b>10,736,923</b>	<b>9,653,511</b>
			<b>322,200</b>
			<b>322,200</b>

# EDUCATION AND TRAINING

---

## 1. College Level

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Opportunities for Undergraduate Research and Development in Marine Science and Engineering Watson, W. H. 61 UM/UNH Sea Grant Program SID# 397	0	15,000	0
Massachusetts Institute of Technology Chrystostomidis, Chr 61 MIT SID# 225	38,000	25,000	0
Development of a Computational Model for Ducted Propellers with Cyclic Pitch Control Kerwin, Justin 62 MIT SID# 433	0	0	29,850
MIT Sea Grant/MMA Joint Program in Marine Education and Training Callahan, John J. 66 MIT SID# 306	58,000	240,000	0
Sea Grant Fellowship Program Hanson, Roger 70 Mississippi-Alabama Sea Grant Consortium SID# 3	20,000	0	0
Sea Grant Marine Policy Fellowship Queen, W.' 70 University of North Carolina Sea Grant College Program SID# 9	14,166	0	0
Marine Studies Sourcebook for Secondary and College Levels Weiss, H. M. 70 Connecticut Sea Grant College Program SID# 184	22,800	66,100	0

Marine Fellowship Program Guseman, L. F. Jr. 70 Texas A&M University Sea Grant College Program SID# 719	0	57,000	0
Envirovet, Project II. An Intensive Shortcourse in Freshwater Aquatic Animal Medicine/Environmental Toxicology Beasley, Val Richard 70 Illinois-Indiana Sea Grant SID# 660	28,018	56,925	0
California Sea Grant State Fellowship Program Sullivan, James J. 70 California Sea Grant College Program SID# 554	20,000	10,489	0
Graduate Research Fellowship Program Holmes, Robert W. 70 California Sea Grant College Program SID# 555	30,503	5,000	0
<b>SUBTOTAL:</b>	<b>231,487</b>	<b>475,514</b>	<b>29,850</b>

## 2. Knauss Fellowships

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Sea Grant Fellowship Monahan, E. 70 Connecticut Sea Grant College Program SID# 54	0	0	30,000
National Sea Grant Fellowship Cato, James C. 70 Florida Sea Grant College Program SID# 78	0	0	30,000
National Sea Grant Fellowship Cato, James C. 70 Florida Sea Grant College Program SID# 79	0	0	30,000
Sea Grant Internship - Forman Davidson, Jack R. 70 University of Hawaii Sea Grant College Program SID# 101	30,000	0	0

Sea Grant Internship - Sessing Davidson, Jack R. 70 University of Hawaii Sea Grant College Program SID# 102	0	0	30,000
Sea Grant Fellows McNaught, Donald C. 70 Minnesota Sea Grant College Program SID# 103	0	0	60,000
Dean John A. Knauss Marine Policy Fellow: Margaret Spring Copeland, B. J. 70 University of North Carolina Sea Grant College Program SID# 122	30,000	11,876	0
Dean John A. Knauss Marine Policy Fellow: Terrence Schaff Copeland, B. J. 70 University of North Carolina Sea Grant College Program SID# 123	30,000	1,084	0
Dean John A. Knauss Marine Policy Fellowship - Steven Kokkinakis Wick, William W. 70 Oregon Sea Grant College Program SID# 129	30,000	0	0
Dean John A. Knauss Marine Policy Fellowship - Robert Shavelson Wick, William W. 70 Oregon Sea Grant College Program SID# 130	30,000	0	0
Dean John A. Knauss Marine Policy Fellowship Andren, Anders W. 70 Wisconsin Sea Grant College Program SID# 141	0	0	30,000
Knauss Sea Grant Fellow Echols, Louie S. 70 Washington Sea Grant College Program SID# 76	0	0	30,000
Knauss Sea Grant Fellowship for Jill Brady Dearborn, R. K. 70 Alaska Sea Grant College Program SID# 192	30,000	0	0



3. Traineeships (Research Assistants)

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Sea Grant Assistantships McNaught, Donald C.                   62 Minnesota Sea Grant College Program SID# 135	127,552	0	0
Graduate Traineeships Copeland, B. J.                           70 University of North Carolina Sea Grant College Program SID# 10	119,448	0	0
Sea Grant Traineeships Dearborn, R. K.                         70 Alaska Sea Grant College Program SID# 422	179,500	0	0
Graduate Student Support Tarpley, R. W.                         70 University of Delaware SID# 155	353,592	0	0
Sea Grant Trainee Program Mckiernan, Gail B.                     70 Maryland Sea Grant College Program SID# 53	80,000	161,369	0
Sea Grant Graduate Student Trainee Program Fawcett, James A.                     70 Univ of Southern California Sea Grant College SID# 668	36,000	18,000	0
Sea Grant Trainees Sullivan, James J.                     70 California Sea Grant College Program SID# 552	561,188	65,500	0
SUBTOTAL:	1,457,280	244,869	0

**4. Minority Programs**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
American Indians in Marine Science Kramer, Joyce 62 Minnesota Sea Grant College Program SID# 136	52,141	29,791	0
A Comprehensive Marine Education Program for Puerto Rico Ortiz, Alida 70 University of Puerto Rico Sea Grant College Program SID# 277	23,419	41,617	0
NOAA Marine Engineering/Science Career Orientation Program Cox, Elbert L. 70 Howard University SID# 280	0	24,497	46,999
Marine Education: An Interdisciplinary Approach to Minority Science Programs Tinnin, Richard K. 70 Texas A&M University Sea Grant College Program SID# 720	47,731	24,984	0
<b>SUBTOTAL:</b>	<b>123,291</b>	<b>120,889</b>	<b>46,999</b>

**5. K-12 & Teacher Training**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Aquatic and Marine Environments: A Three-part Study for Elementary and Middle School Teachers Walker, Sharon H. 70 Mississippi-Alabama Sea Grant Consortium SID# 121	34,964	36,697	0
Global Environmental Change in the Great Lakes: Information for Educators and Advisory Services Fortner, Rosanne W. 70 Ohio Sea Grant College Program SID# 636	36,366	11,895	0

Marine Education and Training Calkins, Jay R. 70 Georgia Sea Grant College Program SID# 574	52,719	193,164	0
--	--------	---------	---

SUBTOTAL:	124,049	241,756	0
-----------	---------	---------	---

6. U.S./Asia Interchange

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
United States-Asia Aquaculture Exchange--The Asian Interchange Program Davidson, Jack R. 70 University of Hawaii Sea Grant College Program SID# 292	282,000	0	0

SUBTOTAL:	282,000	0	0
-----------	---------	---	---

7. Informal

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Special Enrichment Activities in Oceanography for Area Teachers and Students (Project SEA OATS) Hosking, William 70 Mississippi-Alabama Sea Grant Consortium SID# 503	15,336	9,169	0
Public and Industrial Information Ross, David A. 70 Woods Hole Oceanographic Institution SID# 346	28,969	97,490	0
Special Marine Education Programs Andren, Anders W. 70 Wisconsin Sea Grant College Program SID# 279	21,492	39,311	0
Seminar on Recent Advances in Limnology and Oceanography Brooks, Arthur S. 70 Wisconsin Sea Grant College Program SID# 482	3,744	1,440	0



The Narragansett Bay Classroom Hickox, Sara 70 Rhode Island Sea Grant College Program SID# 613	5,345	3,981	0
---	-------	-------	---

United States and Japanese Natural Resource Meeting of Scientists for 1991 Tubb, Richard 70 Oregon Sea Grant College Program SID# 642	9,600	0	0
--	-------	---	---

SUBTOTAL:	84,486	151,391	0
-----------	--------	---------	---

8. Handbook

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
A Mid-Atlantic Handbook on Effective Participation in Fisheries Management McCay, B. J. 70 New Jersey Marine Science Consortium SID# 329	15,174	10,091	0

SUBTOTAL:	15,174	10,091	0
-----------	--------	--------	---

9. Fishery Safety

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Marine Safety Training: Development of Port-based Training for Commercial Fishermen Killion, Patrick J. 66 Oregon Sea Grant College Program SID# 481	83,700	23,900	0

SUBTOTAL:	83,700	23,900	0
-----------	--------	--------	---

TOTAL:	2,701,467	1,289,369	436,849
--------	-----------	-----------	---------

# SOCIAL SCIENCE AND MARINE POLICY

---

## A. Recreation and Tourism

### 1. Recreational Fishing

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Reassessment of the Concept of Angler Specialization Through Sequential Stages of Development Dawson, Chad 18 (SUNY, College of Environmental Science and Forestry) SID# PD3	13,627	7,903	0
<b>SUBTOTAL:</b>	<b>13,627</b>	<b>7,903</b>	<b>0</b>

### 2. Tourism and other Recreation:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Attitudinal Basis of Marine/Coastal Litter: Assessing Louisiana Coastal Users' Attitudes Toward the Environment Laska, Shirley B. 20 (University of New Orleans) SID# 1026	14,616	8,464	0
<b>SUBTOTAL:</b>	<b>14,616</b>	<b>8,464</b>	<b>0</b>
<b>TOTAL:</b>	<b>28,243</b>	<b>16,367</b>	<b>0</b>

## B. Commercial Fisheries:

### 1. Sociocultural, Political, Historical

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
International Management Regimes, the EEZ, and the U.S. Pacific Fisheries Scheiber, Harry N. 16 (University of California/Berkeley) SID# 529	9,463	9,151	0
Coping Strategies of Fishing Families in Response to Perceived Impacts of Changes in Marine Regulations Smith, S. 20 (University of Florida) SID# 91	25,535	12,827	0

---

Safety and Perceptions of Risk Among Fishermen in Southern New England Poggie, John & Pollnac, Richard 20 (University of Rhode Island) SID# 608	62,019	45,021	0
---	--------	--------	---

Models for Fish Harvest Technology and the Choice of Fishing Location Sampson, David B. 30 (Oregon State University) SID# 461	48,300	42,700	0
---	--------	--------	---

SUBTOTAL:	145,317	109,699	0
-----------	---------	---------	---

2. Fisheries Management:

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
---------------------	------------------	-------------------	-----------------

Management of Mixed Stock Fisheries: A Turning Point Pikitch, Ellen K. 06 (University of Washington Fisheries Research Institute) SID# 161	97,600	49,737	100,000
---	--------	--------	---------

Decision-Making Behavior and Economic Information Needs for Regulating the U.S. Sea Scallop Fishery Kirkley, James E. 14 (Virginia Institute of Marine Sciences) SID# 211	53,903	38,506	0
--	--------	--------	---

TEDS: Balancing Environmental and Marine Resource Management Policy Laska, Shirley 20 (University of New Orleans) SID# 221	29,419	14,893	0
--	--------	--------	---

Social Impacts of ITQs in the Sea Clam Fisheries McCay, B. J. 20 (Rutgers University) SID# 323	27,324	15,985	0
--	--------	--------	---

Balancing Environmental and Marine Resource Management Policy Laska, Shirley B. 20 (University of New Orleans) SID# 1027	45,969	14,751	0
--	--------	--------	---

A Mid-Atlantic Handbook on Effective Participation in Fisheries Management McCay, B. J. 70 (Rutgers University) SID# 329	15,174	10,091	0
SUBTOTAL:	269,389	143,963	100,000
3. Aquaculture (no projects 1991)	0	0	0
4. Fisheries Development			
TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Michigan Sea Grant Extension Schwartz, John 71 Michigan Sea Grant College Program Marine Advisory Program SID# 273	348,300	184,141	0
SUBTOTAL:	348,300	184,141	0
TOTAL:	763,006	437,803	100,000

C. Marine Resources – Policy and Governance

1. Estuaries, Wetlands and Coastal Zone

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Mississippi-Alabama Sea Grant Legal Program McLaughlin, Richard 15 (University of Mississippi Mississippi-Alabama Sea Grant Consortium) SID# 500	48,673	110,254	0
Managing Adaptively: Early Experience in Western North America Lee, Kai N. 20 (University of Washington) SID# 70	81,000	64,188	0
Effects of Land Use and Commoditization on the Socio-political Processes Involved in the Development of Coastal Gentrification in Puerto Rico Valdes-Pizzini, Manuel 20 (University of Puerto Rico) SID# 146	23,182	30,317	0

Boat Traffic Monitoring Geographic Information System (GIS) for Planning Estuarine Waterways: Florida Case Study Antonini, G. A. 38 Florida Sea Grant College Program SID# 94	27,834	14,012	0
Adaptive Response and Greenhouse-Induced Sea Level Rise Along the Mainland Shore of Long Island Sound Yohe, Gary W. 38 Connecticut Sea Grant College Program SID# 183	27,000	23,000	0
Sea Grant Marine Policy Fellowship Queen, W. 70 University of North Carolina Sea Grant College Program (East Carolina University) SID# 9	14,166	0	0
The Cultural Resources of Coastal Waterfront Communities: An Evaluative Research Design Eilertsen, John 38 (Hallockville Folk Arts Center) Soloman, Nancy (Long Island Arts Council) New York Sea Grant Institute SID# PD1	21,000	15,975	0
SUBTOTAL:	242,855	257,746	0

2. Ocean Policy and Water Policy

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Introduction of Aquatic Nuisance Species by Vessels Entering the Waters of the United States, Other Than the Great Lakes Carlton, James T. 07 Connecticut Sea Grant College Program SID# 305	0	0	198,950
Multiple-Use Ocean Management in the U.S. Toward a New Conceptual Framework Cicin-Sain, Bliana 17 (University of Delaware) SID# 56	6,174	34,456	0

Coalition Building for Wise Water Management in the Great Lakes Basin: Climatic Uncertainties and Cultural Boundaries Gerlach, Luther P. 20 (University of Minnesota) SID# 107	28,936	11,244	0
---	--------	--------	---

A Study of Coastal Ocean Space Utilization Keach, Donald 38 (University of Southern California) SID# 239	0	0	35,000
---	---	---	--------

SUBTOTAL:	35,110	45,700	233,950
-----------	--------	--------	---------

TOTAL:	277,965	303,446	233,950
--------	---------	---------	---------

D. Archaeology

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Submerged Cultural Resources Survey: Selected Sites in Lakes Michigan and Superior Cooper, David 34 Wisconsin Sea Grant College Program (State Historical Society of Wisconsin) SID# 466	10,073	5,373	0

SUBTOTAL:	10,073	5,373	0
-----------	--------	-------	---

TOTAL:	10,073	5,373	0
--------	--------	-------	---

E. Public Health & Safety

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Sociobehavioral and Emergency-Management Aspects of Catastrophic Marine Oil Spills Nigg, Joanne M. 20 (University of Delaware) SID# 57	24,960	89,976	0
Human Behavioral Responses to Perceptions of Coastal Pollution and Seafood Safety Griffith, D. and Johnson, J. 20 (East Carolina University) SID# 109	3,500	19,653	0

Factors Governing Stress Responses in Scuba Divers Morgan, William P.                    32 Wisconsin Sea Grant College Program SID# 468	43,963	24,149	0
--	--------	--------	---

Effects of Health Advisory Changes on Fishing Habits and Fish Consumption in Sport Fisheries Knuth, Barbara A.                    18 and Bisogni, C. (Cornell) SID# PD2	41,772	25,431	0
---	--------	--------	---

SUBTOTAL:	114,195	159,209	0
-----------	---------	---------	---

TOTAL:	114,195	159,209	0
--------	---------	---------	---

F. Valuation of Non-market Resources

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Measuring the Full Recreation Related Benefits from Improvements in Estuarine Water Quality Smith, K.                                    14 (North Carolina State University) SID# 11	25,737	7,533	0
Estimating the Use and Nonuse Damages of Debris for Coastal Resources and Noncommercial Marine Species Smith, K.                                    14 (North Carolina State) SID# 413	0	0	65,889
SUBTOTAL:	25,737	7,533	65,889
TOTAL:	25,737	7,533	65,889
GRANT TOTAL:	1,219,219	929,731	399,839

# COMMUNICATIONS

---

## 1. Communications - Base Programs

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Public Information Services Melteff, B.R. and Byers, Kurt Alaska Sea Grant College Program <sup>1</sup> SID# 88	118,897	310,881	0
Communications Program Sullivan, James J. and Amidei, Rosemary California Sea Grant College Program SID# 557	249,650	47,558	0
Communications and Publications Grifman, Phyllis Univ of Southern California Sea Grant College SID# 666	88,660	92,875	0
Communications Van Patten, Margaret Connecticut Sea Grant College Program SID# 188	77,100	0	0
Sea Grant Communications Bryant, Tracey L. Delaware Sea Grant College Program SID# 177	151,481	58,065	0
Florida Sea Grant Communication Program Woeste, J. T. and Humphreys, Jay Florida Sea Grant College Program SID# 564	114,500	57,252	0
Communications Program Rivers, Reita Georgia Sea Grant College Program SID# 576	86,420	16,862	0
The Communications Program Davidson, Jack R. University of Hawaii Sea Grant College Program SID# 227	124,276	40,633	0
Communications Goettel, Robin Illinois-Indiana Sea Grant SID# 419	53,019	6,771	0



Publications and Information Dissemination Coleman, Elizabeth Louisiana Sea Grant College Program SID# 1004	46,575	140,283	0
Communications and Information Program Lignell, Kathleen and Adams, Stephen UM/UNH Sea Grant College Program SID# 400	180,000	73,180	0
Sea Grant Communications Greer, John R. Maryland Sea Grant College Program SID# 40	138,346	226,999	0
Marine Communications/Information Service Hartley, Karen MIT Sea Grant College Program SID# 314	262,630	28,651	0
Communications and Public Outreach Ross, David A. and Campbell, Lee Anne Woods Hole Sea Grant Program SID# 641	46,855	40,000	0
Michigan Sea Grant Communications Flory, Mildred Michigan Sea Grant College Program SID# 274	153,900	119,182	0
Communications Tibbetts, Alice Minnesota Sea Grant College Program SID# 138	87,143	83,612	0
Program Management: Communications Jones, James I. and Skupien, Linda Mississippi-Alabama Sea Grant Consortium SID# 6	82,400	32,179	0
Communications Kosko, Kim New Jersey Sea Grant College Program SID# 245	69,386	17,061	0
Communications Klauber, Avery H. New York Sea Grant College Program SID# 111	130,325	82,799	0

Program Communications Hart, Kathy University of North Carolina Sea Grant College Program SID# 8	98,077	112,826	0
Ohio Sea Grant Communications Program Brainard, Maran Ohio Sea Grant College Program SID# 637	14,112	83,622	0
Sea Grant Communications Larison, James R. Oregon Sea Grant College Program <sup>1</sup> SID# 486	150,000	133,600	4,000
Communications/Publications Cotte-Emmanuelli, Laura University of Puerto Rico Sea Grant College Program SID# 151	70,997	71,331	0
Rhode Island Sea Grant Advisory Services: Information and Education Program Jaworski, Carole Rhode Island Sea Grant College Program SID# 615	255,628	13,705	0
Communication and Information Services Handal, Leigh South Carolina Sea Grant Consortium SID# 256	78,102	29,317	0
Marine Information Service Broussard, Army Texas A&M University Sea Grant College Program SID# 722	161,977	94,032	0
Washington Sea Grant Communications Peyton, Patricia Washington Sea Grant College Program <sup>1</sup> SID# 73	253,200	84,453	0

Communications Office and Subprogram Coordination Wittman, Stephen Wisconsin Sea Grant College Program SID# 479	157,308	145,198	0
SUBTOTAL: <sup>2</sup>	3,500,964	2,242,927	4,000

<sup>1</sup> Additional funds for communications personnel are included within the advisory extension budgets at these programs.

<sup>2</sup> Funding for core communications program at Virginia is included in Marine Advisory Services and program management budgets.

**2. Communications - Pass Through & Special Projects**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Assessing Coastal Habitat Restoration Strategies Leffler, Merrill Maryland Sea Grant College Program SID# 493	0	0	21,000
A Proposal for the Support of Continuing and New Activities of the National Sea Grant Depository Murray, Cynthia J. Rhode Island Sea Grant College Program SID# 725	128,379	0	0
Marine Mammal Stranding Information Broussard, Amy Texas A&M University Sea Grant College Program SID# 577	0	0	34,000
Marine Mammal Educational Information Broussard, Amy Texas A&M University Sea Grant College Program SID# 578	0	0	15,000
National Marine Sanctuary Information Broussard, Amy Texas A&M University Sea Grant College Program SID# 579	0	0	25,000

Earthwatch Public Service Radio Program Hoops, Richard Wisconsin Sea Grant College Program SID# 480	41,937	35,760	0
Sea Grant Abstracts Quarterly Publication Shephard, Frank Woods Hole Data Base, Inc.	74,000	0	0
SUBTOTAL:	244,316	35,760	95,000
GRANT TOTAL:	3,745,280	2,278,687	99,000







# Environmental Studies

Following is a listing of Sea Grant's Environmental Studies Division technical staff,  
their subject area(s), and their phone number.  
They can be reached at the following address:

**National Oceanic and Atmospheric Administration  
National Sea Grant College Program  
1335 East-West Highway  
SSMC1, 5th Floor  
Silver Spring, MD 20910**

**Environmental Studies.....301/713-2435**  
Environmental Studies - Dr. William F. Graham  
Dr. Leon M. Cammen  
Coastal Processes - Dr. John P. Ahrens



# ENVIRONMENTAL STUDIES

---

## A. Environmental Characterization

### 1. Biological

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Population Dynamics of Hatchery-Reared Juveniles of the Soft-Shell Clam ( <i>Mya arenaria</i> L.) in Maine: A Series of Manipulative Experiments Beal, Brian F. 03 UM/UNH Sea Grant Program SID# 388	37,062	11,815	0
Fisheries Oceanography: Status and Synthesis Power, James H. 06 Louisiana Sea Grant College Program SID# 1013	14,804	10,959	0
Red Drum Ichthyoplankton Dynamics and Recruitment Implications Shaw, Richard F. 06 Louisiana Sea Grant College Program SID# 1011	14,058	20,145	0
Seasonal Abundance and Transport of Blue Crab Larvae in the Mississippi Bight and At a Tidal Pass Power, James H. 06 Louisiana Sea Grant College Program SID# 1012	38,239	31,069	0
The Biology of Estuarine Lobsters Watson, W. H. 06 UM/UNH Sea Grant Program SID# 12	34,000	12,404	0
Vertical Distributions of Larval Lobsters: Offshore vs. Inshore Patterns Incze, Lewis S. 06 UM/UNH Sea Grant Program SID# 28	36,816	1,242	0
In Situ Studies on the American Lobster: Its Ecology and Susceptibility to Dragging Steneck, Robert S. 06 UM/UNH Sea Grant Program SID# 386	77,037	35,058	0

<p>Application of Experimental Ecology to Development of a New Mya Fishery Peterson, C. 06 University of North Carolina Sea Grant College Program SID# 19</p>	28,205	7,195	0
<p>Salmonid Fisheries Oceanography of the Northeast Pacific Ocean Francis, R. C. 06 Washington Sea Grant College Program SID# 162</p>	82,200	54,148	0
<p>Spring- and Summer-Spawned Bluefish: A Comparison of Processes Leading to Variations in Survival and Recruitment Cowen, Robert K. 06 New York Sea Grant Institute SID# 199</p>	83,816	37,153	0
<p>An Analysis of Factors Affecting Recruitment of Larval and Juvenile Atlantic Croaker Jones, Cynthia 06 Virginia Graduate Marine Science Consortium SID# 31</p>	36,107	18,044	0
<p>Recruitment Dynamics of the Blue Crab: Patterns, Processes and Fisheries Applications Van Montfrans, Jacques 06 Virginia Graduate Marine Science Consortium SID# 205</p>	92,177	89,425	0
<p>Abundance and Comparative Trophic Ecology of Schooling Pelagic Fishes in the Chesapeake Bay Houde, Edward D. 06 Maryland Sea Grant College Program SID# 41</p>	74,601	34,528	0
<p>Evaluating the Ecological Effects of Commonly Used Hard Clam (<i>Mercenaria mercenaria</i>) Harvesting Methods Fegley, Stephen R. 06 New Jersey Marine Science Consortium SID# 235</p>	41,279	27,290	0

<p>Recruitment Dynamics of Juvenile Dover Sole on an Outer Continental Shelf Nursery Ground  Markle, Douglas F.                    06  Oregon Sea Grant College Program  SID# 438</p>	88,500	50,200	0
<p>Continuing Investigations of Louisiana Continental Slope Chemosynthetic Faunal Communities  Carney, Robert S.                    07  Louisiana Sea Grant College Program  SID# 1014</p>	21,447	25,252	0
<p>The Gulf Stream Front, Its Role in Larval Fish Survival and Recruitment in Florida  Kleppel, G. S.                    07  Florida Sea Grant College Program  SID# 646</p>	101,933	33,795	0
<p>Temporal Aspects of Recruitment and Spawning of the Gag Grouper in the Gulf of Mexico  Travis, J.                    07  Florida Sea Grant College Program  SID# 84</p>	49,517	24,800	0
<p>Spawning Temperature and Location of the Atlantic Menhaden: Inference from Strontium-Calcium Thermometry and Satellite Imagery  Checkley, D. M.                    07  University of North Carolina Sea Grant College Program  SID# 18</p>	43,234	12,638	0
<p>Blue Crab Megalopae Recruitment: Role of Fronts and Mesoscale Physics on Aggregation and Transport into the Estuary  McConaugha, John R.                    07  Virginia Graduate Marine Science Consortium  SID# 207</p>	87,423	44,688	0
<p>Osmotic Regulation by the Euryhaline Sponge, <i>Microciona prolifera</i>  Loomis, S. H.                    07  Connecticut Sea Grant College Program  SID# 181</p>	7,600	7,599	0

Enhancement of Soft-Shell Clam Recruitment in Flow-Generated Larval "Sinks" Mullineaux, Lauren 07 Woods Hole Oceanographic Institution SID# 335	30,032	2,416	0
Salmonid Fishery Oceanography of the Northeast Pacific Ocean Pearcy, William G. 07 Oregon Sea Grant College Program SID# 440	28,400	17,000	0
Molecular Population Genetics of Benthic Anthozoans Lasker, Howard R. 07 New York Sea Grant Institute SID# 522	70,442	34,489	0
Spawning Grounds and Life History of the Commercially Valuable Squid, <i>Ommastrephes bartramii</i> , within the Hawaiian EEZ Young, Richard E. 07 University of Hawaii Sea Grant College Program SID# 587	33,120	160,774	0
Estimating Year Class Strength at Inlets to Pamlico Sound Miller, J. M. 07 University of North Carolina Sea Grant College Program SID# 617	0	0	95,000
CZCS-Chlorophyll and AVHRR-Sea Surface Temperature Variability and Co-Variability in the SABRE Study Area Yoder, James A. 07 Rhode Island Sea Grant College Program SID# 675	0	0	54,996
The Importance of Transport Processes in Recruitment of Rockfishes (Genus <i>Sebastes</i> ) to Nearshore Areas of Monterey Bay, California Loeb, Valerie J. 07 California Sea Grant College Program SID# 687	32,842	82,637	0
Identification of Actively used Near-shore Lake Trout Spawning Sites in Southwestern Lake Michigan Marsden, Ellen J. 08 Illinois-Indiana Sea Grant SID# 659	29,920	36,648	0

Benthic Community Disturbance and Succession Following Simulated Manganese-Nodule Mining in the Equatorial Pacific Ocean Smith, Craig R. 10 University of Hawaii Sea Grant College Program SID# 219	0	14,569	134,040
Bacterial Fouling of Metal Surfaces: Implications for Biocorrosion Kirchman, David L. 24 University of Delaware SID# 58	16,480	28,444	0
Influence of Marine Bacterial Films on Crevice Corrosion Dexter, Steven C. 24 University of Delaware SID# 60	15,268	20,790	0
Mathematic Model of Larval Transport and Recruitment Epifanio, Charles E. 46 University of Delaware SID# 71	17,836	59,446	0
Population Implications of Various Management Approaches to Threatened and Endangered Sea Turtles Crowder, L. B. 47 University of North Carolina Sea Grant College Program SID# 414	0	0	64,601
Microbiology and Chemistry of Active Hydrothermal Vents on Loihi Seamount Karl, David M. 48 University of Hawaii Sea Grant College Program SID# 197	42,336	39,308	0
SUBTOTAL:	1,406,731	1,085,968	348,637
<b>2. Chemical - Geological</b>			
TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Co-Variation in Hydrothermal Output and Earthquake Activity: A Ridge Crest Time Series Experiment Delaney, John R. 09 Washington Sea Grant College Program SID# 66	37,700	24,235	0

<p>The Role of Microbial Activity and Microbiogenic Detritus in the Growth and Composition of Ferromanganese Cowen, James P. 09 University of Hawaii Sea Grant College Program SID# 590</p>	24,193	28,310	0
<p>The Combined Use of Chemical-and Biostratigraphy to Date Fe-Mn Crusts, Estimate Their Growth Rates, and Reconstruct Their History DeCarlo, Eric H. 09 University of Hawaii Sea Grant College Program SID# 213</p>	40,530	24,288	0
<p>Chemical and Isotopic Stratigraphy of Co-rich Ferromanganese Crusts from the Hawaiian Archipelago McMurtry, Gary M. 09 University of Hawaii Sea Grant College Program SID# 210</p>	46,189	31,126	0
<p>Continuum of Ferromanganese Pavements on Seamounts of the Hawaiian EEZ Malahoff, Alexander 09 University of Hawaii Sea Grant College Program SID# 591</p>	32,855	9,400	0
<p>The Environmental Impact and Feasibility of a Novel Method of Solution Recovery of Cobalt-Rich Ferromanganese Crusts from Seamounts Malahoff, Alexander 09 University of Hawaii Sea Grant College Program SID# 592</p>	20,480	21,490	0
<p>A Submersible Investigation of Manganese Crust Deposits Off Johnston Island Wiltshire, John 09 University of Hawaii Sea Grant College Program SID# 593</p>	10,218	12,000	0

The Geological Setting of Hydrothermal Vents and the Neovolcanic Zone of Loihi Seamount, Hawaii Malahoff, Alexander 09 University of Hawaii Sea Grant College Program SID# 594	30,368	18,980	0
Geochemistry of Loihi Seamount Hydrothermal System McMurtry, Gary 09 University of Hawaii Sea Grant College Program SID# 216	34,158	19,700	0
Coastal Turbidity Associated with Natural and Man-Induced Phenomena Hanes, D. M. 25 Florida Sea Grant College Program SID# 652	51,270	25,635	0
A Unified Model for Cross-Shore and Longshore Sand Transport Dally, W. R. 25 Florida Sea Grant College Program SID# 93	48,000	24,000	0
Modeling Beach and Nearshore Profile Response to Lake Level Change and Storm Wave Forcing Wood, William L. 25 Illinois-Indiana Sea Grant SID# 655	0	0	30,000
Development of a Hydrostratigraphical Model for the Interaction of Ground Water with Lake Michigan in Southeastern Wisconsin Cherkauer, Douglas S. 39 Wisconsin Sea Grant College Program SID# 469	27,659	15,264	0
Spatial and Temporal Scales of Sediment Accumulation in the Near-Shore Zone of Massachusetts Bay Wallace, Gordon T. 44 MIT SID# 302	50,000	63,926	0
In Situ Analysis of Volatile Organic Chemicals in the Marine Environment Hemond, Harold F. 45 MIT SID# 264	39,865	17,882	0

A Sand Budget for Maine's Sandy Embayments: Calculation of Sand Volumes and Transport Paths in the Nearshore and Littoral Regions of Saco Bay and the Kennebec River Mouth Kelley, Joseph T. 46 UM/UNH Sea Grant Program SID# 494	46,184	53,118	0
Cross-Shore Length Scales of Longshore Bars and Associated Forcing Perlin, Marc 46 Michigan Sea Grant College Program SID# 354	40,246	14,625	0
Contemporary and Historical Eolian Sand Transport in a Coastal Dune Environment: South Shore, Lake Michigan, Indiana Olyphant, G. A. 46 Illinois-Indiana Sea Grant SID# 428	0	0	30,000
Sand Deposits on the Illinois and Indiana Shoreline of Lake Michigan Shabica, Charles W. 46 Illinois-Indiana Sea Grant SID# 426	0	0	49,852
The Dynamics of Horizontal Sediment Transport and Focusing in Large Lakes Edgington, David N. 48 Wisconsin Sea Grant College Program SID# 454	53,921	31,082	0
Formulation and Maintenance of Shore-Oblique Sand Ridges: Hydrodynamics and Sediment Transport Trowbridge, John H. 50 Woods Hole Oceanographic Institution SID# 339	45,299	21,081	0
<b>SUBTOTAL:</b>	<b>679,135</b>	<b>456,142</b>	<b>109,852</b>
<b>3. Physical</b>			
<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
South Atlantic Bight Recruitment Experiment: Physical Oceanography and Modeling Atkinson, Larry P. 07 Virginia Graduate Marine Science Consortium SID# 398	0	0	50,000



Numerical Modelling of Nearshore Hydrodynamics Svendsen, Ib A. 25 University of Delaware SID# 163	6,680	42,861	0
Nonlinear Wave Interactions in Surf Zones Kobayashi, Nobuhisa 25 University of Delaware SID# 64	9,672	49,917	0
Surf Beat Dynamics: Long Wave Excitations Through the Refraction, Diffraction, and Breaking of Wave Groups Liu, Philip L. 25 New York Sea Grant Institute SID# 100	34,304	39,235	0
An Analysis of the Lagrangian Motion in Delaware's Inland Bays Wong, Kuo-Chuin 39 University of Delaware SID# 68	29,388	45,871	0
Wave Climate and Extreme Storm Events on the Oregon Coast Komar, Paul D. 39 Oregon Sea Grant College Program SID# 472	43,200	43,600	0
Measurement of Gas Transfer Under Various Wind Conditions in Lake Gulliver, John S. 45 Minnesota Sea Grant College Program SID# 116	16,629	11,277	0
Estimation of Wave Properties in Coastal Gulf of Maine Panchang, V. G. 46 UM/UNH Sea Grant Program SID# 36	53,560	9,201	0
Gravity Currents and Internal Bores Yeh, H. H. 46 Washington Sea Grant College Program SID# 170	48,400	51,491	0

The Implementation and Evaluation of a Real-Time AVHRR In-Situ Data System for Great Lakes Sea Surface and Heat Flux Predictions Bedford, Keith W. 46 Ohio Sea Grant College Program SID# 634	34,369	18,232	0
SABRE: Physical Oceanography and Modelling Blanton, Jackson O. 46 Georgia Sea Grant College Program SID# 357	0	36,897	50,000
Physical Oceanography and Modeling Lee, Thomas N. 48 Florida Sea Grant College Program SID# 408	0	0	35,000
Coastal Upwelling in Cape Cod Bay Geyer, Wayne R. 50 Woods Hole Oceanographic Institution SID# 340	35,250	31,135	0
Physical Factors Affecting the Circulation of Tampa Bay Cato, James C. 50 Florida Sea Grant College Program SID# 281	0	0	24,990
A Three Dimensional, Time-Dependent Model of Tampa Bay System Cato, James C. 50 Florida Sea Grant College Program SID# 344	0	0	54,004
<b>SUBTOTAL:</b>	<b>311,452</b>	<b>379,717</b>	<b>213,994</b>

#### 4. Instrumental and Observation Techniques

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Remote Sensing of Pelagic Fish Eggs. Checkley, D. M. 07 University of North Carolina Sea Grant College Program SID# 616	0	0	55,000

A Proposal to Build a Deep Ocean Rock Coring Drill Johnson, Paul H. 09 Washington Sea Grant College Program SID# 67	46,300	32,396	0
Technological Developments for Seafloor Ridge and Margin Studies Schultz, Adam 09 Washington Sea Grant College Program SID# 164	80,200	45,917	0
Developing the First Integrated Mapping Laboratory Aboard Ship Tyce, Robert C. 23 Rhode Island Sea Grant College Program SID# 242	0	64,261	156,692
A Retrospective Analysis of GEOSAT Altimeter Data in the Bering Sea Leben, Robert R. 28 University of Colorado SID# 405	0	0	62,401
Improved Utilization and Management of the U.S. Extended Economic Zone (EEZ) Using Advanced Satellite and Geographic Information Systems Technologies Simpson, James J. 30 California Sea Grant College Program SID# 692	48,311	49,429	0
Variable Scales in an Oceanographic GIS Bokuniewicz, Henry J. 39 New York Sea Grant Institute SID# 441	0	0	146,596
Utility of Thematic Mapper Data for Chlorophyll-a Estimation in New Jersey Coastal Waters of the New York Bight Apex Bagheri, Sima 39 New Jersey Marine Science Consortium SID# 238	43,986	21,988	0
Merger of Regional Wetland Inventories from Remotely-Sensed Data Khorram, S. 39 University of North Carolina Sea Grant College Program SID# 371	0	0	26,641

<b>A Feasibility Study to Determine Optimum Methods for Producing Coastwatch Deliverables in Two South Carolina Environments</b> Cowen, David J. 39 South Carolina Sea Grant Consortium SID# 284	0	37,738	74,729
<b>Detection of Event-Scale Phytoplankton Increases in the Chesapeake Bay During the Winter-Spring Transition Using Aircraft Remote Sensing</b> Harding, Lawrence Jr. 40 Maryland Sea Grant College Program SID# 46	47,900	7,478	0
<b>Measurement of Phytoplankton Chlorophyll Concentrations and Biomass in the Chesapeake Bay Using Aircraft Remote Sensing</b> Harding, Lawrence Jr. 40 Maryland Sea Grant College Program SID# 347	0	0	99,839
<b>Coupling Flow Cytometry and Molecular Probes for the Analysis of Microorganisms in Aquatic Ecosystems</b> Chisholm, Sallie W. 42 MIT SID# 295	50,000	23,456	0
<b>Mapping Temperature, Salinity and Velocity at Shallow Depth</b> Gregg, M.C. 46 Washington Sea Grant College Program SID# 168	85,800	45,858	0
<b>The Identification of Tornadic vs. Non-tornadic Supercell Thunderstorms by Observing Storm Top Features as Seen in Geosynchronous Satellite Imagery</b> Anderson, Charles E. 46 University of North Carolina Sea Grant College Program SID# 266	0	0	37,599

A Coastal Ocean and Estuarine Prediction System Mellor, George L. 46 New Jersey Marine Science Consortium SID# 328	0	0	80,000
---	---	---	--------

SUBTOTAL:	402,497	328,521	739,497
TOTAL:	2,799,815	2,250,348	1,411,980

**B: Environmental Management:**

**1. Aquaculture**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Effect of Salmon Net-pen Aquaculture on the Benthic Microfauna and Macrofauna of Coastal Maine Waters Pindlay, R. H. 02 UM/UNH Sea Grant Program SID# 1	40,600	40,540	0
Attaining Suitable Water Supplies for Salmon Hatcheries Johnson, Ronald A. 26 Alaska Sea Grant College Program SID# 189	54,660	0	0

SUBTOTAL:	95,260	40,540	0
-----------	--------	--------	---

**2. Coastal/Wetland Management**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Balancing Environmental and Marine Resource Management Policy Laska, Shirley B. 20 Louisiana Sea Grant College Program SID# 1027	45,969	14,751	0
Coalition Building for Wise Water Management in the Great Lakes Basin: Climatic Uncertainties and Cultural Boundaries Gerlach, Luther P. 20 Minnesota Sea Grant College Program SID# 107	28,936	11,244	0

<b>TEDS: Balancing Environmental and Marine Resource Management Policy</b> Laska, Shirley 20 Louisiana Sea Grant College Program SID# 221	29,419	14,893	0
<b>A Long Island Sound Study Public Participation Coordinator Based in New York</b> Voiland, Michael P. 75 New York Sea Grant Institute SID# 439	0	0	91,250
<b>Environmental Education Pertaining to the Gulf of Mexico</b> Veal, David C. 75 Mississippi-Alabama Sea Grant Consortium SID# 409	0	0	35,000
<b>Long Island Sound Study Public Education and Participation</b> Arnold, C. 76 Connecticut Sea Grant College Program SID# 424	0	0	108,000
<b>National Marine Sanctuary</b> Broussard, Amy 76 Texas A&M University Sea Grant College Program SID# 579	0	0	25,000
<b>SUBTOTAL:</b>	<b>104,324</b>	<b>40,888</b>	<b>259,250</b>
<b>3. Environmental Quality Assessment</b>			
<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
<b>Measuring the Full Recreation Related Benefits from Improvements in Estuarine Water Quality</b> Smith, K. 14 University of North Carolina Sea Grant College Program SID# 11	25,737	7,533	0
<b>Estimating the Use and Nonuse Damages of Debris for Coastal Resources and Noncommercial Marine Species</b> Smith, K. 14 University of North Carolina Sea Grant College Program SID# 413	0	0	65,889

Sociobehavioral and Emergency-Management Aspects of Catastrophic Marine Oil Spills Nigg, Joanne M. 20 University of Delaware SID# 57	24,960	89,976	0
The Attitudinal Basis of Marine/Coastal Litter: Assessing Louisiana Coastal Users' Attitudes Toward the Environment Laska, Shirley B. 20 Louisiana Sea Grant College Program SID# 1026	14,616	8,464	0
Urbanization and Southeastern Estuarine System (USES) Bernberg, F.J. 40 South Carolina Sea Grant Consortium SID# 215	0	172,697	230,410
Report on National Pollution Research Needs for the 1990's Swanson, R. Lawrence 45 New York Sea Grant Institute SID# 237	26	7,771	51,000
Economic Aspects of Marine Debris McConnell, K. E. 45 Maryland Sea Grant College Program SID# 430	39,026	29,539	31,510
Detection and Monitoring of Bacteria with Molecular Probes Chapman, David J. 45 California Sea Grant College Program SID# 697	28,378	31,652	0
Latin American Marine Debris Public Awareness Project Hernandez-Avila, M. 75 University of Puerto Rico Sea Grant College Program SID# 278	0	0	20,000
Dissemination of Technical Information on the Long-term Trends in Water Quality and Living Aquatic Resources in Two South Carolina Estuaries DeVoe, Richard M. 80 South Carolina Sea Grant Consortium SID# 643	0	0	7,000

Saginaw Bay Research Institute Kantak, Gail 81 Michigan Sea Grant College Program SID# 356	8,369	6,961	0
<b>SUBTOTAL:</b>	<b>141,112</b>	<b>354,593</b>	<b>405,809</b>
<b>4. Waste Disposal</b>			
<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Management and Use of Solid and Liquid Wastes from the Blue Crab ( <i>Callinectes sapidus</i> ) Industry Boardman, Gregory 35 Virginia Graduate Marine Science Consortium SID# 212	44,729	22,831	0
Depuration of Secondary Sewage Effluents in a Mangrove Ecosystem Corredor, Jorge E. 45 University of Puerto Rico Sea Grant College Program SID# 148	25,943	47,238	0
Physical Forcing, Particulate Fluxes, and Primary Productivity in the Area Around White's Point Sewage Outfall Jones, Burton 45 Univ of Southern California Sea Grant College SID# 670	49,363	59,275	0
The Flux of Trace Metals and Nutrients from the Seafloor in the Area Around the White's Point Sewage Outfall Berelson, William 45 Univ of Southern California Sea Grant College SID# 671	49,577	34,386	0
Temporal Evaluation of Particulate Distributions in the Vicinity of an Ocean Outfall as Forced by Physical and Biological Processes Dickey, Tommy 45 Univ. of Southern California Sea Grant College SID# 672	31,365	58,085	0
<b>SUBTOTAL:</b>	<b>200,977</b>	<b>221,815</b>	<b>0</b>
<b>TOTAL:</b>	<b>541,673</b>	<b>657,836</b>	<b>665,059</b>



C. Exotic and Non-indigenous Species:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Trophic Relations of the Exotic Ruffe (Gymnocephalus cernuus) in the St. Louis River Estuary Newman, Raymond M. 06 Minnesota Sea Grant College Program SID# 128	19,410	9,000	0
Determining the Olfactory Sensitivity of Sea lamprey: An Essential First Step Sorensen, Peter W. 06 Minnesota Sea Grant College Program SID# 669	19,717	6,549	0
The Significance of Spreading Vectors in the Zebra Mussel Invasion: Experimental and Observational Studies on Dispersal Mechanisms of Dreissena polymorpha Carlton, James T. 07 Connecticut Sea Grant College Program SID# 304	0	57,594	112,975
The Introduction of Aquatic Nuisance Species by Vessels Entering the Waters of the United States, Other Than the Great Lakes Carlton, James T. 07 Connecticut Sea Grant College Program SID# 305	0	0	198,950
The Byssal Adhesive of Zebra Mussels, Dreissena polymorpha Waite, Herbert J. 07 University of Delaware SID# 311	0	75,393	149,997
Approaches to Zebra Mussel Control Through Intervention in Reproduction Ram, Jeffrey L. 07 Michigan Sea Grant College Program SID# 387	0	94,219	150,000
Osmoregulatory Physiology of the Zebra Mussel Preston, Robert L. 07 Illinois-Indiana Sea Grant SID# 392	0	121,575	150,000

The Impact of Zebra Mussels ( <i>Dreissena polymorpha</i> ) on Lower Food Web Dynamics in a Large Freshwater Ecosystem Mitchell 07 New York Sea Grant Institute SID# 421	0	12,368	22,099
The Role of Lake Erie Fishing and the Zebra Mussel in Ohio's North Coast Tourism Industry Hushak, Leroy J. 14 Ohio Sea Grant College Program SID# 625	8,272	13,847	0
The Economic Costs of the Zebra Mussel to Ohio's North Coast Economy Hushak, Leroy J. 14 Ohio Sea Grant College Program SID# 382	0	46,195	87,097
Ship Operational and Safety Aspects of Ballast Water Exchange at Sea Woodward, John B. 23 Michigan Sea Grant College Program SID# 385	0	42,032	59,946
Nonpolluting Control of Biosurface Fouling Baier, Robert E. 25 New York Sea Grant Institute SID# 411	0	32,548	47,741
Effect of Ultraviolet-B Radiation (280-320 NM) On Survivorship of Zebra Mussel ( <i>Dreissena polymorpha</i> ): A Potential Control Strategy Chalker-Scott, Linda 25 New York Sea Grant Institute SID# 412	0	110,398	149,279
Environmental and Economic Benefits from Zebra Mussel Harvesting Through Contaminant Reduction and Product Development Regenstein, Joe M. 35 New York Sea Grant Institute SID# 418	0	84,109	132,973
Interactions Between Newly-Introduced Zebra Mussel, <i>Dreissena polymorpha</i> , and Pelagic Communities in Western Lake Erie Garton, David W. 40 Ohio Sea Grant College Program SID# 240	0	46,705	0

<p>Exotic Species Invasions: Population Dynamics and Community Consequences of the Zebra Mussel, (<i>Dreissena polymorpha</i>)            Padilla, D. K. 40            Wisconsin Sea Grant College Program            SID# 271</p>	0	77,528	119,002
<p>Plankton Size Spectrum Shifts and Food Web "Bottlenecks" Accompanying the Invasion of Lake Michigan by the Predatory Cladoceran, <i>Bythotrephes</i>            Sandren, Craig D. 40            Wisconsin Sea Grant College Program            SID# 447</p>	54,100	26,359	0
<p>Influence of Zebra Mussel Invasion on Carbon and Phosphorus Dynamics in Plankton Communities: a Mesocosm Study in Saginaw Bay            Heath, Robert 40            Ohio Sea Grant College Program            SID# 381</p>	0	37,968	59,812
<p>Biom mineralization and the Requirement for Strontium During Larval Development of the Zebra Mussel <i>Dreissena polymorpha</i>            Gallagher, Scott M. 40            Woods Hole Oceanographic Institution            SID# 491</p>	0	18,000	35,105
<p>Michigan Sea Grant Zebra Mussel Outreach Program            Flory, Mildred 71            Michigan Sea Grant College Program            SID# 234</p>	0	55,292	107,150
<p>Zebra Mussel Outreach Plan for Minnesota: The Great Lakes Sea Grant Network            Baker, Dale 73            Minnesota Sea Grant College Program            SID# 236</p>	0	28,452	56,671
<p>Ohio Sea Grant Zebra Mussel Outreach Educational Proposal            Hushak, Leroy J. 75            Ohio Sea Grant College Program            SID# 233</p>	0	52,092	104,017

Extension Program Zebra Mussel Outreach Voiland, Michael P. 77 New York Sea Grant Institute SID# 230	0	60,190	105,000
Observing and Disseminating Information on the Spread and Control of Zebra Mussel in the Upper Great Lakes Miller, Allen H. 77 Wisconsin Sea Grant College Program SID# 478	0	0	104,410
Zebra Mussel Extension Program O'Leary, Joseph 77 Illinois-Indiana Sea Grant SID# 283	0	14,801	41,997
SUBTOTAL:	101,499	1,123,214	1,994,221
TOTAL:	101,499	1,123,214	1,994,221

D. Global Change:

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Impact of Enhanced UV-B Radiation on Primary Productivity in the Sea Kinzie, Robert A. II 07 University of Hawaii Sea Grant College Program SID# 584	19,899	12,046	0
Variation in Coastal Pelagic Fish Populations Over the Past Millennium as a Response to Global Climate Change and Biological Interaction Baumgartner, Tim R. 07 California Sea Grant College Program SID# 688	35,099	38,686	0
Coastal Effects of a Potential Rise in Sea Level: A Comprehensive Plan for Action Fisher, J. 25 University of North Carolina Sea Grant College Program SID# 370	0	0	7,500

Late Holocene Sea-Level Fluctuations: Implications for Future Environmental Changes Along the Connecticut Coast Varekamp, J. C. 38 Connecticut Sea Grant College Program SID# 182	6,700	14,600	0
Adaptive Response and Greenhouse-Induced Sea Level Rise Along the Mainland Shore of Long Island Sound Yohe, Gary W. 38 Connecticut Sea Grant College Program SID# 183	27,000	23,000	0
Paleoclimatic Implications of Late Holocene Lake Level Fluctuations in the Lake Michigan Basin Stoermer, Eugene F. 39 Michigan Sea Grant College Program SID# 601	41,541	17,045	0
Air Mass-Based Climate Change Scenarios for the Great Lakes Basin Brinkmann, Waltraud 46 Wisconsin Sea Grant College Program SID# 471	47,064	25,965	0
Models of the Biological Cycle of Carbon in the Ocean Sarmiento, Jorge L. 47 New Jersey Marine Science Consortium SID# 327	90,000	65,481	10,000
Paralabrax as a Model for Predicting Effects of Ocean Warming Rosenblatt, Richard 47 California Sea Grant College Program SID# 549	36,987	21,071	0
Acoustic Global Ocean Warming Feasibility Experiment Spindel, R. C. 48 Washington Sea Grant College Program SID# 417	0	0	658,092
Global Environmental Change in the Great Lakes: Information for Educators and Advisory Services Fortner, Rosanne W. 70 Ohio Sea Grant College Program SID# 636	36,366	11,895	0
SUBTOTAL:	340,656	229,789	675,592
TOTAL:	340,656	229,789	675,592

E. Habitat Studies:

1. Habitat Restoration

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Improved Genotypes of Submerged and Emergent Halophytes for Crops and Restoration Ecology through Somaclonal Variation, Transformation, and Protoplast Fusion Gallagher, John L. 05 University of Delaware SID# 169	21,596	72,033	0
Factors and Processes Controlling Eelgrass Habitat Persistence and Loss Porter, David 08 Georgia Sea Grant College Program SID# 285	0	0	22,500
Field Experiment Evaluation of the Effects of Beach Restoration on Stony Corals of Southeast Florida Goldberg, W. 28 Florida Sea Grant College Program SID# 651	39,946	19,153	0
Salinity and Low-Oxygen Stress Interactions: A Possible Tool for Regulating Vegetative Recovery in Phragmites australis Infested Wetland Impoundments Gallagher, John L. 39 University of Delaware SID# 65	9,360	39,277	0
Use of Sediment Fences for Marsh Restoration and Creation Day, J. W., Jr. 39 Louisiana Sea Grant College Program SID# 378	0	4,058	33,330
Mitigating Loss of Eelgrass: Providing Sufficient Genetic Diversity Williams, Susan L. 39 California Sea Grant College Program SID# 693	37,902	23,748	0

<p>The Degradation and Restoration of Wetland Vegetation: The Role of Saltwater Intrusion and Chronic Soil Waterlogging in Controlling Dieback and Restoration of Freshwater Marshes Mendelssohn, Irving 40 Louisiana Sea Grant College Program SID# 1016</p>	39,721	22,782	0
<p>An Ecosystem Comparison of Transplanted and Native Salt Marshes: The Chronological Development of Habitat Value for Fishery Species Webb, J. W. 40 Texas A&amp;M University Sea Grant College Program SID# 380</p>	0	0	41,140
<p>Accelerating and Evaluating the Development of Restored and Created Seagrass Ecosystems Bell, S. S. 40 Florida Sea Grant College Program SID# 402</p>	0	0	83,323
<p>Accelerating Salt Marsh Functional Development through Plant Genotype Selection: Intraspecific Diversity from Natural Populations and the Tissue Culture Laboratory Seliskar, Denise M. 40 University of Delaware SID# 425</p>	0	0	75,000
<p>Modeling Spectral Light Available to Submerged Aquatic Vegetation in Relation to Water Quality and Epiphytic Growth Gallegos, Charles L. 40 Maryland Sea Grant College Program SID# 298</p>	0	0	40,000
<p>Accelerating the Development of Ecosystem Functions in Restored and Constructed Wetlands Broome, S. 40 University of North Carolina Sea Grant College Program SID# 351</p>	0	0	86,829

Accelerating and Evaluating the Development of Restored and Created Seagrass Ecosystems Peterson, C. 40 University of North Carolina Sea Grant College Program SID# 352	0	0	50,000
Micropropagation and Aquaculture of Zostera Marina and Spartina alterniflora Bird, K. 40 University of North Carolina Sea Grant College Program SID# 332	0	0	40,000
Assessing Coastal Habitat Restoration Strategies Leffler, Merrill 40 Maryland Sea Grant College Program SID# 493	0	0	21,000
Accelerating the Development of Ecosystem Functions in Restored and Constructed Wetlands Zedler, Joy B. 40 California Sea Grant College Program SID# 653	0	0	40,000
Methods to Improve Restoration of Pacific Estuarine Ecosystems Zedler, Joy B. 40 California Sea Grant College Program SID# 695	36,250	22,293	0
Factors and Processes Controlling Eelgrass Habitat Persistence and Loss Short, Frederick 40 UM/UNH Sea Grant Program SID# 253	0	0	129,165
Comparing Ecological Functions of Estuarine Habitats Veal, David C. 48 Mississippi-Alabama Sea Grant Consortium SID# 393	0	0	14,539
Evaluating the Ecological Functions of Tidal Marshes: Technique Development and Testing Veal, David C. 48 Mississippi-Alabama Sea Grant Consortium SID# 394	0	0	23,144



Evaluation of Dissolved Oxygen and Turbidity as Variables for Use in Habitat Evaluation Procedures (HEP) Applied to Estuarine and Marine Habitats Veal, David C. 77 Mississippi-Alabama Sea Grant Consortium SID# 241	0	0	20,722
--	---	---	--------

SUBTOTAL:	184,775	203,344	720,692
-----------	---------	---------	---------

2. Habitat Utilization

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Recruitment to and Use of Great Bay Estuary by the Larval and Juvenile Stages of Coastal Fishes Sale, Peter F. 06 UM/UNH Sea Grant Program SID# 30	38,399	12,373	0
The Influence of Eelgrass Cover on Growth and Survival of Post-Settlement Bay Scallops, with a View Towards Optimizing Scallop Transplants Bricelj, Monica V. 06 New York Sea Grant Institute SID# 517	49,045	34,710	0
Habitat Specific Patterns of Distribution, Movement, and Growth in Estuarine Dependent Fishes: Determinants of Habitat Quality Able, Ken 07 New Jersey Marine Science Consortium SID# 317	61,182	25,148	0
The Influence of Inundation Regime on the Use of Gulf Coast Marshes by Fishes and Macrocrustaceans Rozas, L. P. 39 Louisiana Sea Grant College Program SID# 377	0	4,472	29,170
Effects of Estuarine Habitat Modifications on Anadromous Salmonids Simenstad, C. A. 40 Washington Sea Grant College Program SID# 674	0	0	49,750

Estuarine Slough Function and Restoration for Juvenile Salmon Residence and Foraging Simenstad, C. A. 48 Washington Sea Grant College Program SID# 282	0	0	59,769
---	---	---	--------

SUBTOTAL:	148,626	76,703	138,689
-----------	---------	--------	---------

**3. Wetland Dynamics**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Comparison of Marsh Vertical Accretion Rates Under Altered Hydrologic Conditions in Saline and Brackish Marshes of Coastal Louisiana Cahoon, Donald R. 40 Louisiana Sea Grant College Program SID# 1017	11,980	12,534	0
Control of Production in Eelgrass Communities: Balance Between Nutrient Enrichment and Food Web Interactions Burkholder, J. 40 University of North Carolina Sea Grant College Program SID# 16	62,740	6,102	0
Intertidal Wetland Responses to a Changing Salinity Gradient Morris, James T. 40 South Carolina Sea Grant Consortium SID# 255	63,000	31,815	0
Development of a Protocol for Mapping Coastal Habitat for the NOAA Coastal Ocean Program: Remote Sensing of Wetland Condition Indicators and Functional Health Klemas, V. 40 University of Delaware SID# 532	57	4,728	42,500
SUBTOTAL:	137,777	55,179	42,500
TOTAL:	471,178	335,226	901,881

Human Health:

1. Pathogens and Toxic Pollutants

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Norwalk and HAV Virus in Shellfish Estes, Mary K. 06 Texas A&M University Sea Grant College Program SID# 644	64,053	20,144	0
Detection of Vibrio cholerae 01 Cells in Shellfish Meat Homogenate and Meat Enrichment Broths by Dipstick ELISA Siebeling, Ronald J. 35 Louisiana Sea Grant College Program SID# 1023	45,609	24,883	0
Quick Enzymatic Test for Contamination of Marine Resources by Toxic Organics Stegeman, John J. 45 Woods Hole Oceanographic Institution SID# 337	31,498	21,177	0
PCBs in the Sera of Great Lakes Fish Eaters: Differential Congener Toxicity and Patterns of Exposure Sonzogni, William C. 45 Wisconsin Sea Grant College Program SID# 457	27,787	15,264	0
SUBTOTAL:	168,947	81,468	0

3. Toxic Plankton

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Noxious Phytoplankton Blooms and Marine Salmon Culture in Puget Sound Banse, Karl 02 Washington Sea Grant College Program SID# 59	82,100	46,755	0
Biology of the Oyster Crassostrea virginica: Is Domoic Acid a Threat? Fryxell, G. 06 Texas A&M University Sea Grant College Program SID# 545	56,256	19,219	0

Shellfish Toxicity in Southern New England Anderson, Donald M. 07 Woods Hole Oceanographic Institution SID# 334	50,128	21,211	0
Nuisance Phytoplankton Blooms: Effects of Solar Ultraviolet Light Hargraves, Paul 07 Rhose Island Sea Grant College Program SID# 607	47,678	50,264	0
Isolation of Viruses That Infect Toxic and Economically Important Phytoplankton Suttle, Curtis A. 40 Texas A&M University Sea Grant College Program SID# 562	50,043	25,821	0
Genetic Detection of Red Tide Dinoflagellates Triplett, Edward L. 47 California Sea Grant College Program SID# 543	26,874	12,085	0
SUBTOTAL:	313,079	175,355	0
TOTAL:	482,026	256,823	0

F. Nutrient and Carbon Dynamics:

1. Eutrophication

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Effects of Low Dissolved Oxygen Levels in the Chesapeake Bay on Behavior, Growth and Survival of Fish Larvae Breitburg, Denise 07 Maryland Sea Grant College Program SID# 51	41,388	27,881	0
Retrospective Analysis of Nutrient Enhanced Coastal Ocean Productivity in Sediments from the Louisiana Continental Shelf McKee, Brent A. 07 Louisiana Sea Grant College Program SID# 363	0	6,582	34,000

Zooplankton Grazing and the Fate of Fixed Carbon in Louisiana Coastal Waters Dagg, M. J. 07 Louisiana Sea Grant College Program SID# 364	0	9,635	68,261
Hypoxia Monitoring and Related Process Studies Rabalais, Nancy N. 07 Louisiana Sea Grant College Program SID# 367	0	21,028	211,000
Large-Scale Synoptic Sampling of Surface Chlorophyll Pigments and Suspended Sediments Associated with the Mississippi River Plume and Louisiana Coastal Shelf Dagg, M. J. 07 Louisiana Sea Grant College Program SID# 368	0	4,082	4,296
Workshop on National Saltwater Dissolved Oxygen Criteria Mackiernan, Gail B. 39 Maryland Sea Grant College Program SID# 195	0	0	17,562
Nutrient Limitation and Nutrient Enrichment Impact on Microbial Food Webs in the Upper Estuarine Transition Zone Webb, K. L. 39 Virginia Graduate Marine Science Consortium SID# 37	28,735	30,241	0
Buoyancy and Nutrient Exchange in the Mississippi River Outflow Region Scott, Dinnel P. 39 Mississippi-Alabama Sea Grant Consortium SID# 727	0	0	15,543
Effects of Increased Nitrogen Loading on Estuarine Primary Productivity and Microbial Nitrogen Cycling Stanley, D. 40 University of North Carolina Sea Grant College Program SID# 15	22,209	12,638	0

<p>Scales of Spatial and Temporal Variation of Nutrients and Pigments Within the Outflow of the Mississippi River Plume Shelf Ecosystem Whittedge, Terry E. 40 Texas A&amp;M University Sea Grant College Program SID# 286</p>	0	0	86,298
<p>The Fate and Effects of Riverine (and Shelf-derived) Dissolved Organic Matter on Mississippi River Plume/Gulf Shelf Processes Benner, Ronald 40 Texas A&amp;M University Sea Grant College Program SID# 287</p>	0	0	58,386
<p>NECOP: Benthic Metabolism Measured with the GOMEX Benthic Lander Rowe, Gilbert 40 Texas A&amp;M University Sea Grant College Program SID# 288</p>	0	0	60,000
<p>Satellite Estimation of Surface Flow Fields, Mesoscale Variability and River Plume Evolution on the Texas-Louisiana Shelf Kelly, Frank 40 Texas A&amp;M University Sea Grant College Program SID# 289</p>	0	0	44,999
<p>The Impacts of Hypoxia on Benthic Populations and Fisheries Resources Harper, Donald E. Jr. 40 Texas A&amp;M University Sea Grant College Program SID# 290</p>	0	0	24,903
<p>Nutrient Enhanced Coastal Ocean Productivity: The Role of Phosphate Ammerman, James 40 Texas A&amp;M University Sea Grant College Program SID# 214</p>	0	0	30,000
<p>Effects of Eutrophication on Seagrass Habitats of Coastal Lagoons Taylor, David I. 40 Rhode Island Sea Grant College Program SID# 680</p>	0	0	75,000

<p>Assessing the Impact of Three Decades of Increased Nutrient Loading from Coastal Development on an Eelgrass Community  Short, Frederick 40  Rhode Island Sea Grant College Program  SID# 609</p>	41,973	0	0
<p>Experimental Studies of the Effects of Nutrient Enrichment in Coastal Lagoons – Limiting Nutrients and Flushing  Nixon, Scott 40  Rhode Island Sea Grant College Program  SID# 610</p>	151,162	151,538	0
<p>Effect of Increased Nutrient Loading on Seagrass Habitat: Importance of Nitrogen Removal via Denitrification – Year II  Seitzinger, Sybil P. 45  New Jersey Marine Science Consortium  SID# 291</p>	0	0	50,000
<p>Eutrophication in Estuaries: Do Anthropogenic Inputs of Dissolved Organic N Contribute to Estuarine Eutrophication?  Seitzinger, Sybil P. 45  New Jersey Marine Science Consortium  SID# 324</p>	69,240	35,823	0
<p>Influence of Phytoplankton Size and Species Composition on the Fate of Carbon and Hypoxia in the Mississippi River/Shelf Ecosystem  Dortch, Quay 45  Louisiana Sea Grant College Program  SID# 362</p>	0	15,215	40,256
<p>The Impacts of Hypoxia on Benthic Populations and Fisheries Resources  Rabalais, Nancy N. 45  Louisiana Sea Grant College Program  SID# 338</p>	0	5,204	25,097
<p>Primary Production and Vertical Flux of Organic Carbon from Mississippi River Plume and Adjacent Shelf Waters  Lohrenz, Steven E. 47  Mississippi–Alabama Sea Grant Consortium  SID# 303</p>	0	18,272	139,020

Hypoxia on the Louisiana Inner Shelf: A Modeling Study Wiseman, William J. 47 Louisiana Sea Grant College Program SID# 366	0	7,580	150,000
A Retrospective Analysis of Nutrient Enhanced Coastal Ocean Productivity in Sediments from the Louisiana Continental Shelf Trefry, J. H. 48 Florida Sea Grant College Program SID# 431	0	0	32,000
Suspended Sediment on the Louisiana Continental Shelf: Concentrations, Composition, and Transport Pathways Trefry, J. H. 48 Florida Sea Grant College Program SID# 432	0	0	46,000
<b>SUBTOTAL:</b>	<b>354,707</b>	<b>345,719</b>	<b>1,212,621</b>
<b>2. Primary Production and Nutrient Cycling</b>			
<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Effects of Crayfish Grazing on Benthic Algal Standing Crops, Turnover Rates and Productivity Tuchman, Nancy C. 05 Illinois-Indiana Sea Grant SID# 369	29,910	30,586	0
Nutrient Cycles and Optimum Productivity of Shallow-Water Artificial Reefs Szmant, A. M. 07 Florida Sea Grant College Program SID# 86	49,564	40,438	0
Persistent Effects of Environmental Stress on Algal Production Gerard, Valrie A. 07 New York Sea Grant Institute SID# 520	6,499	13,370	0
Enhancement of Coastal Productivity Associated with Processes in the Atchafalaya Bay Ecosystem: V. Stable Isotope Ratios and Primary Production Dynamics in High Growth Zones Day, J. W. Jr. 39 Louisiana Sea Grant College Program SID# 1019	40,90	24,853	0



<p>Enhancement of Coastal Productivity Associated with Processes in the Atchafalaya Bay Ecosystem: VI. The Relative Influence of Denitrification and Sedimentation on the Availability of Nutrients to Primary Producers            Twilley, Robert R. 39            Louisiana Sea Grant College Program            SID# 1020</p>	46,070	13,430	0
<p>The Role of Light Attenuation Processes and Plant Sediment Interaction in Determining Seagrass Survival            Orth, Robert 39            Virginia Graduate Marine Science Consortium            SID# 416</p>	0	0	125,000
<p>Regulation of Estuarine Phytoplankton Dynamics: The Interaction of Reduced Salinity, Enhanced N:P Ratios and Pulsed Nutrient Inputs            Vargo, G. A. 40            Florida Sea Grant College Program            SID# 656</p>	41,633	24,954	0
<p>Primary Production Dynamics and Trophic Importance of Epiphytic Algae in Mississippi Seagrass Beds            Sullivan, Michael J. 40            Mississippi-Alabama Sea Grant Consortium            SID# 501</p>	59,118	29,561	0
<p>Light and Zooplankton Effects on Phytoplankton Production in Lower Green Bay            Sager, Paul E. 40            Wisconsin Sea Grant College Program            SID# 448</p>	65,349	33,179	0
<p>Transfer of Riverine Organic Carbon to the Marine Environment: Dynamics of Dissolved Organic Matter in Estuaries            Ertel, John R. 40            Georgia Sea Grant College Program            SID# 571</p>	74,000	24,157	0

Lignocellulose-derived Organic Matter in the Georgia Nearshore: Diagnostic Changes and Relative Importance as a Carbon Source Hodson, Robert E.                      40 Georgia Sea Grant College Program SID# 410	73,675	16,757	0
--	--------	--------	---

Seagrass Habitat and Its Management in Texas Estuaries: Effect of Extended Periods of Low Light Dunton, Kenneth H.                      40 Texas A&M University Sea Grant College Program SID# 715	49,538	24,769	0
--	--------	--------	---

Estuarine Nutrient Dynamics and Water Quality Interactions: Relation to River Flow, Land Use and Wetland Exchanges McKellar, H. N.                          46 South Carolina Sea Grant Consortium SID# 254	35,300	18,322	0
---	--------	--------	---

Significance of Dissolved Organic Phosphorus Compounds to Plankton Communities Developing in Sandusky Bay Heath, Robert                              47 Ohio Sea Grant College Program SID# 631	0	0	0
--	---	---	---

SUBTOTAL:	571,560	294,376	125,000
-----------	---------	---------	---------

3. Trophic Dynamics

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Nutritional and Ecological Importance of Protozoans in the Diet of First-Feeding Winter Flounder Larvae, <i>Pseudopleuronectes americanus</i> Gallager, Scott M.                      02 Woods Hole Oceanographic Institution SID# 260	35,167	25,910	0
Role of Microbial Ecology in Larval Fish Nutrition Holt, Joan G.                                02 Texas A&M University Sea Grant College Program SID# 534	36,760	18,750	0

Abalone Wasting Disease: Role of Coccidian Parasites and Environmental Factors Kuris, Armand M. 03 California Sea Grant College Program SID# 516	60,451	44,609	0
The Effect of Prey Limitation on Growth and Survival of Early Juvenile Summer Flounder ( <i>Paralichthys dentatus</i> ): Interaction with Temperature and Latitude Targett, Timothy E. 06 University of Delaware SID# 173	7,020	39,759	0
Modeling the Upper Ocean Production Dynamics of Plankton and Larval Pollock in the Bering Sea Bollens, Stephen M. 06 Woods Hole Oceanographic Institution SID# 663	0	0	63,230
An Investigation of Coupling Between Phytoplankton Productivity and Zooplankton Dynamics in Long Island Coastal Embayments Casper, Elizabeth M. 07 New York Sea Grant Institute SID# 521	48,636	28,111	0
Zooplankton Abundance and Effects of Prey Variation on Walleye Pollock Larvae in the Bering Sea Paul, A. J. 07 Alaska Sea Grant College Program SID# 679	0	0	47,472
Atchafalaya Subprogram Synthesis Carney, Robert 39 Louisiana Sea Grant College Program SID# 1018	0	29,265	0
Enhancement of Coastal Productivity Associated with Processes in the Atchafalaya Bay Ecosystem. VII. Zooplankton Feeding and Egg Production in Fourleague Bay Dagg, Michael 39 Louisiana Sea Grant College Program SID# 1021	23,104	24,124	0

<p>Enhancement of Coastal Productivity Associated with Processes in the Atchafalaya Bay Ecosystem: VIII. Ichthyoplankton Abundance Along a Recruitment Corridor and the Role of an Estuarine Frontal Zone as an Ephemeral Nursery Zone Shaw, Richard F. 39 Louisiana Sea Grant College Program SID# 1022</p>	47,411	29,371	0
<p>Bacterial Community Changes and Polysaccharide Biogeochemistry Hicks, Randall E. 39 Minnesota Sea Grant College Program SID# 131</p>	24,150	7,360	0
<p>Effect of Microbial Predators on Lake Erie Blue-Green Algae in Laboratory Tanks and Outdoor Pool Ecosystems Burnham, Jeffrey C. 40 Ohio Sea Grant College Program SID# 629</p>	0	0	0
<p>Trophic Dynamics in Chesapeake Bay: Ecological and Biochemical Approaches to the Study of Flows of Carbon from Phytoplankton to Bacterioplankton Fletcher, Madilyn 40 Maryland Sea Grant College Program SID# 49</p>	49,986	28,972	0
<p>Plankton Trophic Dynamics in Chesapeake Bay: Top Down vs Bottom up Control of Copepod Populations Purcell, Jennifer E. 40 Maryland Sea Grant College Program SID# 50</p>	37,001	32,883	0
<p>Year Class Strength of Rainbow Smelt and Lake Whitefish as Influenced by Interspecific Interactions and Climate Taylor, William W. 40 Michigan Sea Grant College Program SID# 270</p>	56,520	34,977	0
<p>Causes and Consequences of Cladoceran Dynamics in Lake Michigan: Implications for Recruitment Success of Forage Fish Species Lehman, John T. 40 Michigan Sea Grant College Program SID# 602</p>	48,823	32,169	0

Biomass and Production Dynamics of Pelagic Planktivores: A Comparative Analysis of Lakes Ontario and Michigan Stewart, Donald J. 40 New York Sea Grant Institute SID# 524	57,896	42,545	0	
Viruses in the Ocean Near Los Angeles Fuhrman, Jed 45 Univ of Southern California Sea Grant College SID# 510	31,904	73,749	0	
Modeling Predator-Prey Linkages in Great Lakes Food Webs Kitchell, James F. 47 Wisconsin Sea Grant College Program SID# 446	52,509	41,145	0	
Development of an Advanced Ecosystem Model for Coastal Waters Kremer, James 47 Rhode Island Sea Grant College Program SID# 612	31,259	0	0	
A Mesocosm Simulation of Estuarine Trophodynamics Using Dual Labelling Sharp, Jonathan A. 48 University of Delaware SID# 77	30,520	28,630	0	
Stable Carbon and Nitrogen Isotope Budgets for Sediments in Green Bay Klump, Val J. 48 Wisconsin Sea Grant College Program SID# 450	25,740	13,260	0	
	<b>SUBTOTAL:</b>	<b>704,857</b>	<b>575,589</b>	<b>110,702</b>
	<b>TOTAL:</b>	<b>1,631,124</b>	<b>1,215,684</b>	<b>1,448,323</b>

**G. Toxics:**

**1. Effects**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Chemistry of Estuarine Bio-mineralization as Indicators of Past Pollution and Anoxia Luther, George W. II 44 University of Delaware SID# 69	76,520	35,171	0

Behavior and Vocalizations of Transient Killer Whales Fay, Francis H. 07 Alaska Sea Grant College Program SID# 174	32,283	7,979	0
Uptake and Retention of Contaminants by Fish Maintained on Artificial Diets in Lake Ontario Buttner, Joseph K. 02 New York Sea Grant Institute SID# 198	32,302	13,682	0
Disposition and Metabolism of Polychlorinated Dibenzofurans in Fish Sikka, Harish C. 45 New York Sea Grant Institute SID# 106	53,475	28,952	0
Assessment of Genetic Damage in Mangroves Resulting from Long-term Exposure to Oil Pollution Klekowski, E. J. 40 University of Puerto Rico Sea Grant College Program SID# 232	10,000	17,311	0
Trace Metal Stress in the Algal Community of Boston Harbor and Massachusetts Bay Morel, Francois M.M. 39 MIT SID# 263	50,000	0	0
Toxic Halogenated Aromatic Hydrocarbons in Lake Trout Gametes as a Factor in Fry Survival Peterson, Richard E. 45 Wisconsin Sea Grant College Program SID# 455	53,747	49,261	0
Distribution of Heavy Metal-Resistant Bacteria, Their Mechanism(s) of Resistance, and Use of Biosensors (Genetic Fusions) To Determine Biologically Available Heavy Metals Nealson, Kenneth H. 44 Wisconsin Sea Grant College Program SID# 459	38,107	21,243	0
The Chemistry of Estuarine Bio-mineralization as Indicators of Past Pollution and Anoxia Jacobsen, Timothy R. 45 New Jersey Marine Science Consortium SID# 326	15,000	7,981	0

<p>Ecological Risk Assessment of Complex Mixtures of Polybrominated Aromatic Hydrocarbons in Feral Fish Eggs Andren, Anders W. 45 Wisconsin Sea Grant College Program SID# 423</p>	0	35,060	69,972
<p>Cell Proliferation: A Potential Marker for the Biological Effect of Chronic Exposure to Epigenetic Carcinogens in Coastal Benthic Finfish and Shellfish Stegeman, John J. 45 Woods Hole Oceanographic Institution SID# 488</p>	0	57,746	71,401
<p>Uptake of Dissolved and Particle-Associated Toxicants by the Eastern Oyster Weston, Donald P. 45 Maryland Sea Grant College Program SID# 502</p>	0	0	79,993
<p>Effects of Trace Metals and Organic Pollutants on Stress-Induced Proteins in Oyster Larvae and Spat: A Molecular Approach Chen, Thomas T. 45 Maryland Sea Grant College Program SID# 504</p>	0	0	40,000
<p>Investigation of the Variability of Copper Speciation and the Potential Effects on Phytoplankton in Estuarine Waters Hanson, Alfred 44 Rhode Island Sea Grant College Program SID# 611</p>	94,951	48,357	0
<p>Relationship of Pollutants to the Onset of Disease in the Eastern Oyster, <i>Crassostrea virginica</i> Chu, Fu-Lin E. 45 Virginia Graduate Marine Science Consortium SID# 704</p>	0	0	79,754
<p>Use of Fish and Oyster Cell Cultures to Study Toxic Effects of Chemical Pollutants of the Chesapeake Bay Faisal, M. 45 Virginia Graduate Marine Science Consortium SID# 623</p>	0	0	17,825

Assessment of Sublethal Toxic Effects in Marine Organisms by NMR Spectroscopy Tjeerdema, Ronald S.           45 California Sea Grant College Program SID# 548	39,471	39,978	0
SUBTOTAL:	495,856	362,721	358,945
<b>2. Transport, Cycling, and Fate</b>			
TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Evaluation of Marine Microbial Chemoorganotrophs/Chemolithoautotrophs for Contributions to Benthic Habitat Dynamics and Biotechnological Applications Portier, Ralph J.               11 Louisiana Sea Grant College Program SID# 1015	15,001	14,769	0
Quantifying Sediment Resuspension Flux of Nutrients and Contaminants in Estuaries Due to Episodic Events Shen, P.                         40 Florida Sea Grant College Program SID# 95	51,925	25,963	0
The Influence of Organic Matter Dynamics on the Cycling of Toxic Organic Contaminants in Chesapeake Bay Baker, Joel E.                 40 Maryland Sea Grant College Program SID# 47	37,780	12,622	0
Pollutant Metal Removal and Release Via Reactions with Sedimentary Pyrite Morse, John                   40 Texas A&M University Sea Grant College Program SID# 716	47,459	24,893	0
Processes That Control the Cycling of the Toxicant Lead in Galveston Bay Santschi, P.                   40 Texas A&M University Sea Grant College Program SID# 572	49,760	29,768	0
Toxic-Element Sources and Fates in the Delaware Estuary and Mid-Atlantic Coastal Waters Church, Thomas M.           44 University of Delaware SID# 157	39,080	85,410	0



Accumulation Rates, Heavy Metal Pollution and Processes of Sedimentation in Organic-Rich Muds Wells, J. 44 University of North Carolina Sea Grant College Program SID# 14	8,593	20,120	0
The Transfer of Toxic Metals from Contaminated Sediment to the Blue Crab: An Integrated Field and Laboratory Study Levinton, Jeffrey S. 44 New York Sea Grant Institute SID# 104	62,489	46,335	0
Geochemical Control of Toxicant Release Rates from San Diego Bay Sediments Reimers, Clare E. 44 California Sea Grant College Program SID# 696	28,300	8,000	0
Sunlight Induced Photochemistry in Lake Erie: Formation of Reactive Species Cooper, William J. 45 Ohio Sea Grant College Program SID# 630	0	0	0
Environmental Factors Affecting the Accumulation of Sediment-Sorbed Carcinogens into Great Lakes Foodchains Fisher, Susan W. 45 Ohio Sea Grant College Program SID# 632	33,884	41,930	0
Partitioning of Organic Contaminants Between Air, Water, and Sediment in a Freshwater Estuary Andren, Anders W. 45 Wisconsin Sea Grant College Program SID# 449	57,126	31,795	0
The Role of Benthic Infauna and Fluctuating Oxygen Concentrations in the Flux of Toxic Trace Elements from Chesapeake Bay Sediments Riedel, Gerhardt 45 Maryland Sea Grant College Program SID# 404	0	0	103,589

<b>Resuspension and Transport of Sediment Associated Toxics in the Northern Chesapeake Bay</b> Sanford, Lawrence P.           45 Maryland Sea Grant College Program SID# 406	0	14,100	70,770
<b>The Role of Plankton in Controlling the Partitioning and Transport of Hydrophobic Organic Contaminants in Chesapeake Bay: Zooplankton Feeding and Excretion</b> McManus, George               45 Maryland Sea Grant College Program SID# 407	0	0	82,593
<b>Microbial Degradation of Chlorinated Hydrocarbons Under Alternating Redox Conditions in Chesapeake Bay Sediments</b> Capone, Douglas G.           45 Maryland Sea Grant College Program SID# 495	0	0	44,998
<b>Direct Measurements and Biogeochemical Controls of Sediment-Water Flux of Trace Metals from Estuarine Sediments</b> Cornwell, Jeffrey C.           45 Maryland Sea Grant College Program SID# 496	0	0	57,208
<b>The Importance of Dinoflagellate Blooms in the Transport of Carbon and Toxic Trace Elements in Chesapeake Bay</b> Sanders, James G.             45 Maryland Sea Grant College Program SID# 498	0	0	89,998
<b>Air/Water Partitioning and Mass Transfer Properties of Toxic Organic Chemicals</b> Dickhut, Rebecca M.         45 Virginia Graduate Marine Science Consortium SID# 618	0	0	60,000
<b>Particle-Reactive Radionuclides as Analogues of Particle-Reactive Pollutants in the Chesapeake Bay</b> Wong, George T. F.           45 Virginia Graduate Marine Science Consortium SID# 619	0	0	82,418

Particle-reactive Pollutants in Southern Chesapeake Bay: Accumulation, Resuspension and Flux into the Bottom Swift, Donald J. P. 45 Virginia Graduate Marine Science Consortium SID# 620	0	0	50,003
Dynamics of Sediment Resuspension: Bay-stem Plains of the Lower Chesapeake Bay Wright, L. D. 45 Virginia Graduate Marine Science Consortium SID# 621	0	0	58,121
Direct Measurements and Biogeochemical Controls of Sediment-Water Flux of Trace Metals From Estuarine Sediments Cornwell, Jeffrey C. 45 Virginia Graduate Marine Science Consortium SID# 645	0	0	42,785
Determination of the Chemical Speciation of Dissolved Copper and Cadmium in Chesapeake Bay Donat, John R. 45 Virginia Graduate Marine Science Consortium SID# 647	0	0	40,000
Role of Benthic Communities in Sediment-Associated Toxic Organic Chemical Fate and Transport in Lower Chesapeake Bay Schaffner, Linda C. 45 Virginia Graduate Marine Science Consortium SID# 648	0	0	100,000
Biodegradation of Polycyclic Aromatic Hydrocarbons in Sediments of the Grand Calumet River Konopka, Allan 45 Illinois-Indiana Sea Grant SID# 373	27,000	27,000	0
Degradation of Trichloroethylene and Other Pollutants by Ammonia-Oxidizing Bacteria Hooper, Alan B. 45 Minnesota Sea Grant College Program SID# 673	29,076	14,527	0

<b>Role of Plankton in Controlling the Partitioning and Transport of Hydrophobic Organic Contaminants in Chesapeake Bay</b> Baker, Joel E. 45 Maryland Sea Grant College Program SID# 248	0	0	109,957
<b>Phenolic Compounds in Seawater: Rates and Mechanisms of Biodegradation</b> Carlucci, Angelo F. 45 California Sea Grant College Program SID# 544	7,080	9,818	0
<b>Mobile Mapping of the Resuspension Potential of Toxic Sediment in the Great Lakes</b> Libicki, Charels 46 Ohio Sea Grant College Program SID# 635	35,000	20,898	0
<b>Patterns of Contaminant Flux in Great Lakes Food Webs</b> Carpenter, Stephen R. 47 Wisconsin Sea Grant College Program SID# 456	40,442	23,619	0
<b>Fluxes and Residence Times of Organic Matter and Organic Contaminants in Large Lakes</b> Eisenreich, Steven J. 48 Minnesota Sea Grant College Program SID# 133	27,320	14,440	0
<b>Role of Phytoplankton in Contaminant Fate in Lakes</b> Swackhamer, Deborah 48 Minnesota Sea Grant College Program SID# 134	22,630	7,950	0
<b>Prediction of Management Effects on Pollutant Loading from Poorly Drained Soils Adjacent to Coastal Waters</b> Gilliam, J. 48 University of North Carolina Sea Grant College Program SID# 13	51,812	0	0
<b>Rates and Mechanisms of Contaminant Uptake and Release by Suspended Sediments in Lake Michigan</b> Armstrong, David E. 48 Wisconsin Sea Grant College Program SID# 452	54,681	33,983	0

Molecular Properties and Fate of Organic Chemicals in Aquatic environments Andren, Anders W. 48 Wisconsin Sea Grant College Program SID# 458	52,935	27,791	0
Modeling Toxic Material in Galveston Bay Armstrong, Neal 48 Texas A&M University Sea Grant College Program SID# 573	37,441	20,961	0
Chesapeake Bay Environmental Effects Research: New Project Initiatives Rickards, William L. 81 Virginia Graduate Marine Science Consortium SID# 624	0	0	74,988
	<b>SUBTOTAL:</b>	<b>816,814</b>	<b>556,692</b>
	<b>TOTAL:</b>	<b>1,312,670</b>	<b>1,426,373</b>
	<b>GRANT TOTAL:</b>	<b>7,680,641</b>	<b>6,988,333</b>
			<b>8,523,429</b>

# COASTAL PROCESSES

---

## 1. Coastal Sediment Transport

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Coastal Turbidity Associated with Natural and Man-Induced Phenomena Hanes, D. M. 25 Florida Sea Grant College Program SID# 652	51,270	25,635	0
A Unified Model for Cross-Shore and Longshore Sand Transport Dally, W. R. 25 Florida Sea Grant College Program SID# 93	48,000	24,000	0
Interaction of Waves and Currents Over a Movable Bed Madsen, Ole S. 25 MIT SID# 297	50,000	26,931	0
Use of Sediment Fences for Marsh Restoration and Creation Day, J. W., Jr. 39 Louisiana Sea Grant College Program SID# 378	0	4,058	33,330
Spatial and Temporal Scales of Sediment Accumulation in the Near-Shore Zone of Massachusetts Bay Wallace, Gordon T. 44 MIT SID# 302	50,000	63,926	0
Random Walk Models of Coastal and Estuarine Transport Adams, Eric E. 45 MIT SID# 265	50,000	30,000	0
Resuspension and Transport of Sediment Associated Toxics in the Northern Chesapeake Bay Sanford, Lawrence P. 45 Maryland Sea Grant College Program SID# 406	0	14,100	70,770

Dynamics of Sediment Resuspension: Bay-stem Plains of the Lower Chesapeake Bay Wright, L. D. 45 Virginia Graduate Marine Science Consortium SID# 621	0	0	58,121
A Sand Budget for Maine's Sandy Embayments: Calculation of Sand Volumes and Transport Paths in the Nearshore and Littoral Regions of Saco Bay and the Kennebec River Mouth Kelley, Joseph T. 46 UM/UNH Sea Grant Program SID# 494	46,184	53,118	0
Cross-Shore Length Scales of Longshore Bars and Associated Forcing Perlin, Marc 46 Michigan Sea Grant College Program SID# 354	40,246	14,625	0
Sand Deposits on the Illinois and Indiana Shoreline of Lake Michigan Shabica, Charles W. 46 Illinois-Indiana Sea Grant SID# 426	0	0	49,852
The Dynamics of Horizontal Sediment Transport and Focusing in Large Lakes Edgington, David N. 48 Wisconsin Sea Grant College Program SID# 454	53,921	31,082	0
Formulation and Maintenance of Shore-Oblique Sand Ridges: Hydrodynamics and Sediment Transport Trowbridge, John H. 50 Woods Hole Oceanographic Institution SID# 339	45,299	21,081	0
SUBTOTAL:	434,920	308,556	212,073

## 2. Inlets and Estuaries

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
An Analysis of the Lagrangian Motion in Delaware's Inland Bays Wong, Kuo-Chuin 39 University of Delaware SID# 68	29,388	45,871	0

Gravity Currents and Internal Bores Yeh, H. H. 46 Washington Sea Grant College Program SID# 170	48,400	51,491	0
Physical Factors Affecting the Circulation of Tampa Bay Cato, James C. 50 Florida Sea Grant College Program SID# 281	0	0	24,990
A Three Dimensional, Time-Dependent Model of Tampa Bay System Cato, James C. 50 Florida Sea Grant College Program SID# 344	0	0	54,004
<b>SUBTOTAL:</b>	<b>77,788</b>	<b>97,362</b>	<b>78,994</b>

### 3. Coastal Oceanography

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
South Atlantic Bight Recruitment Experiment: Physical Oceanography and Modeling Atkinson, Larry P. 07 Virginia Graduate Marine Science Consortium SID# 398	0	0	50,000
Numerical Modelling of Nearshore Hydrodynamics Svendsen, Ib A. 25 University of Delaware SID# 163	6,680	42,861	0
Water Waves in the Vicinity of Breakwaters and Jetties Dalrymple, Robert A. 25 University of Delaware SID# 61	780	43,839	0
Modelling Effects of Vertical Current Shear in Wave-Propagation Schemes Kirby, James T. 25 University of Delaware SID# 63	4,680	35,248	0
Nonlinear Wave Interactions in Surf Zones Kobayashi, Nobuhisa 25 University of Delaware SID# 64	9,672	49,917	0



Surf Beat Dynamics: Long Wave Excitations Through the Refraction, Diffraction, and Breaking of Wave Groups Liu, Phillip L. 25 New York Sea Grant Institute SID# 100	34,304	39,235	0
Southern California Waves: Model Verification and Utilization Guza, Robert T. 25 California Sea Grant College Program SID# 530	45,280	7,979	0
Wave Climate and Extreme Storm Events on the Oregon Coast Komar, Paul D. 39 Oregon Sea Grant College Program SID# 472	43,200	43,600	0
Seismic Risk of the Offshore San Gregorio-Hosgri Fault Zone Between Monterey and San Francisco, California Reed, Donald L. 39 California Sea Grant College Program SID# 694	13,108	23,182	0
Estimation of Wave Properties in Coastal Gulf of Maine Panchang, V. G. 46 UM/UNH Sea Grant Program SID# 36	53,560	9,201	0
Mapping Temperature, Salinity and Velocity at Shallow Depth Gregg, M.C. 46 Washington Sea Grant College Program SID# 168	85,800	45,858	0
Air Mass-Based Climate Change Scenarios for the Great Lakes Basin Brinkmann, Waltraud 46 Wisconsin Sea Grant College Program SID# 471	47,064	25,965	0
SABRE: Physical Oceanography and Modelling Blanton, Jackson O. 46 Georgia Sea Grant College Program SID# 357	0	36,897	50,000

Development of a Numerical Model for Steep, Directional Seas Webster, William C. 46 California Sea Grant College Program SID# 698	22,824	13,259	0
Suspended Sediment on the Louisiana Continental Shelf: Concentrations, Composition, and Transport Pathways Trefry, J. H. 48 Florida Sea Grant College Program SID# 432	0	0	46,000
Acoustic Global Ocean Warming Feasibility Experiment Spindel, R. C. 48 Washington Sea Grant College Program SID# 417	0	0	658,092
Physical Oceanography and Modeling Lee, Thomas N. 48 Florida Sea Grant College Program SID# 408	0	0	35,000
Coastal Upwelling in Cape Cod Bay Geyer, Wayne Rockwel 50 Woods Hole Oceanographic Institution SID# 340	35,250	31,135	0

SUBTOTAL: 402,202 448,176 839,092

4. Coasts and Shore Protection


TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
An Economic Analysis of Beach Preservation Parsons, George R. 14 University of Delaware SID# 175	4,992	15,830	0
Benefits of Protection from Damage Caused by Fluctuating Water Levels in the Western Basin: Evidence from the Market in Shoreline Property Randall, Alan 14 Ohio Sea Grant College Program SID# 626	30,122	24,118	0
Reliability Based LRFD Criteria of Anchored Bulkheads Sandford, Thomas 24 UM/UNH Sea Grant Program SID# 391	44,404	17,269	0

Field Evaluation and Continued Development of Equilibrium Beach Profile Concepts Dean, R. G. 25 Florida Sea Grant College Program SID# 92	49,336	24,887	0
The Relation of Waves and Storm Surges: Its Effect on Extreme-Value Statistics for Coastal Design in the Great Lakes Green, Theodore 25 Wisconsin Sea Grant College Program SID# 470	32,687	18,337	0
Coastal Engineering Advisory Services Keillor, Philip 25 Wisconsin Sea Grant College Program SID# 474	21,748	18,674	0
Coastal Effects of a Potential Rise in Sea Level: A Comprehensive Plan for Action Fisher, J. 25 University of North Carolina Sea Grant College Program SID# 370	0	0	7,500
A Rational Analysis and Design Procedure for Rubble Mound Coastal Structures McDougal, William G. 25 Oregon Sea Grant College Program SID# 330	123,000	91,600	0
Modeling Beach and Nearshore Profile Response to Lake Level Change and Storm Wave Forcing Wood, William L. 25 Illinois-Indiana Sea Grant SID# 655	0	0	30,000
Field Experiment Evaluation of the Effects of Beach Restoration on Stony Corals of Southeast Florida Goldberg, W. 28 Florida Sea Grant College Program SID# 651	39,946	19,153	0
Late Holocene Sea-Level Fluctuations: Implications for Future Environmental Changes Along the Connecticut Coast Varekamp, J. C. 38 Connecticut Sea Grant College Program SID# 182	6,700	14,600	0

Adaptive Response and Greenhouse-Induced Sea Level Rise Along the Mainland Shore of Long Island Sound Yohe, Gary W. 38 Connecticut Sea Grant College Program SID# 183	27,000	23,000	0
Paleoclimatic Implications of Late Holocene Lake Level Fluctuations in the Lake Michigan Basin Stoermer, Eugene F. 39 Michigan Sea Grant College Program SID# 601	41,541	17,045	0
Contemporary and Historical Eolian Sand Transport in a Coastal Dune Environment: South Shore, Lake Michigan, Indiana Olyphant, G. A. 46 Illinois-Indiana Sea Grant SID# 428	0	0	30,000
SUBTOTAL:	421,476	284,513	67,500

#### 5. Coastal Processes

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Interactive Acoustic Data Display and Statistical Analysis Swartzman, G. L. 06 Washington Sea Grant College Program SID# 267	0	0	40,000
The Implementation and Evaluation of a Real-Time AVHRP In-Situ Data System for Great Lakes Sea Surface and Heat Flux Predictions Bedford, Keith W. 46 Ohio Sea Grant College Program SID# 634	34,369	18,232	0
SUBTOTAL:	34,369	18,232	40,000
TOTAL:	1,370,755	1,156,839	1,237,659



# Technology and Commercial Development

Following is a listing of Sea Grant's Technology and Commercial Development Division technical staff, their subject area(s), and their phone number.

They can be reached at the following address:

**National Oceanic and Atmospheric Administration  
National Sea Grant College Program  
1335 East-West Highway  
SSMC1, 5th Floor  
Silver Spring, MD 20910**

**Technology and Commercial Development .....301/713-2445**  
Ocean Engineering & Marine & Coastal Transportation Systems - Dr. Richard C. Kolf  
Marine Resource Economics - Dr. Francis M. Schuler  
Marine Recreation - Dr. Francis M. Schuler

# OCEAN ENGINEERING AND MARINE AND COASTAL TRANSPORTATION SYSTEMS

---

## 1. Education

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Opportunities for Undergraduate Research and Development in Marine Science and Engineering Watson, W. H. 61 UM/UNH Sea Grant Program SID# 397	0	15,000	0
MIT Sea Grant/Undergraduate Research Opportunities Program Doelling, Norman 70 MIT SID# 307	25,000	17,992	0
Public Education and Training Short Courses McGarry, Frederick J. 75 MIT SID# 313	0	48,552	0
SUBTOTAL:	25,000	81,544	0

## 2. Fisheries and Seafood Processing

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Modeling Quality Changes Which Occur During Frozen Storage of Seafoods Kolbe, Edward R. 35 Oregon Sea Grant College Program SID# 333	38,300	32,500	0
Frozen Stabilized Mince as a Source of Surimi--Initial Feasibility Kolbe, Edward R. 35 Oregon Sea Grant College Program SID# 462	66,300	57,600	0
Center for Fisheries Engineering Goudey, Clifford A. 73 MIT SID# 309	77,700	80,000	0
SUBTOTAL:	182,300	170,100	0

3. Aquaculture

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development of Techniques for Increasing the Efficiency of Soft Shell Production by Removal/Neutralization of the Eyestalk Sinus Gland/X-Organ Complex from the Red Swamp Crawfish (Pocambarus clarkii) Malone, Ronald F. 01 Louisiana Sea Grant College Program SID# 1009	50,394	43,550	0
A Workshop: Optimization of Biological Filtration for High Density Recirculating Aquaculture Production Units Malone, Ronald F. 02 Louisiana Sea Grant College Program SID# 1010	5,000	4,249	0
Development of Sand Filtration Technologies to Support Finfish Culture Systems Malone, Ronald F. 02 Louisiana Sea Grant College Program SID# 1008	21,153	10,202	0
Development and Characterization of a High Rate Biofilter for Recirculating Aquaculture Systems Piedrahita, Raul H. 26 California Sea Grant College Program SID# 690	14,714	10,178	0
Microcomputer-Based Automation and Expert System Development of Aquaculture Lee, Phillip G. 28 Texas A&M University Sea Grant College Program SID# 550	59,293	55,642	0
SUBTOTAL:	150,554	123,821	0



**4. Erosion Control Structures**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Water Waves in the Vicinity of Breakwaters and Jetties Dalrymple, Robert A. 25 University of Delaware SID# 61	780	43,839	0
<b>SUBTOTAL:</b>	<b>780</b>	<b>43,839</b>	<b>0</b>

**5. Remote Sensing**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Remote Sensing of Pelagic Fish Eggs Checkley, D. M. 07 University of North Carolina Sea Grant College Program SID# 616	0	0	55,000
Acoustic Sensing of Pelagic Fish Stocks Jaffe, Jules S. 28 California Sea Grant College Program SID# 691	65,624	6,961	0
Utility of Thematic Mapper Data for Chlorophyll-a Estimation in New Jersey Coastal Waters of the New York Bight Apex Bagheri, Sima 39 New Jersey Marine Science Consortium SID# 238	43,986	21,988	0
Merger of Regional Wetland Inventories from Remotely Sensed Data Khorram, S. 39 University of North Carolina Sea Grant College Program SID# 371	0	0	26,641
Satellite Estimation of Surface Flow Fields, Mesoscale Variability and River Plume Evolution on the Texas-Louisiana Shelf Kelly, Frank 40 Texas A&M University Sea Grant College Program SID# 289	0	0	44,999

Detection of Event-Scale Phytoplankton Increases in the Chesapeake Bay During the Winter-Spring Transition Using Aircraft Remote Sensing Harding, Lawrence Jr. 40 Maryland Sea Grant College Program SID# 46	47,900	7,478	0
Development of a Protocol for Mapping Coastal Habitat for the NOAA Coastal Ocean Program: Remote Sensing of Wetland Condition Indicators and Functional Health Klemas, V. 40 University of Delaware SID# 532	57	4,728	42,500
The Implementation and Evaluation of a Real-Time AVHRP In-Situ Data System for Great Lakes Sea Surface and Heat Flux Predictions Bedford, Keith W. 46 Ohio Sea Grant College Program SID# 634	34,369	18,232	0
<b>SUBTOTAL:</b>	<b>191,936</b>	<b>59,387</b>	<b>169,140</b>

#### 6. Coastal Construction

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Reliability Based LRFD Criteria of Anchored Bulkheads Sandford, Thomas 24 UM/UNH Sea Grant Program SID# 391	44,404	17,269	0
A Rational Analysis and Design Procedure for Rubble Mound Coastal Structures McDougal, William G. 25 Oregon Sea Grant College Program SID# 330	123,000	91,600	0
Development of In-Process Nondestructive Evaluation Technique for Underwater Welding Rokhlin, Stanislav I 28 Ohio Sea Grant College Program SID# 633	38,000	39,131	0
<b>SUBTOTAL:</b>	<b>205,404</b>	<b>148,000</b>	<b>0</b>

7. Ship Design, Construction, and Safety

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development of Dynamic Stability and Maneuvering Performance Evaluation Capability for Icebreaker Hulls Lewandowski, E. M. 23 New Jersey Marine Science Consortium SID# 217	0	0	44,775
Shape Interrogation and Representation by Medical-Axis Transform Patrikalakis, Nichol 23 MIT SID# 296	50,000	20,004	0
Oscillating Foils as Efficient Propulsors for Autonomous Underwater Vehicles Triantafyllou, Micha 23 MIT SID# 301	50,000	59,380	0
Continuing Development of an Improved Method for Predicting the Resistance and Seakeeping of Planing Boats Vorus, William S. 23 Michigan Sea Grant College Program SID# 348	54,846	15,553	0
Continuation of Seakeeping and Dynamic Analysis of High-Speed Planing Craft Troesch, Armin W. 23 Michigan Sea Grant College Program SID# 349	52,465	10,217	0
A Nonlinear Probabilistic Approach to Fishing Vessel Capsizing Shaw, Steven W. 23 Michigan Sea Grant College Program SID# 350	42,261	10,238	0
Ship Operational and Safety Aspects of Ballast Water Exchange at Sea Woodward, John B. 23 Michigan Sea Grant College Program SID# 385	0	42,032	59,946
An Intelligent Control System for Underwater Robotic Vehicles Yuh, Junku 23 University of Hawaii Sea Grant College Program SID# 597	30,549	23,668	0

Development of a Mini-ROV Manipulator Chryssostomidis, Chr           28 MIT SID# 261	45,000	11,932	20,000
Geometry Data Representation, Exchange and Inspection Chryssostomidis, Chr           62 MIT SID# 434	0	0	378,100
Development of a Computational Model for Ducted Propellers with Cyclic Pitch Control Kerwin, Justin                   62 MIT SID# 433	0	0	29,850
SUBTOTAL:	325,121	193,024	532,671

8. Water and Waste Treatment - Waste Disposal

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Physical Forcing, Particulate Fluxes, and Primary Productivity in the Area Around White's Point Sewage Outfall Jones, Burton                   45 Univ of Southern California Sea Grant College SID# 670	49,363	59,275	0
The Flux of Trace Metals and Nutrients from the Seafloor in the Area Around the White's Point Sewage Outfall Berelson, William               45 Univ of Southern California Sea Grant College SID# 671	49,577	34,386	0
Temporal Evolution of Particulate Distributions in the Vicinity of an Ocean Outfall as Forced by Physical and Biological Dickey, Tommy                   45 Univ of Southern California Sea Grant College SID# 672	31,365	58,085	0

Viruses in the Ocean Near Los Angeles Fuhrman, Jed 45 Univ of Southern California Sea Grant College SID# 510	31,904	73,749	0
--	--------	--------	---

SUBTOTAL:	162,209	225,495	0
-----------	---------	---------	---

9. Offshore Structure Design and Analysis

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
A Knowledge-Based Approach for Assessing the Integrity of Offshore Platforms Subjected to Seismic Loading Ibbs, William C. 23 California Sea Grant College Program SID# 689	31,825	31,733	0

Development of a Numerical Model for Steep, Directional Seas Webster, William C. 46 California Sea Grant College Program SID# 698	22,824	13,259	0
--	--------	--------	---

SUBTOTAL:	54,649	44,992	0
-----------	--------	--------	---

10. Biofouling and Metal Corrosion

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Anticorrosive Properties of Adhesive Proteins Isolated from the Mussel Mytilus Edulis Dexter, Steven C. 13 University of Delaware SID# 166	18,720	22,609	0

Polypeptide Inhibitors of Corrosion from Marine Organisms Sikes, Steven C. 13 Mississippi-Alabama Sea Grant Consortium SID# 499	33,613	17,091	0
--	--------	--------	---

Bacterial Fouling of Metal Surfaces: Implications for Biocorrosion Kirchman, David L. 24 University of Delaware SID# 58	16,480	28,444	0
--	--------	--------	---

Influence of Marine Bacterial Films on Crevice Corrosion Dexter, Steven C.                    24 University of Delaware SID# 60	15,268	20,790	0
Development of New Antifouling Coating Utilizing Controlled Release Technology Weisman, G. R.                    45 UM/UNH Sea Grant Program SID# 35	49,600	20,139	0

SUBTOTAL:                    133,681                    109,073                    0

11. Materials in the Marine Environment - Other

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Improved Fatigue Life for Moorings Seymour, Richard J.                    24 California Sea Grant College Program SID# 537	24,582	11,997	0
Repair of Damaged Offshore Structural Steel Members Using Grouting Ricles, James M.                    24 California Sea Grant College Program SID# 535	28,646	44,612	0

SUBTOTAL:                    53,228                    56,609                    0

12. Ice Engineering

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Docks and Marinas Advisory Services Wortley, Allen C.                    25 Wisconsin Sea Grant College Program SID# 476	21,007	19,693	0

SUBTOTAL:                    21,007                    19,693                    0

13. Industry Relations - Industry Advisory Service

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The University of Michigan/Sea Grant/Industry Consortium in Offshore Engineering Bernitsas, Michael                    23 Michigan Sea Grant College Program SID# 244	50,885	48,061	0

MIT Sea Grant Marine Industry Collegium Moore, John Jr.                    73 MIT SID# 308	140,380	97,399	0
--	---------	--------	---

New Jersey Sea Grant Marine Advisory Service Wypyszinski, A. W.                77 New Jersey Marine Science Consortium SID# 244	156,700	263,509	0
---	---------	---------	---

SUBTOTAL:	347,965	408,969	0
-----------	---------	---------	---

14. Miscellaneous

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Salinity Powered Distillation of Freshwater from Seawater Using Plastic-Sheet Heat Exchangers Lowrey, Preston D.                28 California Sea Grant College Program SID# 539	24,934	9,531	0

Management of Human Error in Operations of Marine Systems Bea, Robert G.                    28 California Sea Grant College Program SID# 533	30,828	18,760	0
--	--------	--------	---

SUBTOTAL:	55,762	28,291	0
-----------	--------	--------	---

TOTAL:	1,909,596	1,712,837	701,811
--------	-----------	-----------	---------

**MARINE AND COASTAL TRANSPORTATION SYSTEMS**

<b>TITLE/INVES./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Boat Traffic Monitoring Geographic Information System (GIS) for Planning Estuarine Waterways: Florida Case Study Antonini, G. A. 38 Florida Sea Grant College Program SID# 94	27,834	14,012	0
Ports and Waterways Advisory Services Beacham, Christopher 77 Louisiana Sea Grant College Program SID# 1005	25,249	3,074	0
<b>SUBTOTAL:</b>	<b>53,083</b>	<b>17,086</b>	<b>0</b>
<b>GRANT TOTAL:</b>	<b>1,962,679</b>	<b>1,729,923</b>	<b>701,811</b>



# MARINE RESOURCE ECONOMICS

---

## 1. Fisheries Management and Development:

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Economic Analysis of Surf Clam and Ocean Quahog Individual Transferable Quotas Anderson, Lee G. 14 University of Delaware SID# 55	4,680	23,746	0
Economics of Limiting Access to Selected U.S. Pacific Fisheries Huppert, D. D. 14 Washington Sea Grant College Program SID# 167	61,400	34,613	0
Economics for Hard Blue Crab Fishery Management Planning Shabman, Leonard 14 Virginia Graduate Marine Science Consortium SID# 209	15,255	7,761	0
Decision-Making Behavior and Economic Information Needs for Regulating the U.S. Sea Scallop Fishery Kirkley, James E. 14 Virginia Graduate Marine Science Consortium SID# 211	53,903	38,506	0
An Economics Evaluation of Management Alternatives and Market Factors in the West Coast Groundfish Fishery Hanna, Susan S. 14 Oregon Sea Grant College Program SID# 442	17,000	53,600	0
International Management Regimes, the EEZ, and the U.S. Pacific Fisheries Scheiber, Harry N. 16 California Sea Grant College Program SID# 529	9,463	9,151	0



4. Coastal Resources:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
An Economic Analysis of Beach Preservation Parsons, George R. 14 University of Delaware SID# 175	4,992	15,830	0
Benefits of Protection from Damage Caused by Fluctuating Water Levels in the Western Basin: Evidence from the Market in Shoreline Property Randall, Alan 14 Ohio Sea Grant College Program SID# 626	30,122	24,118	0
The Economic Costs of the Zebra Mussel to Ohio's North Coast Economy Hushak, Leroy J. 14 Ohio Sea Grant College Program SID# 382	0	46,195	87,097
Estimating the Use and Nonuse Damages of Debris for Coastal Resources and Noncommercial Marine Species Smith, K. 14 University of North Carolina Sea Grant College Program SID# 413	0	0	65,889
Adaptive Response and Greenhouse-Induced Sea Level Rise Along the Mainland Shore of Long Island Sound Yohe, Gary W. 38 Connecticut Sea Grant College Program SID# 183	27,000	23,000	0
Economic Aspects of Marine Debris McConnell, K. E. 45 Maryland Sea Grant College Program SID# 430	39,026	29,539	31,510
SUBTOTAL:	101,140	138,682	184,496

**5. Marine Minerals:**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Estimating the Value of Marine Mining for Strategic Minerals Supply Broadus, James M. 14 Woods Hole Oceanographic Institution SID# 342	41,068	34,867	0
<b>SUBTOTAL:</b>	<b>41,068</b>	<b>34,867</b>	<b>0</b>

**6. Marine Transportation:**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
A Spatial-Sectoral Economic Impact Model of Seaport Development for Evaluating the Development and Resolution of Intra-Community Conflicts Heikkila, Eric J. 14 Univ of Southern California Sea Grant College SID# 508	43,598	40,997	0
<b>SUBTOTAL:</b>	<b>43,598</b>	<b>40,997</b>	<b>0</b>

**7. Marine Technology:**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Assessing Marine Biotechnology in the United States and Other Countries Zilinskas, Raymond A. 81 Maryland Sea Grant College Program SID# 396	33,872	0	0
<b>SUBTOTAL:</b>	<b>33,872</b>	<b>0</b>	<b>0</b>
<b>TOTAL:</b>	<b>545,752</b>	<b>471,218</b>	<b>184,496</b>

# MARINE RECREATION AND TOURISM

---

## 1. Marine Recreational Fishing:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Measuring the Full Recreation Related Benefits from Improvements in Estuarine Water Quality Smith, K. 14 University of North Carolina Sea Grant College Program SID# 11	25,737	7,533	0
The Role of Lake Erie Fishing and the Zebra Mussel in Ohio's North Coast Tourism Industry Hushak, Leroy J. 14 Ohio Sea Grant College Program SID# 625	8,272	13,847	0
Valuation of Great Lakes Fisheries Bishop, Richard C. 14 Wisconsin Sea Grant College Program SID# 465	44,039	21,551	0
The Economic Value of Fish Contamination Advisories to Individual Great Lakes Sport Anglers Hoehn, John 18 Michigan Sea Grant College Program SID# 262	34,844	18,089	0
SUBTOTAL:	112,892	61,020	0

## 2. Boating:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Boat Traffic Monitoring Geographic Information System (GIS) for Planning Estuarine Waterways: Florida Case Study Antonini, G. A. 38 Florida Sea Grant College Program SID# 94	27,834	14,012	0
SUBTOTAL:	27,834	14,012	0

**3. Coastal Tourism Development:**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Advisory Services in Marine Recreation and Tourism Liffmann, Michael 19 Louisiana Sea Grant College Program SID# 1003	19,280	19,529	0
The Attitudinal Basis of Marine/Coastal Litter: Assessing Louisiana Coastal on Users' Attitudes Toward the Environment Laska, Shirley B. 20 Louisiana Sea Grant College Program SID# 1026	14,616	8,464	0
<b>SUBTOTAL:</b>	<b>33,896</b>	<b>27,993</b>	<b>0</b>
<b>TOTAL:</b>	<b>174,622</b>	<b>103,025</b>	<b>0</b>



# Living Resources

Following is a listing of Sea Grant's Living Resources Division technical staff, their subject area(s), and their phone number.

They can be reached at the following address:

**National Oceanic and Atmospheric Administration  
National Sea Grant College Program  
1335 East-West Highway  
SSMC1, 5th Floor  
Silver Spring, MD 20910**

**Living Resources ..... 301/713-2451**

Seafood Science and Technology - Dr. David H. Attaway

Marine Biotechnology - Dr. David H. Attaway

Fisheries - Dr. Eugene S. Fritz

Aquaculture - Dr. James P. McVey



# FISHERIES

---

## A. Improve the Capability for Predicting Yields, Age-Class Strength and Long-Term Population Status

### 1. Improve Predictive Capability of Single Species and Multispecies Models:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Northern California Red Sea Urchin Fishery Botsford, Louis W. 06 California Sea Grant College Program SID# 518	41,081	32,436	0
Influence of Compensatory Mechanisms in Lake Trout Population Dynamics Taylor, William W. 40 Michigan Sea Grant College Program SID# 353	33,350	14,120	0
Modeling Predator-Prey Linkages in Great Lakes Food Webs Kitchell, James F. 47 Wisconsin Sea Grant College Program SID# 446	52,509	41,145	0
<b>SUBTOTAL:</b>	<b>126,940</b>	<b>87,701</b>	<b>0</b>

### 2. Determine the developmental stage of fish and shellfish at which year class strength is established: (no projects 1991)

0	0	0
---	---	---

### 3. Determine the physical, chemical, and biological factors most important to recruitment:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Nutritional and Ecological Importance of Protozoans in the Diet of First-Feeding Winter Flounder Larvae, <i>Pseudopleuronectes americanus</i> Gallager, Scott M. 02 Woods Hole Oceanographic Institution SID# 260	35,167	25,910	0

<b>Fisheries Oceanography: Status and Synthesis</b> Power, James H.                      06 Louisiana Sea Grant College Program SID# 1013	14,804	10,959	0
<b>Red Drum Ichthyoplankton Dynamics and Recruitment Implications</b> Shaw, Richard F.                      06 Louisiana Sea Grant College Program SID# 1011	14,058	20,145	0
<b>Seasonal Abundance and Transport of Blue Crab Larvae in the Mississippi Bight and At a Tidal Pass</b> Power, James H.                      06 Louisiana Sea Grant College Program SID# 1012	38,239	31,069	0
<b>Vertical Distributions of Larval Lobsters: Offshore vs. Inshore Patterns</b> Incze, Lewis S.                      06 UM/UNH Sea Grant Program SID# 28	36,816	1,242	0
<b>Recruitment and use of Great Bay Estuary by the Larval and Juvenile Stages of Coastal Fishes</b> Sale, Peter F.                      06 UM/UNH Sea Grant Program SID# 30	38,399	12,373	0
<b>The Effect of Prey Limitation on Growth and Survival of Early Juvenile Summer Flounder (<i>Paralichthys dentatus</i>): Interaction with Temperature and Latitude</b> Targett, Timothy E.                      06 University of Delaware SID# 173	7,020	39,759	0
<b>Salmonid Fisheries Oceanography of the Northeast Pacific Ocean</b> Francis, R. C.                      06 Washington Sea Grant College Program SID# 162	82,200	54,148	0
<b>Spring- and Summer-Spawned Bluefish: A Comparison of Processes Leading to Variations in Survival and Recruitment</b> Cowen, Robert K.                      06 New York Sea Grant Institute SID# 199	83,816	37,153	0

An Analysis of Factors Affecting Recruitment of Larval and Juvenile Atlantic Croaker Jones, Cynthia 06 Virginia Graduate Marine Science Consortium SID# 31	36,107	18,044	0
Recruitment Dynamics of the Blue Crab: Patterns, Processes and Fisheries Applications Van Montfrans, Jacqu 06 Virginia Graduate Marine Science Consortium SID# 205	92,177	89,425	0
Recruitment Dynamics of Juvenile Dover Sole on an Outer Continental Shelf Nursery Ground Markle, Douglas F. 06 Oregon Sea Grant College Program SID# 438	88,500	50,200	0
Juvenile and Adult Fishes as Predators on Red Drum Larvae in Texas Bays Fuiman, Lee 06 Texas A&M University Sea Grant College Program SID# 542	44,169	28,065	0
Influence of Temperature on Survival During the Critical Period of Larval Development in Winter Flounder Durbin, Ann 06 Rhode Island Sea Grant College Program SID# 686	57,000	55,826	0
Sensory Development and Feeding Behavior in the Larval Alewife and Rainbow Smelt Jones, Warren R. 06 Illinois-Indiana Sea Grant SID# 658	11,270	9,983	0
The Gulf Stream Front, Its Role in Larval Fish Survival and Recruitment in Florida Kleppel, G. S. 07 Florida Sea Grant College Program SID# 646	101,933	33,795	0

Size-Dependent Recruitment Mechanisms for Larval and Juvenile Fishes: Integrated Modeling and Experimental Approach Rice, J. 07 University of North Carolina Sea Grant College Program SID# 17	19,078	3,600	0
Cooperative Fisheries and Oceanographic Studies (CFOS) Cooney, Robert T. 07 Alaska Sea Grant College Program SID# 178	69,964	45,644	0
Alaska Sea Grant College Program Collie, Jeremy 07 Alaska Sea Grant College Program SID# 180	94,829	32,089	0
Blue Crab Megalopae Recruitment: Role of Fronts and Mesoscale Physics on Aggregation and Transport into the Estuary McConaugha, John R. 07 Virginia Graduate Marine Science Consortium SID# 207	87,423	44,688	0
Enhancement of Soft-Shell Clam Recruitment in Flow-Generated Larval "Sinks" Mullineaux, Lauren 07 Woods Hole Oceanographic Institution SID# 335	30,032	2,416	0
Salmonid Fishery Oceanography of the Northeast Pacific Ocean Percy, William G. 07 Oregon Sea Grant College Program SID# 440	28,400	17,000	0
The Importance of Transport Processes in Recruitment of Rockfishes (Genus Sebastes) to Nearshore Areas of Monterey Bay, California Loeb, Valerie J. 07 California Sea Grant College Program SID# 687	32,842	82,637	0

Variation in Coastal Pelagic Fish Populations Over the Past Millenium as a Response to Global Climate Change and Biological Interaction Baumgartner, Tim R. 07 California Sea Grant College Program SID# 688	35,099	38,686	0
Enhancement of Coastal Productivity Associated with Processes in the Atchafalaya Bay Ecosystem: VIII. Ichthyoplankton Abundance Along a Recruitment Corridor and the Role of an Estuarine Frontal Zone as an Ephemeral Nursery Zone Shaw, Richard F. 39 Louisiana Sea Grant College Program SID# 1022	47,411	29,371	0
Integrating Factors Controlling Recruitment Dynamics in Fishes: A Synthesis Based on Larval Size Binkowski, Fred P. 40 Wisconsin Sea Grant College Program SID# 445	65,804	34,122	0
Year Class Strength of Rainbows Smelt and Lake Whitefish as Influenced by Interspecific Internations and Climate Taylor, William W. 40 Michigan Sea Grant College Program SID# 270	56,520	34,977	0
Alewife Survival Rates and Recruitment Under Low Population Levels in Lake Michigan Jude, David 40 Michigan Sea Grant College Program SID# 604	38,250	7,950	0
Mathematic Model of Larval Transport and Recruitment Epifanio, Charles E. 46 University of Delaware SID# 71	17,836	59,446	0
SUBTOTAL:	1,290,651	859,178	0

**4. Develop Cost Effective Techniques for Assessing Stock Size and Distribution:**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Interactive Acoustic Data Display and Statistical Analysis Swartzman, G. L. 06 Washington Sea Grant College Program SID# 267	0	0	40,000
Acoustic Sensing of Pelagic Fish Stocks Jaffe, Jules S. 28 California Sea Grant College Program SID# 691	65,624	6,961	0
<b>SUBTOTAL:</b>	<b>65,624</b>	<b>6,961</b>	<b>40,000</b>

**5. Develop Means for Adapting Multi Species Socio-economic Models to Short Term Operational Models:  
(no projects 1991)**

<b>TOTAL:</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<b>1,597,727</b>	<b>1,045,385</b>	<b>40,000</b>

**B. Determine the Relationships of Habitat to Fisheries Production and the Means of Managing Habitats for Multiple Users**

**1. To Determine the Environmental Characteristics of Primary and Secondary Nursery Areas and Explain Why Some Areas are More Productive Than Other Similar Areas:**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Investigate Eelgrass-blue Mussel Interactions for their Application to the Aquaculture Industry Short, F. T. 03 UM/UNH Sea Grant Program SID# 487	70,630	44,596	0
<b>SUBTOTAL:</b>	<b>70,630</b>	<b>44,596</b>	<b>0</b>

**2. The Environmental Factors That Affect Fisheries and Quantify Their Relationships to Fisheries Productivity in Major Habitats Inshore and Offshore.**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development Rate & Instream Survivals of Early & Late Run Pink Salmon Gharrett, A. J. 02 Alaska Sea Grant College Program SID# 172	44,546	10,908	0

In Situ Studies on the American Lobster: Its Ecology and Susceptibility to Dragging Steneck, Robert S. 06 UM/UNH Sea Grant Program SID# 386	77,037	35,058	0
Application of Experimental Ecology to Development of a New Mya Fishery Peterson, C. 06 University of North Carolina Sea Grant College Program SID# 19	28,205	7,195	0
Abundance and Comparative Trophic Ecology of Schooling Pelagic Fishes in the Chesapeake Bay House, Edward D. 06 Maryland Sea Grant College Program SID# 41	74,601	34,528	0
Evaluating the Ecological Effects of Commonly Used Hard Clam ( <i>Mercenaria mercenaria</i> ) Harvesting methods Fegley, Stephen R. 06 New Jersey Marine Science Consortium SID# 235	41,279	27,290	0
Spawning Temperature and Location of the Atlantic Menhaden: Inference from Strontium-calcium Thermometry and Satellite Imagery Checkley, D. M. 07 University of North Carolina Sea Grant College Program SID# 18	43,234	12,638	0
Habitat Specific Patterns of Distribution, Movement, and Growth in Estuarine Dependent Fishes: Determinants of Habitat Quality Able, Ken 07 New Jersey Marine Science Consortium SID# 317	61,182	25,148	0
Spawning Grounds and Life History of the Commercially Valuable Squid, <i>Ommastrephes bartramii</i> , within the Hawaiian EEZ Young, Richard E. 07 University of Hawaii Sea Grant College Program SID# 587	33,120	160,774	0

Identification of Actively used Near-shore Lake Trout Spawning Sites in Southwestern Lake Michigan Marsden, Ellen J. 08 Illinois-Indiana Sea Grant SID# 659	29,920	36,648	0
The Influence of Inundation Regime on the Use of Gulf Coast Marshes by Fishes and Macrocrustaceans Rozas, L. P. 39 Louisiana Sea Grant College Program SID# 377	0	4,472	29,170
Biomass and Production Dynamics of Pelagic Planktivores: A Comparative Analysis of Lakes Ontario and Michigan Stewart, Donald J. 40 New York Sea Grant Institute SID# 524	57,896	42,545	0
Effects of Estuarine Habitat Modifications on Anadromous Salmonids Simenstad, C. A. 40 Washington Sea Grant College Program SID# 674	0	0	49,750
The Impacts of Hypoxia on Benthic Populations and Fisheries Resources Rabalais, Nancy N. 45 Louisiana Sea Grant College Program SID# 338	0	5,204	25,097
Estuarine Slough Function and Restoration for Juvenile Salmon Residence and Foraging Simenstad, C. A. 48 Washington Sea Grant College Program SID# 282	0	0	59,769
SUBTOTAL:	491,020	402,408	163,786



**3. To Develop Models For Predicting the Consequences of Change In Environmental Parameters On Fisheries Production:**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Influence of Eelgrass Cover on Growth and Survival of Post-Settlement Bay Scallops, with a View Towards Optimizing Scallop Transplants Bricelj, Monica V. 06 New York Sea Grant Institute SID# 517	49,045	34,710	0
Effects of Low Dissolved Oxygen Levels In the Chesapeake Bay on Behavior, Growth and Survival of Fish Larvae Breitburg, Denise 07 Maryland Sea Grant College Program SID# 51	41,388	27,881	0
SUBTOTAL:	90,433	62,591	0
TOTAL:	652,083	509,595	163,786

**C. Restoring and/or Enhancing Heavily Exploited Stocks**

**1. Develop Means For Evaluating Management Options In Enhancing Fisheries and the Consequences of Various Associated Strategies:**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development of a Heritable Genetic "Tag" for Estimating Survivorship of Released Hatchery Fishers over Several Generations Wilson, R. R. 07 Florida Sea Grant College Program SID# 85	37,880	18,940	0
Economic Analysis of Surf Clam and Ocean Quahog Individual Transferable Quotas Anderson, Lee G. 14 University of Delaware SID# 55	4,680	23,746	0

Economics of Limiting Access to Selected U.S. Pacific Fisheries Huppert, D. D. 14 Washington Sea Grant College Program SID# 167	61,400	34,613	0
--	--------	--------	---

Decision-Making Behavior and Economic Information Needs for Regulating the U.S. Sea Scallop Fishery Kirkley, James E. 14 Virginia Graduate Marine Science Consortium SID# 211	53,903	38,506	0
--	--------	--------	---

International Management Regimes, the EEZ, and the U.S. Pacific Fisheries Scheiber, Harry N. 16 California Sea Grant College Program SID# 529	9,463	9,151	0
--	-------	-------	---

Dynamic Fishery Stock Recuperation under Variable Annual Quota Allocations: The Florida Mackerels Ehrhardt, N. M. 48 Florida Sea Grant College Program SID# 96	48,064	28,838	0
--	--------	--------	---

<b>SUBTOTAL:</b>	<b>215,390</b>	<b>153,794</b>	<b>0</b>
------------------	----------------	----------------	----------

**2. Integrating Biological, Environmental, Social, and Economic Knowledge Into Management Plans For Enhancement or Rehabilitation Of Fisheries:**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Management of Mixed Stock Fisheries: A Turning Point Pikitch, Ellen K. 06 Washington Sea Grant College Program SID# 161	97,600	49,737	100,000
"Social Impacts of ITQs in the Sea Clam Fisheries" McCay, B. J. 20 New Jersey Marine Science Consortium SID# 323	27,324	15,985	0
<b>SUBTOTAL:</b>	<b>124,924</b>	<b>65,722</b>	<b>100,000</b>

3. Develop, Through Hybridization and Genetic Engineering, Better Strains Of Fish and Shellfish:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development of Expression Vectors for Gene Transfer into Fish Hackett, Perry B. 02 Minnesota Sea Grant College Program SID# 105	25,230	14,230	0
Economic Improvement of Fish Through Gene Transfer Guise, Kevin S. 02 Minnesota Sea Grant College Program SID# 127	26,550	10,750	0
Artificial Selection for Run Timing in Salmon Culture Smoker, W. W. 02 Alaska Sea Grant College Program SID# 80	28,577	11,664	0
Genetic Engineering of Finfish and Shellfish by Gene Transfer Technology Chen, Thomas T. 02 Maryland Sea Grant College Program SID# 45	66,970	34,568	0
Development of Transcriptional Promoters for Gene Transfer into Fish Hackett, Perry B. 02 Minnesota Sea Grant College Program SID# 126	2,102	1,185	0
Rejuvenation of the Chesapeake Bay Oyster Industry: Development of Disease-Resistant Crassostrea virginica and Assessment of Disease Resistance in Crassostrea gigas Burreson, Eugene 03 Virginia Graduate Marine Science Consortium SID# 203	62,792	31,833	0
Application of Molecular Biology in Aquaculture and Management of Salmonids Gharrett, A. J. 06 Alaska Sea Grant College Program SID# 81	79,230	6,284	0
<b>SUBTOTAL:</b>	<b>291,451</b>	<b>110,514</b>	<b>0</b>

**4. Evaluate the Effectiveness Of Fish Attraction Devices and Artificial Reefs On Local Fish Populations and Fishermen:**

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Limits to Recruitment of Spiny Lobster in Florida: Assessment of Artificial Enhancement Techniques Butler, M. J. 07 Florida Sea Grant College Program SID# 738	62,372	35,235	0
<b>SUBTOTAL:</b>	<b>62,372</b>	<b>35,235</b>	<b>0</b>
<b>TOTAL:</b>	<b>694,137</b>	<b>365,265</b>	<b>100,000</b>

**D. Increase Commercial Uses Of Underutilized Fish and shellfish.**

1. Identify and Evaluate Species With the Greatest Potential For Development:  
(no projects 1991)

0                      0                      0

**E. Developing Efficient and Selective Methods To Harvest Fish and Shellfish**

1. Improve the Selectivity Of Harvesting Gear:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Fish Behavior in the Vicinity of Bottom Trawls in the New England Fisheries DeAlteris, Joseph 06 Rhode Island Sea Grant College Program SID# 606	74,603	62,394	0
Models for Fish Harvest Technology and the Choice of Fishing Location Sampson, David B. 30 Oregon Sea Grant College Program SID# 461	48,300	42,700	0
<b>SUBTOTAL:</b>	<b>122,903</b>	<b>105,094</b>	<b>0</b>

2. Develop Harvesting Gear With Reduced Friction Drag:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Center for Fisheries Engineering Goudey, Clifford A. 73 MIT SID# 309	77,700	80,000	0
SUBTOTAL:	77,700	80,000	0
TOTAL:	200,603	185,094	0

F. Investigating Promising Areas Of Research Or Acquisition Of Needed Information

1. Hormonal Controls:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Physiology of Gonadotropins and Prolactin in Atlantic Croaker, Red Drum and Spotted Seatrout Thomas, Peter 02 Texas A&M University Sea Grant College Program SID# 705	50,098	26,085	0
Hormone Stimulation of Sturgeon Female Reproduction Maturation Moberg, Gary P. 02 California Sea Grant College Program SID# 682	33,987	62,606	0
Field and Laboratory Evaluation of Endocrine Indices of Reproductive Dysfunction in Atlantic Croaker Thomas, Peter 12 Texas A&M University Sea Grant College Program SID# 489	0	12,148	68,993
SUBTOTAL:	84,085	100,839	68,993

2. Physiology:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Purification and Characterization of a Lipoprotein Found in Eggs of the Hard Clam, <i>Mercenaria mercenaria</i> : Lipid and Lipoprotein Concentrations in the Eggs from Wild and Genetic Lines of Clams Lee, Richard 03 Georgia Sea Grant College Program SID# 569	42,594	31,431	0
Salinity and Metabolic Adaptations of Taxa of the Genus <i>Menippe</i> in the Gulf of Mexico/Juvenile Studies Henry, Raymond P. 06 Mississippi-Alabama Sea Grant Consortium SID# 497	60,000	69,742	0
The Capacity for Growth Among Latitudinal Populations of Fishes: Testing the Contergradient Hypothesis in Striped Bass Conover, David O. 07 New York Sea Grant Institute SID# 519	63,129	36,725	0
Evaluation of Biochemical Indicators of Growth in Crustaceans Wang, Shiao Y. 13 Mississippi-Alabama Sea Grant Consortium SID# 119	0	0	0
<b>SUBTOTAL:</b>	<b>165,723</b>	<b>137,898</b>	<b>0</b>

3. Life History:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Reproductive Biology and Growth in Bering Sea Snow Crab Armstrong, David E. 06 Washington Sea Grant College Program SID# 389	0	0	90,000

Temporal Aspects of Recruitment and Spawning of the Gag Grouper in the Gulf of Mexico Travis, J. 07 Florida Sea Grant College Program SID# 84	49,517	24,800	0
--	--------	--------	---

SUBTOTAL:	49,517	24,800	90,000
-----------	--------	--------	--------

4. Species Interactions:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Trophic Relations of the Exotic Ruffe (Gymnocephalus cernuus) in the St. Louis River Estuary Newman, Raymond M. 06 Minnesota Sea Grant College Program SID# 128	19,41	9,000	0
Plankton Size Spectrum Shifts and Food Web "Bottlenecks" Accompanying the Invasion of Lake Michigan by the Predatory Cladoceran, Bythotrephes Sandren, Craig D. 40 Wisconsin Sea Grant College Program SID# 447	54,100	26,359	0
Causes and Consequences of Cladoceran Dynamics in Lake Michigan: Implications for Recruitment Success of Forage Fish Species Lehman, John T. 40 Michigan Sea Grant College Program SID# 602	48,823	32,169	0
Determining the Olfactory Sensitivity of Sea lamprey: An essential First Step Sorensen, Peter W. 06 Minnesota Sea Grant College Program SID# 669	19,717	6,549	0
SUBTOTAL:	142,050	74,077	0

**5. Stock Separation:**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
DNA Fingerprints as Genetic Markers in Salmon Thorgaard, Gary H. 02 Washington Sea Grant College Program SID# 158	39,800	8,751	0
Genetic Tagging of Pacific Mahimahi: an Example of Non-Destructive Biotechnology Cann, Rebecca L. 02 University of Hawaii Sea Grant College Program SID# 223	10,282	14,420	0
Integrity of the Georges Bank Stock of Atlantic Herring Kornfield, Irv 06 UM/UNH Sea Grant Program SID# 29	27,565	20,001	0
Identification of Cobia <i>Rachycentron Canadum</i> Breeding Populations in the Gulf of Mexico Using Mitochondrial DNA Sequence Analysis Biesiot, Patricia M. 06 Mississippi-Alabama Sea Grant Consortium SID# 117	0	0	0
Statistical Algorithms for Stock Identification of Marine Resource Organisms Prager, Michael 06 Virginia Graduate Marine Science Consortium SID# 32	35,195	21,117	0
Genetic Analysis of Adult and Larval Blue Crabs in Chesapeake Bay Chapman, Robert W. 06 Maryland Sea Grant College Program SID# 42	42,473	6,415	0



Population Genetic Studies of Red Snapper in the Northern Gulf of Mexico Gold, John R. 06 Texas A&M University Sea Grant College Program SID# 538	24,310	71,367	0
--	--------	--------	---

SUBTOTAL:	179,625	142,071	0
-----------	---------	---------	---

6. Information For Managing Exploited Stocks:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Biology of Estuarine Lobsters Watson, W. H. 06 UM/UNH Sea Grant Program SID# 12	34,000	12,404	0
Salmon Management Using Coded Wire Tag Data Hillborn, Ray 06 Washington Sea Grant College Program SID# 160	54,100	42,054	0
Population Dynamics and Stock Identification of Rainbow Smelt (OSmerus Mordax) in Green Bay and Adjacent Waters of Lake Michigan Copes, Frederick A. 06 Wisconsin Sea Grant College Program SID# 451	29,011	17,567	0
Biology and Management of Rockfish Stocks Gunderson, D. R. 06 Washington Sea Grant College Program SID# 390	0	0	29,153
Fluorescent Age Pigment Quantification as a Novel Method for Age Determination for Commercially Important Crustacean Species Womersley, Christoph 06 University of Hawaii Sea Grant College Program SID# 588	20,000	20,480	0
Age Determination of the Long-finned Squid Using Statoliths Mac, William 06 Rhode Island Sea Grant College Program SID# 605	71,397	34,641	0
SUBTOTAL:	208,508	127,146	29,153

7. Parasitology and Disease Control:

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Genetics of Resistance to Bacterial Kidney Disease in Chinook Salmon Hershberger, W. K. 02 Washington Sea Grant College Program SID# 143	34,400	10,366	0
Abalone Wasting Disease: Role of Coccidian Parasites and Environmental Factors Kuris, Armand M. 03 California Sea Grant College Program SID# 516	60,451	44,609	0
Pathogenesis and Diagnosis of Selected Striped Bass Diseases of Microbial Etiology Hetrick, Frank M. 08 Maryland Sea Grant College Program SID# 44	48,529	44,012	0
Fluoroquinolone Treatment of Bacterial Diseases of Salmonids Bowser, Paul R. 08 New York Sea Grant Institute SID# 97	67,725	55,030	0
Cell Proliferation: A Potential Marker for the Biological Effect of Chronic Exposure to Epigenetic Carcinogens in Coastal Benthic Finfish and Shellfish Stegeman, John J. 45 Woods Hole Oceanographic Institution SID# 488	0	57,746	71,401
Relationship of Pollutants to the Onset of Disease in the Eastern Oyster, Crassostrea Virginica Chu, Fu-Lin E. 45 Virginia Graduate Marine Science Consortium SID# 704	0	0	79,754
<b>SUBTOTAL:</b>	<b>211,105</b>	<b>211,763</b>	<b>151,155</b>

8. Toxicity:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Assessment of Low-Level Gas Supersaturation as Stressors in Lake Trout and Rainbow Trout Malison, Jeffrey A. 02 Wisconsin Sea Grant College Program SID# 460	98,516	43,981	0
Norwalk and HAV Virus in Shellfish Estes, Mary K. 06 Texas A&M University Sea Grant College Program SID# 644	64,053	20,144	0
The Transfer of Toxic Metals from Contaminated Sediment to the Blue Crab: An Integrated Field and Laboratory Study Levinton, Jeffrey S. 44 New York Sea Grant Institute SID# 104	62,489	46,335	0
Disposition and Metabolism of Polychlorinated Dibenzofurans in fish Sikka, Harish C. 45 New York Sea Grant Institute SID# 106	53,475	28,952	0
Toxic Halogenated Aromatic Hydrocarbons in Lake Trout Gametes as a Factor in Fry Survival Peterson, Richard E. 45 Wisconsin Sea Grant College Program SID# 455	53,747	49,261	0
Ecological Risk Assessment of Complex Mixtures of Polybrominated Aromatic Hydrocarbons in Feral Fish Eggs Andren, Anders W. 45 Wisconsin Sea Grant College Program SID# 423	0	35,060	69,972
Effects of Trace Metals and Organic Pollutants on Stress-Induced Proteins in Oyster Larvae and Spat: A Molecular Approach Chen, Thomas T. 45 Maryland Sea Grant College Program SID# 504	0	0	40,000
<b>SUBTOTAL:</b>	<b>332,280</b>	<b>223,733</b>	<b>109,972</b>

**9. Training:**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Marine Safety Training: Development of Port-based Training for Commercial Fishermen Killion, Patrick J.                      66 Oregon Sea Grant College Program SID# 481	83,700	23,900	0
<b>SUBTOTAL:</b>	<b>83,700</b>	<b>23,900</b>	<b>0</b>

**10. Threatened and Endangered Species**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
Behavior and Vocalizations of Transient Killer Whales Fay, Francis H.                      07 Alaska Sea Grant College Program SID# 174	32,283	7,979	0
Population Implications of Various Management Approaches to Threatened and Endangered Sea Turtles Crowder, L. B.                      47 University of North Carolina Sea Grant College Program SID# 414	0	0	64,601
Behavioral Modification of the Male Hawaiian Monk Seal Grau, Gordon E.                      07 University of Hawaii Sea Grant College Program SID# 585	15,000	12,204	0
<b>SUBTOTAL:</b>	<b>47,283</b>	<b>20,183</b>	<b>64,601</b>
<b>TOTAL:</b>	<b>1,503,876</b>	<b>1,086,410</b>	<b>513,874</b>

**COASTAL OCEAN PROGRAM: Coastal Fisheries Ecosystems**

**Bering Sea FOCI**

<b>TITLE/INVEST./INST.</b>	<b>FEDERAL FUNDS</b>	<b>MATCHING FUNDS</b>	<b>PASS THROUGH</b>
The Use of Molecular Techniques to Dissect the Genetic Architecture of Pollock Populations: Analysis of Mitochondrial and Nuclear Genes by the Polymerase Chain Reaction Powers, Dennis A. 02 California Sea Grant College Program SID# 654	0	0	87,503
Modelling the Upper Ocean Production Dynamics of Plankton and Larval Pollock in the Bering Sea Bollens, Stephen M. 06 Woods Hole Oceanographic Institution SID# 663	0	0	63,230
Zooplankton Abundance and Effects of Prey Variation on Walleye Pollock Larvae in the Bering Sea Paul, A. J. 07 Alaska Sea Grant College Program SID# 679	0	0	47,472
Otolith Technique for Tracing Geographic Life History of Pollock Norcross, Brenda 07 Alaska Sea Grant College Program SID# 681	0	0	9,948
A Retrospective Analysis of GEOSAT Altimeter Data in the Bering Sea Leben, Robert R. 28 University of Colorado SID# 405	0	0	62,401
<b>SUBTOTAL:</b>	<b>0</b>	<b>0</b>	<b>270,554</b>
<b>TOTAL:</b>	<b>0</b>	<b>0</b>	<b>270,554</b>

South Atlantic Bight Recruitment Experiment

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
South Atlantic Bight Recruitment Experiment: Physical Oceanography and Modeling Atkinson, Larry P. 07 Virginia Graduate Marine Science Consortium SID# 398	0	0	50,000
Remote Sensing of Pelagic Fish Eggs Checkley, D. M. 07 North Carolina Sea Grant College Program SID# 616	0	0	55,000
Estimating Year Class Strength at Inlets to Pamlico Sound Miller, J. M. 07 North Carolina Sea Grant College Program SID# 617	0	0	95,000
Age and Elemental Analysis of Atlantic Menhaden Otoliths: Validation and Field Application Rice, J. A. 07 North Carolina Sea Grant College Program SID# 622	0	0	105,000
Individual-Based Population Modeling of Atlantic Menhaden Crowder, L. B. 07 North Carolina Sea Grant College Program SID# 628	0	0	55,000
CZCS-Chlorophyll and AVHRR-Sea Surface Temperature Variability and Co-Variability in the SABRE Study Area Yoder, James A. 07 Rhode Island Sea Grant College Program SID# 675	0	0	54,996
SABRE: Physical Oceanography and Modelling Blanton, Jackson O. 46 Georgia Sea Grant College Program SID# 357	0	36,897	50,000
SUBTOTAL:	0	36,897	464,996
TOTAL:	0	36,897	464,996
GRANT TOTAL:	4,648,426	3,228,645	1,553,210

# AQUACULTURE

---

## 1. Aquaculture Systems and Engineering

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Optimization of High Density Recirculating Aquaculture Production Units: Phase I: State-of-the-Art Design Malone, Ronald F. 02 Louisiana Sea Grant College Program SID# 224	15,000	6,433	0
Assessment of Low-Level Gas Supersaturation as Stressors in Lake Trout and Rainbow Trout Malison, Jeffrey A. 02 Wisconsin Sea Grant College Program SID# 460	98,516	43,981	0
Thermal Refuge to Protect Overwintering Red Drum from Cold-kill in Aquaculture Ponds Neill, William H. 02 Texas A&M University Sea Grant College Program SID# 536	25,977	24,693	0
Development of Technology for the Nursery and Field Cultivation of the Angel Wing Clam, <i>Cyrtopleura costata</i> Vaughan, D. E. 03 Florida Sea Grant College Program SID# 82	39,341	19,633	0
Development of a Greenhouse Bivalve Hatchery System Heffernan, Peter B. 03 Georgia Sea Grant College Program SID# 568	74,910	22,883	0
Controlled Culture of a New Marine Model, the Sea Anemone <i>Nematostella vectensis</i> Hand, Cadet 04 California Sea Grant College Program SID# 515	4,735	12,500	0

Polyculture of Macroalgae and Invertebrates in Pump-ashore Salmon Mariculture Systems McNeil, William J. 05 Oregon Sea Grant College Program SID# 427	41,900	40,900	0
Bioreactor Studies of Marine Plant Cells in Liquid Culture for Production of Valued Natural Products Rorrer, Gregory L. 05 Oregon Sea Grant College Program SID# 429	42,400	20,400	0
Evaluating the Ecological Effects of Commonly Used Hard Clam ( <i>Mercenaria mercenaria</i> ) Harvesting Methods Fegley, Stephen R. 06 New Jersey Marine Science Consortium SID# 235	41,279	27,290	0
Development of a Heritable Genetic "Tag" for Estimating Survivorship of Released Hatchery Fishers over Several Generations Wilson, R. R. 07 Florida Sea Grant College Program SID# 85	37,880	18,940	0
Enhancement of Soft-Shell Clam Recruitment in Flow-Generated Larval "Sinks" Mullineaux, Lauren 07 Woods Hole Oceanographic Institution SID# 335	30,032	2,416	0
Industrial Microbiology of Blue-Green Algae (Cyanobacteria) Patterson, Gregory M. 13 University of Hawaii Sea Grant College Program SID# 596	29,265	57,254	0
Attaining Suitable Water Supplies for Salmon Hatcheries Johnson, Ronald A. 26 Alaska Sea Grant College Program SID# 189	54,660	0	0
Development and Characterization of a High Rate Biofilter for Recirculating Aquaculture Systems Piedrahita, Raul H. 26 California Sea Grant College Program SID# 690	14,714	10,178	0



Microcomputer-Based Automation and Expert System Development of Aquaculture Lee, Phillip G. 28 Texas A&M University Sea Grant College Program SID# 550	59,293	55,642	0
Evaluation of Lactic Acid Treatment, Cryogenic Freezing and Depuration of Salmonella in Oysters of the Suwannee Region Rodrick, G. E. 35 Florida Sea Grant College Program SID# 89	24,012	12,006	0
Rapid Investigation of Imported and Domestic Shrimp Davis, Scott K. 35 Texas A&M University Sea Grant College Program SID# 551	27,362	16,955	0
Technology Transfer Services for the Molluscan Shellfish Industry Supan, John Louisiana Sea Grant College Program SID# PD1	29,985	33,815	0
Optimization of High Density Recirculating Aquaculture Production Units: Phase I: State-of-the-Art Design Malone, R. F. Louisiana Sea Grant College Program SID# PD2	12,633	1,538	0
SUBTOTAL:	703,894	427,457	0

## 2. Genetics and Selective Breeding

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development of Technologies for Long-Term Storage and Genetic Manipulation of Penaeoidean Eggs Wallis, Clark H. 01 California Sea Grant College Program SID# 512	91,210	58,417	0

University of Minnesota Kapusinski, Anne R.                   02 Minnesota Sea Grant College Program SID# 125	26,540	14,300	0
Development of Expression Vectors for Gene Transfer into Fish Hackett, Perry B.                   02 Minnesota Sea Grant College Program SID# 105	25,230	14,230	0
Economic Improvement of Fish Through Gene Transfer Guise, Kevin S.                   02 Minnesota Sea Grant College Program SID# 127	26,550	10,750	0
Aquaculture Potential of Sterile Tripliod Trout X Salmon Hybrids Thorgaard, Gary H.                   02 Washington Sea Grant College Program SID# 147	34,600	16,051	0
DNA Fingerprints as Genetic Markers in Salmon Thorgaard, Gary H.                   02 Washington Sea Grant College Program SID# 158	39,800	8,751	0
Artificial Selection for Run Timing in Salmon Culture Smoker, W. W.                   02 Alaska Sea Grant College Program SID# 80	28,577	11,664	0
Development Rate & Instream Survivals of Early & Late Run Pink Salmon Gharrett, A. J.                   02 Alaska Sea Grant College Program SID# 172	44,546	10,908	0
Genetic Engineering of Finfish and Shellfish by Gene Transfer Technology Chen, Thomas T.                   02 Maryland Sea Grant College Program SID# 45	66,970	34,568	0
Control of Growth, Sex and Reproduction in Great Lakes Cool-Water Fishes by Genetic and Endocrine Manipulation Malison, Jeffrey A.                   02 Wisconsin Sea Grant College Program SID# 272	59,013	56,387	0

Production of Sterile and Unisexual Populations of Salmonids for Aquaculture Schreck, Carl B. 02 Oregon Sea Grant College Program SID# 318	29,600	10,900	0
Genetic Tagging of Pacific Mahimahi: an Example of Non-Destructive Biotechnology Cann, Rebecca L. 02 University of Hawaii Sea Grant College Program SID# 223	10,282	14,420	0
Development of Transcriptional Promoters for Gene Transfer into Fish Hackett, Perry B. 02 Minnesota Sea Grant College Program SID# 126	2,102	1,185	0
Population Dynamics of Hatchery-Reared Juveniles of the Soft-Shell Clam ( <i>Mya            arenaria</i> L.) in Maine: A Series of Manipulative Experiments Beal, Brian F. 03 UM/UNH Sea Grant Program SID# 388	37,062	11,815	0
Applied Breeding of the Hard Clam, <i>Mercenaria</i> Burrell, V. G. Jr. 03 South Carolina Sea Grant Consortium SID# 251	41,084	32,706	0
Genetics of the Hard Clam <i>Mercenaria            Mercenaria</i> Hilbish, Thomas J. 03 South Carolina Sea Grant Consortium SID# 268	35,000	35,942	0
Purification and Characterization of a Lipoprotein Found in Eggs of the Hard Clam, <i>Mercenaria mercenaria</i> : Lipid and Lipoprotein Concentrations in the Eggs from Wild and Genetic Lines of Clams Lee, Richard 03 Georgia Sea Grant College Program SID# 569	42,594	31,431	0

Aquaculture Applications of Biochemical Genetics to the Economic Kelps, Laminaria Saccharina and Laminaria Longicuris Mathieson, Arthur C. 05 UM/UNH Sea Grant Program SID# 5	28,000	6,101	0
Vectors of Genetic Engineering in Marine Algae: The Ti Plasmid Hall, L. M. 05 Mississippi-Alabama Sea Grant Consortium SID# 2	63,000	47,120	0
Transcriptional Gene Regulation in Marine Algae Cattolico, Rose Ann 05 Washington Sea Grant College Program SID# 159	96,800	56,210	0
Application of Molecular Biology in Aquaculture and Management of Salmonids Gharrett, A. J. 06 Alaska Sea Grant College Program SID# 81	79,230	6,284	0
Genetic Engineering of Secondary Metabolite Biosynthetic Pathways in Cyanobacteria Bylina, Edward J. 12 University of Hawaii Sea Grant College Program SID# 595	34,471	23,976	0
Development of Genetic Engineering Techniques with Economically Important Marine Algae Minocha, Subhas C. 13 UM/UNH Sea Grant Program SID# 395	55,000	17,008	0
Micropropagation and Aquaculture of Zostera Marina and Spartina Alterniflora Bird, K. 40 University of North Carolina Sea Grant College Program SID# 332	0	0	40,000

Development of Technologies for Long-Term Storage and Genetic Manipulation of Penaeoidean Eggs Crowe, John California Sea Grant College Program SID# PD3	10,000	0	0
---	--------	---	---

SUBTOTAL:	1,007,261	531,124	40,000
-----------	-----------	---------	--------

3. Physiology and Endocrinology

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Regulation of Yolk Production in a Marine Shrimp, <i>Penaeus vannamei</i> Quackenbush, L. S. 01 Florida Sea Grant College Program SID# 83	48,394	24,197	0
Endocrine Control of Crustacean Reproduction With Some Emphasis on Shrimp Resources Laufer, H. 01 Connecticut Sea Grant College Program SID# 179	62,400	41,800	0
Neuroendocrine Control of Reproduction in Penaeid Shrimp Keeley, L. L. 01 Texas A&M University Sea Grant College Program SID# 702	62,920	39,843	0
Endocrine Regulation of Crustacean Growth Borst, David W. 01 Illinois-Indiana Sea Grant SID# 657	34,172	39,559	0
Hormonal Regulation of Crustacean Growth and Reproduction Chang, Ernest S. 01 California Sea Grant College Program SID# 511	54,172	50,342	0
Aquaculture of Temperate Basses: Hormonal Control of Reproduction and Broodstock Development Sullivan, C. 02 University of North Carolina Sea Grant College Program SID# 23	54,755	0	0

Development of a Technology for the Manipulation of Fish Reproduction Cycles: Controlled Release of Gonadotropin-Releasing Hormones Langer, Robert S. 02 MIT SID# 294	50,000	37,032	0
Physiology of Gonadotropins and Prolactin in Atlantic Croaker, Red Drum and Spotted Seatrout Thomas, Peter 02 Texas A&M University Sea Grant College Program SID# 705	50,098	26,085	0
Endocrine Manipulation of Fish Growth and Development in the United States and China Grau, Gordon E. 02 University of Hawaii Sea Grant College Program SID# 581	17,712	5,000	0
Atlantic Salmon: Manipulation of Readiness for Sea Cage Culture Specker, Jennifer 02 Rhode Island Sea Grant College Program SID# 603	86,300	25,845	0
Environmental Effect on the Ovarian Development in Captive Sturgeon Broodstock Doroshov, Serge I. 02 California Sea Grant College Program SID# 509	28,222	54,187	0
Hormone Stimulation of Sturgeon Female Reproduction Maturation Moberg, Gary P. 02 California Sea Grant College Program SID# 682	33,987	62,606	0
Stimulation of Growth Hormone Gene Expression in Abalone: Applications for Acceleration of Growth and Improvement of Food-Conversion Efficiency and Resistance Morse, Daniel E. 03 California Sea Grant College Program SID# 684	55,947	41,962	0

Control of Growth and Survival in the Striped Bass Bern, Howard 06 California Sea Grant College Program SID# 685	52,137	58,900	0
Influence of Temperature on Survival During the Critical Period of Larval Development in Winter Flounder Durbin, Ann 06 Rhode Island Sea Grant College Program SID# 686	57,000	55,826	0
Comparative Studies of Macrophage Function: Bivalve Hemocyte Chemiluminescence Anderson, R. S. 08 Maryland Sea Grant College Program SID# 284	0	0	69,874
Field and Laboratory Evaluation of Endocrine Indices of Reproductive Dysfunction in Atlantic Croaker Thomas, Peter 12 Texas A&M University Sea Grant College Program SID# 489	0	12,148	68,993
Evaluation of Biochemical Indicators of Growth in Crustaceans Wang, Shiao Y. 13 Mississippi-Alabama Sea Grant Consortium SID# 119	0	0	0
A Feasibility Study to Determine Optimum Methods for Producing Coastwatch Deliverables in Two South Carolina Environments Cowen, David J. 39 South Carolina Sea Grant Consortium SID# 284	0	37,738	74,729
Trophic Dynamics in Chesapeake Bay: Ecological and Biochemical Approaches to the Study of Flows of Carbon from Phytoplankton to bacterioplankton Fletcher, Madilyn 40 Maryland Sea Grant College Program SID# 49	49,986	28,972	0
<b>SUBTOTAL:</b>	<b>798,202</b>	<b>642,042</b>	<b>213,596</b>

4. Nutrition

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Lipid and Fatty Acid Requirements of Marine Shrimp, <i>Penaeus vannamei</i> Brown, Christopher L. 01 University of Hawaii Sea Grant College Program SID# 580	16,000	60,160	0
Alternative Protein Sources for Hybrid Striped Bass Feeds Gallagher, Scott M. 02 University of North Carolina Sea Grant College Program SID# 22	21,452	22,302	0
Force Feeding of Larval Finfish for Aquaculture Bonaventura, J. 02 University of North Carolina Sea Grant College Program SID# 21	750	17,705	0
Larval Fish Micro-diet Development and Nutrition Stickney, R. R. 02 Washington Sea Grant College Program SID# 144	45,600	31,027	0
Uptake and Retention of Contaminants by Fish Maintained on Artificial Diets in Lake Ontario Buttner, Joseph K. 02 New York Sea Grant Institute SID# 198	32,302	13,682	0
Nutritional and Ecological Importance of Protozoans in the Diet of First-Feeding Winter Flounder Larvae, <i>Pseudopleuronectes americanus</i> Gallager, Scott M. 02 Woods Hole Oceanographic Institution SID# 260	35,167	25,910	0
Essential Fatty Acid Nutrition of Hybrid Striped Bass Larvae Harrell, Reginal M. 02 Maryland Sea Grant College Program SID# 43	32,326	17,647	0



Influence of N-3 and Ratios of N-3:N-6 Dietary Fatty Acids on Nutritional, Physiological, and Quality Parameters in Cultured Hybrid Striped Bass Williams, W. P. 02 South Carolina Sea Grant Consortium SID# 252	7,500	3,150	0
--	-------	-------	---

Feeds Technology Research (Phase 3): Sensory, Hormonal and Nutritional Aspects Grau, Gordon E. 02 University of Hawaii Sea Grant College Program SID# 222	52,176	103,929	0
---	--------	---------	---

Effect of Temperature, Maternal Nutrition, and Feeding on Survival of Larval Mahimahi, Coryphaena hippurus Kraul, Sydney A. Jr. 02 University of Hawaii Sea Grant College Program SID# 583	14,168	52,274	0
--	--------	--------	---

Microencapsulated Diets for Intensive Production of Molluscan Shellfish Langdon, Christopher 03 Oregon Sea Grant College Program SID# 320	2,200	0	0
---	-------	---	---

SUBTOTAL:	259,641	347,786	0
-----------	---------	---------	---

5. Disease/Parasites

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
---------------------	------------------	-------------------	-----------------

Development and Evaluation of Gene Probes and Immunological Methods for the Diagnosis of Virus Infections in Penaeid Shrimp Lightner, D. V. 01 University of Arizona, Tucson SID# 507	36,217	27,840	0
---	--------	--------	---

Evaluation of a Solid-Phase Enzyme-Immunoassay Procedure for the Detection of Infectious Hypodermal and Hematopoietic Necrosis Virus (IHHNV) Infection and the Growth of the Virus in Cell Cultures Loh, Philip C. 01 University of Hawaii Sea Grant College Program SID# 193	32,700	61,034	0
--	--------	--------	---

<p>Noxious Phytoplankton Blooms and Marine Salmon Culture in Puget Sound  Banse, Karl 02  Washington Sea Grant College Program  SID# 59</p>	82,100	46,755	0
<p>Cloning and Expression of the Gene for the Major Soluble Antigen of Renibacterium Salmoninarum  Landolt, Marsha L. 02  Washington Sea Grant College Program  SID# 142</p>	35,900	20,579	0
<p>Genetics of Resistance to Bacterial Kidney Disease in Chinook Salmon  Hershberger, W. K. 02  Washington Sea Grant College Program  SID# 143</p>	34,400	10,366	0
<p>Development of Therapeutics for Stress-related Immune Dysfunction in Intensive Aquaculture  Kaattari, Stephen L. 02  Oregon Sea Grant College Program  SID# 319</p>	37,500	80,900	0
<p>Rejuvenation of the Chesapeake Bay Oyster Industry: Development of Disease-Resistant Crassostrea virginica and Assessment of Disease Resistance in Crassostrea gigas  Burreson, Eugene 03  Virginia Graduate Marine Science Consortium  SID# 203</p>	62,792	31,833	0
<p>Abalone Wasting Disease: Role of Coccidian Parasites and Environmental Factors  Kuris, Armand M. 03  California Sea Grant College Program  SID# 516</p>	60,451	44,609	0
<p>Fungal Pathogens of Nori  Whisler, Howard C. 05  Washington Sea Grant College Program  SID# 62</p>	19,700	12,191	0
<p>Norwalk and HAV Virus in Shellfish  Estes, Mary K. 06  Texas A&amp;M University Sea Grant College Program  SID# 644</p>	64,053	20,144	0

Shellfish Toxicity in Southern New England Anderson, Donald M. 07 Woods Hole Oceanographic Institution SID# 334	50,128	21,211	0
Use of Anti-Idiotypic Antibodies as Potential Vaccines, Diagnostic Reagents and Research Probes for Aquatic Birnaviruses Nicholson, Bruce L. 08 UM/UNH Sea Grant Program SID# 34	40,124	88,762	0
Effects of Temperature Abuse on Survival, Growth and Virulence of Culturable and Nonculturable <i>Vibrio Vulnificus</i> in Oysters Oliver, J. 08 University of North Carolina Sea Grant College Program SID# 24	7,048	3,417	0
Virulence Factors Important to the Pathogenesis of Fish Diseases Rohovec, John S. 08 Oregon Sea Grant College Program SID# 322	6,100	0	0
Pathogenesis and Diagnosis of Selected Striped Bass Diseases of Microbial Etiology Hetrick, Frank M. 08 Maryland Sea Grant College Program SID# 44	48,529	44,012	0
Isolation and Characterization of the Interferon Genes of Rainbow Trout II. Expression and Biological Activity Leong, Jo-Ann C. 08 Oregon Sea Grant College Program SID# 435	66,000	26,600	0
Virulence Factors of Fish Pathogens Rohovec, John S. 08 Oregon Sea Grant College Program SID# 436	57,100	182,100	0
Molecular Characterization of Marine Algae and Their Viral Pathogens Meints, Russel H. 08 Oregon Sea Grant College Program SID# 437	23,800	7,100	0

Fluoroquinolone Treatment of Bacterial Diseases of Salmonids Bowser, Paul R. 08 New York Sea Grant Institute SID# 97	67,725	55,030	0
---	--------	--------	---

Use of Natural and Synthetic Antifreeze Proteins as Cryoprotectants for Stored Frozen Seafood Products Harrington, John P. 13 Mississippi-Alabama Sea Grant Consortium SID# 120	0	0	0
--	---	---	---

SUBTOTAL:	832,367	784,483	0
-----------	---------	---------	---

6. Policy and Economics

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Economic Analysis of Hard Clam Aquaculture Systems Under Price and Yield Risk Thunber, E. M. 14 Florida Sea Grant College Program SID# 90	24,157	12,290	0

SUBTOTAL:	24,157	12,290	0
-----------	--------	--------	---

7. Other

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Effect of Salmon Net-pen Aquaculture on the Benthic Microfauna and Macrofauna of Coastal Maine Waters Pindlay, R. H. 02 UM/UNH Sea Grant Program SID# 1	40,600	40,540	0

Development of Culture Techniques for Yellow Perch Culver, David A. 02 Ohio Sea Grant College Program SID# 627	35,933	22,894	0
---	--------	--------	---

Investigate Eelgrass-blue Mussel Interactions for their Application to the Aquaculture Industry Short, F. T. 03 UM/UNH Sea Grant Program SID# 487	70,630	44,596	0
--	--------	--------	---

Uptake of Dissolved and Particle-Associated Toxicants by the Eastern Oyster Weston, Donald P. 45 Maryland Sea Grant College Program SID# 502	0	0	79,993
Effects of Trace Metals and Organic Pollutants on Stress-Induced Proteins in Oyster Larvae and Spat: A Molecular Approach Chen, Thomas T. 45 Maryland Sea Grant College Program SID# 504	0	0	40,000
United States and Japanese Natural Resource Meeting of Scientists for 1991 Tubb, Richard 70 Oregon Sea Grant College Program SID# 642	9,600	0	0
An International Oyster Conference 1991 Jensen 74 Maryland Department of Natural Resources SID# 703	20,000	10,000	0
Transfer of Hybrid Striped Bass Culture Technology to the Private Sector in South Carolina Smith, Theodore I.J. 77 South Carolina Sea Grant Consortium SID# 258	41,394	31,171	0
Aquaculture Advisory Services Binkowski, Fred P. 77 Wisconsin Sea Grant College Program SID# 477	12,633	11,625	0
SUBTOTAL:	230,790	160,826	119,993
TOTAL:	3,856,312	2,906,008	373,589

# MARINE BIOTECHNOLOGY

---

## 1. Biochemistry & Pharmacology:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development of Selective Halogenation by Naturally Occurring Enzymes in Marine Organisms: A Biotechnological Approach Butler, Alison 12 California Sea Grant College Program SID# 528	41,134	14,845	0
Marine Natural Products in Pharmacology: Discovery and Development of New Chemotherapeutics from Marine Animals Crews, Phillip 12 California Sea Grant College Program SID# 527	30,084	31,582	0
Marine Pharmaceutical Discovery Program: Chemistry Component A Faulkner, John D. 12 California Sea Grant College Program SID# 526	48,243	31,456	0
Marine Pharmaceutical Discovery Program: Pharmacology Jacobs, Robert S. 12 California Sea Grant College Program SID# 523	93,003	76,648	0
Marine Pharmaceutical Discovery Program: Chemistry Component B Fenical, William H. 12 California Sea Grant College Program SID# 525	46,166	22,145	0
Marine Metabolites for Medicine and Agriculture Scheuer, Paul J. 13 University of Hawaii Sea Grant College Program SID# 206	42,840	5,000	0
Biologically Active Compounds of Marine Organisms Sharma, Gurdial M. 12 New Jersey Marine Science Consortium SID# 321	42,869	60,805	0

<p>The N-3 Polyunsaturated Fatty Acids of Marine Lipids: Determination of Biochemical Effects, Optimum Dietary Intake, and Oxidative Stability Kinsella, John E. 12 New York Sea Grant Institute SID# 98</p>	50,185	42,053	0
<p>Structural and Synthetic Studies on Marine Natural Products Clardy, Jon C. 12 New York Sea Grant Institute SID# 99</p>	82,938	47,969	0
<p>Bioactive Compounds from Marine Organisms Schmitz, Francis J. 13 University of Oklahoma SID# 415</p>	70,200	37,863	0
<p>Biomedicinals from Pacific Northwest Marine Algae Gerwick, William H. 12 Oregon Sea Grant College Program SID# 325</p>	3,700	0	0
<p>Biomedicinals from Marine Algae Gerwick, William H. 12 Oregon Sea Grant College Program SID# 444</p>	67,000	25,100	0
<p>Effects of Purified Omega-3 Fatty Acids from Fish Oil upon Plasma Lipids, Lipoproteins, and Platelet Function in Humans Connor, William E. 12 Oregon Sea Grant College Program SID# 453</p>	45,900	12,900	0
<p>Isolation and Characterization of New Anti-HIV Products from Marine Sources Kraiselburd, Edmundo 12 University of Puerto Rico Sea Grant College Program SID# 145</p>	29,917	58,815	0
<p>Neurotoxic and Cytolytic Activity of New Polypeptides Isolated from Marine Invertebrates Escalona de Motta, G. 13 University of Puerto Rico Sea Grant College Program SID# 231</p>	34,967	55,131	0

Metabolite Studies with Marine Bacteria Ireland, Chris University of Utah SID# 403	07	65,000	38,772	0
---	----	--------	--------	---

SUBTOTAL:		794,146	561,084	0
-----------	--	---------	---------	---

2. Molecular Biology:

TITLE/INVEST./INST.		FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Development and Evaluation of Gene Probes and Immunological Methods for the Diagnosis of Virus Infections in Penaeid Shrimp Lightner, D. V. University of Arizona, Tucson SID# 507	01	36,217	27,840	0
Detection and Monitoring of Bacteria with Molecular Probes Chapman, David J. California Sea Grant College Program SID# 697	45	28,378	31,652	0
Genetic Detection of Red Tide Dinoflagellates Triplett, Edward L. California Sea Grant College Program SID# 543	47	26,874	12,085	0
Improved Genotypes of Submerged and Emergent Halophytes for Crops and Restoration Ecology through Somaclonal Variation, Transformation, and Protoplast Fusion Gallagher, John L. University of Delaware SID# 169	05	21,596	72,033	0
Evaluation of a Solid-Phase Enzyme-Immunoassay Procedure for the Detection of Infectious Hypodermal and Hematopoietic Necrosis Virus (IHHNV) Infection and the Growth of the Virus in Cell Cultures Loh, Philip C. University of Hawaii Sea Grant College Program SID# 193	01	32,700	61,034	0



Development of Technologies for Long-Term Storage and Genetic Manipulation of Penaeoidean Eggs Crowe, John 6 California Sea Grant College Program SID# 512	10,000	0	0
Genetic Engineering of Secondary Metabolite Biosynthetic Pathways in Cyanobacteria Bylina, Edward J. 12 University of Hawaii Sea Grant College Program SID# 595	34,471	23,976	0
Development of Gene Probe Assays for the Detection of Microbial Pathogens Margolin, Aaron B. 08 UM/UNH Sea Grant Program SID# 33	27,999	3,490	0
Use of Anti-Idiotypic Antibodies as Potential Vaccines, Diagnostic Reagents and Research Probes for Aquatic Birnaviruses Nicholson, Bruce L. 08 UM/UNH Sea Grant Program SID# 34	40,124	88,762	0
Development of Generic Engineering Techniques with Economically Important Marine Algae Minocha, Subhas C. 13 UM/UNH Sea Grant Program SID# 395	55,000	17,008	0
Genetic Engineering of Finfish and Shellfish by Gene Transfer Technology Chen, Thomas T. 02 Maryland Sea Grant College Program SID# 45	66,970	34,568	0
Coupling Flow Cytometry and Molecular Probes for the Analysis of Microorganisms in Aquatic Ecosystems Chisholm, Sallie W. 42 MIT SID# 295	50,000	23,456	0
Development of Expression Vectors for Gene Transfer into Fish Hackett, Perry B. 02 Minnesota Sea Grant College Program SID# 105	25,230	14,230	0

Economic Improvement of Fish Through Gene Transfer Guise, Kevin S. 02 Minnesota Sea Grant College Program SID# 127	26,550	10,750	0
Development of Transcriptional Promoters for Gene Transfer into Fish Hackett, Perry B. 02 Minnesota Sea Grant College Program SID# 126	2,102	1,185	0
Vectors of Genetic Engineering in Marine Algae: The Ti Plasmid Hall, L. M. 05 Mississippi-Alabama Sea Grant Consortium SID# 2	63,000	47,120	0
Molecular Population Genetics of Benthic Anthozoans Lasker, Howard R. 07 New York Sea Grant Institute SID# 522	70,442	34,489	0
Isolation and Characterization of the Interferon Genes of Rainbow Trout II. Expression and Biological Activity Leong, Jo-Ann C. 08 Oregon Sea Grant College Program SID# 435	66,000	26,600	0
Molecular Characterization of Marine Algae and Their Viral Pathogens Meints, Russel H. 08 Oregon Sea Grant College Program SID# 437	23,800	7,100	0
Cloning and Expression of the Gene for the Major Soluble Antigen of Renibacterium Salmoninarum Landolt, Marsha L. 02 Washington Sea Grant College Program SID# 142	35,900	20,579	0
Transcriptional Gene Regulation in Marine Algae Cattolico, Rose Ann 05 Washington Sea Grant College Program SID# 159	96,800	56,210	0
SUBTOTAL:	840,153	614,167	0

3. Biochemical Engineering:

TITLE/INVS./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Controlled Culture of a New Marine Model, the Sea Anemone <i>Nematostella vectensis</i> Hand, Cadet 04 California Sea Grant College Program SID# 515	4,735	12,500	0
The Byssal Adhesive of Zebra Mussels, <i>Dreissena polymorpha</i> Waite, Herbert J. 07 University of Delaware SID# 311	0	75,393	149,997
Anticorrosive Properties of Adhesive Proteins Isolated from the Mussel <i>Mytilus edulis</i> Dexter, Steven C. 13 University of Delaware SID# 166	18,720	22,609	0
Influence of Marine Bacterial Films on Crevice Corrosion Dexter, Steven C. 24 University of Delaware SID# 60	15,268	20,790	0
Industrial Microbiology of Blue-Green Algae (Cyanobacteria) Patterson, Gregory M. 13 University of Hawaii Sea Grant College Program SID# 596	29,265	57,254	0
Degradation of Trichloroethylene and Other Pollutants by Ammonia-Oxidizing Bacteria Hooper, Alan B. 45 Minnesota Sea Grant College Program SID# 673	29,076	14,527	0
Polypeptide Inhibitors of Corrosion from Marine Organisms Sikes, Steven C. 13 Mississippi-Alabama Sea Grant Consortium SID# 499	33,613	17,091	0

Accumulation of a Biodegradable Polymer in a Cyanobacterium Heinhorst, Sabina 13 Mississippi-Alabama Sea Grant Consortium SID# 118	58,224	29,088	0
Use of Natural and Synthetic Antifreeze Proteins as Cryoprotectants for Stored Frozen Seafood Products Harrington, John P. 13 Mississippi-Alabama Sea Grant Consortium SID# 120	9,900	5,058	0
Bioreactor Studies of Marine Plant Cells in Liquid Culture for Production of Valued Natural Products Rorrer, Gregory L. 05 Oregon Sea Grant College Program SID# 429	42,400	20,400	0
Synthetic Ice-Suppressing Macromolecules: Development of Enhance Bioengineered Mimics of Marine Antifreeze Peptides Caceci, Thomas 13 Virginia Graduate Marine Science Consortium SID# 208	69,732	50,861	0
<b>SUBTOTAL:</b>	<b>310,933</b>	<b>325,571</b>	<b>149,997</b>

#### 4. Microbiology & Phycology:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Bacterial Fouling of Metal Surfaces: Implications for Biocorrosion Kirchman, David L. 24 University of Delaware SID# 58	16,480	28,444	0
Development of New Antifouling Coasting Utilizing Controlled Release Technology Weisman, G. R. 45 UM/UNH Sea Grant Program SID# 35	49,600	20,139	0

Norwalk and HAV Virus in Shellfish Estes, Mary K. 06 Texas A&M University Sea Grant College Program SID# 644	64,053	20,144	0
Isolation of Viruses That Infect Toxic and Economically Important Phytoplankton Suttle, Curtis A. 40 Texas A&M University Sea Grant College Program SID# 562	50,043	25,821	0
Crab Shell Chitosan: Utilization of Its Gene Activation Properties Hadwiger, Lee A. 13 Washington Sea Grant College Program SID# 165	64,700	25,052	0
SUBTOTAL:	244,876	119,600	0

5. General:

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Assessing Marine Biotechnology in the United States and Other Countries Zilinskas, Raymond A. 81 Maryland Sea Grant College Program SID# 396	33,872	0	0
Fifth International Conference on Chitin and Chitosan Brine, C. J. 74 American Chitoscience Society SID# 229	5,000	160,000	0
International Marine Biotechnology Conference 1991 Hunter-Cevera, Jenni 13 Society for Industrial Microbiology SID# 269	15,000	35,000	0
SUBTOTAL:	53,872	195,000	0
TOTAL:	2,243,980	1,815,422	149,997

# SEAFOOD SCIENCE AND TECHNOLOGY

---

## 1. Engineering & Waste Treatment:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Management and Use of Solid and Liquid Wastes from the Blue Crab ( <i>Callinectes sapidus</i> ) Industry Boardman, Gregory 35 Virginia Graduate Marine Science Consortium SID# 212	44,729	22,831	0
SUBTOTAL:	44,729	22,831	0

## 2. Product Development & Byproduct Recovery:

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Enhanced Recover and Functionally of Protein Enriched Products French, John S. 35 Alaska Sea Grant College Program SID# 191	60,317	21,921	0
Expanded Uses for Surimi in Processed Muscle Foods Hamann, D. 35 University of North Carolina Sea Grant College Program SID# 26	0	36,497	0
Protein Recovery and Water Reuse in Surimi Manufacture Lanier, T. 35 University of North Carolina Sea Grant College Program SID# 25	60,086	0	0
Frozen Stabilized Mince as a Source of Surimi--Initial Feasibility Kolbe, Edward R. 35 Oregon Sea Grant College Program SID# 462	66,300	57,600	0

Mechanical Separation of Food-Grade Meat from Blue Crab Processing Wastes Meyers, Samuel P. 35 Louisiana Sea Grant College Program	10,005	10,209	0
---	--------	--------	---

SUBTOTAL:	196,708	126,227	0
-----------	---------	---------	---

3. Microbial & Nutritional Quality & Safety:

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Detection and Monitoring of Bacteria with Molecular Probes Chapman, David J. 45 California Sea Grant College Program SID# 697	28,378	31,652	0
Genetic Detection of Red Tide Dinoflagellates Triplett, Edward L. 47 California Sea Grant College Program SID# 543	26,874	12,085	0
Evaluation of Lactic Acid Treatment, Cryogenic Freezing and Depuration of Salmonella in Oysters of the Suwannee Region Rodrick, G. E. 35 Florida Sea Grant College Program SID# 89	24,012	12,006	0
Quality Assessment of Consumer-oriented Seafood Packaging and Its Impact on Listeria and Clostridium Botulinum Survival Gates, Keith W. 35 Georgia Sea Grant College Program SID# 570	99,857	37,668	0
Development of Gene Probe Assays for the Detection of Microbial Pathogens Margolin, Aaron B. 08 UM/UNH Sea Grant Program SID# 33	27,999	3,490	0
Uptake of Dissolved and Particle-Associated Toxicants by the Eastern Oyster Weston, Donald P. 45 Maryland Sea Grant College Program SID# 502	0	0	79,993

Shellfish Toxicity in Southern New England Anderson, Donald M. 07 Woods Hole Oceanographic Institution SID# 334	50,128	21,211	0
Detection of Vibrio cholerae 01 Cells in Shellfish Meat Homogenate and Meat Enrichment Broths by Dipstick ELISA Siebeling, Ronald J. 35 Louisiana Sea Grant College Program SID# 1023	45,609	24,883	0
Effects of Menhaden Oil on Gestational Diabetes Berdanier, Carolyn D. 12 Georgia Sea Grant College Program	12,000	0	0
Quick Enzymatic Test for Contamination of Marine Resources by Toxic Organics Stegeman, John J. 45 Woods Hole Oceanographic Institution SID# 337	31,498	21,177	0
The N-3 Polyunsaturated Fatty Acids of Marine Lipids: Determination of Biochemical Effects, Optimum Dietary Intake, and Oxidative Stability Kinsella, John E. 12 New York Sea Grant Institute SID# 98	50,185	42,053	0
Disposition and Metabolism of Polychlorinated Dibenzofurans in fish Sikka, Harish C. 45 New York Sea Grant Institute SID# 106	53,475	28,952	0
Effects of Temperature Abuse on Survival, Growth and Virulence of Culturable and Nonculturable Vibrio vulnificus in Oysters Oliver, J. 08 University of North Carolina Sea Grant College Program SID# 24	7,048	3,417	0
Effects of Purified Omega-3 Fatty Acids from Fish Oil upon Plasma Lipids, Lipoproteins, and Platelet Function in Humans Connor, William E. 12 Oregon Sea Grant College Program SID# 453	45,900	12,900	0




Influence of N-3 and Ratios of N-3:N-6 Dietary Fatty Acids on Nutritional, Physiological, and Quality Parameters in Cultured Hybrid Striped Bass Williams, W. P. 02 South Carolina Sea Grant Consortium SID# 252	7,500	3,150	0
Norwalk and HAV Virus in Shellfish Estes, Mary K. 06 Texas A&M University Sea Grant College Program SID# 644	64,053	20,144	0
Biology of the Oyster Crassostrea virginica: Is Domoic Acid a Threat? Fryxell, G. 06 Texas A&M University Sea Grant College Program SID# 545	56,256	19,219	0
Biology of the Oyster Crassostrea virginica: Is Domoic Acid a Threat? Landry, Andre M. Jr. 06 Texas A&M University Sea Grant College Program SID# 546	0	0	10,000
Isolation of Viruses That Infect Toxic and Economically Important Phytoplankton Suttle, Curtis A. 40 Texas A&M University Sea Grant College Program SID# 562	50,043	25,821	0
PCBs in the Sera of Great Lakes Fish Eaters: Differential Congener Toxicity and Patterns of Exposure Sonzogni, William C. 45 Wisconsin Sea Grant College Program SID# 457	27,787	15,264	0
<b>SUBTOTAL:</b>	<b>708,602</b>	<b>335,092</b>	<b>89,993</b>

4. Handling & Processing:

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Oxidative Metabolism of Polyunsaturated Fatty Acids in Fish; Mechanism and Physiological Function of Lipoxygenase German, Bruce J. 35 California Sea Grant College Program SID# 540	26,047	18,174	0
Edible Films to Prevent Quality Loss in Frozen Fish Krochta, John M. 35 California Sea Grant College Program SID# 541	13,870	36,956	0
Determination of the Causes of Burnt Tuna and Reasons for Differential Susceptibility to the Problem Holland, Kim N. 06 University of Hawaii Sea Grant College Program SID# 586	19,694	15,073	0
Use of Natural and Synthetic Antifreeze Proteins as Cryoprotectants for Stored Frozen Seafood Products Harrington, John P. 13 Mississippi-Alabama Sea Grant Consortium SID# 120	9,900	5,058	0
Modeling Quality Changes Which Occur During Frozen Storage of Seafoods Kolbe, Edward R. 35 Oregon Sea Grant College Program SID# 333	38,300	32,500	0
Rapid Investigation of Imported and Domestic Shrimp Davis, Scott K. 35 Texas A&M University Sea Grant College Program SID# 551	27,362	16,955	0
The Role of Formaldehyde in the Textural Deterioration of Frozen Gadoid Fish Muscle Parkin, Kirk L. 35 Wisconsin Sea Grant College Program SID# 463	22,649	12,479	0

Suppression of Off-Flavors in Oxidizing Fish Oils and Seafoods Lindsay, Robert C. 35 Wisconsin Sea Grant College Program SID# 464	26,347	12,672	0
Seafood Technology Advisory Services Stuiber, David A. 71 Wisconsin Sea Grant College Program SID# 475	54,749	41,741	0
SUBTOTAL:	238,918	191,608	0
TOTAL:	1,188,957	675,758	89,993





# Non-Living Resources

Following is a listing of Sea Grant's Non-Living Resources Division technical staff, their subject area(s), and their phone number.

They can be reached at the following address:

**National Oceanic and Atmospheric Administration  
National Sea Grant College Program  
1335 East-West Highway  
SSMC1, 5th Floor  
Silver Spring, MD 20910**

**Non-Living Resources .....301/713-2713**

Marine Geological Resources - Dr. David B. Duane

Diving Physiology & Technical Development - Mr. N. Eugene Smith

# DIVING PHYSIOLOGY AND TECHNICAL DEVELOPMENT

---

## A. Remotely Operated Vehicles (ROV's) Manned Submersibles and Research Instrumentation

### 1. ROV

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Oscillating Foils as Efficient Propulsors for Autonomous Underwater Vehicles Triantafyllou, Micha 23 MIT SID# 301	50,000	59,380	0
An Intelligent Control System for Underwater Robotic Vehicles Yuh, Junku 23 University of Hawaii Sea Grant College Program SID# 597	30,549	23,668	0
Development of a Mini-ROV Manipulator Chryssostomidis, Chr 28 MIT SID# 261	45,000	11,932	20,000
SUBTOTAL:	125,549	94,980	20,000

### 2. Manned Submersibles

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
Management of Human Error in Operations of Marine Systems Bea, Robert G. 28 California Sea Grant College Program SID# 533	30,828	18,760	0
Development of New Antifouling Coating Utilizing Controlled Release Technology Weisman, G. R. 45 UM/UNH Sea Grant Program SID# 35	49,600	20,139	0

Development of a Computational Model for Ducted Propellers with Cyclic Pitch Control Kerwin, Justin                      62 MIT SID# 433	0	0	29,850
---	---	---	--------

SUBTOTAL:	80,428	38,899	29,850
-----------	--------	--------	--------

**3. Research Instrumentation**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
A Proposal to Build a Deep Ocean Rock Coring Drill Johnson, Paul H.                      09 Washington Sea Grant College Program SID# 67	46,300	32,396	0
Technological Developments for Seafloor Ridge and Margin Studies Schultz, Adam                      09 Washington Sea Grant College Program SID# 164	80,200	45,917	0
Developing the First Integrated Mapping Laboratory Aboard Ship Tyce, Robert C.                      23 Rhode Island Sea Grant College Program SID# 242	0	64,261	156,692
Shape Interrogation and Representation by Medical-Axis Transform Patrikalakis, Nichol                      23 MIT SID# 296	50,000	20,004	0
The University of Michigan/Sea Grant/Industry Consortium in Offshore Engineering Bernitsas, Michael                      23 Michigan Sea Grant College Program SID# 243	50,885	48,061	0
Acoustic Sensing of Pelagic Fish Stocks Jaffe, Jules S.                      28 California Sea Grant College Program SID# 691	65,624	6,961	0



Opportunities for Undergraduate Research and Development in Marine Science and Engineering Watson, W. H.                      61 UM/UNH Sea Grant Program SID# 397	0	15,000	0
---	---	--------	---

SUBTOTAL:	293,009	232,600	156,692
-----------	---------	---------	---------

TOTAL:	498,986	366,479	206,542
--------	---------	---------	---------

**B Hyperbaric Physiology and Diving Technology**

**1. Hyperbaric Physiology**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
---------------------	---------------	----------------	--------------

Decompression and Diver Safety Lanphier, Edward H.                      32 Wisconsin Sea Grant College Program SID# 467	113,486	64,050	0
--	---------	--------	---

Factors Governing Stress Responses in Scuba Divers Morgan, William P.                      32 Wisconsin Sea Grant College Program SID# 468	43,963	24,149	0
--	--------	--------	---

Applied Physiology of Diving Lin, Yu-Chong                      32 University of Hawaii Sea Grant College Program SID# 200	42,610	62,785	0
--	--------	--------	---

SUBTOTAL:	200,059	150,984	0
-----------	---------	---------	---

**2. Diving Technology**

TITLE/INVEST./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
---------------------	---------------	----------------	--------------

Development of In-Process Nondestructive Evaluation Technique for Underwater Welding Rokhlin, Stanislav I                      28 Ohio Sea Grant College Program SID# 633	38,000	39,131	0
--	--------	--------	---

Management of Human Error in Operations of Marine Systems  
Bea, Robert G. 28  
California Sea Grant College Program  
SID# 533

SUBTOTAL:	68,828	57,891	0
TOTAL:	268,887	208,875	0
GRANT TOTAL:	768,873	575,354	206,542

# MARINE GEOLOGICAL RESOURCES

---

## Marine Geological Resources

TITLE/INVES./INST.	FEDERAL FUNDS	MATCHING FUNDS	PASS THROUGH
The Combined Use of Chemical-and Biostratigraphy to Date Fe-Mn Crusts, Estimate Their Growth Rates, and Reconstruct Their History DeCarlo, Eric H. 09 University of Hawaii Sea Grant College Program SID# 213	40,530	24,288	0
Chemical and Isotopic Stratigraphy of Co-rich Ferromanganese Crusts from the Hawaiian Archipelago McMurtry, Gary M. 09 University of Hawaii Sea Grant College Program SID# 210	46,189	31,126	0
Continuum of Ferromanganese Pavements on Seamounts of the Hawaiian EEZ Malahoff, Alexander 09 University of Hawaii Sea Grant College Program SID# 591	32,855	9,400	0
The Environmental Impact and Feasibility of a Novel Method of Solution Recovery of Cobalt-Rich Ferromanganese Crusts from Seamounts Malahoff, Alexander 09 University of Hawaii Sea Grant College Program SID# 592	20,480	21,490	0
A Submersible Investigation of Manganese Crust Deposits Off Johnston Island Wiltshire, John 09 University of Hawaii Sea Grant College Program SID# 593	10,218	12,000	0

<p>The Geological Setting of Hydrothermal Vents and the Neovolcanic Zone of Loihi Seamount, Hawaii  Malahoff, Alexander 09  University of Hawaii Sea Grant College Program  SID# 594</p>	30,368	18,980	0
<p>Geochemistry of Loihi Seamount Hydrothermal System  McMurtry, Gary 09  University of Hawaii Sea Grant College Program  SID# 216</p>	34,158	19,700	0
<p>Benthic Community Disturbance and Succession Following Simulated Manganese-Nodule Mining in the Equatorial Pacific Ocean  Smith, Craig R. 10  University of Hawaii Sea Grant College Program  SID# 219</p>	0	14,569	134,040
<p>Microbiology and Chemistry of Active Hydrothermal Vents on Loihi Seamount  Karl, David M. 48  University of Hawaii Sea Grant College Program  SID# 197</p>	42,336	39,308	0
<p>A Sand Budget for Maine's Sandy Embayments: Calculation of Sand Volumes and Transport Paths in the Nearshore and Littoral Regions of Saco Bay and the Kennebec River Mouth  Kelley, Joseph T. 46  UM/UNH Sea Grant Program  SID# 494</p>	46,184	53,118	0
<p>Paleoclimatic Implications of Late Holocene Lake Level Fluctuations in the Lake Michigan Basin  Stoermer, Eugene F. 39  Michigan Sea Grant College Program  SID# 601</p>	41,541	17,045	0
<p>Prediction of Management Effects on Pollutant Loading from Poorly Drained Soils Adjacent to Coastal Waters  Gilliam, J. 48  University of North Carolina Sea Grant College Program  SID# 13</p>	51,812	0	0

Co-Variation in Hydrothermal Output and Earthquake Activity: A Ridge Crest Time Series Experiment Delaney, John R. 09 Washington Sea Grant College Program SID# 66	37,700	24,235	0	
A Proposal to Build a Deep Ocean Rock Coring Drill Johnson, Paul H. 09 Washington Sea Grant College Program SID# 67	46,300	32,396	0	
Technological Developments for Seafloor Ridge and Margin Studies Schultz, Adam 09 Washington Sea Grant College Program SID# 164	80,200	45,917	0	
Estimating the Value of Marine Mining for Strategic Minerals Supply Broadus, James M. 14 Woods Hole Oceanographic Institution SID# 342	41,068	34,867	0	
International Marine Science Cooperation Program Ross, David A. 20 Woods Hole Oceanographic Institution SID# 341	143,738	0	0	
Formulation and Maintenance of Shore-Oblique Sand Ridges: Hydrodynamics and Sediment Transport Trowbridge, John H. 50 Woods Hole Oceanographic Institution SID# 339 778	45,299	21,081	0	
	<b>SUBTOTAL:</b>	<b>790,976</b>	<b>419,520</b>	<b>134,040</b>
	<b>TOTAL:</b>	<b>790,976</b>	<b>419,520</b>	<b>134,040</b>

