



Annual Progress Report, 2004

Programmatic Accomplishments and Benefits Achieved

University of Wisconsin Sea Grant College Program

Dr. Anders W. Andren, Director

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Prepared by

Stephen Wittman, Communications Manager

With Contributions from

James Hurley, Assistant Director for Research & Outreach

Mary Lou Reeb, Assistant Director for Administration & Information

Daniel Marklein, Finance & Grants Administrator and Information Technology Coordinator

Terri Klousie, Assistant to the Director

Rich Dellinger, Web Developer

Richard Hoops, Earthwatch Radio Producer & Editor

John Karl, Science Writer

Linda Campbell, Publications Sales & Distribution Coordinator

Proofread by

Gloria Gardner, Program Assistant

Cover by

Tina Yao, Designer & Art Director



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University of Wisconsin Sea Grant Institute
Goodnight Hall, 2nd Floor
1975 Willow Drive
Madison, WI 53706-1177
USA

Phone (608) 262-0905

Fax (608) 262-0591

World Wide Web www.seagrant.wisc.edu

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INTRODUCTION

The University of Wisconsin Sea Grant Institute requires an annual progress report for all projects funded through the UW Sea Grant College Program. Continuation of funding depends on the submission of a satisfactory report. Specifically, we require that investigators provide a summary of their progress toward meeting project objectives and describe any applications, impacts and benefits of their projects during the preceding calendar year. Other requested information includes significant partnerships with resource managers and user groups, students supported and degrees granted, papers published, presentations and workshops held, patents/copyrights awarded or pending, special recognitions or awards, and other project-related activities. We also ask them to note any significant funding or in-kind support to their projects received from non-Sea Grant sources. This information is submitted via UW Sea Grant's Web-based interactive Project Reporting Online (iPRO) system and archived in a database from which it can be retrieved for review and analyses by program management and outreach staff.

Each progress report is reviewed and evaluated by UW Sea Grant program managers and appropriate staff and kept on file electronically at the institute. A project continuing from one biennium into the next is not subjected to external review unless it is making insufficient progress toward its objectives or its focus has changed significantly from the original approved work plan. We require a detailed justification of any major shifts in project emphasis or significant budget changes. Continued funding for these projects also depends on sufficient funding of the overall Wisconsin Sea Grant program. The highlights of those reports are presented herein.

In addition to formal reports, project progress is also monitored via iPRO and reviewed in the context of program thematic areas through periodic briefings involving project investigators and UW Sea Grant outreach and management staff. Outreach staff members use the results to develop or enhance their work plans. Communications staff members also review these progress reports and meet with project investigators and students in connection with producing our bimonthly newsletter and other program reports, news releases, "Earthwatch" radio programs, Websites and other means of communicating the results of UW Sea Grant research, outreach and education projects. We have asked program staff to pay particular attention to looking for and recording potential impacts in these research and outreach reports.

Annual progress reports are also required for UW Sea Grant's ongoing core program in Advisory Services, Communications and Education, the highlights of which are likewise included in this report. In accordance with the program evaluation process outlined by the NOAA Sea Grant Office, these projects are subject to intense review every four years (most recently in connection with the NOAA Sea Grant Program Assessment Team visit in June 2001 and the 2002-04 omnibus institutional proposal submission; next in 2005 in connection with the 2006-08 omnibus institutional proposal submission and the next federal program assessment scheduled for 2006).

Lastly, a brief progress report is also required for completed or terminated projects, pending submission of a final project completion report within six months of the termination date of the project. The highlights of those reports also are included here.

The appendices to this report meet and surpass all of the required and suggested annual progress report content outlined in NOAA Sea Grant's *Policy Document on the Implementation of Program Evaluation Procedures and Omnibus Proposal Submission in the National Sea Grant College Program, Section 4: Ongoing Program Assessment and Progress Reporting* (September 2000) to satisfy U.S. Department of Commerce Standard Terms and Conditions for Grants requirements.

PROGRAMMATIC ACCOMPLISHMENTS AND BENEFITS

During the past year, the University of Wisconsin Sea Grant College Program continued to produce significant results and provide noteworthy impacts in all areas of its biennial program of research, outreach and education under the efficient and effective program management of the UW-Madison Sea Grant Institute.

Organizing and Managing for Success

PROGRAM STRATEGIC PLAN UPDATED. Following the recommendations of our NOAA Sea Grant Program Assessment Team, we implemented a new process for annually updating our program strategic plan with a process that relies on more extensive, direct input from our external advisory groups, research faculty statewide, Advisory Services staff, and various local, state and regional constituencies. Approved by the UW Sea Grant Advisory Council, our university policy oversight committee, this process involved completely restructuring our existing five-year strategic plan in accordance with Sea Grant's 10 national themes. During the summer, the plan was then updated with input from constituent advisory groups and distributed for comment to more than 530 interested individuals statewide in conjunction with developing our 2006-08 Request for Proposals (RFP).

The research, outreach and education priorities outlined in this updated strategic plan will figure significantly in the process of selecting projects for funding during the 2006-08 biennium. This process will again involve two external advisory panels—the first to select preliminary proposals to invite for full proposals, and the second to evaluate and recommend proposals for funding.

NATIONAL, REGIONAL & STATE LEADERSHIP. Wisconsin Sea Grant staff members also continued to serve in a variety of leadership roles at the regional and national levels both within and outside the national Sea Grant program. During the past year, for example, UW Sea Grant's director (**Andren**) was reelected chair of the Sea Grant Association (SGA) Program Mission Committee, while our assistant director for administration and information (**Reeb**) served as SGA representative on the NOAA Sea Grant Program Information Work Group. Our assistant director for research and outreach (**Hurley**) is serving on the steering committee for the 2004 International Conference on Mercury as a Global Pollutant and will cochair the 2006 international conference in Madison.

UW Sea Grant communications manager (**Wittman**) was named communications liaison for the newly formed Aquatic Invasive Species Theme Team. He also continued to serve as chair for all theme team communicators, while our "Earthwatch Radio" producer (**Hoops**) continued to chair the Sea Grant communicators' national Radio Task Group.

On behalf of the Council of Great Lakes Governors, we cohosted a Lake Superior Restoration & Protection Workshop with Minnesota Sea Grant last June in Duluth. We also organized and hosted two Lake Michigan Restoration & Protection Workshops in August in partnership with Wisconsin's Department of Natural Resources and Coastal Management Program. Designed to get public feedback and input on Great Lakes restoration and protection priorities, all three workshops were funded by the Great Lakes Commission with a grant from the National Sea Grant College Program.

Wisconsin Sea Grant also helped sponsor the 47th annual conference of the International Association for Great Lakes Research held in May 2004 in Waterloo, Ont., and the American Fisheries Society 134th annual meeting in August in Madison, for which our fisheries specialist (**Moy**) served as general chair.

AWARDS AND RECOGNITIONS. During the past year, our fisheries outreach specialist **Philip Moy** was presented the Christie-Loftus Award from the Great Lakes Fishery Commission for “distinguished contributions to healthy Great Lakes ecosystems,” and retired coastal engineering outreach specialist **Philip Keillor** received the William Q. Wick Award for Visionary Career Leadership from the Assembly of Sea Grant Extension Program Leaders.

Science writer **John Karl** won the 2004 “Superior Program” Award from the Great Lakes Sea Grant Network for his project, “Diving into History: Research and Public Education on Wisconsin’s Underwater Archaeological Resources” (C/C-6), and art director **Tina Yao** received an “Excellence in Design” Award in the research publications category from the University and College Designers Association for *2004-06 Sea Grant Program Directory*.

Lastly, our **Wisconsin’s Water Library** project won the “Multi-Type Library of the Year” award from the Wisconsin South Central Library System as the first UW System library—and the first academic library in the state—to make its collection directly accessible online, free of charge, to the public statewide. A complete list of awards and recognitions is presented in Appendix F.

STAFFING. **Philip Keillor**, our coastal engineering outreach specialist, retired from university service in early 2003 after serving 28 years with the program. Based on the recommendations of our Committee on Advisory Services (Appendix J) and following a national search and screening process and in-person interviews with several candidates, **Gene Clark** was hired in February as our new coastal engineering specialist located at our UW-Superior field office. Besides serving the state’s four counties along Lake Superior, Clark will provide coastal engineering expertise and advice to state and local government officials, contractors, and lakeshore property owners in all Wisconsin coastal counties, including those along Lake Michigan. Clark previously worked 10 years as state lakeshore engineer for the Minnesota Board of Water and Soil Resources, where he provided technical design assistance for lakeshore protection and erosion control project. Clark holds two master’s degrees—one in coastal engineering from the University of Florida, and a civil engineering master’s in hydrology and hydraulics from UW-Madison.

Former Earthwatch graduate student writer **Kathleen Schmitt** rejoined Wisconsin Sea Grant in July as our new Science Writer, replacing Jill Ladwig, who left the program to take a position as national strategic marketing leader with Flad & Associates, Inc., a Madison-based architectural firm. Schmitt was previously employed for two years as science writer at New Hampshire Sea Grant. She holds a master’s in life sciences communication from UW-Madison.

APPLYING NEW INFORMATION TECHNOLOGY. Technological advancement is a UW Sea Grant program priority, and we place an emphasis on using the Internet and new Web-based database applications. During the past year, our website was reorganized according to national Sea Grant themes, each providing an integration of research projects and results, outreach activities, and communications products. The “Wisconsin Water Policy Database” website debuted in April 2004,

providing state citizens with a new, Web-based tool for researcher in the state's major policies pertaining to water.

Our online Publications Store, launched in February of 2003, has contributed to a significant increase in publication sales over the last year, and this system also gives us the ability to accurately track and manage our publications inventory (see Appendix D). We also continued development of a computer intranet for the use of program staff and UW Sea Grant-funded investigators, including a project budget management system.

To measure the effectiveness of our Websites, UW Sea Grant installed state-of-the-art WebTrends® tracking software. WebTrends allows us to determine which of our sites are receiving the most traffic and which topics are of the most interest to our visitors. For example, it allows us to determine the most popular scripts that visitors are reading on our Earthwatch Radio Website and which publications visitors are viewing in our online Publications Store. This has enabled us to evaluate and refine our online efforts to maximize the impact of our messages and online products and to improve areas of our sites that are less successful.

Connecting with Users

Program outreach staff members serve as the primary means for connecting users with Sea Grant information and conveying research needs to faculty and program management. Complete listings of program outreach activities and project partnerships during the past year are presented in appendices H and I, respectively. The highlights of the past year are presented below, listed alphabetically by Sea Grant national theme area and subprogram number.

AQUACULTURE (Wisconsin program priority area)

A/AS-54—WATERS 2004-06: Wisconsin's Aquaculture Technology, Education and Research Services. During the past year, the investigators provided direct, one-to-one assistance and hands-on training to more than a dozen fledgling aquaculture businesses, and both general and specific aquaculture-related information. Requests for information about sources of various aquaculture species and planning resources requests were typical. Intensive perch-rearing techniques (IAT) was one of the principal topics of inquiry from within Wisconsin, other states and in some cases from Europe.

Our aquaculture outreach specialist (**Binkowski**) also interacted with the Native American groups and the regional U.S. Department of the Interior Bureau of Indian Affairs to develop a consortium of yellow perch fingerling producers among eight regional Native American bands: the St. Croix, Red Lake, Leech Lake, Red Cliff, Bad River, Lac Courte Oreilles, Menominee and Lac du Flambeau.

AQUATIC INVASIVE SPECIES (Wisconsin program priority area)

A/AS-1—Asian Carp Rapid Response Project and Chicago Sanitary-Ship Canal Fish Dispersal Barrier. This high-profile AIS control and prevention effort has attracted increasing public interest as three invasive species of Asian carp (bighead, silver and black) continue to spread up the

Mississippi and Illinois rivers toward the Great Lakes via the Chicago San-Ship Canal. Our invasive species specialist (**Moy**) cochairs semiannual meetings of the Dispersal Barrier Advisory Panel, a multi-agency *ad hoc* advisory body that provides input and direction on the U.S. Army Corps of Engineers' electric barrier on the canal. The present barrier is expected to wear out by April 2005, and a second larger, longer-life electric barrier was scheduled for construction in the fall of 2004. Panel members have facilitated funding of this project through both federal and state avenues. The panel also acts as a coordinating body for public input to the project, research direction, funding and coordination, and ensures that the multiple international, federal, state and municipal agencies with interests in the canal as well as business interests have a forum for discussion and consensus.

Moy also chairs monthly meetings of the Asian Carp Rapid Response Committee, formed at the request of the Great Lakes Fishery Commission to develop a response plan in case Asian carp get through the electric barrier. This effort began with 12 regulating entities and expanded to about 19 interested entities, including the Lt. Governor of Illinois. Subcommittees of the team have developed a response plan for Asian carp and a coordinated outreach effort.

A/AS-1—Aquatic Invasive Species Outreach. Our AIS specialist (**Moy**) led a project funded by the U.S. EPA Great Lakes National Program Office to create “Great Lakes Alien Invasion,” an interactive computer kiosk on key invasive aquatic species, that spent last summer crisscrossing Lake Michigan aboard the *S.S. Badger* car ferry, which carries nearly 100,000 passengers a season. During the winter, the kiosk will be stationed at the Wisconsin Maritime Museum in Manitowoc.

A/AS-1—Hazard Analysis and Critical Control Point (HACCP) for the Baitfish Industry. This collaborative project of the Wisconsin, Minnesota, Michigan, Ohio and Pennsylvania Sea Grant programs was continued with a grant from the U.S. EPA's Great Lakes Protection Fund. Our AIS specialist (**Moy**) gave a presentation on HACCP to an audience of 50 at the Wisconsin Aquaculture Industry meeting in Stevens Point last March and has scheduled three more HACCP workshops in January 2005. He is also working with the Wisconsin Bait Dealers Association to conduct a multi-state HACCP workshop and with the Wisconsin Department of Natural Resources (DNR) to arrange a HACCP workshop for its wardens and field staff.

A/AS-53—Sea Grant Non-Indigenous Species (SGNIS) Website: Development and Support. SGNIS has served Sea Grant's principal web presence on aquatic invasive species (AIS) issues since 1996. Users can be confident that the materials available there are of the highest quality, as all research and outreach documents on SGNIS must pass peer review. Each accepted paper or report is coded and cited for use by website search engines, and users have the opportunity to search by using 49 keywords, 18 product types, and 6 user types. SGNIS logged more than 3 million file transfers during the past year, up 88% from the previous year. Accessed by users from 125 countries, most users were American (66%), led by users on commercial (23%), educational (18%) and internet service providers (18%) domains. Responding to the increasing demand for AIS outreach products from Sea Grant programs, government agencies and nonprofit organizations, SGNIS has increased its efforts to obtain these materials, nearly doubling its holdings of outreach materials over the past year. Also, SGNIS was recently redesigned to greatly decrease file loading time and accommodate various web browsers.

COASTAL COMMUNITIES & ECONOMIES

C/C-7—Exploring Wisconsin's Great Lakes Schooners: Integrating Underwater Archaeology, Shipwreck Preservation and Public Education. This project has greatly increased public access to Great Lakes shipwrecks and maritime history, strengthening public appreciation of the need to preserve these finite cultural resources. Since the beginning of the project, an average of nearly 11,000 visitors per month have accessed the UW Sea Grant website, “Wisconsin’s Great Lakes Shipwrecks” (www.wisconsinshipwrecks.org). Much of the information on the website comes from scholarly reports resulting from these investigations, so recasting their highlights in accessible language on the website and in the other outreach efforts supported by the project has greatly increased the number of people this information reaches.

The shipwrecks website is a major component of Wisconsin’s Maritime Trails, which is being developed in a partnership between Wisconsin Historical Society (WHS) and UW Sea Grant (www.maritimetrails.org). In the past year, three Maritime Trails outdoor displays were produced for the shipwrecks *Milwaukee* and *Vernon*, and the historic Bayfield waterfront, and production began on three additional markers for the shipwrecks *Lumberman*, *Kate Kelly*, and *Appomattox*. Also, three Maritime Trails kiosks were installed at the Wisconsin Maritime Museum in Manitowoc, the Kenosha Public Museum in Kenosha and the Wisconsin Historical Society in Madison. These interactive kiosks utilize touch-screen technology to enable visitors to explore Wisconsin shipwrecks, underwater archaeology, artifact conservation and scuba diving. A special feature is a 3-D computer model of a typical Great Lakes three-masted schooner.

Project investigators made 20 public presentations to a total of nearly 1,100 school children and adults (see Communications Outreach Activities, Appendix H), and more than a dozen articles about the project were published in newspapers, magazines, newsletters and websites. In addition, last summer’s archaeological fieldwork was documented daily on the popular online journal, “Notes from the Field 2004: Exploring Wisconsin’s Shipwrecks,” a Web-based chronicle of shipwreck exploration and related activities (www.maritimetrails.org/notes/index2.asp). The entries from WHS archaeologists and volunteers included descriptions of their work with explanations of how and why the work was conducted.

COASTAL NATURAL HAZARDS

A/AS-1—Coastal Natural Hazards Outreach. The objective of this project is to assist Great Lakes property owners and local, regional and state agencies with awareness and sound coastal engineering in promoting smart coastal growth and the identification, education and direct engineering assistance of all aspects of coastal natural hazards and their potential impact on Wisconsin’s Great Lakes shorelines. The project was initiated with the introduction of UW Sea Grant’s new coastal engineering specialist (**Clark**) to many local, regional and national resource agencies. Several coastal engineering presentations were made, along with several individual Wisconsin coastal erosion site observations and preliminary erosion control recommendations. Partnerships were established with several regional and national coastal engineering resource agencies and committees.

A/AS-1—Port, Harbor & Marina Engineering Assistance. Projects involving partnerships with six of Wisconsin’s harbor, port and marina managers were completed, as well as the initial

identification of the most important issues they are facing. The accelerated corrosion problem at Duluth-Superior port facilities was the focus of a technical workshop organized and cosponsored by the Wisconsin and Minnesota Sea Grant programs to identify possible causes and future research and studies to help characterize the problem. More than 60 port officials, scientists and other interested parties participated in the workshop.

A/AS-1—Visualization of Coastal Erosion Hazards. Our GIS specialist (**Hart**) collaborated in a research and outreach project to visualize coastal erosion hazards on the Great Lakes. Information gathered by scientists about coastal processes is often very technical in nature and, therefore, difficult to communicate to coastal landowners and local officials. UW Sea Grant partnered on a project, headed by Prof. Mark Harrower of the UW-Madison Geography Department, that was designed to bridge the gap between scientific understanding and public perception by utilizing Web-based geovisualization tools and remotely sensed data to present integrated and scientifically informed views of coastal erosion.

DIGITAL OCEAN-GREAT LAKES (Wisconsin program priority area)

A/AS-1—Geographic Information Systems Outreach. Our GIS specialist (**Hart**) received funding from the NOAA Coastal Services Center for a project called “Developing a Dynamic and Distributed GIS to Support Coastal Management along the Lake Superior Coast of Wisconsin.” This project will expand the web mapping capabilities of local governments, enable local government data to be shared and integrated into regional applications, and provide training and education on how to use web mapping services to address coastal hazards and coastal planning issues.

R/NI-33—Applications of "Dynamic and Distributed" GIS and Visualization for Great Lakes Coastal Management. The investigators updated a website of Wisconsin county internet mapping sites (coastal.lic.wisc.edu/wisconsin-ims/wisconsin-ims.htm). As of October 2004, there are 31 county web mapping sites accessible to the public and 19 that are in development or limited to the intranet or subscription only.

The investigators also updated a website of Wisconsin municipal internet mapping sites and investigated web mapping services that provide useful information for coastal management GIS applications. They tested several kinds of web mapping clients that can access and integrate interoperable web mapping services and explored interoperability tools for web mapping servers. They also worked with the North Carolina Center for Geographic Information & Analysis to develop an interoperable web mapping service for land use mapping in Sheboygan County.

The investigators developed an integrated bathymetric/topographic digital elevation model for Ozaukee County to visualize changing lake levels and the components of coastal setback alternatives. This extends work completed as part of the NASA-IAGT coastal visualization project. They created a land use/cover data set based on a 2000 orthophoto to show building setback with real topographical data and current building locations with the goal of providing a more realistic visual of what is happening in the area and show different set-back scenarios.

Most recently, they created a historical digital elevation model of southern Ozaukee County in an attempt to show bluff conditions in 1956. This was done by redrawing contour values based on the

bluff top-bluff toe location in the 1956 orthophoto. Based on erosion processes (rotational slumping) for cohesive bluffs, the goal is to show recession rates in a 3-D, volumetric way to help users visualize what is happening.

ECOSYSTEMS & HABITATS

A/AS-1—*Cladophora* Nuisance Algae Outreach. During the past year, our habitat restoration specialist (**Harris**) authored an article on the factors influencing *Cladophora* growth in Lake Michigan for the Wisconsin Coastal Management Program's *Great Lakes Chronicle* newsletter. Tens of thousands of copies were printed and distributed throughout the state, and UW Sea Grant reprinted the article in its *Littoral Drift* newsletter.

In an August presentation that drew 122 citizens and members of the Door County Environmental Council, Harris discussed the sources of phosphorus and other conditions that contribute to excess *Cladophora* growth along the Lake Michigan shoreline. A follow-up interview with the *Green Bay Press Gazette* resulted in a comprehensive article on the relative importance of point and nonpoint sources of phosphorus.

She also gave a presentation to the media and guests of the Manitowoc County UW-Extension and UW Discovery Farms 2004 Media Day & Farm Tour on the causes of *Cladophora* growth in Lake Michigan. Many citizens and local officials are upset about the nuisance conditions and blame large farming operations in the area, and some concerned citizens have even formed an action group, Centerville Cares. The Media Day and Farm Tour was organized to share information about the algae problem and to tour several different types of farming operations (traditional, confined feeding and rotational grazing) participating in Discovery Farm studies of best management practices. The event was covered by numerous local media, and attended by about 50 farmers, land conservation agency staff, university researchers and elected officials.

A/AS-1—Coastal Habitat Restoration Outreach. Construction of two headlands, a captive beach, rock spawning bed and rock reefs at South Bay Marina was completed in late 2003. Over a period of five years, our habitat restoration outreach specialist (**Harris**) worked with the marina owners, their development consultant and the RAP Biota & Habitat Work Group to design the habitat restoration project, identify appropriate construction materials, and obtain funding for construction.

FISHERIES

A/AS-1—Fisheries Outreach. During the past year, our fisheries specialist (**Moy**) continued to chair monthly meetings of the Lake Michigan Fisheries Forum, an advisory body formed by the Wisconsin DNR to address issues related to Lake Michigan fisheries. Its purpose is to facilitate information exchange between the department and interested groups and individuals, provide a forum for discussion of issues of concern, develop consensus among diverse interests on matters of common concern, and develop public advocacy for policies of general interest.

A/AS-52—Great Lakes Fisheries Leadership Institutes. Our fisheries specialist (**Moy**) organized and hosted two Great Lakes Fisheries Leadership Institute workshops held in Ashland and Stevens

Point the past year—Wisconsin’s part of a Fisheries Extension National Strategic Investment project of the Great Lakes Sea Grant Network. The Ashland workshop, held January 24-25, was the Lake Superior basin workshop and included eight participants and 11 speakers from Wisconsin, Michigan and Minnesota. The session in Stevens Point, held April 24, was the Wisconsin state leadership workshop. Ten people participated in that workshop—six students and four instructors. Though the workshops were not well attended, participants ranked the workshops highly in their evaluations.

MARINE & AQUATIC SCIENCE LITERACY

A/AS-1— Science of the Great Lakes-Elementary to Post-Secondary (Lake Sturgeon Bowl).

Our education specialist (**Lubner**) provided assistance and guidance in the implementation of the Lake Sturgeon Bowl through involvement in the training of officials, volunteers, team coaches and team participants, and in conducting limnological and oceanographic research experiences for the winning teams. Lubner also participated in a seminar on participation in the Lake Sturgeon Bowl held as part of the annual meeting of the Wisconsin Society of Science Teachers. Work is already underway on preparing for the 2005 competition.

C/C-2—Earthwatch Public Service Radio Program. Earthwatch Radio made a significant advance in distribution in 2004 by developing a partnership with the World Radio Network (WRN) in London. WRN started using the program in February. WRN delivers a wide range of public service radio programs to listeners around the world, and Earthwatch Radio is featured on three of its English language channels.

Other monthly subscribers included 120 commercial and noncommercial radio stations in the United States and Canada (see “Earthwatch Radio Partners,” Appendix I). The radio program scripts are also sent via an email distribution service to about 300 subscribers in the United States and Canada, as well as to many others in the United Kingdom, Russia, South Africa, India and Taiwan.

About half of the 260 two-minute programs produced by UW Sea Grant last year covered atmospheric or water-related subjects, such as global climate change, fisheries, and marine and Great Lakes research. Many of the scientists and other sources for Earthwatch stories work for or are funded by NOAA, Wisconsin Sea Grant and other Sea Grant programs around the country.

Earthwatch also continued to expand its presence on the World Wide Web. During the reporting period, two online essays were produced to complement Earthwatch radio programs on the problem of hypoxia in the Gulf of Mexico (ewradio.org/feature_wetland.aspx) and research at UW-Madison on the chronic wasting disease that is spreading among deer populations in the Midwest (ewradio.org/cwd_extended.aspx). This developed a usable format for future online essays and reference materials. The Earthwatch website recorded more than 150,000 visits from more than 48,000 visitors during the past year, and each of the online essays registered about 500 visits.

During the year, four students—three graduate and one undergraduate—were employed to work as part-time science writers on the Earthwatch Radio project. One of them, Diane Pansky (M.S., 2004) was selected to receive a 2005 Dean John A. Knauss Marine Policy Fellowship.

E/E-1—JASON Project. Eighteen teachers and nearly 800 students from 11 schools and one home school in the communities of Abbotsford, Beaver Dam, Blair, Columbus, DeForest, Madison,

Stoughton, Sun Prairie, and Windsor participated in the Madison JASON project during the last year (see Appendix I). In addition, more than 300 Milwaukee-area students also experienced the 2004 live JASON Project telecast from the rainforest of Panama, witnessing firsthand the science being conducted along with a look at the history of the region, including the importance of the canal. These students also had an opportunity to interact onsite with university scientists and to ask questions relative to marine and aquatic science.

E/E-1—Allied Drive Aquatic Science Literacy Project. The Allied Drive neighborhood of Madison has a variety of community problems concomitant with a low-income, chiefly minority population, including literacy underachievement among area children. Studies indicate access to library resources can improve literacy, and, given the national Sea Grant goal of advancing marine and aquatic literacy, UW Sea Grant and the UW-Madison Water Resources Library undertook a library pilot project to improve aquatic science literacy by presenting story hours to K-5 grade students in the Allied Drive neighborhood. After working initially with K-5 students from both the Boys and Girls Clubs of Dane County and Madison School & Community Recreation (MSCR), we established a partnership with MSCR's Safe Haven after school program to work with K-1 students. Further information can be found on the Web at www.aqua.wisc.edu/waterlibrary.

The School of Library & Information Studies and UW-Madison Libraries have applied for an Ira and Ineva Reilly Baldwin Wisconsin Idea Endowment grant to build on and expand this outreach project with staff from UW campus libraries and students from the School of Library & Information Studies.

E/E-45-SE—Problems in Oceanography, Fall Semester 2003. Offered continuously since 1968, this biennial interdisciplinary graduate program in Limnology & Marine Sciences encourages participation in a week-long program of field studies based at the University of Georgia's Marine Institute on Sapelo Island, Ga., as a core element of any LMS graduate student curriculum. Several students were recruited from departmental graduate programs in Civil & Environmental Engineering and Zoology. This UW Sea Grant project provided travel support for 11 graduate students and three faculty to participate in the fall 2003 course.

E/E-46—Knauss Fellowship 2004, Wisconsin. UW-Madison graduate Colleen Corrigan was selected for a 2004 Dean John A. Knauss Marine Policy Fellowship. She's currently working on marine mammal conservation issues at the U.S. Fish & Wildlife Service's Branch of Resource Management Support in Washington, D.C.

E/E-48—Recent Advances in Limnology and Oceanography Seminar Series, 2004-06.

Sponsored continuously by UW Sea Grant since 1973, this popular annual public seminar series was offered in the spring semester at UW-Milwaukee. The topic for this year's series was: "Climate Change in the Great Lakes and Oceans." The names of the speakers and the titles of their talks are listed under "Education Workshops, Lectures & Seminars" in Appendix H.

Travel itineraries were arranged so the speakers could spend at least one full day in Milwaukee to meet with students, faculty and other interested individuals. In some cases, the speakers stayed an extra day and presented a second talk at the Center for Great Lakes Studies Anchor Watch seminar,

or the Biological Sciences Colloquium, which draws upwards of 100 graduate students and faculty from the main campus community.

This seminar series offered two academic credits to graduate and advanced undergraduate students who registered for Biological Sciences 611. For the 2003-04 series, 11 students were enrolled, and again they were about evenly divided between graduate and undergraduates. Many more students attended the public lectures than were officially registered for credit. Attendance at each of the eight lectures ranged from 25 to 50 people. These lectures informed students, scientists and the interested public about the potential impact of climate change on freshwater and marine ecosystems; provided information about current research that is underway to address these problems, and provided a forum in which students, faculty and the public could meet and discuss these problems with leading experts from around the nation.

E/E-49—Sea Grant-Industry Fellowship to Develop a Hybrid Photocatalytic Disinfecting Point-of-Use Drinking Water Treatment Device. The investigators have acquired a prototype point-of-use reactor from their industrial partner, Pentair Water Treatment, Sheboygan, Wis. This reactor has been set up in the laboratory at the university and is now ready to test with contaminated laboratory waters. The investigators have selected arsenic and MTBE for initial testing of the device. They have collected the reagents needed for these contaminants and selected the analytical equipment and methods to be used for this study. They also have begun collecting and reviewing the research literature on photocatalytic treatment of drinking water to determine the applicability of this process to other contaminants. The light transmission/absorbance properties of materials of interest are continuing at both the university and the industrial partner.

URBAN COAST

A/AS-1—Coastal GIS Training and Education. This Advisory Services project continued to support web-based GIS “teaching models” to demonstrate how GIS can be applied to specific issues, including shoreland management, coastal erosion and stormwater management. These sites have been used in Wisconsin and worldwide to gain an understanding of how GIS can be applied to coastal issues.

A/AS-49—Implementation of Comprehensive, Dynamic GIS for Coastal Management: Linking Agencies for Better Decisions and Public Information about the Coastal Zone. The Community Planning Resources (CPR) website and associated Great Lakes Coastal Communities (GLCC) websites have been released for general public use as of mid-September 2004. Although work will continue, particularly on the "Maps and Data" section, the product is usable as is. The Community Planning Resources website offers land use planning information, methods, guidelines, and tools for people with varying levels of expertise, from the concerned citizen to the trained professional.

The GLCC website provides a toolkit to support comprehensive planning and sustainable development along the Great Lakes coasts of Wisconsin. This website includes an online Coastal Planning Guidebook to help Wisconsin communities address coastal issues within their comprehensive plans. The guidebook explores some of the data and tools that might be needed to

document coastal resource issues and provides strategies that communities might implement to reach common coastal planning goals. The GLCC also provides information and links on laws and regulations that affect coastal resources planning; comprehensive plan examples from Wisconsin coastal communities; coastal hazards planning and mitigation; tutorials and demonstrations on coastal mapping, including Geographic Information Systems; training opportunities; coastal-related issues, and coastal planning news and events.

Evaluation to date has consisted of detailed review by two groups of planning professionals: the site has been presented twice to members of the State Agency Resource Working Group (SARWG) and once to the University of Wisconsin-Extension land use planning team.

A/AS-55—EPA Smart Growth Extension Partnership. This project provided 50 county conservationists and county board members of Great Lakes Basin Land & Water Conservation Departments with vital information on how to improve the quality and implementation of Land and Water Resource Management Plans. Plans that base nonpoint-source abatement activities on specific water quality objectives will help to achieve the goals of the Lake Michigan Lakewide Management Plan, Remedial Action Plans and Section 204 Basin Plans. A facilitated discussion generated recommendations and a strategy for addressing state impaired waters, incorporating receiving body water quality objectives into upstream plans, and coordinating the development of county plans across watershed boundaries.

In addition, our water quality specialist (**Harris**) presented future scenarios for Wisconsin's water resources based on alternative urban, agricultural and lakeshore development patterns and land management practices to a conference on "East Central Wisconsin in 2050: The Future ... Ours to Envision, Ours to Create." She also reported on the major conclusions and recommendations of the Waters of Wisconsin initiative. The conference was sponsored by East Central Regional Planning Commission and UW-Extension and attended by 60 community officials, commission members and local agency staff.

INNOVATIVE SCIENCE & TECHNOLOGY

R/NI-31—Improving Safety and Efficiency in Scuba Diving. This project proffers a unique opportunity for developing an educational outreach program to promote diver health and safety among seafood and recreational scuba divers alike. The collaboration of UW Sea Grant and University of Puerto Rico Sea Grant researchers, Harvard University scientists, and the Diver's Alert Network (DAN) on this project provides an excellent resource of cultural and linguistic understanding to effectively communicate a diving health and safety message to the diving populations of the Caribbean and Latin America, as many members of this research group are fully bilingual in Spanish and English and culturally aware. By promoting a better understanding of those diving practices that carry unacceptable risks, an educational outreach approach directed toward seafood and recreational scuba divers offers the benefits of lowering the incidences of decompression sickness, dysbaric osteonecrosis and secondary disabling osteoarthritis. This joint collaboration involving personnel from the University of Wisconsin, Harvard University, and University of Puerto Rico Sea Grant offers a unique cultural and linguistic understanding to effectively communicate the diving health and safety message in an educational outreach program.

Producing Significant Results

This fall's project progress reports indicate excellent results in **24 projects** in **nine theme areas**.

AQUATIC INVASIVE SPECIES (Wisconsin program priority area)

A/AS-53—Sea Grant Non-Indigenous Species (SGNIS) Website: Development and Support.

The SGNIS website provides global access to high-quality, science-based information on aquatic invasive species (AIS). An important feature of SGNIS is its ability to compile and provide materials regarding newly identified aquatic invasive species from a variety of sources, such as the annual International Aquatic Nonindigenous Species Conference, the Sea Grant network, NOAA environmental research labs, U.S. Army Corps of Engineers, U.S. Coast Guard and the USGS Florida Caribbean Science Center. New invasive species on SGNIS include the Asiatic clam (*Corbicula fluminea*), European rudd (*Scardinius erythrophthalmus*) and *Caulerpa taxifolia*, an alga believed to have been introduced via plant and aquarium hobbyists.

To date, the SGNIS database contains more than 1,700 items related to AIS. Housed at the site are over 922 completed research findings, 384 papers from six conference proceedings, 91 issues of newsletters, 106 slides in the graphic library, and 96 outreach and education products. Contributions to SGNIS have been made by more than 100 organizations (including 20 Sea Grant programs) and 148 professional scientific journals. A committee for developing a refined "Kids Page" based on the latest Instructional Design Strategies was put into place during the last project period and the planning process continues into this project period. Robin Goettel (Illinois-Indiana Sea Grant) and Helen Domske (New York Sea Grant) are co-chairing the committee of Sea Grant educators.

R/LR-91—Quagga Mussel Invasions: Functional Morphology, Biomechanics, Zebra Mussel Displacement and Future Spread. We know very little about quagga mussel behavior, attachment mechanics, and substrate utilization, which is critical for determining how and why they are displacing zebra mussels in the Great Lakes, and what types of substrates and habitats they are able to colonize. The investigators on this project have made a discovery regarding quagga mussel attachment dynamics and behavior that provides an insight into the quagga's abilities to out-compete zebra mussels.

Over the past year, the investigators collected quagga mussels from shallow (<40 m) and deep (up to 150 m) habitats in Lake Ontario, and soft sediment where deep quagga mussels are found. In the laboratory, they discovered that shallow and deep quagga mussels possess different behaviors in addition to different shell morphologies. As expected, shallow quagga mussels attach to one another with byssal threads, like zebra mussels, and in some areas in the field they form extensive beds across the sediment. In contrast, the investigators discovered that deep quagga mussels do not lie passively on the soft sediment, but rather they move readily by leveraging their foot against the sediment and eventually burrow.

This burrowing ability may be a unique adaptation to living on soft sediment in hydrodynamically calm environments and demonstrates fundamental functional differences in behavior within a species or at different stages in their life. It is possible that the burrowed orientation allows for more efficient feeding on soft sediment.

AQUACULTURE (Wisconsin program priority area)

A/AS-50—WATERS 2002: Wisconsin’s Aquaculture Technology, Education and Research Services. A technical report coauthored by the investigators, *Aquaculture Effluents and Waste By-Products: Characteristics, Potential Recovery and Beneficial Reuse*, was published recently by the Iowa State University Press with support from Wisconsin Sea Grant and the North Central Regional Aquaculture Center (NCRAC). This publication responds to the need to develop environmentally sound freshwater aquaculture systems focused on reducing water usage and waste effluents, and it addresses a Wisconsin Sea Grant research priority of developing cost-effective methodologies and sustainable technology for the recovery and beneficial reuse of suspended solids and dissolved nutrients to satisfy effluent water quality standards and avoid water use conflicts.

A/AS-54—WATERS 2004-06: Wisconsin’s Aquaculture Technology, Education and Research Services. Through a joint UW Sea Grant and NCRAC project, the investigators have instituted improved regional aquaculture information and networking strategies that include the establishment of an Aquaculture Regional Extension Facilitator phone line and website. The website (www.ncaref.org) provides links to online aquaculture information at NCRAC, Wisconsin and other Great Lakes Sea Grant programs, UW Great Lakes WATER Institute, and other regionally appropriate sources. This project serves the entire North Central region, which includes six Great Lakes bordering states.

R/AQ-40—Tetracycline Antibiotics and Resistance Genes in Aquaculture Environments: Genotypic Diversity and Potential Resistance Reservoirs. The investigators have acquired the expertise necessary to extract and detect oxytetracycline (OTC) in sediments and water. Their work with the USGS and Wisconsin State Laboratory of Hygiene is promoting significant knowledge transfer between federal and state agencies regarding the detection of pharmaceuticals in the environment using state-of-the-art methods.

The investigators have also adapted a molecular method—previously used only for pure cultures of bacteria—to detect tetracycline resistance genes in mixed populations of environmental microbes. This strategy will enable their lab to quickly screen a larger number of samples.

A manuscript describing the predicted distribution of oxytetracycline in streams receiving discharges from aquaculture facilities is in press. This work will help target locations for sampling that are predicted to have the greatest likelihood for promoting OTC resistance.

BIOTECHNOLOGY (Wisconsin program priority area)

R/BT-16—Dioxin Developmental Toxicity in Zebrafish. To understand the risk that exposure to TCDD and related halogenated aromatic hydrocarbons pose to fish early life stage survival it is essential to identify target organs of TCDD toxicity and components of the AHR signaling pathway in fish embryos and larvae that are required for TCDD developmental toxicity to be expressed. During the past year, the investigators on this project have realized three major research advances. First, they identified heart malformation as one of the earliest occurring adverse effects of TCDD exposure in the zebrafish embryo. Second, they determined that only one of the two forms of ARNT that exist in zebrafish, ARNT1, is required for TCDD developmental toxicity to be expressed;

ARNT2 is not essential for TCDD toxicity. Third, they discovered that cyp1a induction is not required for TCDD developmental toxicity. This is a very important finding because it directs future research on TCDD toxicity away from events downstream of cyp1a induction and to other dioxin response element (DRE) dependent mechanisms.

Taken together, these results increase our understanding of the negative impact to recruitment of yearling fish into feral populations posed by exposure of fertilized eggs to complex mixtures of AHR agonists including both polychlorinated and polybrominated dibenzo-*p*-dioxins, dibenzofurans and biphenyls. The World Health Organization will use this new information when it updates the relative potency factors for these toxins currently used by regulatory agencies globally to assess the risk of recruitment failure in feral fish populations exposed to these classes of persistent organic pollutants.

COASTAL COMMUNITIES & ECONOMIES

C/C-7—Exploring Wisconsin's Great Lakes Schooners: Integrating Underwater Archaeology, Shipwreck Preservation and Public Education. This highly successful project seeks to increase public appreciation and protection of Wisconsin's maritime heritage through archaeological surveys and public education. Evidence of the significant impacts of these efforts includes positive feedback from numerous website visitors and the willingness of recreational divers to act as mooring custodians and help conduct archaeological surveys.

During the past year, the wreck of the fish tug *T.H. Camp* was listed and the wreck of the *Appomattox* was nominated for the state and national Registers of Historic Places. Built in 1876 and sunk off Madeline Island in Lake Superior in 1900, the *Camp* played an important role in the expansion and ultimate decline of the Great Lakes commercial fishing industry, and its remains are extremely well preserved in 185 feet of water. Built in 1896 and wrecked off Milwaukee in 1905, the *Appomattox* was the largest wooden steamer to ever sail the Great Lakes—possibly the world. A marvel of wooden ship architecture, the *Appomattox*'s remains are a rare and important example of wooden ship construction at its zenith. Also, significant progress was made during the 2004 field season on archaeological research on two more historic shipwrecks, the schooners *Perry Hannah* and *Cecelia*.

Finally, the U.S. Court of Appeals for the 7th Circuit in Chicago affirmed an earlier decision by the federal district court in Milwaukee that the state of Wisconsin owns a historic shipwreck lying in state waters. The decision settled a case begun Aug. 7, 2000, when an Illinois resident asserted a claim under admiralty law for title to the shipwreck *Rosinco* on the bottom of Lake Michigan. The Wisconsin Historical Society and state Department of Justice argued that these wrecks are publicly owned, and neither the wrecks nor the artifacts associated with them can be privately held. The appeals court ruling greatly bolsters the state's efforts to protect historic shipwrecks from looting by treasure and artifact hunters, as well as from commercial salvagers.

COASTAL NATURAL HAZARDS

A/AS-1—Shore Protection Advice For Great Lakes Shore Property Owners. A new Great Lakes shore protection booklet, *Living on the Coast*, was jointly published by UW Sea Grant and the U.S. Army Corps of Engineers-Detroit District during the year—the first new, comprehensive booklet on shore protection in the Great Lakes since an Environment Canada booklet published in

1986. Intended for Canadian and U.S. lakeshore property owners throughout the Great Lakes basin, the booklet has been extremely successful. The USACE's first printing of 1,000 copies was quickly exhausted, and UW Sea Grant is funding a second printing of 5,000 copies. Three other booklets are also in various stages of preparation. A 16-page booklet entitled *Stabilizing Coastal Slopes on the Great Lakes* will be published in late 2004 or early 2005. A five-page pamphlet titled "Working with Engineers and Contractors on Shore Protection Projects" is ready for printing. A 13-page pamphlet entitled "The Economics of Coastal Investments along the Shores of the Great Lakes" has been drafted. These publications, along with several others being prepared in other UW Sea Grant projects, will form the foundation for a comprehensive set of shore protection advice booklets for Great lakes property owners.

A/AS-1—GIS and Coastal Hazards. As part of a project funded by the U.S. Army Corps of Engineers-Detroit District, historical digital orthophotos and current and historical depictions of bluff tops and toes have been developed for seven Wisconsin coastal counties (Kenosha, Racine, Milwaukee, Ozaukee, Sheboygan, Manitowoc, and Kewaunee). This information will be useful in the implementation of the coastal setback provisions of local zoning ordinances and the revision of a model shoreland zoning ordinance for the Lake Michigan coast of Wisconsin.

DIGITAL OCEAN-GREAT LAKES (Wisconsin program priority area)

R/MW-85—Enhanced Experimental Methods for Measuring Inorganic Contaminants in Water Using a Micromachined DC Plasma Instrument. During the past year, a liquid electrode spectral emission chip (LEd-SpEC) has been developed for use in this project. The LEd-SpEC uses the water sample itself as the electrode material for generating a glow discharge for spectroscopic analysis, rather than a nebulizer that is commonly used for sample introduction in macro-scale instruments. The physical limitations associated with scaling down the nebulizer for sample introduction were identified as a major challenge associated with the development of a micromachined DC plasma instrument for this project, so development of the LEd-SpEC is a major advancement for the application of this technology. Based on these experiments, a manuscript entitled "Detection of aqueous metals using a microglow discharge atomic emission sensor" has been accepted for publication in *Sensor Letters*.

The significance of this project is its potential for developing a micromachined instrument several hundred times smaller than macro-scale instruments. The investigators have used this microplasma device to qualitatively determine 21 environmentally relevant aqueous metals—specifically, Li, Be, B, Na, Mg, Al, K, Ca, Cr, Mn, Fe, Co, Ni, Cu, Zn, Mo, Ag, Cd, Ba, Tl, and Pb.

ECOSYSTEMS & HABITATS

A/AS-1—Coastal Habitat Restoration. The South Bay Marina habitat enhancement project rehabilitates degraded habitat in an urban area, providing habitat for shorebirds, waterfowl, walleye, bass and other aquatic life. Observations at the project site this year indicate that wetland vegetation is becoming established behind the east headland, as planned. The captive beach materials have sorted well and provide a much improved habitat over pre-project conditions. Wildlife observed using the restored habitat area include waterbirds, shorebirds, ducks and bald eagles.

The Cat Island restoration project will reestablish a chain of barrier islands in southern Green Bay that provide more than 150 acres of nesting habitat for colonial nesting waterfowl, shorebirds, turtles and amphibians. The islands will also protect several hundred acres of shallow water habitat, allowing for the reestablishment of submerged aquatic vegetation and coastal marsh. The physical modeling and reviews with project engineers have resulted in improved island designs over the preliminary CDF-like armored structures and should reduce the federal and local cost-shares for construction materials. The project provides a beneficial use for sediments dredged from the Green Bay navigation channel, reduces the amount of material landfilled at the Bayport disposal area, extends the life of the disposal facility and saves Brown County tax dollars otherwise spent on land disposal. Results of sediment sampling will determine the present quality and suitability of dredged materials for island construction.

A/AS-1—“State of the Bay” Website. The “State of the Bay Report” is a web-based report card on indicators of ecosystem change. It tracks system response as remedial and restoration actions are implemented for Green Bay and its major tributaries and provides a valuable assessment of ecosystem change as resource management, remedial and restoration actions are implemented. It tracks indicators for water quality, biota, habitat and public uses over a 20-year period. The report can be used by government agencies, scientists, teachers and decision makers to inform, educate and report progress in obtaining management objectives. The information is also being used to develop a total maximum daily load allocation for phosphorus and total suspended for the lower Fox River and to integrate water quality objectives into County Land and Water Resource Management Plans.

Nearly \$1 billion will be spent between 2000 and 2020 on PCB remediation and natural resource damage compensation projects alone. The report provides a status and trends assessment using maps and up-to-date data for 41 indicators (water quality, toxic contaminants, biota, habitat, dredging and recreational use) over a 15- to 20-year period. Our water quality specialist (**Harris**) completed a draft report on trophic state indicators for phosphorus, nitrate and nitrites, ammonia, total suspended solids, chlorophyll, light transparency, temperature and chlorides. It synthesizes 1986-2002 data and provides statistical analyses of trends before and after significant management actions and the introduction of zebra mussels. The draft report was peer reviewed and is now being used by the Science & Technical Advisory Committee for the Green Bay RAP to review and possibly revise trophic state objectives for the Lower Green Bay Area of Concern.

R/EC-9—Coastal Sediment Resuspension, Transport and Deposition in Great Lakes. Current water transport models of Lake Michigan do not include suspended sediment transport. As many contaminants adsorb to sediments, this work is a first step toward obtaining large-scale sediment transport data, which will then allow us to better predict the fate of contaminants associated with those sediments. The bottom erosion and deposition system developed in the first year of this project is now being used as an important tool to examine nearshore sediment transport processes in Lake Michigan.

The results obtained from this study will enable us to better understand sediment transport in Great Lakes. The results will also be useful in assessing the fate and transport of contaminated sediments in rivers and lakes. In addition, the data will be very valuable to calibrating ongoing research on numerical modeling at NOAA’s Great Lakes Environmental Research Laboratory.

R/EC-10—Impact of a Shifting Wind Field over the Laurentian Great Lakes on Accumulation and Resuspension of Sediments in Green Bay, Lake Michigan. Beginning around 1990, a significant shift in summer surface wind fields occurred over the Laurentian Great Lakes. The overall objective of this research is to assess the impact of summer storm trajectories and the associated wind fields of the changing climatology of the Laurentian Great Lakes on the dynamics of particle accumulation and resuspension in Green Bay, Lake Michigan. Specifically, the investigators intend to determine whether sedimentation rates in lower Green Bay have changed due to a shift in wind patterns that began at the end of the 1980s and how short-term particle dynamics in the bay have changed as a result of this shift in wind patterns.

Understanding if, and how, the observed shift in wind direction has affected particle dynamics in southern Green Bay is crucial to understanding the role Green Bay plays in modulating the material loading from Fox River. Consideration of the local wind field history is also crucial to understanding coastal and estuarine ecosystems and may help to explain fluctuations in sediment and chemical inventories and biological populations that might otherwise be attributed to anthropogenic stress or coastal management and remediation efforts.

While higher sedimentation rates in southern Green Bay could conceivably translate to a reduction in nutrient (e.g., phosphorus) and toxin (e.g., PCB) loadings to Lake Michigan, a higher sediment resuspension frequency for surface sediments could greatly impact the local (Green Bay) pelagic community. There is also a possibility that shifting winds have altered the sediment focusing pattern within the bay itself, resulting in the potential exposure of deep sediments and their related contaminant loads. This work extends previous UW Sea Grant contaminants research in this area.

R/LR-94—Compensatory and Spatial Dynamics in Great Lakes Food Webs. A lake-wide acoustic assessment is currently underway and will produce a first-ever detailed estimate of fish abundance and distribution in Lake Superior. In collaboration with the lead investigator on that project and Lake Superior Technical Committee personnel, the investigators are continuing work on a dual-scale modeling effort involving development of an Ecospace model at the ecosystem scale that deals with the dynamics of interactions between nearshore and offshore habitats, and a shorter time-scale model of predator-prey dynamics owing to the diel migration process. This is an important and uniquely valuable opportunity to develop and calibrate models in conjunction with the key personnel of responsible fishery management agencies.

FISHERIES

A/AS-1—Fisheries Outreach. Our fisheries specialist (**Moy**) spent a significant portion of his time this past year to organizing and serving as general chair for the 2004 American Fisheries Society (AFS) conference held in Madison in August. The planning for this meeting consisted of near monthly meetings of a 23-member planning committee. This highly successful AFS meeting was attended by nearly 1,700 fisheries scientists and managers—the largest such meeting in the Midwest and third largest in AFS history. The conference featured three days of symposia and sessions, including one led by Moy discussing the threats posed to the Great Lakes by bighead and silver Asian carp in the Mississippi River. Moy was interviewed by reporters from Channel 5 News in Green Bay, *The London Financial Times*, *Milwaukee Journal Sentinel* and *Minneapolis Star Tribune*.

R/LR-90—MHC Diversity in Lake Trout at the Mid-Lake Reef Complex and Northern Refuge, Lake Michigan. When all of the genetic data are analyzed and correlated with the pit tag data later this year, the investigators expect to provide additional data that will be useful for lake trout stocking efforts. They have found reduced genetic diversity at the MHC II locus in all of the hatchery populations as compared to wild fish in Lake Superior. These results are in agreement with the data from an investigator at Michigan State who has examined the genetic diversity in lake trout hatchery stocks using microsatellite loci markers. The current practice of stocking multiple genetic stocks into Lake Michigan should ensure genetic diversity among the stocked fish. In addition, the profiles of the different hatchery stocks show that they share a number of common MHC alleles and that all of the common microsatellite alleles are present in each stock.

These results suggest the relative proportion of different hatchery stocks used in different years for stocking could be varied without a major effect on genetic diversity. The initial results of this project have significant implications for the lake trout stocking program of the U.S. Fish & Wildlife Service.

R/LR-92—A Retrospective Analysis of Lake Michigan and Lake Superior Food Webs.

Although the investigators are in the very early stages of this new project and still in the process of producing data, they expect that their research findings could strongly affect fisheries management and restoration efforts in the Great Lakes. The main impact of this work will be to provide an understanding of the state of the historical ecosystem and a documentation of how this has changed as a result of anthropogenic impacts.

This understanding of historical change could form the basis for directing the Great Lakes management actions in the future. Our lack of knowledge about historical ecosystems and subsequent ecological changes makes the setting of Great Lakes fish community restoration goals problematic. Developing an understanding of historical food web change caused by invasive species can be of great assistance in the setting of ecosystem restoration targets for the Great Lakes, and it will contribute to a broader, ecosystem-based approach for managing Great Lakes fisheries.

MARINE & AQUATIC SCIENCE LITERACY

E/E-47—Lake Sturgeon Bowl: Wisconsin's Regional Academic Competition for the National Ocean Sciences Bowl, 2004-06. The third annual Lake Sturgeon Bowl, regional competition of the National Ocean Sciences Bowl, was conducted with 18 teams of Wisconsin high school students participating. Three of the participating teams were from the Milwaukee Public Schools system, which has a large number of students from underrepresented populations. Nearly 100 high school students focused intensely on oceanography and the aquatic sciences in preparation for the competition.

Student evaluations following the 2003 competition showed them to be enthusiastic about the competition (82% of responding non-seniors said they would participate again), and 58 out of 94 reported they were “much more aware of marine science career options” after the competition. As of October this year, 26 schools have registered for the 2005 Lake Sturgeon Bowl, 10 of which are new to the competition. In recognition of our efforts to recruit and support students of color, Wisconsin has been invited by the Consortium for Oceanographic Research and Education to join three other sites in a pilot diversity initiative in 2005.

E/E-48—Recent Advances in Limnology and Oceanography Seminar Series, 2004-06. This seminar featured an excellent series of speakers, many of whom are clear leaders in their field. The formal presentations by the speakers were open to the public as well as the undergraduate and graduate students registered for academic credit under Biological Sciences 611. While tangible benefits of a long-running seminar series such as this are difficult to quantify, the information that was conveyed to the audience and the discussion that occurred at the seminars certainly indicated that the participants benefited from the experience. References to past seminar presentations are frequently raised in later discussions with students and staff who recall specific information presented in these seminars. We also receive many compliments from individuals outside the university who have attended the seminars.

URBAN COAST

A/AS-1—Coastal Erosion on the Great Lakes: Using Remote Sensing and Geovisualization for Public Education. Our GIS specialist (**Hart**) and coinvestigators received a grant from the NASA-funded Institute for the Application of Geospatial Technology to apply remotely sensed data to a local government concern. The project is creating an educational website for Ozaukee County that utilizes cutting-edge web-based geovisualization tools and techniques to represent dynamic coastal processes, allowing users to explore the factors that lead to coastal erosion.

A/AS-1—GIS, Coastal Communities & Smart Growth. The Community Planning Resource (CPR) developed in this project and project A/AS-49 provides a wealth of information to support comprehensive planning and “smart growth” in Wisconsin. It is designed to assist a variety of people involved in planning, from the concerned citizen to the trained professional. The Great Lakes Coastal Communities section of the CPR provides a toolkit to support comprehensive planning and sustainable development along the Lake Michigan and Lake Superior coasts of Wisconsin. This site provides links to an online Coastal Planning Guidebook and Comprehensive Plan examples, as well as to information on laws and regulations that affect coastal resources planning, maps and GIS data, training opportunities, and news and events.

A/AS-1—Developing a Dynamic and Distributed GIS to Support Coastal Management along the Lake Superior Coast of Wisconsin. Our GIS specialist (**Hart**) was awarded a grant from the NOAA Coastal Services Center concerning the development of a “dynamic and distributed GIS” to support integrated coastal management along the Lake Superior coast of Wisconsin. A dynamic and distributed GIS is one where custodians—whether local, regional, state, federal, academic or nonprofit—maintain and provide access to the most current spatial data and multiple remote users can access and integrate data in real-time from multiple sources.

The first task involved the development of web mapping interfaces and tools to support public access to local government GIS data. It extends the prototype developed for Bayfield County to other local and regional government organizations along the Lake Superior coast.

The second task concerns the implementation of web mapping services that allow integration of disparate GIS data across political boundaries. Rather than developing stand-alone local government web mapping sites, the project will draw upon the principles and protocols of the Open GIS

Consortium (www.opengis.org) to link local web mapping services and build an interoperable, “bottom-up” coastal GIS. A third task builds upon the Sea Grant-LICGF coastal GIS training program to teach local government professional staff, citizens, and other coastal constituents how to use these integrated web mapping services through workshops and web-based tutorials.

In related efforts, Hart continued work on a grant from the Wisconsin Coastal Management Program (CMP) to provide technical assistance to the WCMP to enhance the utilization of GIS for decision-making about Great Lakes coastal management and to develop and apply performance indicators for specific coastal management objectives. He also developed a website for web mapping at the Bay-Lake Regional Planning Commission (maps.baylakerpc.org).

A/AS-1—Wisconsin Marine Management Areas Inventory. Our GIS specialist (**Hart**) received a grant from the NOAA National Center for Marine Protected Areas to conduct an inventory of marine managed areas in Wisconsin. This project involves development of the Wisconsin Marine Managed Areas inventory, including a report listing marine managed sites and associated policies in Wisconsin, the submission of two sample sites (Moonlight Bay Bedrock Beach State Natural Area and Gull Island Fish Refuge) to the NOAA Marine Managed Areas database, and meetings with Wisconsin DNR and CMP staff to discuss completion and use of the inventory.

R/EC-8—Methylmercury Production and Transfer to Benthic Food Webs in Nearshore and Wetland Environments of Southern Lake Superior. The goal of this project is to answer one mystifying question about Lake Superior: Why does such a large and clean lake have a mercury problem in its fish? The results of this project will lead to the formulation of a model that will assess the relative contribution of in-lake sediments versus tributary methylmercury in Lake Superior bioaccumulation. The results will be beneficial to resource managers who are interested in mercury sources and fluxes, as well in other aquatic systems with similar sediment characteristics. The investigators have sampled a significant amount of Chequamegon Bay spatially, and this data will serve as excellent baseline data for subsequent studies. The sediment incubation rates developed in this project will also be useful in predicting methylation rates in other aquatic systems, based on sediment characteristics such as the percentages of organic carbon, clay content and porosity.

R/MW-86—Factors Regulating the Interactions of Trace Metals and Aquatic Organisms in Watersheds of the Great Lakes. The investigators used modern trace-metal clean techniques to develop and apply an algal bioassay that is sensitive to environmental levels of copper. Their research has demonstrated that *Selenastrum* is a viable algal probe for metal speciation and bioavailability studies, and that copper toxicity is related to dissolved organic carbon (DOC) levels, confirming that colloidal DOC is an important factor regulating metal toxicity to algae. Using protocols developed during the past 18 months, they also conducted experiments on the influence of synthetic and natural ligands on the bioavailability of methylmercury to *Selenastrum*. A Ph.D. thesis and manuscript resulted from this work.

This study is expected to appreciably advance our understanding of the ecological response of aquatic systems to metal loadings and significantly affect management decisions related to regulation of the release of metal into the environment.

R/MW-87—The Importance of Trophic Level and Carbon Source as Factors Affecting the Accumulation of PCBs in the Lake Michigan Food Web. PCB analysis for the first set of 20 tissue samples from various fish species (alewife, bloater chub, slimy sculpin, deepwater sculpin, lake trout) was completed in September. About 75% of the planned number of stable isotope analyses (carbon and nitrogen) has been completed, and these data are now being analyzed and prepared for publication.

The investigators report that their analyses to date suggest that nearshore carbon sources support a significant number of commercially important fish species, including yellow perch and young lake trout. Their initial results indicate that PCB (polychlorinated biphenyl) concentrations in slimy sculpins vary significantly with location, and that sculpins on Lake Michigan's mid-lake reef have exceptionally high PCB concentrations. They are conducting further PCB and isotope analyses to determine whether this is the case for the entire mid-lake reef, and if this is due to spatial differences in sculpin feeding strategies.

These data will provide fishery managers and anglers with location-specific information on fish PCB burdens, as well as providing greater predictive capacity regarding the effects of changes in feeding strategies and trophic relationships on fish PCB concentrations.

R/MW-89—Sources and Transport Mechanisms for *Escherichia coli* Contamination at Lake Michigan Beaches. During the summer, the investigator sampled five Door County beaches and two Milwaukee beaches. Five Manitowoc-area beaches were also evaluated using samples provided by the Manitowoc County Soil & Water Conservation Department. Regional water quality was also assessed in Green Bay along the west shore of the Door County peninsula and in the nearshore waters adjacent to Milwaukee's beaches.

Beach sand samples were also assessed for *E. coli* burden, and the investigator reports finding extremely high levels (>10,000 *E. coli* per 100 grams sand) at two of the three beach sites tested. Further work in this project will focus on determining whether these results can be attributed to replication in the environment, or if the sand is acting as a reservoir for accumulating pollution. *In situ* replication of an indicator organism diminishes the relationship between what is measured (*E. coli*) and pollution. The *E. coli* levels being relied upon to determine potential health risk due to fecal pollution may be influenced more by their ecology in the sand environment than actual pollution sources.

INNOVATIVE SCIENCE & TECHNOLOGY

R/NI-31—Improving Safety and Efficiency in Scuba Diving. The investigators on this project have discovered prevalent “chokes” (respiratory decompression sickness) following decompression after prolonged hyperbaric exposure, demonstrating for the first time a surprisingly steep dose-response curve of lethal decompression risk that apparently was unknown to U.S. Navy as well as civilian diving medical personnel.

Repetitive dives, especially among seafood divers, as in Puerto Rico, are frequently associated with decompression sickness (DCS) and cases of dysbaric osteonecrosis (DON), and the investigators hypothesized that prolonged shallow repetitive dives carry a greater hidden risk of DON than short deep repetitive dives. In collaboration with University of Puerto Rico Sea Grant-supported

researchers and the Diver's Alert Network (DAN), they used whole-body bone scan images to evaluate 30 Puerto Rican seafood divers and found that 15 showed active osteonecrosis lesions, presumably DON, indicating an overall DON prevalence of about 50% in this Puerto Rican seafood diving population using scuba.

Humans experiencing extreme decompression in an emergency escape from a disabled submarine or from an underwater habitat may carry a high-risk of developing potentially fatal DCS. The investigators have found that the minimal hyperbaric exposure and "drop-out" decompression observed to induce lethal chokes after a 24-hour exposure pressure was only 52 feet of sea water. Those managing a potential submarine or habitat escape emergency thus face important operational decisions to minimize DCS and the possible loss of human lives.

APPENDIX A

Activities Supported from Program Development Funds

November 1, 2003, through October 31, 2004

- Funding was provided to initiate projects on tetracycline resistance genes in aquaculture environments: genotypic diversity and potential resistance reservoirs (**R/AQ-40**), and sources and transport mechanisms for *Escherichia coli* contamination at Lake Michigan beaches (**R/MW-89**).
- Partial funding was provided to cosponsor the 2004 **International Association for Great Lakes Research Conference**, *Great Lakes Need Great Watersheds*. Partial support was provided toward the printing of a historical sites guidebook, *Around Lake Superior: A Journey in Time and Place* and match support was provided to purchase a multimedia computer and digital camera (**C/C-1**).
- Travel support was provided for two principal investigators, one researcher and one outreach specialist to attend scientific/technical conferences/meetings and/or to present papers based on UW Sea Grant-supported research and outreach (**R/NI-32, R/MW-78, A/AS-1**). Travel support was provided for two UW Sea Grant communicators and one fiscal officer to attend a national Sea Grant network conference (**C/C-1, C/C-2, M/SGA-1**).
- Education Program Development funds were used to support four graduate students to attend scientific conferences and present papers, oral presentations and/or poster sessions based on Sea Grant-supported research (**R/MW-86, R/LR-90, R/NI-29**). In-kind travel support was provided for a graduate student to attend a **Dean John A. Knauss Marine Policy Fellowship** orientation; partial match support was provided for the successful candidate to attend two scientific conferences (**E/E-46**). Partial funding and in-kind support was provided for the “**Madison JASON Project**” and its educator professional learning workshop and related Website. In-kind support was also provided for a Madison JASON Project 4th-grade class chosen for a reading hour with Wisconsin First Lady, Jessica Doyle. Partial funding and in-kind support were provided for a **library outreach pilot project** to improve aquatic science literacy of K-5 graders in a low-income, chiefly traditionally underrepresented population neighborhood.

APPENDIX B

Collaborating Institutions

November 1, 2003, through October 31, 2004

Bay-Lake Regional Planning Commission

Canadian Department of Fisheries and Oceans
Winnipeg Research Office

Conservation Congress Great Lakes Study Committee

East Central Wisconsin Regional Planning Commission

Great Lakes Fishery Commission

Great Lakes Indian Fish & Wildlife Commission

Great Lakes Nonpoint Abatement Coalition

Great Lakes Sport Fishing Federation

Harvard Medical School
Department of Anesthesiology

Marquette University
Biological Sciences

North Carolina State University
Agricultural and Resource Economics

The Ohio State University
Ohio Sea Grant College Program

Partners in Amphibian and Reptile Conservation

Penn State University-Erie
Pennsylvania Sea Grant Project

Purdue University
Illinois-Indiana Sea Grant College Program

State University of New York-Buffalo
New York Sea Grant Institute

U.S. Army Corps of Engineers
Detroit District

U.S. Environmental Protection Agency
Lake Michigan LaMP Forum

U.S. Fish and Wildlife Service
Delta Institute
Green Bay Resource Office

U.S. Geological Survey
Great Lakes Science Center

University of Illinois at Champaign-Urbana
Illinois-Indiana Sea Grant College Program

University of Maryland
Chesapeake Biological Laboratory

University of Michigan
Michigan Sea Grant College Program

University of Minnesota
Sea Grant College Program

University of Puerto Rico
Department of Anesthesiology

University of Vermont
Lake Champlain Sea Grant Project

University of Wisconsin-Green Bay
Chemistry Department
Natural & Applied Sciences
Sea Grant Advisory Services

University of Wisconsin-La Crosse
Biology
Chemistry
College of Science and Allied Health
Microbiology
River Studies Center

University of Wisconsin-Madison
Agricultural and Applied Economics
Animal Sciences
Aquaculture Program
Aquatic Sciences Center

Biochemistry
Biological Sciences
Biometry
Biotron
Center for Limnology
Chemical Engineering
Civil & Environmental Engineering
College of Agricultural & Life Sciences
College of Engineering
College of Letters & Science
Diving Physiology Laboratory
Electrical and Computer Engineering
Environmental Chemistry & Technology
Program
Environmental Remote Sensing Center
Environmental Studies, Forest Ecology &
Management
Extension
Food Science
Forest Ecology & Management
Gaylord Nelson Institute for Environmental Studies
Genetics
Graduate School
Hospital & Clinics
Land Information & Computer Graphics
Facility
Medical School
Molecular Environmental Toxicology Center
Oceanography & Limnology Graduate Program
Radiology
Research Animal Resources Center
Russell Labs
Sea Grant Institute
School of Pharmacy
School of Veterinary Medicine
Soil Science and Environmental Studies
State Laboratory of Hygiene
Statistics
Surgical Sciences
Water Resources Institute
Water Science and Engineering Laboratory
Wildlife Ecology
Zoology

University of Wisconsin-Manitowoc
Sea Grant Advisory Services

University of Wisconsin-Milwaukee
Aquaculture Institute
Biological Sciences
Center for Great Lakes Studies
Center for Urban Initiatives & Research
Chemistry
Graduate School
Great Lakes WATER Institute
School of Education
Sea Grant Advisory Services

University of Wisconsin-Stevens Point
College of Natural Resources
Department of Biology

University of Wisconsin-Superior
Sea Grant Advisory Services

University of Wisconsin System
Great Lakes Wisconsin Aquatic Technology &
Environmental Research (WATER) Institute

Washington State University
School of Biological Sciences

Wisconsin Aquaculture Association

Wisconsin Department of Administration
Wisconsin Coastal Management Program

**Wisconsin Department of Agriculture, Trade &
Consumer Protection**
Division of Animal Health, Aquaculture Program

Wisconsin Department of Natural Resources
Division of Air and Waste
Division of Water
Division of Enforcement and Science
Northern Region
Northeast Region
Southeast Region

Wisconsin Historical Society
Historic Preservation Division
Maritime Preservation and Archaeology Program

APPENDIX C

Sources of Significant Nonfederal and Federal Program Funding

November 1, 2003, through October 31, 2004

University of Wisconsin Sea Grant Institute NONFEDERAL SUPPORT					
Agency/Donor	Date of Award	Purpose	Amount	Award No.	Period of Support
Univ. of Minnesota (GLPF Pass-Through)	2/6/2004	ANS-HACCP Training Initiative: To Prevent the Spread of Biological Pollution	\$ 32,445	D9039027604	10/3/03-9/20/05
State of Wisconsin	7/1/2004	Match toward ANS-HACCP Training Initiative: To Prevent the Spread of Biological Pollution	8,111	N/A	7/1/04-6/30/05
State of Wisconsin	7/1/2004	FY 2004-2005 matching funds for FY 2004 Sea Grant Omnibus	1,380,000	N/A	7/1/04-6/30/05
Pentair Corporation	6/1/2004	Match toward Sea Grant—Industry Fellowship	30,000	N/A	7/1/04-6/30/05
Marquette University	7/1/2004	Sea Grant Aquatic Nuisance Species: Inhibition of Zebra Mussel Attachment by Bacterial Extracellular Polymers, Year 2	10,390	N/A	7/1/04-6/30/05
Total Nonfederal Support, November 2003-October 2004			\$1,460,946		

University of Wisconsin Sea Grant Institute FEDERAL SUPPORT					
Agency/Donor	Date of Award	Purpose	Amount	Award No.	Period of Support
NOAA-Sea Grant	4/2/2004	Knauss Fellowship 2004, WI, Colleen Corrigan	\$ 38,000	NA04OAR4170022	2/1/04-1/31/05
NOAA-Sea Grant	4/23/2004	FY 2004 Sea Grant Omnibus	1,963,392	NA16RG2257	3/1/04-2/28/05
NOAA-Sea Grant	6/21/2004	Sea Grant—Industry Fellowship	30,000	NA16RG2257	6/1/04-5/31/05
NOAA-Sea Grant	6/30/2004	Sea Grant Aquatic Nuisance Species: Inhibition of Zebra Mussel Attachment by Bacterial Extracellular Polymers, Year 2	20,735	NA16RG2257	6/1/03-5/31/05
USEPA	8/24/2004	Mercury Contamination of the Environment: A Workshop for Critical Analysis and Synthesis	60,000	X3-83193301-0	9/1/04-8/31/05
NOAA-Sea Grant	8/10/2004	Supplemental Ship Time Support for FY2004 Omnibus Program	49,820	NA16RG2257	3/1/04-2/28/05
Total Federal Support, November 2003-October 2004			\$2,161,947		

COMBINED NONFEDERAL AND FEDERAL SUPPORT, November 2003-October 2004:	\$3,622,893
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APPENDIX D

Lists of Publications

November 1, 2003, through October 31, 2004

Including Print and Electronic Publications, Distribution and Requests Data, Funds Recovered through Sales, News Releases, Newsletters and Radio Programs

New Print Publications

<u>Quantity Printed</u>	<u>Publication No., Title, Author(s), Publisher</u>
100	WISCU-C-03-001 <i>Proceedings of Percis III: The Third International Perch Fish Symposium</i> by Terence P. Barry and Jeffrey A. Malison, editors (Proceedings of Conference held July 20-24, 2003, at the University of Wisconsin-Madison, UW Sea Grant Institute), CD format
500	WISCU-G-04-001 <i>PCBs in Green Bay</i> by John Karl (University of Wisconsin Sea Grant Institute)
35	WISCU-G-04-003 <i>Trap Net Poster for Bayfield, Wisconsin</i> by Gene Clark and Tina Yao (University of Wisconsin Sea Grant Institute)
300	WISCU-G-04-004 <i>Research for the Real World</i> by Stephen Wittman (University of Wisconsin Sea Grant Institute)
5,200	WISCU-H-03-002 <i>Living on the Coast: Protecting Investments in Shore Property on the Great Lakes</i> , Phillip Keillor and Elizabeth White, editors (U.S. Army Corps of Engineers-Detroit and University of Wisconsin Sea Grant Institute, 2003)
100	WISCU-H-04-001 <i>Aquaculture Effluents and Waste By-Products: Characteristics, Potential Recovery, and Beneficial Reuse</i> by Steven E. Yeo, Frederick P. Binkowski and Joseph E. Morris (North Central Regional Aquaculture Center, Iowa State University Press, 2004)
50	WISCU-Q-03-003 <i>UW Sea Grant Institute 2002-06 Strategic Plan</i> (2003 update) by Stephen Wittman (University of Wisconsin Sea Grant Institute)
50	WISCU-Q-03-004 <i>UW Sea Grant Institute 2004-06 Implementation Plan</i> , by Stephen Wittman, editor (University of Wisconsin Sea Grant Institute report)
1,300	WISCU-Q-04-001 <i>Sea Grant 2004-06 Directory of Projects and People</i> , by Stephen Wittman, editor (University of Wisconsin Sea Grant Institute, Madison)
150	WISCU-R-02-016 <i>Ontogeny of the Cortisol Stress Response in Yellow Perch (Perca flavescens)</i> by Sissel Jentoft, James A. Held, Jeffrey A. Malison and Terence P. Barry (<i>Fish Physiology and Biochemistry</i> , 26:371-378, 2002)

- 100 WISCU-R-03-011 *Lipase-Catalyzed Synthesis of Designer Acylglycerols Rich in Residues of Eicosapentaenoic, Docosahexaenoic, Conjugated Linoleic, and/or Stearic Acids* by Carlos F. Torres, Betty Lin, Marlina Moeljadi and Charles G. Hill, Jr. (*Lipid Science and Technology*, 105:614-623, 2003)
- 300 WISCU-R-03-012 *Aryl Hydrocarbon Receptor 2 Mediates 2,3,7,8-Tetrachlorodibenzo-p-dioxin Developmental Toxicity in Zebrafish* by Amy L. Prasch, Hiroki Teraoka, Sara A. Carney, Wu Dong, Takeo Hiraga, John J. Stegeman, Warren Heideman and Richard E. Peterson (*Toxicological Sciences*, 76:138-150, 2003)
- 100 WISCU-R-04-001 *Toxicity of Ambient Atmospheric Particulate Matter from the Lake Michigan (USA) Airshed to Aquatic Organisms* by Rebecca J. Sheesley, James J. Schauer, Jocelyn D. Hemming, Miel A. Barman, Steven W. Geis and James J. Tortorelli (*Environmental Toxicology and Chemistry*, 23(1):133-140, 2004)
- 10 WISCU-R-04-002 *Production of a Recombinantly Derived Growth Hormone Antibody and the Characterization of Growth Hormone Levels in Yellow Perch* by S. Roberts, T. Barry, J. Malison and F. Goetz (*Aquaculture*, 232:591-602, 2004)
- 100 WISCU-R-04-003 *Interactions Between 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and Hypoxia Signaling Pathways in Zebrafish: Hypoxia Decreases Responses to TCDD in Zebrafish Embryos* by Amy L. Prasch, Eric A. Andreasen, Richard E. Peterson and Warren Heideman (*Toxicological Sciences*, 78:68-77, 2004)
- 150 WISCU-R-04-004 *Ecological Patterns of Benthic Invertebrates in a Great Lakes Coastal Wetland* by Richard A. MacKenzie, Jerry L. Kaster and J. Val Klump (*Journal of Great Lakes Research*, 30(1):58-69, 2004)
- 100 WISCU-R-04-005 *Water Permeability and TCDD-Induced Edema in Zebrafish Early-Life Stages* by Adrian J. Hill, Susan M. Bello, Amy L. Prasch, Richard E. Peterson and Warren Heideman (*Toxicological Sciences*, 78:78-87, 2004)
- 200 WISCU-R-04-006 *Effect of Rewards on Lake Trout Tag Returns in Northwestern Lake Michigan* by Patrick J. Schmalz, Michael J. Hansen, Mark E. Holey, Patrick C. McKee and Michael L. Toneys (*North American Journal of Fisheries Management*, 24:1-6, 2004)
- 150 WISCU-R-04-007 *Trait Anxiety Predicts Panic Behavior in Beginning Scuba Students* by W.P. Morgan, J.S. Raglin and P.J. O'Connor (*International Journal of Sports Medicine*, 25:314-322, 2004)
- 200 WISCU-R-04-008 *Fleet Dynamics of the Commercial Lake Trout Fishery in Michigan Waters of Lake Superior During 1929-1961* by Michael J. Wilberg, Charles R. Bronte and Michael J. Hansen (*Journal of Great Lakes Research*, 30(2):252-266, 2004)
- 200 WISCU-R-04-009 *Recruitment Dynamics of the 1971-1991 Year-Classes of Lake Trout in Michigan Water of Lake Superior* by Jessica M. Richard, Michael J. Hansen, Charles R. Bronte and Shawn P. Sitar (*North American Journal of Fisheries Management*, 24:475-489, 2004)
- 100 WISCU-R-04-010 *2,3,7,8-Tetrachlorodibenzo-p-dioxin Activation of the Aryl Hydrocarbon Receptor/Aryl Hydrocarbon Receptor Nuclear Translocator Pathway Causes Developmental Toxicity Through a CYP1A-Independent Mechanism in Zebrafish* by Sara A. Carney, Richard E. Peterson and Warren Heideman (*Molecular Pharmacology*, 66(3), 2004)
- 200 WISCU-R-04-011 *Temporal and Spatial Patterns of Insect Emergery from a Lake Michigan Coastal Wetland* by Richard A. MacKenzie and Jerry L. Kaster (*Wetlands* 24(3):688-700, 2004)

- 200 WISCU-R-04-012 *Method for Analysis of TAG Formed by Reaction of Fish Oil with Hydrogenated Soybean Oil* by Arnolde Lopez-Hernandez, Carlos F. Torres, Hugo S. Garcia and Charles G. Hill, Jr. (*Journal of American Oil Chemists' Society*, 81(8):743-747, 2004)
- 200 WISCU-W-03-001 *Proceedings of Percis III: The Third International Perch Fish Symposium* by Terence P. Barry and Jeffrey A. Malison, editors (Proceedings of Conference held July 20-24, 2003, at the University of Wisconsin-Madison, UW Sea Grant Institute)

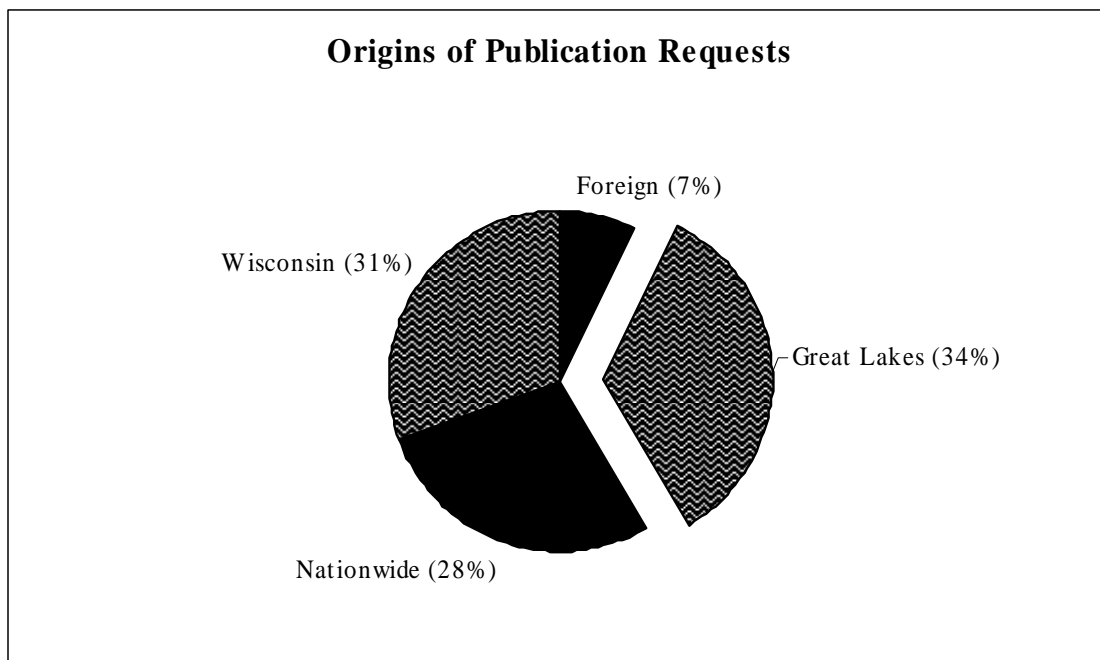
10,095 Total Quantity of 23 New Publications

Distribution of Publications & Other Products

(not including Madison JASON bookmarks and "Zebra Mussel Watch" cards – see next page)

- 69 Books
- 123 CDs
- 9 Films & Videos
- 9,687 General
- 578 Handbooks & Manuals
- 141 Proceedings of Conferences
- 630 Program Reports
- 1,584 Reprints from Journals
- 75 Technical Reports
- 3,097 Non-UWSG Publications
- 7,560 Promotional/Educational Bookmarks

23,553 Total Products Distributed



Customized Printings of “Zebra Mussel Watch” Card Purchased

<u>Quantity Printed</u>	<u>Agency Requesting Cards</u>
6,000	Illinois-Indiana Sea Grant
50,000	Kansas Department of Wildlife & Parks
25,000	Minnesota Department of Natural Resources
33,000	Minnesota Sea Grant
10,000	St. Croix National Scenic Riverway
75,000	Wisconsin Department of Natural Resources
18,000	U.S. Coast Guard
<u>10,000</u>	U.S. Fish & Wildlife Service-Onalaska
227,000	Total Purchased November 2003–October 2004
2,432,390	GRAND TOTAL PRINTED SINCE 1991

Other “Zebra Mussel Watch” Card Requests

	Number of Orders	Quantity Sent
Orders from ASC Online Store	31	4,867
Orders from Zebra Mussel Website (see breakdown below)	1,065	4,748
Totals	1,096	9,615

Cards Distributed via Requests from “Zebra Mussel Watch” Website (www.seagrants.wisc.edu/zebramussels/index.html)

Period	U.S. Requests	Quantity Sent	Foreign Requests	Quantity Sent
July 2004	394	1,460	20	544
August 2004	368	1,207	25	98
September 2004	172	891	10	71
October 2004	62	443	8	34
TOTALS	996	4,001	63	747

Madison JASON Bookmarks Distributed via Requests on Website
 (*seagrant.wisc.edu/madisonjason*)

	U.S. Requests	Quantity Sent	Foreign Requests	Quantity Sent
Dec. 2003–Feb. 2004	2,680	5,671	421	965
March 2004	960	5,251	193	589
April-May 2004	2,412	12,181	397	896
June-July 2004	1,171	4,474	177	475
July-August 2004	3,029	10,288	521	847
September-October 2004	1,502	4,465	452	791
TOTALS	11,754	42,330	2,161	4,563

Sales Credits (November 2003-October 2004)

\$16,637.57 Total Funds Recovered from the Sale of Publications & Other Products

Littoral Drift Cover Stories (*Bimonthly two-page newsletter, circ. ~1,000 per issue*)

November/December 2003

“Toxic Chemicals Killed All Young Lake Trout in Lake Ontario for 40 Years”

January/February 2004

“Going with the Flow: ‘Year of Water’ Momentum Continues into 2004”

March/April 2004

“New Experiences Old Stuff for New Knauss Fellow”

“UW Sea Grant Hires Coastal Engineering Specialist”

May/June 2004

“Excess Algae Reflect Changes in Lake Michigan: Causes May Include Zebra Mussels, Increased Phosphorus, and Low Lake Levels”

“Wisconsin Water Policy Database Made Available”

July/August 2004

“The Incredible Shrinking Water Quality Sensor: a.k.a. The Micro-fabricated Plasma Emission Spectrometer”

“Schmitt Returns Home”

September/October 2004

“Flame Retardants Spread Like Wildfire: PCB-like chemicals found in Groceries, Great Lakes Fish, Human Breast Milk”

News Release, Media Advisories & Public Service Announcements

<u>Date Issued</u>	<u>Headline</u>
10/28/04	Wisconsin Sea Grant Research Seeks to Shrink Size of Water Quality Sensors
9/07/04	Duluth-Superior Harbor Corrosion News Conference
8/23/04	August 31 Deadline for Lake Michigan Restoration Priorities
8/13/04	Lake Michigan Restoration Workshops Scheduled
6/29/04	Great Lakes Swimmers: Break the Grip of the Rip
6/28/04	Rip Currents PSA for Radio
5/21/04	‘Break the Grip of the Rip’ Press Event to Focus on Prevention of Rip Current Deaths
5/14/04	Keillor Honored for Service to Wisconsin and Nation’s Coasts
5/04/04	Italian Officials Visit UW-Madison to Discuss Lake Water Quality Issues
4/23/04	UW Sea Grant Receives \$1.96 Million Federal Grant
3/30/04	Deadly Great Lakes Rip Currents Subject of Regional Conference
3/11/04	Free Fact Sheets from UW Aquatic Sciences Center
2/26/04	UW Sea Grant Hires Coastal Engineering Outreach Specialist
11/05/03	Toxic Chemicals Killed All Lake Trout in Lake Ontario for 40 Years

TOTAL: 14

Magazine Article

Victoria A. Harris and John Karl. 2004. "Signs of Stress: Lake Michigan Algae" In: *Wisconsin Great Lakes Chronicle 2004*. Madison: Wisconsin Coastal Management Program.

New & Updated Web Publications (since October 2003)

Earthwatch

- Wetland Restoration and Hypoxia Relief (ewradio.org/feature_wetland.aspx)
- Chronic Wasting Disease (ewradio.org/cwd_extended.aspx)

Guide to Finding Water-Related Information (www.library.wisc.edu/guides/WaterResources/index.htm)

UW Sea Grant Themes and Priorities

- Aquaculture (www.seagrant.wisc.edu/aquaculture)
- Aquatic Invasive Species (seagrant.wisc.edu/ais)
- Coastal Communities & Economies (seagrant.wisc.edu/coastalcommunities)
- Coastal Natural Hazards (seagrant.wisc.edu/coastalhazards)
- Digital Great Lakes (seagrant.wisc.edu/digitalgreatlakes)
- Ecosystems & Habitats (seagrant.wisc.edu/ecosystems)
- Fisheries (seagrant.wisc.edu/fisheries)
- Geographic Information Systems (seagrant.wisc.edu/gis)
- Water Quality (seagrant.wisc.edu/waterquality)
- Water Safety & Recreation (seagrant.wisc.edu/watersafety)

Wisconsin's Great Lakes Shipwrecks (www.wisconsinshipwrecks.org)

- Six new shipwrecks—Bullhead Point wrecks (3), *Carrington*, *Christina Nilsson* and *Meridian*
- Current archaeological research
- Seven new video segments
- Additional historical and underwater images
- Calendar of upcoming Wisconsin Historical Society archaeological workshops and presentations

Wisconsin's Maritime Trails (www.maritimetrails.org)

Wisconsin's Water Library (www.aqua.wisc.edu/waterlibrary)

- Building Conservation Organizations (In partnership with the River Alliance of Wisconsin)
- Climate Change and Its Consequences
- Summer Recommended Reading
- Environmentally Friendly Lawn and Garden Care
- Selected Recent Acquisitions, May, July and September, 2004
- Selected Recent Acquisitions for Kids, May, July and September, 2004

Wisconsin's Water Policies (www.aqua.wisc.edu/waterpolicy)

“Earthwatch Radio” (Weekly Series of Five Two-Minute Programs)

UW Sea Grant staff and Earthwatch project students contributed **130 scripts** for the 260 programs broadcast during the past year:

November 2003

"Mystery Molecule"—Richard Hoops
"Feral, Fat and Fit"—Rachel Sohmer
"A Subject That's Too Dry"—Richard Hoops
"The Lost Riches of Coral Reefs"—Jamie Annear
"Ozone Depleter Decline"—Richard Hoops
"Octopus Brains"—John Karl
"Persistent Pathogen"—Charmaine Tryon-Petith
"Durable Diesel"—Rachel Sohmer
"From Air to Sea"—Jamie Annear
"Mean Green Crabs"—Rachel Sohmer

December 2003

"A Website with Great Flare"—Richard Hoops
"Hot Pursuit in Cold Water"—Diane Pansky
"Two Hulls for Tankers"—Diane Pansky
"Flames and Foliage"—Richard Hoops
"No Place Like Home"—Jamie Annear
"Looking for an End to River Blindness"—Jamie Annear
"The Trouble with Tailings"—Liz Albertson
"A Tainted Spectacle"—Diane Pansky
"Winter Homes and Well Being"—Jamie Annear
"Hot Air Snow Blower"—John Karl
"Chemical Cocktail on Ice"—Diane Pansky

January 2004

"Peering into the Pacific"—John Karl
"Green and Brown"—Richard Hoops
"North and South"—Richard Hoops
"Hot Black Market"—Diane Pansky
"Burning Questions"—John Karl
"Suffocating the Reefs"—Jamie Annear
"Cool Coral"—Richard Hoops
"Sea Surface Slowdown"—Richard Hoops
"Smuggling and Survival"—Diane Pansky
"A Not So Small Problem"—Jamie Annear
"Wet Canary"—Diane Pansky

February 2004

"Tropical Fish in Untropical Places"—Diane Pansky
"Fish on Prozac"—John Karl
"Enormous and Abnormal"—Richard Hoops
"Adios to Patagonian Ice"—Diane Pansky
"Swarms of Squirts"—Jamie Annear
"Drained by Disasters"—Diane Pansky
"Ocean to Aquariums"—Diane Pansky
"Demand for Deep Divers"—Diane Pansky
"Primate Plight"—Jamie Annear
"A Hot Topic"—Jamie Annear

March 2004

"Icebergs Ahoy"—Diane Pansky
"No Snow, No Go"—Diane Pansky
"Vapor Trigger"—Richard Hoops
"Gardeners of the Forest"—Jamie Annear
"When Diseases Turn Deadly"—Jamie Annear
"The Ice Patrol"—Diane Pansky
"Melting Moguls"—Diane Pansky
"Wetland in Sand"—Diane Pansky
"A Long and Toxic Life"—Jamie Annear
"A Seriously Boring Insect"—Richard Hoops
"Saving Lives of Primates and People"—Jamie Annear
"Wet Winters Ahead"—Richard Hoops

April 2004

"Gull Grief"—Richard Hoops
"New Controls on Tiny Stowaways"—Jamie Annear
"Genetic Pollution in Mountain Streams"—Jamie Annear
"Nitrate Nuisance"—Charmaine Tryon-Petith
"Multiplying Malformations"—Jamie Annear
"Turtle Turnpike"—Jamie Annear
"Wrench in the Works"—Jamie Annear
"Peach State Plans Ahead"—Diane Pansky
"Quiet Killers"—Diane Pansky
"The Marsh Arabs"—Diane Pansky
"Hard Surfaces"—Charmaine Tryon-Petith

May 2004

"More and More Dead Zones"—Richard Hoops
"One Company's Chemicals"—Diane Pansky
"Passing Permanence"—Jamie Annear
"Menu Change for Scottish Seabirds"—Diane Pansky
"Short Lived Stability"—Richard Hoops
"Conservation on the High Seas"—Diane Pansky
"Fiery Future"—Jamie Annear
"Mosquito Mystery"—Jamie Annear
"Summer in the City"—Diane Pansky
"Saving Seamounts"—Diane Pansky

June 2004

"Nowhere to Hide"—Diane Pansky
"Cicada Strategy"—Diane Pansky
"Rip Tips"—Richard Hoops
"Cicada Song"—Diane Pansky
"Balancing Efficiency and Exhaust"—Jamie Annear
"Glow in the Deep"—Diane Pansky
"Feathered Fallout"—Richard Hoops
"An Appetite for Fish"—John Karl
"Arch and Gelatinous Enemies"—Diane Pansky
"Smoother Sailing"—Richard Hoops
"The Dirt on Invasive Plants"—Jamie Annear

July 2004

"Fine Points in Fossils"—Richard Hoops
"New Predator in the Potomac"—Richard Hoops
"Snowpack Shortage"—Jamie Annear
"State Patrol for Zebra Mussels"—Eve Komosa
"Mountains in the Mid-Atlantic"—Diane Pansky
"Constant Challenge to Amphibians"—Cassie Wyss
"Whale-Free Fishing"—Diane Pansky
"Nimble Giants with Bumpy Flippers"—John Karl
"Algae for Dinner"—Jamie Annear
"Web of Extinctions"—Diane Pansky
"Canada Bounces Back"—John Karl

August 2004

"When Your Snakehead Grows Up"—Richard Hoops
"Rediscovered Wood"—Jamie Annear
"Lionfish along the Atlantic Shores"—Eve Komosa
"European Ban on Atrazine"—Cassie Wyss
"Groundwater Culprit"—Cassie Wyss
"Rubber Ducks at Sea"—Cassie Wyss
"Underwater Logging"—Jamie Annear
"Carp Cleaning Out the Mississippi"—Richard Hoops
"Drilling for Knowledge"—John Karl
"Cell Phones in the Trash"—Cassie Wyss
"New Nanotech Considerations"—Jamie Annear

September 2004

"The Blueprint of the Dolphin Brain"—Richard Hoops
"The Sound of Whale Watching"—Jamie Annear
"Pacific Ocean Garbage Patch"—Cassie Wyss
"Setting New Records Every Year"—Jamie Annear
"Cleaning up Smokestacks at Sea"—Jamie Annear
"Chances for Climate Change in the North Atlantic"—Cassie Wyss
"Drastic Plastic Trash"—Cassie Wyss
"Deep Pacific Warming"—Cassie Wyss
"Limits to the Tallest Trees"—Jamie Annear
"Flame Retardants in Food"—Cassie Wyss
"Farming with Prairie Patterns"—Jamie Annear

October 2004

"No Eyes for Glass"—Cassie Wyss
"Taming the Longhorn"—Cassie Wyss
"Problems with Dairy Air"—Cassie Wyss
"Keeping Campus Cool"—Kathleen Schmitt
"Trading Profits and Pests"—Jamie Annear
"Mississippi River Percentages"—Richard Hoops
"Making the Grade"—Cassie Wyss
"Green Buildings"—Cassie Wyss
"Heat and Health"—Cassie Wyss
"Black, White and Gray Lists"—Jamie Annear
"Curbing Emissions from Cows"—Cassie Wyss

APPENDIX E

Students and Fellows Supported

November 1, 2003, through October 31, 2004

Students Supported

During the past year, support was provided via research and project assistantships and part-time employment to:

23 Graduate students
29 Undergraduate students

Scholarships Awarded

Carl J. Weston Memorial Scholarship

This UW Sea Grant Institute scholarship supports undergraduate students with an interest in Great Lakes and ocean-related issues.

Meghan Olson, Biomedical Engineering, UW-Madison
Prof. Carol Lee, project R/LR-91

Degrees Awarded

Six UW Sea Grant project-related theses were completed during 2003-04, resulting in the awarding of three Master's degrees and three Ph.D.s:

Master's Degrees

Jeffrey Jorgensen, Limnology and Marine Science, UW-Madison, 2004
Prof. James F. Kitchell, project R/LR-82

Gemma May, Zoology, UW-Madison, 2004
Prof. Carol Lee, projects R/LR-87-PD, R/LR-88

Diane Pansky, Institute for Environmental Studies, UW-Madison, 2004
Mr. Richard Hoops, projects C/C-1, C/C-2

Doctorate Degrees

Amy Prasch, Environmental Toxicology, UW-Madison, 2004
Prof. Richard Peterson, projects R/MW-58, R/BT-16, R/BT-17, R/BT-12, R/BT-14

Colin Crowley, Chemical Engineering, UW-Madison, 2004
Prof. Charles Hill, project R/AQ-34

Patrick Gorski, Limnology and Marine Science, UW-Madison, 2004
Profs. David Armstrong/James Hurley, project R/MW-80

Fellows Supported

Dean John A. Knauss Marine Policy Fellowship

Colleen Corrigan, MS graduate, Gaylord Nelson Institute for Environmental Studies, UW-Madison
—U.S. Fish & Wildlife Service, Division of Federal Program Activities, Branch of Resource Management Support, Washington, D.C., 2004
Prof. Anders W. Andren, project E/E-46

Sea Grant Industrial Fellowship

Timothy J. Lee, Ph.D. candidate, Department of Civil and Environmental Engineering, UW-Madison
—Pentair Water Treatment, Sheboygan, Wis., 2004-2006
Prof. Marc A. Anderson, project E/E-49

Master's & Ph.D. Theses Submitted with Project Completion Reports

Project R/LR-84

“Population Dynamics of a Recovering Lake Trout Population in Wisconsin Waters of Lake Superior, 1980-2001” by Brian C. Linton (Master of Science Thesis, UW-Stevens Point, 2002)

“Movements of Lake Trout in U.S. Waters of Lake Superior During 1973-2001” by Kevin L. Kapuscinski (Master of Science Thesis, UW-Stevens Point, 2002)

“A Food Web Analysis of the Fishery in Chequamegon Bay, Lake Superior” by Jennifer A. Devine (Master of Science Thesis, UW-Stevens Point, 2003)

“Dynamics of Lake Trout Recruitment in Michigan Waters of Lake Superior” by Jessica M. Doemel (Master of Science Thesis, UW-Stevens Point, 2000)

“Historic and Modern Lake Trout Abundance, Effects of Fishing on Lake Trout, and Dynamics of the Commercial Lake Trout Fishery in Michigan Waters of Lake Superior” by Michael Wilberg (Master of Science Thesis, UW-Stevens Point, 2000)

“Movements of Adult Lake Trout Tagged in Northwestern Lake Michigan” by Patrick J. Schmalz (Master of Science Thesis, UW-Stevens Point, 1999)

Project R/PS-51

“Treating the Future Fairly: Complications of Uncertainty for Sustainability” by Antony Gordon Scott (Ph.D. Thesis, UW-Madison, 2003)

Project R/PS-55

“Combining Revealed and Stated Preference Data to Explore Cognitive Elements of Choice and Their Implications for Environmental Valuation” by Michael Torin Bennett (Ph.D. Thesis, UW-Madison, 2003)

APPENDIX F

Program Awards and Honors

November 1, 2003, through October 31, 2004

- Award Title:** Jack Christie-Ken Loftus Award
Recipient: Phil Moy (A/AS-1)
Presented by: U.S.-Canadian Great Lakes Fishery Commission
Purpose of Award: Presented for distinguished contributions to healthy Great Lakes ecosystems for leading the effort to prevent the transmigration of invasive species between the Mississippi River and Great Lakes watersheds.
- Award Title:** 2004 Outstanding Program Award
Recipients: Robert Birmingham, John Broihahn, Jeff Gray, Cathy Green, Russ Green, Rich Dellinger, John Karl, Keith Meverden, Tina Yao (C/C-1, C/C-7)
Presented by: Great Lakes Sea Grant Extension Program Leaders
Purpose of Award: Recognition for the project “Diving into History: Research and Public Education on Wisconsin’s Underwater Archaeological Resources.”
- Award Title:** Excellence in Design Award for a Research Publication
Recipient: Tina Yao (C/C-1)
Presented by: University and College Designers Association
Purpose of Award: UW Sea Grant’s 2004-06 *Directory of Projects and People* was selected from among 1,300 entries for excellence in concept, design, illustration, typography, and printing as well as “effectiveness, quality and creativity in solving the problems inherent in institutional design.”
- Award Title:** Multi-Type Library of the Year
Recipient: JoAnn Savoy
Presented by: Wisconsin South Central Library System
Purpose of Award: Presented for “Wisconsin’s Water Library,” a free, online resource for Wisconsin residents, in recognition of being the first UW System library—and the first academic library in the state—to make its collection directly accessible to the public.
- Award Title:** Website of the Month, April 2004
Recipient: Wisconsin’s Water Library
Presented by: Great Lakes Information Network, Great Lakes Commission
Purpose of Award: To highlight exceptional content of the region’s GLIN partners.
- Award Title:** 2004 Auxiliary Membership Service Award
Recipient: Jim Lubner (A/AS-1)
Presented by: United States Coast Guard, Dept. of Homeland Security
Purpose of Award: Presented in recognition of 25 years of dedicated service as a member of the U.S. Coast Guard Auxiliary.
- Award Title:** 2004 Auxiliary Annual Service Performance Award
Recipient: Jim Lubner (A/AS-1)
Presented by: United States Coast Guard, Dept. of Homeland Security
Purpose of Award: Presented in appreciation of outstanding volunteer contribution for 66 hours of Public Education Instruction in 2003.

Award Title: MERIT Award—NIEHS
Recipient: R.E. Peterson (**R/BT-16, R/BT-17**)
Presented by: NIEHS
Purpose of Award: MERIT Award runs from 2000-2005. Based on our research accomplishments thus far the MERIT Award was recently renewed for the period 2006-2010.

Award Title: Best Student Presentation, Student Travel Award
Recipient: Te-Hao Chen (**R/MW-84**)
Presented by: SETAC Midwest and Ozark-Prairie Chapters Joint Meeting
Purpose of Award: For platform presentation “Direct effects of copper on development and swimming behavior of northern leopard frog tadpoles.” Also received a Student Travel Award to attend the meeting.

Award Title: Best Student Poster
Recipient: Jason Gross (**R/MW-84**)
Presented by: Southern and Northern California Chapters Society of Toxicology Meeting
Purpose of Award: For poster presentation “Sublethal effects of cadmium on development in *Rana pipiens* and *Xenopus tropicalis*.”

Award Title: Second Place Award for Student Presentation, Student Travel Award
Recipient: Jason Gross (**R/MW-84**)
Presented by: SETAC Midwest and Ozark-Prairie Chapters Joint Meeting
Purpose of Award: For presentation “Developmental instability in *Rana pipiens* and *Rana clamitans* from Horicon National Wildlife Refuge.” Also received a Student Travel Award to attend the meeting.

APPENDIX G

All Active Projects Listed by Themes

November 1, 2003, through October 31, 2004

AQUACULTURE

A/AS-50—WATERS 2002: Wisconsin's Aquaculture Technology, Education and Research Services, *Fred Binkowski, UW-Milwaukee*

A/AS-54—WATERS 2004-06: Wisconsin's Aquaculture Technology, Education and Research Services, *Fred Binkowski, UW-Milwaukee*

R/AQ-37—National Marine Aquaculture Initiative: Production of a Best Management Practices Manual for Aquaculture in Wisconsin and the Great Lakes Region, *Jeffrey Malison, UW-Madison*

R/AQ-38—Endocrine and Environmental Regulation of Growth in Yellow Perch, *Jeffrey Malison and Terence Barry, UW-Madison*

R/AQ-40—Tetracycline Antibiotics and Resistance Genes in Aquaculture Environments: Genotypic Diversity and Potential Resistance Reservoirs, *Katherine McMahon and Joel Pedersen, UW-Madison*

AQUATIC INVASIVE SPECIES

A/AS-53—Sea Grant Non-Indigenous Species (SGNIS) Website: Development and Support, *Philip Moy, UW Sea Grant Institute*

R/BT-18—Inhibition of Zebra Mussel Attachment by Bacterial Extracellular Polymers, *James Maki, Marquette University*

R/LR-88—Global Reconstruction of Invasion Pathways by the Zebra Mussel, *Dreissena polymorpha*, *Carol Lee, UW-Madison*

R/LR-91—Quagga Mussel Invasions: Functional Morphology, Biomechanics, Zebra Mussel Displacement and Future Spread, *Carol Lee, UW-Madison*

BIOTECHNOLOGY

R/BT-16—Dioxin Developmental Toxicity in Zebrafish, *Richard Peterson and Warren Heideman, UW-Madison*

R/BT-17—AhR Signaling in Rainbow Trout and Zebrafish, *Warren Heideman and Richard Peterson, UW-Madison*

R/BT-19—Effects of Polyhalogenated Aromatic Hydrocarbons on Estrogen Metabolism in Lake Trout, *Terence Barry and Richard Peterson, UW-Madison*

COASTAL COMMUNITIES & ECONOMIES

A/AS-49—Implementation of Comprehensive, Dynamic GIS for Coastal Management: Linking Agencies for Better Decisions and Public Information about the Coastal Zone, *Stephen Ventura, UW-Madison*

A/AS-55—EPA Smart Growth Extension Partnership, *James Hurley, UW Sea Grant Institute*

C/C-6—Diving into History: Research and Public Education on Wisconsin's Underwater Archaeological Resources, *Russell Green, Wisconsin Historical Society, John Karl, UW Sea Grant Institute*

C/C-7—Exploring Wisconsin's Great Lakes Schooners: Integrating Underwater Archaeology, Shipwreck Preservation and Public Education, *John Broihahn, Wisconsin Historical Society, and John Karl, UW Sea Grant Institute*

R/NI-33—Applications of "Dynamic and Distributed" GIS and Visualization for Great Lakes Coastal Management, *Stephen Ventura, UW-Madison*

R/PS-57—Measuring Interrelated Demands for Commercially Caught Fish, *Richard Bishop, UW-Madison*

DIGITAL OCEAN-GREAT LAKES

R/MW-85—Enhanced Experimental Methods for Measuring Inorganic Contaminants in Water Using a Micromachined DC Plasma Instrument, *Marc Anderson, UW-Madison, and Michael Zorn, UW-Green Bay*

R/MW-88—LakeSat: Near Real-Time Monitoring of Water Quality in Green Bay and Wisconsin's Lake Michigan Coastal Waters via Satellite Remote Sensing, *Jonathan Chipman and Thomas Lillesand, UW-Madison*

ECOSYSTEMS & HABITATS

R/EC-7—Material Transformations Through a Series of Linked Basins in a Great Lakes Land Margin Ecosystem, *J. Val Klump and James Waples, UW-Milwaukee*

R/EC-9—Coastal Sediment Resuspension, Transport and Deposition in Great Lakes, *Chin Wu and John Hoopes, UW-Madison*

R/EC-10—Impact of a Shifting Wind Field over the Laurentian Great Lakes on Accumulation and Resuspension of Sediments in Green Bay, Lake Michigan, *James Waples and J. Val Klump, UW-Milwaukee*

R/LR-82—Dynamics of the Lake Superior Food Web, *James Kitchell, UW-Madison*

R/LR-94—Compensatory and Spatial Dynamics in Great Lakes Food Webs, *James Kitchell, UW-Madison*

R/MW-84—Direct Effect of Metals on Behavior, Sexual Development and Reproduction of Amphibians in Great Lakes Ecosystems, *William Karasov, UW-Madison*

FISHERIES

A/AS-52—Great Lakes Fisheries Leadership Institutes, *Philip Moy, UW Sea Grant Institute*

R/LR-84—Development of a Lake Trout Population Model for Lake Superior, *Michael Hansen, UW-Stevens Point*

R/LR-89—Lake Trout Reproduction at the Mid-Lake Reef Complex, Lake Michigan, *John Janssen, UW-Milwaukee*

R/LR-90—MHC Diversity in Lake Trout at the Mid-Lake Reef Complex and Northern Refuge, Lake Michigan, *Ruth Phillips and Timothy Ehlinger, UW-Milwaukee*

R/LR-92—A Retrospective Analysis of Lake Michigan and Lake Superior Food Webs, *M. Jake Vander Zanden, UW-Madison*

R/LR-95—Sustainability of Lake Trout Fisheries in Lake Superior, *Michael Hansen, UW-Stevens Point*

MARINE & AQUATIC SCIENCE LITERACY

A/AS-51—Great Lakes Fisheries Leadership Institute Curriculum Development, *Philip Moy, UW Sea Grant Institute*

C/C-2—Earthwatch Public Service Radio Program, *Richard Hoopes, UW Sea Grant Institute*

E/E-41—Recent Advances in Limnology and Oceanography Seminar, *Arthur Brooks, UW-Milwaukee*

E/E-45-SE—Problems in Oceanography, Fall Semester 2003, *James Kitchell, UW-Madison*

E/E-46—Knauss Fellowship 2004, Wisconsin: Colleen Corrigan, *Anders Andren, UW Sea Grant Institute*

E/E-47—Lake Sturgeon Bowl: Wisconsin's Regional Academic Competition for the National Ocean Sciences Bowl, 2004-06, *Barbara Duffy and J. Val Klump, UW-Milwaukee*

E/E-48—Recent Advances in Limnology and Oceanography Seminar Series, 2004-06, *John Berges and Arthur Brooks, UW-Milwaukee*

E/E-49—Sea Grant-Industry Fellowship to Develop a Hybrid Photocatalytic Disinfecting Point-of-Use Drinking Water Treatment Device, *Marc Anderson, UW-Madison*

SEAFOOD SCIENCE & TECHNOLOGY

R/AQ-39—Use of Fish Oil for Enzyme-Mediated Production of Value-Added Food Products Containing Omega-3 Fatty Acids, *Charles Hill, UW-Madison*

URBAN COAST

R/EC-8—Methylmercury Production and Transfer to Benthic Food Webs in Nearshore and Wetland Environments of Southern Lake Superior, *James Wiener, Kristofer Rolfhus and Roger Haro, UW-La Crosse*

R/MW-83—Polybrominated Diphenyl Ethers: A Global Contaminant of Concern in the Great Lakes, *William Sonzogni, UW-Madison*

R/MW-86—Factors Regulating the Interactions of Trace Metals and Aquatic Organisms in Watersheds of the Great Lakes, *David Armstrong and Martin Shafer, UW-Madison*

R/MW-87—The Importance of Trophic Level and Carbon Source as Factors Affecting the Accumulation of PCBs in the Lake Michigan Food Web, *Harvey Bootsma and Joseph Aldstadt, UW-Milwaukee*

R/MW-89—Sources and Transport Mechanisms for *Escherichia coli* Contamination at Lake Michigan Beaches, *Sandra McLellan, UW-Milwaukee*

R/PS-56—Using Survey Data in Hedonic Price Analysis: An Application to the Economic Valuation of Cleaner Water in Green Bay, Lake Michigan, *R. William Provencher, and Richard Bishop, UW-Madison*

INNOVATIVE SCIENCE & TECHNOLOGY

R/NI-31—Improving Safety and Efficiency in Scuba Diving, *R. Tass Dueland, UW-Madison*

R/NI-32—Improving Safety and Cost Effectiveness in Scuba Diving, *R. Tass Dueland, and Charles Lehner, UW-Madison*

PROGRAM MANAGEMENT

A/AS-1—Advisory Services: Program Coordination and Field Offices, *James Hurley, UW Sea Grant Institute*

C/C-1—Communications Office and Subprogram Coordination, *Stephen Wittman, UW Sea Grant Institute*

E/E-1—Special Marine Education Programs, *Mary Lou Reeb, UW Sea Grant Institute*

M/SGA-1—Program Development, *Anders W. Andren, UW Sea Grant Institute*

M/SGA-2—Program Management, *Anders W. Andren, UW Sea Grant Institute*

M/SGA-3—Ship Time in Support of Sea Grant Research Projects, *Anders W. Andren, UW Sea Grant Institute*

Total Number of Projects Supported: 55

33 Research projects

8 Advisory Services projects (*including A/AS-1*)

7 Education projects (*including E/E-1*)

6 Program management projects (*including A/AS-1, C/C-1 and E/E-1*)

5 Sea Grant National Strategic Investment projects*

4 Communications projects (*including C/C-1*)

2 Sea Grant Fellowship projects*

*Included in total as research, Advisory Services or education projects

APPENDIX H

Outreach Activities

142 Activities & Events ▪ 8,613 Participants ▪ 111,813 Total Possible Audience

November 1, 2003, through October 31, 2004

Advisory Services

USCG Auxiliary Weather Course, Lessons 5-7

Dates: 11/6, 13, & 20, 2003

Attendance: 18

Location: Gateway Technical Institute, Racine

Asian Carp Rapid Response Plan

Date: 11/6/2003

Attendance: 20

Location: St. Louis, Mo.

JASON Teacher Training

Date: 11/8/2003

Attendance: 18

Location: Pyle Center, UW-Madison

**Solving the Land Records Jigsaw Puzzle:
Demonstrating GIS Interoperability in
Wisconsin**

Date: 11/12/2003

Attendance: 25

Location: UW-Madison

Shore Protection Advice

Date: 11/13/2003

Attendance: 60

Location: Wisconsin Dells

Lake Michigan Shore Protection

Date: 12/6/2003

Attendance: 13

Location: Milwaukee and Racine

Lake Sturgeon Bowl Pre-Competition

Workshops

Dates: 12/9, 16, 2003

Attendance: 18

Location: Great Lakes WATER Institute,
UW-Milwaukee

Lake Sturgeon Bowl Pre-Competition

Date: 12/11/2003

Attendance: 28

Location: Stevens Point Area Senior High

Lake Sturgeon Bowl Pre-Competition

Date: 12/17/2003

Attendance: 12

Location: Edgerton High School

Marine Science at Sea: A Hands-on Laboratory

Date: 1/5-19/04

Attendance: 5

Location: Florida and Bahamas, Atlantic
Ocean

Asian Carp Rapid Response Plan

Date: 1/7/04

Attendance: 40

Location: Ann Arbor, Mich.

Asian Carp Rapid Response Plan

Date: 1/13/04

Attendance: 55

Location: Peoria, Ill.

Great Lakes Water Levels

Date: 1/21/04

Attendance: 17

Location: U.S. Coast Guard Base, Milwaukee

Lake Superior Invasive Species

Date: 1/24/04

Attendance: 19

Location: Ashland

Milwaukee JASON Telepresence

Date: 1/26/04

Attendance: 435

Location: Milwaukee Public Museum

Milwaukee JASON Telepresence

Date: 1/27/04
Attendance: 264
Location: Milwaukee Public Museum

Milwaukee JASON Telepresence

Date: 1/28/04
Attendance: 296
Location: Milwaukee Public Museum

Milwaukee JASON Telepresence

Date: 2/3/04
Attendance: 338
Location: Milwaukee Public Museum

Madison Project JASON Telepresence

Date: 2/4/04
Attendance: 315
Location: Promega BioPharmaceutical
Technology Center, Madison

Dispersal Barrier Project

Date: 2/4/04
Attendance: 90
Location: Syracuse, N.Y.

**Kewaunee County/Bay-Lake Regional Planning
Commission WLIS Pilot Project**

Date: 2/4/04
Attendance: 20
Location: Madison

**Lake Sturgeon Bowl Officials' Pre-Competition
Workshop**

Date: 2/5/04
Attendance: 13
Location: Great Lakes WATER Institute,
UW-Milwaukee

**Lake Sturgeon Bowl Officials' Pre-Competition
Workshop**

Date: 2/5/04
Attendance: 9
Location: UW Milwaukee

**Lake Sturgeon Bowl Officials' Pre-Competition
Workshop**

Date: 2/6/04
Attendance: 20
Location: Great Lakes WATER Institute,
UW-Milwaukee

**Status and Concerns of Aquaculture Waste
Effluents in the North Central Region**

Date: 2/7/04
Attendance: -81
Location: Milwaukee

Great Lakes Water Levels

Date: 2/9/04
Attendance: 24
Location: West Allis

**Lake Sturgeon Bowl Officials' Pre-Competition
Workshop**

Date: 2/12/04
Attendance: 17
Location: Great Lakes WATER Institute,
UW-Milwaukee

**Lake Sturgeon Bowl Officials' Pre-Competition
Workshop**

Date: 2/12/04
Attendance: 10
Location: UW Milwaukee

**From Watersheds to Lakes – Issues, Impacts,
Needs and Opportunities**

Date: 2/12/04
Attendance: 75
Location: Appleton

**Lake Sturgeon Bowl Officials' Pre-Competition
Workshop**

Date: 2/13/04
Attendance: 22
Location: Great Lakes WATER Institute,
UW-Milwaukee

Images of Fish Culture Then and Now

Date: 2/15/04
Attendance: 50
Location: Oak Creek

**Demonstrating the Use of Integrated Web
Mapping Services to Address Multi-
Jurisdictional Resource Planning and
Management Issues**

Date: 2/16/04
Attendance: 20
Location: UW-Madison

**Lake Sturgeon Bowl Officials' Pre-Competition
Workshop**

Date: 2/19/04
Attendance: 14
Location: Great Lakes WATER Institute,
UW-Milwaukee

Lake Sturgeon Bowl Officials' Pre-Competition Workshop

Date: 2/19/04
Attendance: 11
Location: UW-Milwaukee

Lake Sturgeon Bowl Officials' Pre-Competition Workshop

Date: 2/20/04
Attendance: 20
Location: Great Lakes WATER Institute,
UW-Milwaukee

Baird Creek Watershed Stewardship Assessment

Date: 2/20/04
Attendance: 24
Location: Green Bay

The Ups and Downs of Great Lakes Water Levels—Impacts on Boaters and Water Quality

Date: 2/20/04
Attendance: 80
Location: Green Bay

Baird Creek Watershed Stewardship Assessment

Date: 2/26/04
Attendance: 15
Location: Oshkosh

Wisconsin Land Information System Pilot Projects

Date: 3/4/04
Attendance: 75
Location: Wisconsin Dells

Update on Aquaculture Advisory Services

Date: 3/11/04
Attendance: 200
Location: Oshkosh

Participating in the Lake Sturgeon Bowl

Date: 3/12/04
Attendance: 6
Location: Appleton

ANS HACCP for Wild Baitfish Harvest

Date: 3/12/04
Attendance: 50
Location: Stevens Point

Nonnative Species in Lake Michigan

Date: 3/15/04
Attendance: 45
Location: South Milwaukee

Great Lakes Invasive Species

Date: 3/18/04
Attendance: 21
Location: Milwaukee

Great Lakes Invasive Species

Date: 3/18/04
Attendance: 21
Location: Milwaukee

Can Anything be Done to Control Coastal Bluff and Dune Erosion?

Date: 3/20/04
Attendance: 110
Location: Sheboygan

Chicago Dispersal Barrier Project

Date: 3/22/04
Attendance: 41
Location: Rock Island, Ill.

From the Lakes to the Watersheds—Merging Great Lakes Objectives with Land and Water Conservation Plans

Date: 3/25/04
Attendance: 50
Location: Oshkosh

The Development of Trophic State Objectives for Lower Green Bay

Date: 3/26/04
Attendance: 50
Location: Winnebago County, Town of
Grand Chute

Great Lakes Issues

Date: 3/31/04
Attendance: 28
Location: Pewaukee

UW Sea Grant: Who We Are & What We Do

Date: 3/31/04
Attendance: 25
Location: Ashland

UW Sea Grant: Who We Are & What We Do

Date: 4/1/04
Attendance: 85
Location: Ashland

Asian Carp Threat and the Dispersal Barrier

Date: 4/5/04
Attendance: 43
Location: Milwaukee

UW Sea Grant Rip Current Outreach

Date: 4/6/04
Attendance: 45
Location: Jacksonville, Fla.

Great Lakes Water Levels

Date: 4/16/04
Attendance: 32
Location: Mequon

Sea Grant Earth Day Exhibit

Date: 4/17/04
Attendance: 125
Location: Milwaukee Public Museum

Wisconsin Boating Basics—Lessons One-Five

Date: 4/20,27/04, 5/4,11,18/04
Attendance: 26
Location: Wauwatosa West H.S.

Wisconsin Boating Basics—Lessons One-Five

Date: 4/21,28/04, 5/5,12,19/04
Attendance: 30
Location: Elm Dale School

Great Lakes Invasive Species

Date: 4/23/04
Attendance: 35
Location: Manitowoc

Wisconsin Boating Basics—Lessons One-Two

Date: 4/24/04, 5/1/04
Attendance: 8
Location: U.S. Naval Reserve Center,
Milwaukee

Great Lakes Contaminants Issues

Date: 4/24/04
Attendance: 10
Location: Stevens Point

Invasive Species

Date: 4/25/04
Attendance: 200
Location: UW-Manitowoc

Dispersal Barrier and Rapid Response Plan

Date: 4/26/04
Attendance: 53
Location: Ann Arbor, Mich.

Dispersal Barrier and Rapid Response Plans

Date: 4/27/04
Attendance: 40
Location: Ann Arbor, Mich.

UW Sea Grant Rip Current Outreach

Date: 4/29/04
Attendance: 50
Location: St. Ignace, Mich.

West Shore Wetlands of Green Bay

Date: 5/12/04
Attendance: 25
Location: West Shore of Green Bay, City of
Green Bay to Peshtigo

**Factors Influencing Enhanced Mercury
Bioaccumulation in Riverine Mixing Zones of
Lake Superior**

Date: 5/17/04
Attendance: 150
Location: Montreal, Quebec

**Using GIS to Develop Performance Indicators
for Coastal Hazards in Wisconsin**

Date: 5/26/04
Attendance: 10
Location: Newport, R.I.

Great Lakes Issues

Date: 6/2/04
Attendance: 25
Location: Milwaukee

Return to *Titanic*

Date: 6/4/04
Attendance: 145
Location: Discovery World, Milwaukee

Return to *Titanic*

Date: 6/7/04
Attendance: 190
Location: Discovery World, Milwaukee

Return to *Titanic*

Date: 6/8/04
Attendance: 225
Location: Discovery World, Milwaukee

Return to *Titanic*

Date: 6/9/04
Attendance: 140
Location: Discovery World, Milwaukee

**A View From The Lake: Coastal Erosion &
Shoreline Development**

Date: 6/18/04
Attendance: 25
Location: Washburn

Great Lakes Aquanaut Program

Date: 6/22/04
Attendance: 14
Location: Great Lakes WATER Institute,
UW-Milwaukee

**Habitat Restoration and Protection Priorities
for Green Bay**

Date: 6/23/04
Attendance: 10
Location: Green Bay

Great Lakes Aquanaut Program

Date: 6/25/04
Attendance: 14
Location: Great Lakes WATER Institute,
UW-Milwaukee

**Uptake of Methylmercury in Lake Superior—
Nearshore vs. Offshore Processes**

Date: 6/28/04
Attendance: 250
Location: Ljubljana, Slovenia

Great Lakes Invasive Species and Fisheries

Date: 6/29/04
Attendance: 20
Location: Ashland

Wisconsin Limnology

Date: 7/15/04
Attendance: 42
Location: UW-Madison

**Status of the Kewaunee/Bay-Lake RPC WLIS
Node Project**

Date: 7/22/04
Attendance: 20
Location: Madison

Great Lakes Waterd: Quantity and Quality

Date: 7/23/04
Attendance: 10
Location: Ephraim

**Land and Lake: Great Lakes Ecology for
Teachers**

Date: 7/26/04
Attendance: 22
Location: Northland College, Ashland

What's That Green Stuff in our Waters?

Date: 8/25/04
Attendance: 122
Location: Baileys Harbor

Training for Schlitz Audubon Naturalists

Date: 8/31/04
Attendance: 16
Location: R/V Neeskay, Lake Michigan

Cladophora on Lake Michigan Shorelines

Date: 8/31/04
Attendance: 50
Location: Fischer Park, Manitowoc County,
Wis.

UW Sea Grant: Who We Are & What We Do

Date: 8/31/04
Attendance: 20
Location: Duluth, Minn.

Rip Current Science Workshop Summary

Date: 9/14/04
Attendance: 60
Location: Put-In-Bay, Ohio

Green Bay Water Quality

Date: 9/16/04
Attendance: 30
Location: Fox River, Green Bay

**Harvesting the Fruits of the Wisconsin Land
Information Program: Fifteen Years of
Investment in Local Government Land Records
Modernization**

Date: 9/16/04
Attendance: 40
Location: Lake Geneva

UW Sea Grant: Who We Are & What We Do

Date: 9/17/04
Attendance: 35
Location: Superior

Winterim Bahamas

Date: 9/22/04
Attendance: 250
Location: UW-Milwaukee

**SGNIS: Expanding the Knowledge Base
Globally**

Date: 9/22/04
Attendance: 40
Location: Ennis, Ireland

Dispersal Barrier Status

Date: 9/23/04
Attendance: 75
Location: Ennis, Ireland

Winterim Bahamas

Date: 10/5/04
Attendance: 18
Location: Carroll College, Waukesha

"Living on the Coast" Outreach

Date: 10/11/04
Attendance: 80
Location: Madison

**Great Lakes Circle Tour Coastal Access Guide:
Using GIS to Support Marine Heritage Tourism**

Date: 10/14/04
Attendance: 35
Location: Traverse City, Mich.

JASON Teacher Training

Date: 10/16/04
Attendance: 21
Location: Aldo Leopold Nature Center,
Madison

Madison JASON Teacher Training

Date: 10/16/04
Attendance: 18
Location: Aldo Leopold Nature Center,
Madison

Great Lakes Invasive Species

Date: 10/19/04
Attendance: 50
Location: NOAA, Silver Spring, Md.

USCG Auxiliary Instructor Training

Date: 10/21/04
Attendance: 21
Location: Great Lakes WATER Institute,
UW-Milwaukee

Communications

National Sea Grant Aquaculture Exhibit

Date: 3/1-6/04
Attendance: 3,000
Location: World Aquaculture Society Triennial
Conference, Honolulu, Hawaii

Submerged in History

Date: 3/6/04
Attendance: 65
Location: Kenosha Public Museum, Kenosha

**Web-Based Management and Delivery of Audio,
Video, Text and Graphics**

Date: 3/30/04
Attendance: 80
Location: Long Beach, Calif.

Wreck of the *W. Young*

Date: 4/14/04
Attendance: 15
Location: Four Lakes Scuba Club, Madison

Cook's Charting of North America

Date: 4/15/04
Attendance: 25
Location: Madison

**Wisconsin Underwater Archeology Association
Biannual Meeting**

Date: 4/17/04
Attendance: 8
Location: La Crosse

Submerged in History

Date: 4/22/04
Attendance: 300
Location: Notebart Nature Museum

Aquatic Invasive Species Kiosk

Dates: Spring-Fall 2004
Attendance: 100,000 (*seasonal est.*)
Location: Badger car ferry, Lake Michigan

Submerged in History

Date: 5/1/04
Attendance: 25
Location: Wisconsin Maritime Museum,
Manitowoc

Submerged in History

Date: 5/4/04
Attendance: 100
Location: Nekoosa Public Library, Nekoosa

Submerged in History

Date: 5/4/04
Attendance: 118
Location: Nekoosa Public Library, Nekoosa

Wisconsin Lighthouses

Date: 6/1/04
Attendance: 25
Location: UW Brown Bag Series, Madison

History of the Great Lakes Coast Guard

Date: 6/6/04
Attendance: 30
Location: Immanuel Lutheran Church, Manitowoc

Wisconsin Underwater Archaeology

Date: 6/10/04
Attendance: 21
Location: Peninsula State Park, Fish Creek

Wisconsin Underwater Archaeology

Date: 6/14/04
Attendance: 31
Location: Peninsula State Park, Fish Creek

History of the Great Lakes Coast Guard

Date: 7/14/04
Attendance: 44
Location: Peninsula State Park, Fish Creek

Charting the Great Lakes

Date: 7/26/04
Attendance: 43
Location: Peninsula State Park, Fish Creek

Meet a Great Lakes Diver

Date: 7/28/04
Attendance: 36
Location: Peninsula State Park, Fish Creek

Great Lakes Restoration & Protection Priorities Workshop-Green Bay

Date: 8/17/04
Attendance: 52
Location: KI Convention Center, Green Bay

Great Lakes Restoration & Protection Priorities Workshop-Lake Michigan

Date: 8/18/04
Attendance: 54
Location: Union Ballroom, UW-Milwaukee

Wisconsin Lighthouses

Date: 8/30/04
Attendance: 42
Location: Peninsula State Park, Fish Creek

UW Archaeology in Wisconsin

Date: 9/1/04
Attendance: 31
Location: Peninsula State Park, Fish Creek

Timber Rafting in Wisconsin

Date: 9/4/04
Attendance: 47
Location: UW History Roundtable, Madison

Rip Current Outreach-Wisconsin

Date: 9/14/04
Attendance: 60
Location: Stone Laboratory, Put-In-Bay, Ohio

Charting the Great Lakes

Date: 9/18/04
Attendance: 61
Location: Wisconsin Maritime Museum, Manitowoc

Door County Lighthouses

Date: 10/4/04
Attendance: 31
Location: St. Paul's Lutheran Church, Fish Creek

Education

Water Resources Library Presentation to UW Water Resources Management Students on Finding Water-Related Information (in partnership with UW Steenbock Agricultural Library) (Savoy)

Date: November 6, 2003
Attendance: 20
Location: Steenbock Library Computer Lab, UW-Madison

Madison JASON Educator Professional Development Workshop (Lubner/Reeb)

Date: November 8, 2003
Attendance: 18 teachers
Location: The Pyle Center, UW-Madison

Madison JASON Telepresence Global Conference
(Lubner/Reeb)

Date: February 3-5, 2004

Attendance: 449 students and their teachers

Location: BioPharmaceutical Technology Center
Institute, Fitchburg

Library Summer Story Hour Pilot Project for At-Risk Kids: Water Critters for Kids: Fish (Savoy)

Date: August 2, 2004

Attendance: 13

Location: Boys and Girls Club of Dane County,
Madison

Library Summer Story Hour Pilot Project for At-Risk Kids: Water Critters for Kids: Frogs (Savoy)

Date: August 9, 2004

Attendance: 68

Location: Boys and Girls Club of Dane County,
Madison

Madison JASON – Reading Hour with Wisconsin First Lady, Jessica Doyle (Savoy)

Date: October 5, 2004

Attendance: 30

Location: Governor's Residence, Maple Bluff

Library Fall Story Hour Pilot Project for At-Risk Kids: More Water Critters for Kids: Parrots of the Rainforest (Savoy)

Date: October 11, 2004

Attendance: 38

Location: Madison School and Community
Recreation Allied Drive Building, Madison

“Recent Advances in Limnology and Oceanography” Seminar Series

These UW Sea Grant-supported lectures were held Thursday evenings at the UW-Milwaukee Great Lakes WATER Institute, 600 E. Greenfield Ave., Milwaukee. Open to the public, attendance at each lecture ranged from **25** to **50** people. For the 2003-04 series, **11 students** were enrolled, about evenly divided between graduate and undergraduates. Many more students attended the public lectures than were officially registered for credit. The theme for the 2004 series was “Climate Change in the Great Lakes and Oceans.” The speakers and topics for the series were:

Feb. 5, 2004—“The Potential Influence of Climate Change on the Great Lakes,” Arthur Brooks, Biological Sciences and Center for Great Lakes Studies, UW-Milwaukee.

Feb. 12, 2004—“Climate Change and the Oceans,” John Berges, Biological Sciences, UW-Milwaukee.

March 4, 2004—“Slippery When Warmed: Predicting Lake Levels Under Greenhouse Warming,” Brent Lofgren, Great Lakes Environmental Research Laboratory, National Oceanic & Atmospheric Administration.

April 1, 2004—“Climate Change in the Experimental Lakes Region of Ontario,” Raymond Hesslein, Freshwater Institute, Winnipeg, Man.

April 8, 2004—“The Influence of Climate Change on Bird Behaviors,” Peter Dunn, Department of Biological Sciences, UW-Milwaukee.

April 15, 2004—“C:N:P in Lake and Ocean Systems: Redfield Today,” Robert Sterner, Department of Ecology, Evolution & Behavior, University of Minnesota.

April 29, 2004—“A Window on the Past: Lake Sediments and Long-Term Climatic Change,” John Smol, Canada Research Chair in Environmental Change, Queen’s University, Kingston, Ont.

May 6, 2004—“From Molecules to Biospheres: Ocean Productivity in a Changing Climate,” Mike Behrenfeld, Goddard Space Flight Center, National Aeronautics & Space Administration.

APPENDIX I

Project Partnerships

November 1, 2003, through October 31, 2004

Advisory Services Projects

A/AS-1—Chicago Sanitary & Ship Canal Fish Dispersal Barrier / Asian Carp Rapid Response Project

Andrew Turnpenny, Fish Guidance Systems
Chris Goddard, Great Lakes Fishery Commission
Chuck Shea, USACE-Chicago District
Dan Thomas, Great Lakes Sport Fishing Council
Darren Melvin, Ill. River Carriers' Assn.
Dave Jude, Univ. of Mich.
Dennis Schornack, International Joint Commission
Irwin Polls, Ecological Monitoring and Assessment
Jacque Savino, Biological Survey, U.S. Geological
Survey
Jay Rendall, Minn. DNR
Jeff Smith, Smith-Root Inc.
Jeremy Nedwell, Fish Guidance
Jim Lynch, Canadian Consulate
John Dettmers, Ill. Natural History Survey
John Janssen, Great Lakes WATER Institute, UW-
Milwaukee
John Rogner, U.S. Fish & Wildlife Service
Julia Wozniak, Midwest Generation
Lt. Commander David Fish, U.S. Coast Guard
Lynda Corkum, Univ. of Windsor
Marc Tuchman, U.S. EPA
Mark Pegg, Ill. Natural History Survey
Mike Conlin, Ill. DNR
Mike Donohue, Great Lakes Commission
Pam Thiel, U.S. Fish & Wildlife Service
Pat Charlebois, Ill.-Ind. Sea Grant
Pete Redmon, U.S. EPA
Richard Lanyon, Metropolitan Water Reclamation
District of Greater Chicago
Richard Sparks, Univ. of Ill.
Rob Sulski, Ill. EPA
Roger Eberhardt, Great Lakes ANS Panel
Russ Van Herik, Great Lakes Protection Fund
Scudder Mackey, Mackey & Associates
Suzanne Malec, Chicago Dept. of Environment
Traci Barkley, Univ. of Ill.

A/AS-1—Coastal Engineering

Apostle Islands Sport Fisherman Assn.
Ashland City Engineer, Ashland

Bodin Fisheries
Douglas, Bayfield, Ashland & Iron County Land &
Water Depts.
Lake Superior Basin Coordinator, UW-Extension
Lake Superior Basin Team, Minn. Pollution Control
Assn.
Lake Superior Research Institute
Minn. Sea Grant
Northland College, Ashland, Wis.
Wis. Dept. of Natural Resources, Ashland Office
Wis. Lake Superior Basin Team

A/AS-1—Coastal Habitat Restoration

Baird & Associates
Bay Lake RPC Harbor Council, Bay-Lake Regional
Planning Commission
Brown County Land Conservation Dept.
Brown County Port
Great Lakes Basin Ecosystem Team, U.S. FWS
Lower Green Bay and Fox River Remedial Action Plan
Biota & Habitat Work Group
McDonald Lumber & Warehousing Companies
U.S. Fish and Wildlife Service
USACE
UW-Extension Basin Educators, UW-Extension
UW-Green Bay Cofrin Biodiversity Center, UW Green
Bay
Wis. Coastal Management Program, Wis. DOA
Wis. Dept. of Natural Resources
Wis. Wetlands Assn., Wis. Coastal Wetlands Science
Forum

A/AS-1—Community-Based Water Quality Monitoring in Coastal Watersheds and Great Lakes Estuaries

Brown, Door, Kewaunee, Manitowoc and Sheboygan
County Land and Water Conservation Depts.
Cofrin Biodiversity Center, UW-Green Bay
Fox River Monitoring Project, UW-Green Bay, UW-
Milwaukee and Arjo Wiggins Corp.
Fox Wolf Watershed Alliance
Lake Michigan Lakewide Management Plan Forum
Lake Michigan Monitoring Coordinating Council
Lakeshore Partnership

Lower Fox River Basin Partnerships
UW-Extension, UW-Extension
Wis. Biodiversity Project
Wis. Dept. of Natural Resources

A/AS-1—Diving Duck Use on Lower Green Bay
U.S. Fish and Wildlife Service
Wis. Dept. of Natural Resources

A/AS-1—Education

John Bennett, Carroll College
Bob Biebel, Southeastern Wis. Regional Planning
Commission
Steve Books, MRBP
Dave Fowler, Milwaukee Metropolitan Sewerage
District
Sharon Gayan, Wis. Dept. of Natural Resources
Susan Lewis, Carroll College
Lisa Sherman, Milwaukee County Div. of Emergency
Management
Carl Stenbol, Milwaukee County Dept. of Emergency
Management
Angie Tornes, U.S. National Park Service

A/AS-1—Fisheries / Nonindigenous Species

Mike Klepinger, Mich. Sea Grant
Mark Maricque, Green Bay commercial fisherman
Winkelman Productions, Inc.

A/AS-1—Geographic Information Systems

Great Lakes Commission
Wis. Coastal Management Program
Wis. Dept. of Natural Resources

A/AS-1—GIS and Coastal Performance Indicators

Michael Friis, Wis. Coastal Management Program
James Langdon, Wis. Dept. of Administration
Alberto Vargas, Wis. Coastal Management Program
Stephen Ventura, Land Information and Computer
Graphics Facility

A/AS-1—Great Lakes Park Packs

Sherry Klosiewski, State Naturalist, Wis. Dept. of
Natural Resources
Beth Mittermaier, Wis. Dept. of Natural Resources &
private consultant
Theresa Stabo, Fisheries Education, Wis. Dept. of
Natural Resources
Wis. Environmental Education Board
Kate Zurlo-Cuva, Friends of the State Parks

**A/AS-1—Hazard Analysis & Critical Control Point
for the Baitfish Industry**

Jeff Gunderson, Minn. Sea Grant
Ron Kinnunen, Mich. Sea Grant
Mike Klepinger, Mich. Sea Grant

Eric Obert, Pa. Sea Grant
Fred Snyder, Ohio Sea Grant
Dave Robinson, Robinson Fisheries

A/AS-1—Coastal Natural Hazards

ASCE Coastal Practice Team
Ashland City Engineer, Ashland, Wis.
Delaware Sea Grant
Lake Superior Research Institute
Mich. Sea Grant
North Carolina Sea Grant
Northland College, Ashland, Wis.
Sheboygan River Basin Partnership
Wis. Coastal Management Program
Wis. Dept. of Natural Resources
Wis. Extension, Lake Superior Basin Coord.
Wis. Lake Superior Basin Team

**A/AS-1—New Risk Management Approach to
Coastal Development**

School of Business, UW-Madison
Wis. Coastal Management Program

**A/AS-1—Port, Harbor and Marina Engineering
Assistance**

ASCE Dredging Team
Ashland City Engineer, Ashland, Wis.
Duluth Port Authority, Duluth Harbor
Green Bay Port Authority, Green Bay Harbor
Minn. Sea Grant
Superior Port Director, Superior Harbor, Wis.
U.S. Fish & Wildlife, Green Bay Office
Wis. Commercial Ports Assn.
Wis. Dept. of Natural Resources
Wis. Harbor Towns Assn.

A/AS-1—Recreational Water Safety

Boating Law Administrator, Wis. Dept. of Natural
Resources
George Bores, Captain, U.S. Coast Guard Auxiliary,
Div. Five
George Egan, Past Commodore, Ninth Western
District, U.S. Coast Guard Auxiliary
Greenfield Park and Recreation Dept., Greenfield, Wis.
Steve Smiley, Boy Scouts of America
Wauwatosa Recreation Dept., Wauwatosa Public
Schools

**A/AS-1—Science of the Great Lakes: Elementary to
Post-Secondary (Lake Sturgeon Bowl)**

Amy Lorenzen, Consortium for Oceanographic
Research & Education
Barbara Duffy, Lake Sturgeon Bowl
Bill Nimke, Wis. Lake Schooner Education Assn.
Caroline Joyce, Continuing Education, UW-Milwaukee
Don Quintenz, Schlitz Audubon Center

Jeanine Staab, Medford Public Schools
Keith Sverdrup, Geosciences Dept., UW-Milwaukee
Robert Pavlik, Marquette Univ.
Russell Cuhel, Center for Great Lakes Studies
Sue Masterson, CESA 12
Susan Haynes, Consortium for Oceanographic Research
and Education
Terry Miller, Center for International Education, UW-
Milwaukee

**A/AS-1—Shore Protection Advice for Great Lakes
Shore Property Owners**

Baird and Associates
Dr. Ronald Chase, Western Mich. Univ.
Gene Clark, Minn. Board of Water & Soil Resources
Dr. Steven Daly, Cold Regions Research and
Environmental Laboratory, USACE
Dr. Robin Davidson-Arnott, Univ. of Guelph, Ont.
Christian J. Stewart Consulting
Dept. of Civil Engineering and Water and the
Environment Group
Detroit and Buffalo districts, and Coastal Hydraulics
Laboratory, USACE
Dr. Tuncer Edil, UW-Madison
Dr. Kevin Hall, Queens Univ., Kingston, Ont.
Environment Canada
Essex Region Conservation Authority
Ill. State Geological Survey
Ind. Dept. of Natural Resources
Dr. Alan Kehew, Western Mich. Univ.
Dr. Warren Kriesel, Univ. of Georgia
Melissa Olsen Leuck, Gallagher Financial Products
Mich. Dept. of Environmental Quality
Minn. Board of Water and Soil Resources
N.Y. State Dept. of Environmental Conservation
Ohio Dept. of Natural Resources
Ont. Ministry of Natural Resources
Pa. Dept. of Environmental Protection
Phillip Ross, USACE-Detroit District
Thomas Bennett, Wetland and Coastal Resources, Inc.
Univ. of Mich., Dept. of Naval Architecture and Marine
Engineering
Wis. Dept. of Natural Resources

**A/AS-1—Software for Sediment Remediation
Decisions**

Berger/Abam Engineers
Dr. Samuel Clemence, Syracuse Univ.
Foth and Van Dyke
Great Lakes Protection Fund
Dr. Isobel Heathcote, Univ. of Guelph
Dr. Robert Mumford, Mumford Consulting, Inc.
USACE-Detroit District
U.S. EPA Great Lakes National Program Office
U.S. EPA-Region Five, Chicago

A/AS-1—“State of the Bay” Website
Green Bay Metropolitan Sewerage District
Science and Technical Advisory Committee for the
Lower Green Bay & Fox River Remedial Action
Plan
UW-Green Bay
Wis. Dept. of Natural Resources

A/AS-1—Water Quality
Lake Michigan LaMP Forum, U.S. EPA
Wis. Coastal Management Program, Wis. DOA
Wis. Dept. of Natural Resources

A/AS-1—“Waters of Wisconsin” Program
U.S. Dept. of Agriculture
UW System Faculty
UW-Extension
Wis. Academy of Sciences, Arts and Letters
Wis. Coastal Management Program
Wis. Dept. of Natural Resources
Wis. Lakes Assn.

**A/AS-50—WATERS 2002: Wisconsin’s
Aquaculture Technology, Education and
Research Services**
North Central Regional Aquaculture Center, USDA

**A/AS-51—Great Lakes Fisheries Leadership
Institute Curriculum Development**
Paul Hansen, Center for Limnology, UW-Madison

**A/AS-52—Great Lakes Fisheries Leadership
Institute**
Bill Pielsticker, Wis. Conservation Voters
Charlie Henriksen, Wis. Commercial Fisherman
Dale Maas, Conservation Congress Great Lakes Study
Committee
Dave West, Lake Superior charter captain
Gary Czypinski, U.S. Fish & Wildlife Service
Gerald Weiesner, L. Mich. sport fisherman
Henry Quinlan, U.S. Fish & Wildlife Service
Jim Thannum, Great Lakes Indian Fish and Wildlife
Commission
Lori Evrard, U.S. Geological Survey
Louis Kowieski, Great Lakes Sport Fishing Federation
Mark Dryer, U.S. Fish & Wildlife Service
Mark Holey, U.S. Fish & Wildlife Service
Mike Ryan, Great Lakes Fishery Commission
Niel Kmiecik, Great Lakes Indian Fish & Wildlife
Commission
Owen Gorman, U.S. Geological Survey
Paul Peeters, Wis. Dept. of Natural Resources
Ron Kinnunen, Mich. Sea Grant
Steve Schram, Wis. Dept. of Natural Resources

A/AS-53—Sea Grant Non-Indigenous Species (SGNIS) Website: Development and Support

Helen Domske, N.Y. Sea Grant
Robin Goettel, Ill.-Ind. Sea Grant
Elizabeth LaPorte, Mich. Sea Grant
Brian Miller, Ill.-Ind. Sea Grant

A/AS-54—WATERS 2004-06: Wisconsin's Aquaculture Technology, Education and Research Services

North Central Regional Aquaculture Center, USDA

A/AS-55—EPA Smart Growth Extension Partnership

Bay-Lake Regional Planning Commission
Delta Institute, U.S. EPA consulting firm
East Central Wis. Regional Planning Commission
Great Lakes Nonpoint Abatement Coalition, County Land & Water Conservation Depts.
Lake Michigan LaMP Forum, U.S. EPA
Office of Smart Growth, U.S. EPA, Washington
UW-Extension

Communications Projects

C/C-1—Aquaculture Effluents and Waste By-Products Publication

Great Lakes WATER Institute, UW-Milwaukee
Iowa State University Press
North Central Regional Aquaculture Center, USDA

C/C-1—Aquatic Invasive Species Watch Cards

Minnesota Sea Grant

C/C-1—Trap Net Avoidance Poster & Brochures

Apostle Islands Sport Fisherman's Assn.
Lake Superior Commercial Fishery Advisory Committee
Wisconsin Dept. of Natural Resources

C/C-1—Ecosystems and Habitats Theme Team

Sea Grant Association
Rhode Island Sea Grant

C/C-1—Fish Bioenergetics Model

University of Wisconsin-Madison
Center for Limnology

C/C-1—Great Lakes Ecosystems & Habitat Theme Team

Great Lakes Sea Grant Network

C/C-1—Great Lakes Restoration & Protection Priorities Workshops

Council of Great Lakes Governors
Great Lakes Commission
Minnesota Sea Grant
UW-Extension
Wisconsin Coastal Management Program
Wisconsin Dept. of Natural Resources
Wisconsin Office of Governor

C/C-1—Guide to Finding Water-Related Information

Steenbock Agricultural Library, UW-Madison

C/C-1—Proceedings of Percis III: The Third International Percid Fish Symposium

Aquaculture Program, UW-Madison

C/C-1—Publications Production

Harvest Studio, Stoughton, Wis.

C/C-1—Public Service Ad on Invasive Species

Wisconsin Trails magazine
Jon Golden, photographer

C/C-1—National Rip Currents Campaign

Great Lakes Sea Grant Network
National Weather Service, NOAA
NOAA Sea Grant
Michigan Sea Grant
North Carolina Sea Grant
Algoma City Department of Recreation
Harrington Beach State Park, Belgium
Kenosha City Parks
Kewaunee City Parks
Kohler-Andrae State Park, Sheboygan
Newport State Park, Ellison Bay
Point Beach State Forest, Two Rivers
Port Washington City Parks and Recreation
Racine City Parks
Sheboygan City Parks Division
Two Rivers City Parks
Whitefish Dunes State Park, Sturgeon Bay

C/C-1—"UW-Madison on the Road" Program

Chancellor's Office
Wisconsin Alumni Association

C/C-1—Speakers for Service Clubs

Speakers Bureau, UW-Madison

C/C-1—Great Lakes Fishes Posters

Michigan Sea Grant

C/C-1—Living on the Coast Publication

U.S. Army Corps of Engineers-Detroit District

C/C-1—News Releases, Media Relations

Daily News, Great Lakes Information Network
Meade Communications, Annapolis, Md.
Minnesota Sea Grant
National Sea Grant Office, NOAA
Oceanic & Atmospheric Research Public Affairs,
NOAA
University Communications Office, UW-Madison

C/C-1—Publications Submissions & Distribution

National Sea Grant Library
Water Resources Library, UW-Madison

C/C-1—Wisconsin Fishes Identification Website

University of Wisconsin-Madison
Center for Limnology
Wisconsin Department of Natural Resources

C/C-1—Wisconsin's Water Library

University of Wisconsin-Madison
Water Resources Library
Wisconsin Academy of Sciences, Arts & Letters

C/C-1—Wisconsin Water Policy Inventory

University of Wisconsin-Madison
Department of Urban & Regional Planning
UW-Madison Libraries
Wisconsin Academy of Sciences, Arts & Letters

C/C-1—World Aquaculture Society Triennial Conference Exhibit

Mississippi-Alabama Sea Grant
NOAA Sea Grant

C/C-1—Zebra Mussel Watch Card

Illinois-Indiana Sea Grant
Kansas Department of Wildlife & Parks
Minnesota Dept. of Natural Resources
Minnesota Sea Grant
St. Croix National Scenic Riverway
Wisconsin Dept. of Natural Resources
U.S. Coast Guard
U.S. Fish & Wildlife Service-Onalaska

C/C-2—“Earthwatch Radio” Program

University of Wisconsin-Madison
Gaylord Nelson Inst. for Environmental Studies
Life Sciences Communication Department
School of Business
School of Journalism & Mass Communications
Approximately 120 radio stations and other
broadcasters (*see list on next page*)

C/C-6—Diving into History: Research and Public Education on Wisconsin's Underwater Archaeological Resources

Wisconsin Historical Society
Maritime Preservation & Archaeology Program

C/C-7—Exploring Wisconsin's Great Lakes Schooners: Integrating Underwater Archaeology, Shipwreck Preservation and Public Education

Wis. Underwater Archaeology Assn.
Neptune's Nimrods Dive Club
Great Lakes Shipwreck Research Foundation
Wis. Maritime Museum
Kenosha Public Museum
Rogers Street Fishing Village
Friends of Wind Point Lighthouse
Great Lakes WATER Institute, UW-Milwaukee
Great Lakes Information Network, Great Lakes
Commission
Wis. Dept. of Natural Resources
City of Bayfield, Wis.

C/C-7—Wisconsin Maritime Trails project

Wisconsin Dept. of Tourism
Wisconsin Dept. of Transportation
Wisconsin Historical Society
Maritime Preservation & Archaeology Program

“Earthwatch Radio” Stations

As of October 2004, “Earthwatch” had **118 outlet subscribers** in the U.S., Canada and the United Kingdom. Each one receives 260 free two-minute science and environmental news programs per year. These broadcasters include one network of four noncommercial stations, a talk show carried by 10 stations and a global radio service in London that transmits public service programs around the world:

Alberta

CFPE-FM Park Radio, Banff

Arkansas

KABF-FM, Little Rock

KXRJ-FM, Russellville

Arizona

KXCI-FM, Tucson

British Columbia

Village 900 CKMO Radio, Victoria

California

KBPK-FM, Fullerton

Armed Forces Radio and Television Services,

March Air Reserve Base

KOOX-FM, Oakland

KWMR-FM, Point Reyes Station

Environmental News Network, San Rafael

Colorado

KRZA-FM, Alamosa

KGNU-FM, Boulder

KSJD-FM, Cortes

KDUR-FM, Durango

KSUT-FM, Ignacio

KQRP-FM, Salida

Connecticut

WAPJ-FM, Torrington

District of Columbia

Voice of America, Washington

Florida

Radio for Peace International, Miami

Idaho

ICBVI, Boise

Illinois

WESN-FM, Bloomington

WDBX-FM, Carbondale

WPCD-FM, Champaign

Illinois Radio Reader, Champaign

WZRD-FM, Chicago

WEPS-FM, Elgin

WDCB-FM, Glen Ellyn

WGEL-FM, Greenville

Radio Information Service, Macomb

WVJC-FM, Mount Carmel

WPNA-AM, Oak Park

WCCI-FM, Savanna

Indiana

WFHB-FM, Bloomington

Northeastern Indiana Radio Reading Service,

Fort Wayne

WGCS-FM, Goshen

WRFT-FM, Indianapolis

WJEF-FM, Lafayette

WWHI-FM, Muncie

WEEM-FM, Pendleton

WECI-FM, Richmond

Iowa

KCCK-FM, Cedar Rapids

KROS-AM, Clinton

KALA-FM, Davenport

KHOE-FM, Fairfield

KCMR-FM, Mason City

Kansas

KTJO-FM, Ottawa

Kentucky

WMMT-FM, Whitesburg

Maine

WHSN-FM, Bangor

Massachusetts

WHAB-FM, Acton

WZBC-FM, Chestnut Hill

WUML-FM, Lowell

WAVM-FM, Maynard

WMFO-FM, Medford

WNMH-FM, Northfield

WAIC-FM, Springfield

Manitoba

CJUM-FM, Winnipeg

Michigan

WATZ-AM, Alpena
WLEW-AM, Bad Axe
WAUS-FM, Berrien Springs
WKAR Radio Talking Book, East Lansing
WOAS-FM, Ontonagon
WKJC-FM, Tawas City
WNMC-FM, Traverse City

Minnesota

WTIP-FM, Grand Marais
KVSC-FM, St. Cloud
KSRQ-FM, Thief River Falls

Missouri

KMNR-FM, Rolla

Montana

KMSM-FM, Butte

North Dakota

KABU-FM, St. Michaels

New Hampshire

WSCS-FM, New London

New Jersey

New Jersey Radio Library for the Blind, Trenton

New Mexico

KGLP-FM, Gallup
KENW-FM, Portales
KRDR-FM, Questa / Red River
KSFR-FM, Santa Fe

New York

WETD-FM, Alfred
WBSU-FM, Brockport
WEOS-FM, Geneva
WLVL-AM, Lockport
In Touch Networks, New York
WPOB-FM, Plainview

Newfoundland

CHMR-FM, St. John's

Ohio

WCRS Reading Service, Akron
WZIP-FM, Akron
Cleveland Radio Reading Service, Cleveland
WHSS-FM, Hamilton
WXTS-FM, Toledo

Oklahoma

KALU-FM, Langston

Ontario

CJLX-FM, Belleville
CHRW-FM, London
CKMS-FM, Waterloo

Pennsylvania

WNAE-AM, Warren

Rhode Island

In-Sight Radio, Warwick

Tennessee

WUTM-FM, Martin

Texas

KOOP-FM, Austin
KEOS-FM, College Station
Houston Taping for the Blind Radio, Houston

United Kingdom

World Radio Network, London

Virginia

Virginia Voice, Richmond
WYOU-FM, Virginia Beach

Vermont

Thom Hartmann Program, Montpelier
(carried by 10 stations)

Washington

KBCS-FM, Bellevue
KUGS-FM, Bellingham
KSVR-FM, Mount Vernon
KVTI-FM, Tacoma

West Virginia

Allegheny Mountain Radio Network, Dunmore
(network of four stations)

Wisconsin

WBSD-FM, Burlington
WCFW-FM, Chippewa Falls
WGAZ-FM, Goodman
WIPZ-FM, Kenosha
WORT-FM, Madison
WMSE-FM, Milwaukee
WOCO-AM / WOCO-FM, Oconto
WDDC-FM, Portage
WXPR-FM / WXPW-FM, Rhinelander
WDOR-AM / WDOR-FM, Sturgeon Bay
KUWS-FM, Superior
WTRW-AM, Two Rivers

Education Projects

E/E-1—Summer and Fall Story Hour Pilot Projects

Boys and Girls Club of Dane County
Madison School and Community Recreation
School of Library and Information Studies,
UW-Madison
UW-Madison Libraries

E/E-1—Wisconsin’s Water Library

River Alliance of Wisconsin
Wisconsin Libraries’ Delivery Network

E/E-1—Guide to Finding Water-Related Information (Website)

Steenbock Library, UW-Madison

E/E-1—Project JASON: Reading Hour with Wisconsin First Lady Jessica Doyle

Wisconsin First Lady Jessica Doyle’s Office
Windsor Elementary School 4th grade

E/E-1—Presentation to Graduate Students on Finding Water-Related Information

Steenbock Library, UW-Madison

E/E-47—Lake Sturgeon Bowl: Wisconsin’s Regional Academic Competition for the National Ocean Sciences Bowl, 2004-06

18 Wisconsin high schools (*see list below*)

Carmen Aguilar, UW-Milwaukee

Russell L. Cuhel, UW-Milwaukee

Caroline Joyce, UW-Milwaukee

James F. Lubner, JASON Project, UW Sea Grant
Advisory Services

Frances L. Luebke, UW-Milwaukee

Keith Sverdrup, UW-Milwaukee

E/E-49—Sea Grant-Industry Fellowship to Develop a Hybrid Photocatalytic/Disinfecting Point of Use Drinking Water Treatment Device

Pentair Water Treatment, Sheboygan, Wis.

E/E-1—“Madison JASON” Schools & Partners

Eighteen teachers and nearly **800 students** from **11 schools plus one home school** in the communities of Abbotsford, Beaver Dam, Blair, Columbus, DeForest, Madison, Stoughton, Sun Prairie, and Windsor participated in this project in the last year.

Schools

Abbotsford School District

Beaver Dam Middle School

Blair-Taylor Elementary School

Cherokee Heights Middle School

Columbus Middle School

Fox Prairie Elementary School

Home Schooling (McGinley)

Randall Elementary School

Sacred Hearts School

Sandhill School

Westside Christian School

Windsor Elementary School

Community Partners

Aldo Leopold Nature Center

Bethel Horizons Nature Center

BioPharmaceutical Technology Center Institute

Henry Vilas Zoo

Madison Metropolitan School District

Olbrich Botanical Gardens

Promega Corporation

Wis. DNR MacKenzie Environmental Educational
Center

University Partners

University of Wisconsin-Madison
Arboretum
Elvehjem Museum of Art
Geology Museum
Pyle Center
Water Resources Library

University of Wisconsin-Milwaukee
University Center for Continuing Education

National Partner

JASON Foundation for Education

E/E-47—“Lake Sturgeon Bowl” Schools & Partners

Eighty-five students representing **18 high schools** throughout Wisconsin participated in the third annual Lake Sturgeon Bowl competition held Feb. 28, 2004, at UW-Milwaukee, Wisconsin’s regional competition of the National Ocean Sciences Bowl:

Appleton West High School	Port Washington High School
Arrowhead High School	Professional Learning Institute (Milwaukee)
Edgerton High School	Rufus King High School, Milwaukee
Marquette University High School, Milwaukee	St. Catherine’s High School, Racine
Marshfield High School	St. Mary Central High School, Neenah
Metropolitan High School (Milwaukee)	Stevens Point Area Senior High
Luxemburg-Casco High School	Stoughton High School
Newman High School (Wausau)	Waterford Union High School
Northern Ozaukee High School (Fredonia)	Whitefish Bay High School

More than **90 volunteers and staff** served as officials or assisted at the competition, including **50 faculty and staff** from 17 UW-Milwaukee departments, **seven graduate and undergraduate students** from UW-Milwaukee and UW-Madison (two were former Lake Sturgeon Bowl participants), 11 representatives from **seven area companies**, 15 representatives from **four area schools** and **three museums**, and **five community volunteers**.

Research Projects

R/AQ-37—National Marine Aquaculture Initiative: Production of a Best Management Practices Manual for Aquaculture in Wisconsin and the Great Lakes Region

Chris Hartleb, UW-Stevens Point
David Gollon *et al.*, Wisconsin Aquaculture Association
Gary Casper, Partners in Amphibian and Reptile Conservation
Jerry Rodenberg *et al.*, Wisconsin Dept. of Natural Resources
Myron Kibus, Wisconsin Dept. of Agriculture, Trade & Consumer Protection
Steven Yeo, UW-Milwaukee

R/AQ-38—Endocrine and Environmental Regulation of Growth in Yellow Perch

Drs. Frederick Goetz and Steven Roberts, Marine Biological Laboratory, Woods Hole Oceanographic Institution
Linus Lozys, Institute of Ecology, Laboratory of Marine Ecology

R/AQ-39—Use of Fish Oil for Enzyme-Mediated Production of Value-Added Food Products Containing Omega-3 Fatty Acids

Hugo S. Garcia, Instituto Tecnológico de Veracruz (Mexico)
Cristina Otero, Instituto de Catalisis y Petroleoquímica, Madrid, Spain

R/BT-16—Dioxin Developmental Toxicity in Zebrafish

John J. Stegeman, Woods Hole Oceanographic Institution
Robert L. Tanguay, Oregon State University
Hiroki Teraoka, Rakuno Gakuen University, Japan

R/BT-17—AhR Signaling in Rainbow Trout and Zebrafish

Eric A. Andreasen, Oregon State University
Geoffrey Burnas, Massachusetts General Hospital, Harvard University
Randall Peterson, Massachusetts General Hospital, Harvard University
John J. Stegeman, Woods Hole Oceanographic Institution
Mary K. Walker, College of Pharmacy, University of New Mexico
Robert L. Tanguay, Oregon State University
Hiroki Teraoka, Rakuno Gakuen University, Japan

R/EC-10—Impact of a Shifting Wind Field over the Laurentian Great Lakes on Accumulation and Resuspension of Sediments in Green Bay, Lake Michigan

Rachel E. Brown, NSF Research Experience for Undergraduates Program, Carleton College

R/EC-8—Methylmercury Production and Transfer to Benthic Food Webs in Nearshore and Wetland Environments of Southern Lake Superior

Bad River Band of Chippewa Indians

R/EC-9—Coastal Sediment Resuspension, Transport and Deposition in Great Lakes

Stephen Galarneau, Wisconsin Dept. of Natural Resources
Dr. Xizo-Chun Zhang, Wisconsin Dept. of Natural Resources

R/LR-82—Dynamics of the Lake Superior Food Web

Wisconsin Dept. Natural Resources

R/LR-90—MHC Diversity in Lake Trout at the Mid-Lake Reef Complex and Northern Refuge, Lake Michigan

Charles R. Bronte, Fishery Biologist, U.S. Fish & Wildlife Service
Tom Burzynski, Lake Michigan Fisheries Technician, Wisconsin Dept. of Natural Resources

R/LR-92—A Retrospective Analysis of Lake Michigan and Lake Superior Food Webs

Dr. Sudeep Chandra, University of Nevada-Reno
Dr. Jim Kitchell, UW-Madison
Dr. Julie Turgeon, Université Laval

R/LR-94—Compensatory and Spatial Dynamics in Great Lakes Food Webs

Lake Superior Technical Committee, Great Lakes Fishery Commission
Wisconsin Dept. of Natural Resources

R/LR-95—Sustainability of Lake Trout Fisheries in Lake Superior

Mark P. Ebener, Chippewa-Ottawa Resource Authority
Mark E. Holey, U.S. Fish & Wildlife Service
Patrick C. McKee, Wisconsin Dept. of Natural Resources

Stephen T. Schram, Wisconsin Dept. of Natural Resources
Donald R. Schreiner, Minnesota Dept. of Natural Resources
Michael L. Toneys, Wisconsin Dept. of Natural Resources

R/MW-84—Direct Effect of Metals on Behavior, Sexual Development and Reproduction of Amphibians in Great Lakes Ecosystems

Pieter Johnson, Center for Limnology, UW-Madison

R/MW-86—Factors Regulating the Interactions of Trace Metals and Aquatic Organisms in Watersheds of the Great Lakes

U.S. Geological Survey
Wisconsin Dept. of Natural Resources
Wisconsin State Laboratory of Hygiene

R/MW-87—The Importance of Trophic Level and Carbon Source as Factors Affecting the Accumulation of PCBs in the Lake Michigan Food Web

Dr. John Janssen, Senior Scientist, UW-Milwaukee

R/MW-88—LakeSat: Near Real-Time Monitoring of Water Quality in Green Bay and Wisconsin's Lake Michigan Coastal Waters via Satellite Remote Sensing

Green Bay Metropolitan Sewerage District, City of Green Bay, Wis.

R/NI-31—Improving Safety and Efficiency in Scuba Diving

R/NI-32—Improving Safety and Cost Effectiveness in Scuba Diving

Capt. John Murray, M.D., Head, Deep Sea Biomedical Development Program, NAVSEA, Washington, D.C.

Dr. Armando Lopez-Tristani, M.D., Prof., Dept. of Anesthesiology, University of Puerto Rico Medical School, San Juan, P.R.

Dr. Bruce Wienke, Ph.D., Los Alamos National Laboratory / Chief Scientist, NAUI

Dr. Edward T. Flynn, Jr., M.D., Naval Sea Systems Command (NAVSEA), U.S. Navy

Dr. Massimo Ferrigno, M.D., Ph.D., Assoc. Prof., Dept. of Anesthesiology, Harvard University Medical School, Boston, Mass.

Dr. Wayne Gerth, Ph.D., Naval Experimental Diving Unit (NEDU), Naval Sea Systems Command (NAVSEA), Panama City, Fla.

Mr. Jim McCarthy, President, Gulf Coast Hyperbarics, Inc., Lynn Haven, Fla.

Mr. Thomas Schmidt, Lockheed Martin, San Diego, Calif., (Rescue submersibles *Mystic* and *Avalon*)

APPENDIX J External Advisory Groups

UW Sea Grant Institute Advisory Council, 2004

ANDERS W. ANDREN (*ex officio*)

Director, Aquatic Sciences Center
Sea Grant Institute
Water Resources Institute
Professor, Environmental Chemistry &
Technology Program
University of Wisconsin-Madison

RICHARD R. BURGESS

Professor, Oncology
McArdle Laboratory
University of Wisconsin-Madison

BEVERLY A. FRENCH

Partner, Orde Advertising, Inc.
West De Pere, Wisconsin

FRANCES C. GARB

Senior Academic Planner, Office of
Academic Affairs
University of Wisconsin System
Madison, Wisconsin

HALLETT J. "BUD" HARRIS (*chair*)

Professor Emeritus, Natural & Applied Sciences
University of Wisconsin-Green Bay

REINHOLD HUTZ

Interim Associate Dean for Research
Research Services & Administration
University of Wisconsin-Milwaukee

LEE KERNEN

Citizen representative
Madison, Wisconsin

REUBEN H. LORENZ

Citizen representative
Madison, Wisconsin

LARRY J. MACDONALD

Owner, Apostle Islands Outfitters & General Store
Mayor of Bayfield
Bayfield, Wisconsin

JOHN J. MAGNUSON

Professor Emeritus, Zoology
Center for Limnology
University of Wisconsin-Madison

KEVIN MCSWEENEY

Professor, Soil Science & Environmental Studies
Director, School of Natural Resources
University of Wisconsin-Madison

DAVID T. MICHAUD

Principal Scientist, Environmental Department
Wisconsin Electric Power Company
Milwaukee, Wisconsin

NATHANIEL E. ROBINSON

Member, National Sea Grant Review Panel
Executive Assistant to the State Director,
Wisconsin Technical College System
Madison, Wisconsin

LINDA L. WEIMER

Vice President for University Relations
University of Wisconsin System
Madison, Wisconsin

Committee on Advisory Services, 2004

CARMEN AGUILAR (*Scientist*)

Great Lakes WATER Institute
Milwaukee, Wis.

KAREN GREEN (*Education*)

Metropolitan High School
Milwaukee, Wis.

LEE HAASCH (*Charter Fishing*)

Haasch Guide Service
Algoma, Wis.

AL HOUSE (*Recreational Fishing*)

Apostle Islands Fishing Club
Washburn, Wis.

JOHN KENNEDY (*Water Quality*)

Green Bay Metropolitan Sewerage District
Milwaukee, Wis.

DAVID LEE (*Coastal GIS*)

Bayfield County Land Information Office
Washburn, Wis.

ANGIE TORNES (*Recreation*)

Rivers, Trails and Conservation Assistance
National Park Service
Milwaukee, Wis.

DAVE WENTLAND (*Coastal Engineering*)

Coastal Planning and Design
Green Bay, Wis.

JOHN WOLF (*Aquaculture*)

Alpine Farms
Sheboygan Falls, Wis.

ROY ZELLMER (*Water Safety*)

Boating Safety Administrator
Wisconsin Department of Natural Resources
Madison, Wis.