

2003

---

UNIVERSITY OF WISCONSIN SEA GRANT COLLEGE PROGRAM

Annual Progress Report

TO THE NATIONAL SEA GRANT COLLEGE PROGRAM



# **Annual Progress Report, 2003**

## **Programmatic Accomplishments and Benefits Achieved**

**University of Wisconsin Sea Grant College Program**

**Anders W. Andren, Director**

**Institution/Grantee: University of Wisconsin Sea Grant Institute**

**Federal Grant Nos.: NA16RG2257  
NA16RG1633  
NA16RG1680**

**Reporting Period: November 2002 through October 2003**

First printing: November 2003

*Prepared by*

Stephen Wittman, Program Information Specialist

*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, Communications Program Assistant

*Proofread by*

Gloria Gardner, Administration Program Assistant

*Cover by*

Tina Yao, Designer/Art Director



*This work was funded by the University of Wisconsin Sea Grant Institute under grants from the National Sea Grant College Program, National Oceanic & Atmospheric Administration, U.S. Department of Commerce, and from the State of Wisconsin. Federal Grant No. NA16RG2257, UWSG Project No. CIC-1. NSGL Doc. No. WISCU-Q-03-002.*

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

Phone (608) 262-0905

Fax (608) 262-0591

World Wide Web [www.seagrants.wisc.edu](http://www.seagrants.wisc.edu)

## CONTENTS

Preface.....	iv
--------------	----

### Program Progress Highlights

#### Programmatic Accomplishments and Benefits

Organizing and Managing for Success.....	1
Connecting with Users.....	3
Producing Significant Results.....	11

### Appendices

A. Activities Supported from Program Development Funds.....	16
B. Collaborating Institutions.....	17
C. Sources of Significant Nonfederal and Federal Program Funding.....	19
D. Lists of Publications.....	20
E. Students and Fellows Supported.....	29
F. Program Awards and Honors.....	30
G. List of All Active Projects.....	32
H. Outreach Activities	
<i>Advisory Services Workshops</i> .....	34
<i>Communications Outreach Activities</i> .....	38
<i>Education Workshops, Lectures &amp; Seminars</i> .....	40
I. Outreach Partnerships	
<i>Advisory Services Partnerships</i> .....	41
<i>Communications Partnerships</i> .....	44
<i>"Earthwatch Radio" Stations</i> .....	47
<i>Education Partnerships</i> .....	49
J. External Advisory Groups	
<i>UW Sea Grant Institute Advisory Council, 2003</i> .....	50
<i>Committee on Advisory Services, 2003</i> .....	51
<i>Technical Review Panels, 2003</i> .....	52
K. Mid-Cycle Evaluation Response Report.....	53

## PREFACE

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, Web sites 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. Detailed information on core program efforts in Advisory Services, Communications and Education subprograms is filed electronically at the UW Sea Grant Institute's administrative offices at UW-Madison. 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).

Lastly, a brief progress report is also required for completed or terminated projects, pending submission of a detailed project completion report within six months of the termination date of the project. The highlights of those reports, when available, 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 notable impacts on the research, outreach and education fronts as well as in advancing and enhancing the efficiency and cost-effectiveness of program management.

### Organizing and Managing for Success

**Outreach Staff Changes.** Our Advisory Services unit has undergone significant transition during the past year. Philip Keillor, our coastal engineering outreach specialist, and Harvey Hoven, our business management outreach specialist, both retired from university service in early 2003. Keillor's retirement was announced well in advance of his February end date and as a result, we were able to use the salary and fringe benefits savings to hire David Hart as our Geographic Information Systems (GIS) specialist in summer of 2002. During the past year, Hart has continued to develop our GIS capabilities and among his activities, he is developing a system for local officials (county, city, town officials) to access several GIS databases simultaneously to aid in coastal planning.

We have recently completed both a national search and screening process and conducted preliminary interviews with candidates for the Hoven position at our outreach office on the UW-Superior campus. We plan to have the new outreach specialist begin an effort on climate change outreach for the Great Lakes. Additionally, we have begun efforts to partner with UW-Extension to expand our outreach capabilities on Wisconsin's Lake Superior coast.

**Applying New Information Technology.** Technological advancement is a UW Sea Grant program priority. We place an emphasis on using the Internet and new Web-based database applications. During the past year, we completed a major university-funded upgrade of our computer network capabilities, including the purchase and installation of a dozen new high-speed Pentium 4 client computers running the Windows XP Professional operating system. This upgrade provides our core staff with uniform work platforms that offer the latest in hardware and software technology with the goal of maximizing productivity. A Campus 21st Century network infrastructure upgrade has also increased our network bandwidth 10 times by moving us to the new backbone. Outside access to our resources has also gone up tenfold with this network topology switch. Web users should experience our audio/visual components 10 times better than they have before the switch was made. In addition, in the past year all staff members were provided with on-site learning opportunities and/or reimbursement for short courses or workshops in Internet and modern communications technology.

Our online Publications Store, launched in February of 2003, has contributed to a significant increase in publication sales over the last eight months. This system also gives us the ability to accurately track and manage our publications inventory. 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. This fall, investigators and staff used our interactive Project Reporting Online (iPRO) system to submit project information for preparing this progress report.

To measure the effectiveness of our Web sites, UW Sea Grant has recently purchased and 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 Web site and which publications visitors are viewing in our online Publications Store. This allows 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.

**Strategic Plan Updated.** Following the recommendations of our NOAA Sea Grant Program Assessment Team, we have implemented a new process for routinely updating our program strategic plan that relies on more extensive input from our external advisory groups, faculty, outreach staff and various local, state and regional constituencies. This process—approved by the UW Sea Grant Advisory Council, our university policy oversight committee—involved completely restructuring our previous strategic plan in accordance with Sea Grant’s 10 national themes. This draft was then distributed for comment to more than 450 constituents statewide in conjunction with developing our 2004-06 Request for Proposals (RFP). This new strategic plan fed directly into the proposal selection process for the 2004-06 biennium.

**National 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 Sea Grant program. During the past year, for example, UW Sea Grant’s director (Andren) completed consecutive terms as chair of the Sea Grant Association (SGA) Program Mission Committee, while our assistant director for administration & information (Reeb) serves as SGA representative on the NOAA Sea Grant Program Information Work Group. Our assistant director for research and outreach (Hurley) served on the steering committee for the 2004 International Conference on Mercury as a Global Pollutant and is co-chairing the 2006 conference.

UW Sea Grant’s program information specialist (Wittman) completed work on leading the development of NOAA Sea Grant’s first strategic national communications plan, and he edited and coordinated production of the updated set of theme team one-pagers for the SGA. Wittman continued to serve as chair of theme team communicators, while our “Earthwatch Radio” producer (Hoops) continued to chair the Sea Grant communicators’ national Radio Task Group.

Our fisheries & aquatic nuisance species outreach specialist (Moy) is co-chair of the Chicago Sanitary-Ship Canal Fish Barrier Advisory Panel and chairs the Asian Carp Rapid Response Team as well as the Great Lakes Panel on Invasive Species’ Research Coordination Committee. He is also president of the American Fisheries Society’s Introduced Fish Section. Our water quality & habitat restoration outreach specialist (Harris) is presently past president of the International Association for Great Lakes Research and a member of the SGA’s Coastal Communities & Economies Theme Team. Harris and Wittman both serve on the national and regional Ecosystems & Habitats Theme teams.

## Connecting with Users

Our outreach staff serves as our principal means for connecting users with Sea Grant information and conveying research needs to faculty and program management. Accordingly, outreach staff members played a significant role in the development of our new strategic plan. The UW Sea Grant Advisory Services program employs six outreach specialists to serve a wide range of users and other audiences statewide in the areas of aquaculture, education and water safety, fisheries & nonindigenous aquatic nuisance species, GIS, and water quality & habitat restoration. Our eight Communications and Information Technology staff members also help disseminate Sea Grant research, outreach and educational information to users via the Web, publications, news releases, newsletters, radio programs and exhibits.

Complete listings of our outreach and education activities and partnerships during the past year are presented in appendices H and I, respectively. The highlights of these outreach activities during the past year are presented below.

**Aquaculture Outreach: WATERS 2002–Wisconsin’s Aquaculture Technology, Education and Research Services (A/AS-50).** This UW Sea Grant aquaculture outreach program is a principal source of information, guidance and technical assistance to the rapidly developing Wisconsin and regional aquaculture industry, providing direct one-on-one assistance and hands-on training to more than a dozen fledgling aquaculture businesses during the past year. Perhaps the most significant transfer of technology has been in cooperation with the St. Croix Fishery of Danbury, Wis., in their first attempt to intensively rear fingerlings from perch eggs to supply fingerlings for grow-out in their recirculating rearing systems.

The \$25 million, 60,000-square-foot St. Croix Fishery facility is starting to successfully apply intensive aquaculture technology (IAT) techniques, developed in part with UW Sea Grant support at the UW-Milwaukee Great Lakes WATER Institute, using perch eggs obtained from a Delaware stock. During the intensive tank-rearing of these fingerlings from eggs at the Danbury facility, a portion of these eggs were reared cooperatively at the institute as a control to allow the St. Croix group to gauge their performance against our own rearing experience. This cooperative effort with the St. Croix Fishery to use IAT techniques, learned through UW Sea Grant aquaculture outreach activities, has led to a request for \$1 million in federal funding to construct additional facilities to house IAT perch-rearing activities and the development and spawning of captive broodstocks for perch fingerling production.

UW Sea Grant’s aquaculture outreach specialist (**Binkowski**) also worked with other Native American groups and the regional U.S. Department of the Interior’s Bureau of Indian Affairs to develop a consortium of yellow perch fingerling producers involving members of the Menominee Nation and seven bands of the Chippewa (St. Croix, Lac Courte Oreilles, Red Lake, Leech Lake, Red Cliff, Bad River and Lac du Flambeau).

**Aquatic Nuisance Species (ANS) Outreach.** We regard the ANS issue as one of our program’s highest priority areas. Accordingly, we have placed an emphasis on developing and implementing a coordinated outreach program that continues to have notable success in wide-scale dissemination of ANS information during the past year.



We continue to lead development and maintenance of the Sea Grant Non-Indigenous Species (SGNIS) Web site (A/AS-53), which now contains over 1,700 items related to ANS. SGNIS has had more than 3 million visits since October 2002 (up 88% over the preceding year), including about a million visitors from 125 foreign countries.

Our aquatic nonindigenous species specialist (Moy) arranged with the Miller Brewing Company, Milwaukee, to include, at no cost to the program, ANS prevention guidelines sporting the UW Sea Grant logo in the 1.5 million copies of its spring 2003 fishing guide.

Last spring, we revised and reprinted 50,000 copies of our popular *Protect Our Waters* brochure, including "Stop Aquatic Hitchhikers" stickers, in partnership with Lower Great Lakes and La Crosse fishery resources offices of the U.S. Fish & Wildlife Service, the Minnesota and Wisconsin departments of natural resources, Michigan Department of Environmental Quality, UW-Extension, and the Illinois-Indiana, Michigan and Minnesota Sea Grant programs, who purchased 43,600 copies of it. In addition, staff for the "Babe Winkelman's Good Fishing" TV program distributed nearly 10,000 of these brochures at Midwest sports shows last winter and spring to people attending Babe's seminars in connection with project A/AS-47.

UW Sea Grant also provided funding for the international Aquatic Invasive Species Summit in May 2003, a two-day event hosted by Chicago Mayor Richard Daley and the U.S. Fish & Wildlife Service. The 60 participants were challenged with the task of identifying means of preventing 100 percent of invasive species transfer between the Great Lakes and Mississippi River basins. Our ANS outreach specialist served on the steering committee and as a moderator for one of the breakout sessions, and he prepared and presented a summary of all the breakout sessions. The proceedings will be published in December 2003. The main impact of this event will be a more focused, continued effort on identifying ways to prevent the spread of ANS via the canal and to examine potential ways that the hydrologic connection between the Lake Michigan and the Des Plaines River can be separated while still maintaining as many of the current canal uses as possible.

During the year, Dr. Moy gave 16 public talks on ANS topics to a total of more than 2,500 people in Wisconsin, Illinois, Minnesota, Michigan and Ontario. He also discussed measures boaters should take to reduce the risk of spreading nuisance species during a 45-minute appearance May 29 on Wisconsin Public Radio's popular "Larry Meiller Show," which has more than 76,000 potential listeners statewide. He also helped train 42 people at Hazard Analysis and Critical Control Point (HACCP) workshops designed to help prevent the spread of aquatic nuisance species via baitfish operations and hatcheries. Participants represented state and private hatcheries, state fish health veterinarians, state ANS biologists and wild bait harvesters. This work is part of a Great Lakes Sea Grant Network ANS National Strategic Investments project involving the Minnesota, Michigan, Ohio and Pennsylvania Sea Grant programs, which won the network's program leaders "Outstanding Program" award for 2003.

A total of nearly 2,000 people visited UW Sea Grant ANS exhibits at the Neville Public Museum (Nov. 20, 2002), Milwaukee Public Museum (May 3, 2003) and Wisconsin State Fair (Aug. 1, 2003). Over 400 information sheets were distributed at the fair, and 451 individuals played our "Fishing for Answers" ANS game.

In April 2003, in addition to the Wisconsin chambers of commerce contacted in 2002, letters offering program ANS materials were also sent to UW-Extension offices, libraries and state agencies. These generated requests for more than 26,000 *Zebra Mussel Watch* cards and related

information, a 456% increase over the 5,700 requests so generated in 2002. Another 2,668 *Zebra Mussel Watch* cards were requested via online. Our "Zebra Mussel Watch" Web site registered 15,834 visitors during the past year, and three zebra mussel sightings were reported via the Web and forwarded to our ANS specialist. It was also featured on the Great Lakes Information Network's "What's New on GLIN" Web page on Oct. 3, 2003.

In total, we distributed 176,633 ANS watch cards, brochures and bookmarks during the year.

**Business Management Outreach.** Our business specialist maintained the annual activity changes in the state's marine-related businesses on Lake Superior since 1992. These annual comparisons within this economically depressed region of Wisconsin are useful for formulating strategic business management decisions by the organizations that participate in the study. He has also been active in developing one of the final portions of the Western Lake Superior Water Trail, an ecotourism development project that has strong support from recreational kayak and canoeing groups on Lake Superior. The completion of this portion of the trail will link sections near the Apostle Islands with the trail along the north shore in Minnesota. With the retirement of our business specialist in April 2003, it is our plan to maintain a portion of these projects once the new Lake Superior specialist is hired in late fall, 2003.

**Chicago Sanitary-Ship Canal Fish Barrier and Asian Carp Rapid Response Project.** This is a high-profile ANS control and prevention effort that 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. The electric barrier currently in the canal was the action recommended about six years ago by the ANS Dispersal Barrier Advisory Panel to prevent the movement of nonindigenous organisms between the Great Lakes and Mississippi River basins. Co-chaired by UW Sea Grant's ANS outreach specialist (Moy), the panel acts as a coordinating body for public input, research direction and funding for the barrier project, and the panel provides a forum for discussion and consensus-building among the many international, federal, state and municipal agencies, as well as several businesses and industries with interests in the canal. In a related effort, our ANS specialist also chairs the Asian Carp Rapid Response Team, which was formed at the request of the Great Lakes Fishery Commission with the charge of developing a response plan in the event that Asian carp get through the electric barrier.

**Coastal Engineering Outreach.** During the past year, our "retired" coastal engineering outreach specialist (Keillor) and UW Sea Grant publications editor (White) completed final revisions to a 50-page booklet, *Living on the Coast*, that was written in collaboration with (and partially funded by) the U.S. Army Corps of Engineers-Detroit District. This completed a three-year project during which Keillor led a Great Lakes-wide team of 20 writers from Canada and the United States. The booklet is scheduled to be printed by the Corps of Engineers by the end of 2003 and will be distributed throughout the Great Lakes Basin as a replacement for the Corps' outdated, 25-year-old *Help Yourself* booklet.

Keillor also served as a technical advisor to the Wisconsin Department of Natural Resources (WDNR) in developing proposed new regulations for shore protection (NR 328: Shore Erosion

Control for Inland Lakes and Flowages). In November 2002, he traveled to Woodruff to view a seawall on an Alder Lake property that became the focus of a contested hearing. Subsequent to his retirement, he was hired part time by the WDNR as a Limited-Term Employee to testify at the hearing in June 2003. The NR 328 criteria for determining where a seawall is allowable became a major contention during the hearing—the first legal test of the proposed regulations. An administrative law judge's decision is expected early in 2004.

Keillor gave two presentations at each of two coastal hazards workshops held Sept. 10 in Herbster, Wis., and September 11 in Washburn, Wis., on the shores of Lake Superior. Organized by Bayfield County Planning & Zoning Department in cooperation with the Wisconsin Coastal Management Program, each workshop involved six speakers and nearly 50 property owners. Several realtors joined the Herbster workshop—the first realtors Keillor has seen attend a coastal hazards workshop in Wisconsin.

On Oct. 16-17, Keillor participated in the Canadian Coastal Conference '03 in Kingston, Ont., where he presented a paper describing the distinctive features and challenges for coastal professionals in the new *Living on the Coast* booklet. Twenty-five coastal engineers, coastal engineering professors and coastal management specialists attended his talk.

**Diving into History: Research and Public Education on Wisconsin's Underwater Archaeological Resources (C/C-6).** This highly successful project aims to increase awareness and appreciation of Wisconsin's maritime heritage by popularizing results of UW Sea Grant-funded archaeological research. Highlights of the past year include:

- The project Web site ([www.wisconsinshipwrecks.org](http://www.wisconsinshipwrecks.org)) was completely redesigned from the bottom up. The end result is tremendously improved usability and greatly enhanced visual appeal. The new site also includes three new featured shipwrecks; a section describing current archaeological research; new and recompressed video segments; new historical and underwater images, and a calendar of upcoming workshops by Wisconsin Historical Society underwater archaeologists.
- A Web site for Wisconsin's Maritime Trails was produced ([www.maritimetrails.org](http://www.maritimetrails.org)). This site serves as a central reference point for the trails' many attractions. It features a database of nearly 700 Wisconsin shipwrecks and a database of statewide maritime-related cultural attractions.
- Nine roadside historical markers were installed for the Door County and midsection of the Lake Michigan Maritime Trails. Each stand-alone marker contains historic information about the vessel and the maritime context in which it operated, underwater images, an archaeological site plan and information about the Maritime Trails program.
- A set of plastic dive guides to four shipwrecks in Door County, Wis., was produced. These are a supplement to the two sets of guides previously produced for shipwrecks in Lake Superior and Lake Michigan.
- Significant progress was made during the 2003 field season on archaeological research on three historic shipwrecks, the steamer *Appomattox*, the schooner *Kate Kelley* and the schooner *Lumberman*.

**Earthwatch Public Service Radio Program (C/C-2).** Radio broadcasting is a highly competitive communications environment that has changed dramatically during the past decade, and this UW Sea Grant public outreach effort is adapting to the changes. The Earthwatch Radio service has been marketed outside the Great Lakes region to establish a stronger national presence, and today it is carried by more than 120 individual radio stations around the United States and Canada, by a radio network of about 20 radio stations around the United States, and by the international Armed Forces Radio & Television Services network (see Appendix I for the complete list).

The Internet is being incorporated more strongly into the radio project in terms of marketing the existing service and developing new ways to distribute audio programs and related material online. To enhance marketing, UW Sea Grant staff redesigned the Earthwatch Radio Web site and developed a section that is specifically oriented to radio station managers and to let them hear and evaluate the program online without requesting a sample CD. After the site was launched in January 2003, five stations have started using the program after listening only to the online audio, and another 30 stations used it to request demo CDs. Overall traffic to the Web site has increased dramatically: visits in late 2002 averaged 80 per day; during the third quarter of 2003, they averaged 500 per day. Subscriptions to an email distribution list for Earthwatch Radio scripts have also increased: in late 2002, the mailing list had 180 subscribers; the total now is roughly 300 and includes academic and government personnel in the United States and Canada as well as subscribers in the United Kingdom, South Africa and Russia.

Our radio producer (**Hoops**) initiated a research project for a group of UW-Madison MBA candidates in early 2003 to examine the market for online distribution of audio, and the results indicated that it is a viable alternative to distribution of programming on CD. He also initiated the development of a special feature section of the Earthwatch Radio site in late 2003 to provide online text and graphic material to complement the radio programming. Both applications for the Earthwatch Radio Web site will be developed further and evaluated.

**Education Outreach.** Our education outreach specialist (**Lubner**) helped pilot a new course in Geosciences for undergraduates during the Winterim term aboard the *S/V Denis Sullivan* for seven students who studied oceanography and nautical science in a hands-on setting as the vessel sailed U.S. and Bahamian waters over a two-week period. This successful pilot enabled Lubner to partner with the Department of Geosciences in formalizing this course as an approved laboratory course (Geosciences 250), which will fulfill three credits of the general education requirements in natural sciences.

*Knauss Fellow (E/E-42).* After earning his Ph.D. from UW-Madison in 2001, Karl Gustavson was awarded a Dean John A. Knauss Marine Policy Fellowship sponsored by UW Sea Grant and NOAA Sea Grant. Karl served in the Subcommittee on Fisheries Conservation, Wildlife and Oceans of the U.S. House of Representatives' Committee on Resources through February 2003. As a member of the subcommittee staff, he was responsible for briefing members on pending legislation, advocating the committee's position in negotiations, and serving as staff liaison at committee hearings, markups and during votes.

*Lake Sturgeon Bowl (E/E-44-SE).* A qualifier for the National Ocean Science Bowl, the Lake Sturgeon Bowl was initiated in Wisconsin in 2001. The purpose of the National Ocean Sciences Bowl—and the Lake Sturgeon Bowl—is to improve science literacy among students and

demonstrate to the general public the importance of the oceans and Great Lakes to our daily lives. In addition, the bowl provides a forum to recognize and reward academic excellence among high school students and their schools. During the past year, UW Sea Grant's education outreach specialist (Lubner) helped bring together 101 students representing 21 teams from 15 schools to participate in the competition. The 2003 Lake Sturgeon Bowl more than doubled the number of participating teams, adding eight new schools to the list of those participating. Three of the participating teams were from the Milwaukee Public Schools system, which has a large proportion of its student body from underrepresented populations. With guidance from their coaches (high school teachers in all cases), the students studied a variety of topics relating to the oceans and Great Lakes, including physics, chemistry, biology and geology; social sciences; ocean-related technology; geography, and current events. Participants were also provided the opportunity to meet aquatic educators, researchers and graduate students; tour a research facility, and, for some, participate in shipboard sample collection and laboratory analysis.

*Madison JASON Project.* The international JASON Project is designed to excite and engage middle school students and their teachers in science and technology, and to provide professional development for their teachers. UW Sea Grant annually hosts this project in the Madison area. During the past year, 19 teachers and 500 students from 12 schools in the communities of Baraboo, Columbus, Madison, Marshall, Stoughton, Sun Prairie and Windsor participated in Madison JASON. In addition, eight public, private and nonprofit organizations in the Madison area volunteered to enhance the event by creating or highlighting an exhibit, presentation or tour at their resource site.

Also this past year, Sue Sewell, a Madison JASON-sponsored 6th-grade teacher, was chosen as one of only eight Teacher Argonauts out of thousands applying worldwide to travel to California's Channel Islands to work directly with a select team of internationally distinguished scientists to study these unique interconnected ecosystems of the Pacific Coast.

**Fisheries Outreach.** During the past year, our fisheries outreach specialist (Moy) continued to chair monthly meetings of the Lake Michigan Fisheries Forum, an advisory body formed by the Wisconsin Department of Natural Resources 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.

In a related effort, Moy hosted a Great Lakes Fisheries Leadership Institute Oct. 3-4 in Manitowoc, Wis., part of a Fisheries Extension National Strategic Investment project of the Great Lakes Sea Grant Network. Twenty-seven people attended this Lake Michigan basin workshop, including 10 sponsored by Michigan Sea Grant, nine sponsored by Illinois-Indiana Sea Grant and eight sponsored by Wisconsin Sea Grant. Speakers included representatives of the U.S. Fish & Wildlife Service, Wisconsin Department of Natural Resources, UW Great Lakes WATER Institute, Illinois Natural History Survey, Michigan Sea Grant and Wisconsin Sea Grant. The Lake Superior Basin Great Lakes Fisheries Leadership Institute will be held Jan. 10-11, 2004, in Ashland, Wis.

**GIS Outreach.** Our Advisory Services Geographic Information Systems specialist (Hart) received a grant from the NOAA Coastal Services Center (CSC) to develop 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 data custodians—local, regional, state, federal, academic or nonprofit—maintain and provide access to the most current spatial data, and remote users can access and integrate data in real-time from multiple sources. This project extends the prototype Hart developed for Bayfield County, Wis., to other local and regional government organizations along the Lake Superior coast. Rather than developing stand-alone local government Web mapping sites, Hart is drawing upon the principles and protocols of the Open GIS Consortium to link local Web mapping services and build an interoperable, “bottom-up” coastal GIS. The third part of the project provides a 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.

Hart also continued work under a grant from the U.S. Army Corps of Engineers-Detroit District to update, acquire and integrate large-scale digital mapping for the Wisconsin Lake Michigan shoreline in support of the Lake Michigan Potential Damages Study. He produced historical digital orthophotos for Kewaunee, Milwaukee, Racine and Kenosha counties, and continued work on the delineation of the bluffs toes and tops from current and historical orthophotos.

He also continued to work on a project supported by the Wisconsin Coastal Management Program to provide the WCMP technical assistance 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.

Lastly, he is conducting an inventory of marine managed areas in Wisconsin under a grant from the NOAA National Center for Marine Protected Areas.

**Habitat Restoration Outreach.** Our habitat restoration outreach specialist (Harris) assisted in the construction of two headlands, a captive beach, rock spawning bed and rock reefs at Southbay (a.k.a. McDonald) Marina, which began in late fall 2002 and was completed in late winter. She worked with the marina owners and Remedial Action Plan (RAP) Biota & Habitat Work Group to design the habitat restoration project and obtain funding for construction. The work group has viewed construction of the headlands and reportedly are very satisfied with the results.

The RAP Biota & Habitat Work Group also met with the U.S. Army Corps of Engineers and Baird & Associates consulting engineers to devise an engineering analysis of alternative designs for the Cat Island Chain restoration project in the south end of Green Bay, Lake Michigan. Harris provided the work group and consultants with a summary of substrate types preferred by targeted avian and reptile species. The analysis is expected to be completed soon, with construction planned to begin in 2004.

**Implementation of Comprehensive, Dynamic GIS for Coastal Management: Linking Agencies for Better Decisions and Public Information about the Coastal Zone (A/AS-49).** In this project, our GIS outreach specialist (Hart) collaborated on the development of the Community Planning Resource (CPR), a comprehensive UW Sea Grant Web site created to

support "Smart Growth" planning by Wisconsin communities. Designed to assist a variety of people, from the concerned citizen to trained professional, the CPR Web site is packed with information and guidelines for land use planning. It will provide a myriad of resources to support comprehensive planning, including information on the planning process, and tools to foster community engagement and exploration of local maps and data. It will also include a Web template that communities can use to support citizen involvement in its planning efforts.

CPR is now being tested in a couple Wisconsin communities, including Iron County on the Lake Superior coast. When fully implemented, this Web site will enable coastal residents to play a greater role in community development, while fully understanding and following the Wisconsin Smart Growth guidelines. As part of the CPR, we are converting "A Guide to Planning for Coastal Communities in Wisconsin," authored by the Bay-Lake Regional Planning Commission, to a Web-based format. This is a guidebook for Great Lakes coastal communities to consider coastal issues as they relate to the nine elements of a comprehensive plan addressed in Wisconsin's Smart Growth legislation.

In a related effort, the project's principal investigators (PIs) also organized a workshop at the Fox Wolf Watershed Alliance 2003 Stormwater Conference that trained 35 professionals in the use of GIS to support stormwater management activities. A Web site created for the workshop expanded the GIS training tools to a wider audience.

This project supported continued development of another Web site (<http://ortho.lic.wisc.edu>) based on open-source Web mapping tools that provides access to integrated GIS data for the Great Lakes coasts of Wisconsin. The Lake Michigan and Lake Superior Coastal OrthoServers provide access to digital imagery of the Great Lakes coast of Wisconsin that has been utilized by numerous consultants, citizens and governmental staff.

Finally, the PIs have created the "Lake Michigan Bathymetry Explorer" Web site (<http://coastal.lic.wisc.edu/bathyexplorer/lmbathy/lmbathy.html>), which is intended to serve as a tool for teaching K-12, university students and the interested public about the geomorphology of the Great Lakes. It utilizes 3-D mapping to enable citizens to better understand the underwater features of the lakes and how the basin and urban areas relate to the lake.

**Waters of Wisconsin.** UW Sea Grant has been an active participant in the Wisconsin Academy of Sciences, Arts and Letters' 2002 "Waters of Wisconsin" (WOW) campaign as well as the resulting 2003 "Year of Water" observance, consisting of nearly 100 events throughout the state. Besides chairing the Year of Water coordinating committee, our Water Quality outreach specialist (Harris) helped develop the WOW final report, which was released on Earth Day 2003 and celebrated with a dinner at the Wisconsin Governor's Residence in Madison. The report summarizes the status of Wisconsin's surface and groundwater resources, defines current and future issues, and recommends and lays the groundwork for developing a comprehensive state policy on water quality, use and sustainability. Gov. Jim Doyle's "Grow Wisconsin" plan for creating jobs now includes a provision to develop a comprehensive state water policy. To facilitate a Wisconsin water policy review, UW Sea Grant is working with Prof. Steve Born, chair of the UW-Madison Department of Urban & Regional Planning, and his graduate students to develop a database of all existing state policies and rules governing water management in Wisconsin.

**Wisconsin's Water Library.** Established in 1964 by the UW Water Resources Institute, the Water Resources Library (WRL) is unique among UW-Madison's many libraries for its collection of almost 30,000 volumes of water-related information, including a curriculum collection, dozens of educational videos, and more than 60 journals and 100 newsletters.

During 2003, UW Sea Grant partnered with the WRL to develop "Wisconsin's Water Library" ([www.aqua.wisc.edu/waterlibrary](http://www.aqua.wisc.edu/waterlibrary)) as a special outreach project in celebration of Wisconsin's Year of Water observance. Through the "Wisconsin's Water Library" Web site, any resident of Wisconsin can check out the library's materials, which are sent free of charge to the user's local public library for pick up and return. This makes the WRL the only, if not the first, academic library in Wisconsin to make its collection directly available online to residents throughout the state. Articles about this new online resource have already appeared in the newsletters or Web sites of the Great Lakes Information Network, Wisconsin Department of Public Instruction, Wisconsin Department of Natural Resources, UW-Madison Libraries, Milwaukee Public Library and more than a dozen other organizations.

With a grant from the Friends of UW-Madison Libraries and the assistance of an advisory committee, library staff members are now selecting materials for a kids section for "Wisconsin's Water Library" to support UW Sea Grant's Madison JASON Project as well as provide a resource to students and teachers statewide.

## Producing Significant Results

This fall's project progress reports indicate outstanding results in seven continuing projects in our Aquaculture, Biotechnology, Digital Ocean/Great Lakes, Fisheries, Urban Coast and Innovative Science & Technology themes.

**National Marine Aquaculture Initiative: Production of a Best Management Practices Manual for Aquaculture in Wisconsin and the Great Lakes Region (R/AQ-37).** The primary product of this project is the development of a Best Management Practices Manual for Aquaculture, which will have significant value throughout the Great Lakes Region. The information to be provided in this manual is needed for supporting the growth and development of a sustainable industry in this region. The manual will be an invaluable resource for (1) assisting current aquaculturists in the region to operate their facilities in the most environmentally friendly manner; (2) providing pertinent environmental information for new prospective aquaculturists for designing, locating, permitting, constructing and operating new hatcheries and fish farms, and (3) assisting regulatory agencies to develop regulations that are needed for environmental protection, uniform in their application, but do not unnecessarily restrict the development and growth of this important agricultural industry.

While the manual is being developed in Wisconsin, its content will be pertinent for the entire Great Lakes region because of the qualitative similarities of aquaculture in Wisconsin and the rest of the region. These similarities include species raised, methods used, and the nature and location of potential risk factors (e.g., pollutants, diseases, exotics, etc.). The PIs will make the manual available throughout the region by providing a large number of copies to all regional aquaculture extension specialists, aquaculture associations and pertinent regulatory agencies. They will invite key representatives from each Great Lakes state to a national conference where



they will present both the contents of the document itself as well as the collaborative approach used in its development. Finally, the manual will be made available electronically as a “living document” that will be updated as regulations and knowledge progress.

In the first 12 months of this project, a committee of experts was assembled that developed a comprehensive outline for the manual and detailed process for writing it. Work on the manual was delayed by a budget recision from NOAA Sea Grant, but drafts of all 11 chapters have been written and are now being reviewed and edited. The PIs anticipate that the manual should be near completion and ready for publication in early 2004.

Perhaps the most valuable attribute of this project is that it is a joint effort between private industry, regulatory agencies, universities and conservation groups. This approach will lead to the generation of unbiased, accurate information and guidance needed for supporting the growth and development of a sustainable industry in the Great Lakes Region.

**Dioxin Developmental Toxicity in Zebrafish (R/BT-16).** This project is one of a continuing series of UW Sea Grant-funded projects aimed at understanding the precise cellular mechanisms by which the global environmental contaminant 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (i.e., dioxin) and similar compounds exert their toxic and often fatal effects on larval fish. The investigators on this project achieved two major accomplishments during the past year:

First, they determined that dioxin toxicity in fish larvae is mediated by only one of two forms of aryl hydrocarbon receptors (AhR), proteins that direct specific genes to manufacture molecules required for certain cellular functions. This advance points the way toward elucidating the ways that activation of this one AhR by dioxin causes larval toxicity in fish.

Second, the scientists gained insight into the cause of edema, the hallmark sign of dioxin developmental toxicity in freshwater fish that culminates in mortality. Edema is the excessive accumulation of fluid in a body tissue. In fish larvae exposed to dioxin, it occurs in the sac surrounding the yolk and the sac surrounding the heart. The distinctive edema in blue sac syndrome indicates a defect in water barrier and/or water export function. Project researchers discovered that increasing the osmolarity of the water surrounding zebrafish embryos and larvae blocks dioxin-induced edema. Thus, it appears that dioxin may increase permeability of the larval skin to water at a critical period in early development.

In addition, the researchers concluded that dioxin-induced circulatory failure is not solely responsible for the edema formation. This is apparent from examining mutations in larval zebrafish that affect cardiac function and retard or stop circulation. These fish develop primarily edema surrounding the heart, but little or no edema of the yolk sac.

Finally, little evidence was found that dioxin disrupts development of the kidney, making that an unlikely cause of edema. In both control and dioxin-treated fish larvae, gross morphology, filtration and expression of key kidney developmental genes appeared normal.

**AhR Signaling in Rainbow Trout and Zebrafish (R/BT-17).** There are too many agonists—chemical agents capable of combining with aryl hydrocarbon receptors (AhR) and initiating a reaction—and there are too many fish species exposed to AhR agonists, to use empirical methods for toxic chemical risk assessment. Fish are invariably exposed to a complex mixture of AhR agonists rather than to a single agent. In view of these considerations, the investigators

believe the most prudent way to predict the risk of low-level exposure of fish embryos to TCDD and related AhR agonists is by understanding the mechanism of toxicity. A fundamental understanding of the mechanisms of AhR-mediated early life-stage toxicity will ultimately enable them to model the effects that AhR agonists have on different fish species. That is the goal of this project.

This project will lead to the development of tools that will enable higher quality risk assessment at lower costs. By understanding the mechanisms that underlie AhR/ARNT-mediated toxic responses to TCDD in rainbow trout and zebrafish, the investigators will be in a better position to determine whether a common mechanism is widely conserved across fish species or not. The end result should be a far better understanding of the risk that low-level exposure of fish embryos to complex mixtures of PCDDs, PCDFs and PCBs poses to the recruitment of Great Lakes trout and other freshwater and marine species of fish.

**Development of a Lake Trout Population Model for Lake Superior (R/LR-84).** The age-structured lake trout model developed by a graduate student on this project was used to develop a quota-prediction model, which in turn was used in collaboration with employees of the Wisconsin Department of Natural Resources, Great Lakes Indian Fish & Wildlife Commission, and the fisheries departments of the Red Cliff and Bad River bands of Chippewa to revise recreational and commercial lake trout harvest quotas for Wisconsin waters of Lake Superior. The revised lake trout quotas will ensure that the total annual harvest of lake trout does not exceed sustainable limits of the population.

The recovery of Superior's lake trout fishery has been pursued in a multiagency collaborative effort since the 1950s, when lake trout stocks collapsed through the combined effects of sea lamprey predation and fishery exploitation. The lake trout fishing quotas developed as a result of this project will ensure that lake trout recovery continues into the future, while maintaining human use of the resource.

**Polybrominated Diphenyl Ethers—A Global Contaminant of Concern in the Great Lakes (R/MW-83).** The importance of polybrominated diphenyl ethers (PBDEs) as an environmental pollutant was recently highlighted by a front-page story in the October 8th issue of *The Wall Street Journal*, which pointed out that PBDEs are not only of scientific interest, but also are a major public policy issue. Moreover, as the article stated, PBDEs have become a "flashpoint" for the larger issue of anthropogenic chemicals accumulating in the environment. Although there is debate over the health effects of these chemicals, it is clear—as this UW Sea Grant research has helped show—that PBDEs are accumulating where they should not. The PIs have created a database of the concentrations of six major PBDE congeners in 60 individual forage fish from four representative species collected on the eastern and western shores of Lake Michigan. They report that PBDEs are present in all analyzed samples, and they observe increasing concentrations over time. The U.S. Environmental Protection Agency administration has been reluctant to limit PBDE use (claiming a lack of evidence of health effects), but California recently enacted a ban on certain PBDEs to begin in 2008. Some European countries already have enacted similar bans. However, even if bans were more widely enacted, research on the fate of PBDEs already discharged to the environment is needed. For example, the investigators on this project have tentatively identified decabrominated diphenyl ether (deca-BDE)—one of the

PBDEs that does not fall under the California ban—in several Lake Michigan sediments samples, with indications that it may be degrading to more toxic compounds. This result, when confirmed, will be of major importance in the ongoing efforts to remove some PBDEs, but not deca-BDE, from common usage. Clearly, this research is focusing on an important societal issue with major implications for future public policy.

**Enhanced Experimental Methods for Measuring Inorganic Contaminants in Water Using a Micromachined DC Plasma Instrument (R/MW-85).** The need for *in situ* measurements of various inorganic chemical contaminants in natural water supplies is well documented. Miniaturization of analytical equipment is essential if we are to meet this need. Emission spectroscopy is widely used in the laboratory to measure a range of inorganic chemicals in the environment. The development of a liquid electrode spectral emission chip (LEd-SpEC) in this project represents significant progress toward application of the microscale DC plasma for analytical chemistry applications. In addition to its use as a research tool, the investigators also plan to develop the microscale device for use in classroom laboratory settings. Dr. Zorn plans to demonstrate the capabilities of the microplasma device in two courses at UW-Green Bay.

Analytical water quality assessment is an extremely costly process that requires labor-intensive collection, transportation and analyses of samples, and even in the most careful of procedures, sample contamination can compromise the analysis. Research laboratories currently need to use highly sophisticated instruments to measure dissolved concentrations of inorganic and organic contaminants in our natural waters. The proposed development of a microfabricated DC argon plasma emission spectrometer would significantly reduce the costs associated with environmental sampling. Since analysis is conducted *in situ*, sample contamination would also be greatly reduced. A long-range goal of this project is to engineer a functional microfabricated DC plasma spectrometer (made from either nontoxic or biodegradable components) that can be deployed in a manner that provides large-scale environmental monitoring directly by research laboratories that could be continents away. The development of an inexpensive, multiple detector system capable of routinely measuring water quality parameters accurately, reliably, *in situ*, in real time and at minimum cost would be an invaluable contribution to environmental chemistry.

**Improving Safety and Efficiency in Scuba Diving (R/NI-31).** Recent collaborative research on scuba divers harvesting seafood in Puerto Rico has involved the Diver's Alert Network (DAN) and the Sea Grant programs of both the University of Wisconsin and University of Puerto Rico. In response to the investigators' submission of Puerto Rican seafood harvest dive profile data, DAN has also offered the PIs (UW and UPR) access to their dive profile database. This mutual interaction is important for enhancing the diving safety of recreational scuba divers as well as for our diving physiology and medicine research.

This work presents a great opportunity for educational outreach in scuba diving health and safety. Interactions among the investigators in the UW Sea Grant project and in the UPR Sea Grant projects offer the extraordinary opportunity to initiate an effective educational outreach program to promote diver health and safety among high-risk seafood and recreational scuba divers. This collaboration provides an excellent resource of cultural and linguistic understanding to effectively communicate the diving health and safety message.

The greatest impact for communicating this diving health and safety message will likely be in Puerto Rico and other scuba diving locations where Spanish and English are widely spoken. The effectiveness of communicating these scientific findings to the recreational scuba divers will also be enhanced by enlisting the divers' instructors and dive instructional organizations, such as PADI and National Association of Underwater Instructors, where the PIs have many professional contacts who respect their measured and practical approach toward diving safety. Moreover, this diving safety message serves the interests of the diver, the diving industry, dive equipment manufacturers, and the collateral transportation, restaurant, hotel and resort industries, as well as other supporting businesses.

The PIs believe a concise and practical approach toward diving safety education based on the results of this project could effectively reach the scuba diving populations in the Caribbean and Latin America. This educational outreach approach directed toward seafood and recreational scuba divers offers the benefits of lowering the risks of decompression sickness, dysbaric osteonecrosis and secondary disabling osteoarthritis along with a better understanding of those diving practices that carry unacceptable risks. This joint collaboration between the Wisconsin and Puerto Rico Sea Grant programs offers a unique cultural and linguistic understanding to effectively communicate the diving health and safety message in an educational outreach program.

## APPENDIX A

### Activities Supported from Program Development Funds

November 1, 2002, through October 31, 2003

---

- Funding was provided for the following Wisconsin "Year of Water" initiatives: (1) partial salary support for a coordinator to help develop improved access to water-related information and initiate a review of water education; (2) partial salary support for a librarian to develop "Wisconsin's Water Library" Web site ([www.aqua.wisc.edu/waterlibrary](http://www.aqua.wisc.edu/waterlibrary)), which is intended to provide Wisconsin residents easy access via the Web to reliable sources of water information; (3) support of the production, printing and distribution of "Wisconsin's Water Library" bookmarks to state libraries (academic, special, public, middle and high schools), technical colleges, and UW-Extension and Wisconsin Department of Natural Resources field offices; and (4) in-kind support to initiate—in conjunction with the Wisconsin Academy of Sciences, Arts & Letters—the UW-Madison fall 2003 graduate student seminar class "Water Policies and Institutions" and other partners—the development of a Wisconsin water policies Web site, which would provide an inventory of Wisconsin's current statutory, administrative and other policies pertaining to water.
- Partial funding was provided to cosponsor the 2003 International Association for Great Lakes Research Conference and the Aquatic Invasive Species Summit. Support was provided for printing of the 4th International Symposium on Sturgeon Proceedings in a hardcover special issue of the *Journal of Applied Ichthyology* and a companion CD of extended abstracts was produced.
- Travel support was provided for principal investigators and project researchers to attend scientific conferences and/or to present papers based on UW Sea Grant-supported research and outreach (R/EC-7, R/MW-83, C/C-6).
- Additional match support was provided to current project (R/MW-83) for needed ship time. Partial salary support was provided to current project (A/AS-49) to fund a temporary position to complete outreach project objectives. In-kind support was contributed to the Wisconsin Historical Society Maritime Trails Program in order to help develop the program and ensure integration of information from current project (C/C-6).
- Education Program Development funds were used to provide travel support for graduate students to obtain field research experience in the "Problems in Oceanography" course (E/E-45-SE). Project funds were used to support one graduate student to attend three scientific conferences and/or present papers based on Sea Grant-supported research (R/MW-83) and to provide an honorarium for an environmental historian who focuses on wetlands to speak at the Student Chapter of the Wisconsin Wetlands Association meeting. Partial funding was provided to cosponsor the Wisconsin regional site of the 2003 National Ocean Sciences Bowl. Partial funding and in-kind support was provided for the "Madison JASON Project" and its Web site.

## APPENDIX B

## Collaborating Institutions

November 1, 2002, through October 31, 2003

<b>Cornell University</b> Ithaca, New York	<b>University of Notre Dame</b> Biological Sciences
<b>Madison, City of</b> Madison Metropolitan School District	<b>University of Vermont</b> School of Natural Resources
<b>Marquette University</b> Biological Sciences	<b>University of Wisconsin-Green Bay</b> Chemistry Department Natural & Applied Sciences Sea Grant Advisory Services
<b>Michigan State University</b> Michigan Sea Grant College Program	<b>University of Wisconsin-La Crosse</b> Biology Chemistry College of Science and Allied Health Microbiology River Studies Center
<b>The Ohio State University</b> Ohio Sea Grant College Program	<b>University of Wisconsin-Madison</b> Agricultural and Applied Economics Animal Sciences Aquaculture Program Aquatic Sciences Center Biotron Center for Limnology Chemical Engineering Civil & Environmental Engineering College of Agricultural & Life Sciences College of Engineering College of Letters & Science Electrical and Computer Engineering Environmental Chemistry & Technology Program Food Science Forest Ecology & Management Gaylord Nelson Institute for Environmental Studies Genetics Graduate School Land Information & Computer Graphics Facility Medical School Molecular Environmental Toxicology Center Oceanography & Limnology Graduate Program Radiology Research Animal Resources Center Russell Labs
<b>Penn State University-Erie</b> Pennsylvania Sea Grant Project	
<b>Purdue University</b> Illinois-Indiana Sea Grant College Program	
<b>State University of New York-Buffalo</b> New York Sea Grant Institute	
<b>Texas A&amp;M University</b> Agricultural Economics	
<b>U.S. Army Corps of Engineers</b>	
<b>U.S. Fish and Wildlife Service</b> Green Bay Resource Office	
<b>U.S. Geological Survey</b> Great Lakes Science Center, Ann Arbor	
<b>University of Illinois at Champaign-Urbana</b> Illinois-Indiana Sea Grant College Program	
<b>University of Maryland</b> Chesapeake Biological Laboratory	
<b>University of Michigan</b> Michigan Sea Grant College Program	
<b>University of Minnesota</b> Sea Grant College Program	

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  
Chemistry  
Department of Curriculum and Instruction  
Graduate School  
Great Lakes WATER Institute  
School of Education  
Sea Grant Advisory Services

University of Wisconsin-Stevens Point  
Department of Biology

University of Wisconsin-Superior  
Sea Grant Advisory Services

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

Washington State University  
School of Biological Sciences

Wisconsin Aquaculture Association  
Dodgeville, Wisconsin

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  
Maritime Preservation and Archaeology Program

## APPENDIX C

## Sources of Significant Nonfederal and Federal Program Funding

November 1, 2002, through October 31, 2003

University of Wisconsin Sea Grant Institute NONFEDERAL SUPPORT					
Agency/ Donor	Date of Award	Purpose	Amount	Award No.	Period of Support
State of Wisconsin	1-Jul-03	FY 2003-04 matching funds for FY 2001 Sea Grant Omnibus	1,530,000	N/A	7/1/03-6/30/04
Total Nonfederal Support, November 2002-October 2003			\$1,530,000		

University of Wisconsin Sea Grant Institute FEDERAL SUPPORT					
Agency/ Donor	Date of Award	Purpose	Amount	Award No.	Period of Support
NOAA-Sea Grant	7-Apr-03	FY 2003 Sea Grant Omnibus	1,933,500	NA16RG2257	3/1/03-2/29/04
NOAA-Sea Grant	12-Sep-03	Additional Ship Time Support for FY 2003 Omnibus Program	19,800	NA16RG2257	3/1/03-2/29/04
NOAA-Sea Grant	12-Sep-03	Sea Grant Aquatic Nuisance Species: Inhibition of Zebra Mussel Attachment by Bacterial Extracellular Polymers	20,735	NA16RG2257	6/1/03-5/31/04
NOAA-Sea Grant	12-Sep-03	Transferring Sea Grant Aquatic Nuisance Species Research and Outreach Results to the Nation Using a World Wide Web Server: A Continuing Project, 2003-2004 (Wisconsin Budget)	20,447	NA16RG2257	10/1/03-2/29/04
US EPA	17-Sep-03	An Interactive Invasive Species Kiosk	10,981	GL965125-01-0	10/1/03-10/2/05
NOAA-Sea Grant	22-Sep-03	Wisconsin Marine Managed Area Data Collection Initiative	5,150	DG133R-03-SE-1166	9/1/03-12/31/03
Total Federal Support, November 2002-October 2003			\$2,010,613		

COMBINED TOTAL NONFEDERAL & FEDERAL SUPPORT, November 2002-October 2003	\$3,540,613
---	-------------



## APPENDIX D

## Lists of Publications

(Including Distribution Data and Funds Recovered through Sales)

Print and Web Publications, News Releases, Newsletters, and Radio Programs  
November 1, 2002, through October 31, 2003*New Print Publications (November 1, 2002–October 31, 2003)*

<u>Quantity Printed</u>	<u>Publication</u>
600	WISCU-C-01-001 <i>Technical Compendium to the Proceedings of the 4th International Symposium on Surgeon</i> , H. Rosenthal, R.M. Bruch, F.P. Binkowski, editors (University of Wisconsin Sea Grant Institute, Madison)
15,000	WISCU-G-02-002 <i>Protect Our Waters</i> by Phil Moy and Jill Ladwig (University of Wisconsin Sea Grant Institute, Madison)
100	WISCU-G-03-001 <i>Research for the Real World</i> by Stephen Wittman (University of Wisconsin Sea Grant Institute, Madison)
10,500	WISCU-G-03-002 <i>Don't Get Trapped! What Anglers and Boaters Should Know about Commercial Fishing Trap Nets</i> by Jill Ladwig and Phil Moy (University of Wisconsin Sea Grant Institute, Madison)
1,000	WISCU-H-03-001 <i>Historic Shipwrecks of Door County: Bullhead Point, Carrington, Christina Nilsson, Meridian</i> by John Karl, Cathy Green and Russ Green; Tina Yao, designer (University of Wisconsin Sea Grant Institute, Madison)
40	WISCU-Q-03-002 <i>UW Sea Grant Institute 2003 Annual Progress Report</i> , Stephen Wittman, editor (University of Wisconsin Sea Grant Institute annual report)
1,200	WISCU-Q-03-001 <i>Liquid Assets: Wisconsin's Water Wealth</i> by Jill Ladwig and Stephen Wittman (University of Wisconsin Aquatic Sciences Center report)
159	WISCU-R-01-019 <i>Fast Growth in Rainbow Trout Is Correlated with a Rapid Decrease in Post-Stress Cortisol Concentrations</i> by L.S. Weil, T.P. Barry and J.A. Malison ( <i>Aquaculture</i> , 193:373-380, 2001)
200	WISCU-R-02-013 <i>Shell Damage in Salt Marsh Periwinkles (Littoraria irrorata [Say, 1822]) and Resistance to Future Attacks by Blue Crabs (Callinectes sapidus [Rathbun, 1896])</i> by Ben K. Greenfield, David B. Lewis and Jefferson T. Hinke ( <i>American Malacological Bulletin</i> , 17(1/2):141-146, 2002)
200	WISCU-R-02-014 <i>A Preservative-Free Emergent Trap for the Isotopic and Elemental Analysis of Emergent Insects from a Wetland System</i> by Richard A. MacKenzie and Jerry L. Kaster ( <i>The Great Lakes Entomologist</i> , 35(1):47-51, 2002)

- 100 WISCU-R-02-015 *Ecological Factors Affecting the Sustainability of Chinook and Coho Salmon Populations in the Great Lakes, Especially Lake Michigan* by Michael J. Hansen and Mark E. Holey (in *Sustaining North American Salmon: Perspectives Across Regions and Disciplines*, Kristine D. Lynch, Michael L. Jones and William W. Taylor, editors, chapter 8, pp. 155-179, 2001)
- 200 WISCU-R-03-001 *Trophic Relationships among Lean and Siscowet Lake Trout in Lake Superior* by Chris J. Harvey, Stephen T. Schram and James F. Kitchell (*Transactions of the American Fisheries Society*, 132:219-228, 2003)
- 200 WISCU-R-03-002 *Historic and Modern Abundance of Wild Lean Lake Trout in Michigan Waters of Lake Superior: Implications for Restoration Goals* by Michael J. Wilberg, Michael J. Hansen and Charles R. Bronte (*North American Journal of Fisheries Management*, 23:100-108, 2003)
- 200 WISCU-R-03-003 *Sector-Level Decisions in a Substantiability-Constrained Economy* by Richard T. Woodward and Richard C. Bishop (*Land Economics*, 79(1):1-14, 2003)
- 200 WISCU-R-03-004 *Effects of Biofilms on Zebra Mussel Post-Veliger Attachment to Artificial Surfaces* by Jerry H. Kavouras and James S. Maki (*Invertebrate Biology*, 122(2):138-151, 2003)
- 300 WISCU-R-03-005 *Effects of Aryl Hydrocarbon Receptor-Mediated Early Life Stage Toxicity on Lake Trout Populations in Lake Ontario during the 20th Century* by Philip M. Cook, John A. Robbins, Douglas D. Endicott, Keith B. Lodge, Patrick D. Guiney, Mary K. Walker, Erik W. Zabel and Richard E. Peterson (*Environmental Science & Technology*, 37(17):3864-3877, 2003)
- 200 WISCU-R-03-006 *Dioxin Toxicity and Aryl Hydrocarbon Receptor Signaling in Fish* by Robert L. Tanguay, Eric A. Andreasen, Mary K. Walker and Richard E. Peterson (In *Dioxins and Health*, Arnold Schecter and Thomas A. Gasiewicz, editors, chapter 15, pp 603-628, 2003)
- 200 WISCU-R-03-007 *Lipase-Catalyzed Ethanolysis of Fish Oils: Multi-response Kinetics* by Carlos F. Torres, Marlina Moeljadi and Charles G. Hill, Jr. (*Biotechnology and Bioengineering*, 83(3):274-281, 2003)
- 250 WISCU-R-03-008 *Zebra Mussels (Dreissena polymorpha) Limit Food for Larval Fish (Pimephales promelas) in Turbulent Systems: A Bioenergetics Analysis* by L.A. Bartsch, W.B. Richardson and M.B. Sandheinrich (*Hydrobiologia*, 495:59-72, 2003)
- 200 WISCU-R-03-009 *Lipase-Catalyzed Interesterification Reaction Between Menhaden Oil and the Ethyl Ester of CLA: Uniresponse Kinetics* by Carlos F. Torres, Betty Lin, Louis P. Lessard and Charles G. Hill, Jr. (*Journal of American Oil Chemists' Society*, 80(9):873-880, 2003)
- 300 WISCU-R-03-010 *Effects of Dietary Methylmercury on Reproductive Endocrinology of Fathead Minnows* by Paul E. Drevnick and Mark B. Sandheinrich (*Environmental Science & Technology*, 37(19):4390-4396, 2003)
- 31,349 **Total Quantity for 21 New Titles**
- 100,000 *Wisconsin's Water Library* bookmark, JoAnn Savoy (UW Aquatic Sciences Center, Madison)

## ***Zebra Mussel Watch Cards Printed (November 2002-October 2003)***

<u>Quantity Printed</u>	<u>Agency Requesting Cards</u>
45,200	Michigan Sea Grant
37,200	U.S. Coast Guard
<u>82,400</u>	Total Printings (November 2002 through October 2003)
2,205,390	Grand Total Printed (1991-2003)

## ***Publications Distribution (November 2002-October 2003)***

<u>Quantity Distributed</u>	<u>Publication Type</u>
39	Books
42	Charts & Films/Videotapes
6,269	General Public/Advisory Information
512	Handbooks/Manuals/Guides
455	Proceedings of Conferences
1,624	Program Reports
1,648	Reprints from Journals
67	Technical Reports
180	Non-UWSG Publications
<u>4,053</u>	Promotional/Educational Bookmarks
14,889	Total

### *Aquatic Nuisance Species Publications*

91,043	<i>Zebra Mussel Watch Cards</i>
43,776	<i>Protect Our Waters</i> Aquatic Nuisance Species Brochures
<u>41,814</u>	Non-UWSG SGNIS Bookmarks, Brochures & ANS Watch Cards
176,633	Total Nonindigenous Species Bookmarks, Brochures & ANS Cards

## ***Origins of Publication Requests (November 2002-October 2003)***

40%	Wisconsin (260 requests)
30%	Great Lakes Region (194)
20%	Nationwide (127)
10%	Foreign (64)

## ***Sales Credits (November 2002-October 2003)***

\$21,952.48 Total Funds Recovered from the Sale of Publications and Other Products

**Littoral Drift Cover Stories** (*Bimonthly two-page newsletter, circ. ~1,000 per issue*)*November/December 2002*

"Is Our Water Safe? Human Health Issues Addressed at Public Forum"  
 "Sea Grant Mourns Death of G.C. Becker"

*January/February 2003*

"Student Work Aids Lake Trout Cause: New Population Model Used to Revise Fishing Quotas"  
 "Celebrate Wisconsin's Water in 2003"

*March/April 2003*

"Mercury May Harm Fish, Too: Mercury-Contaminated Diet May Interfere with Reproduction"  
 "El Niño May Keep Great Lakes Water Levels Low"

*May/June 2003*

"SPECIAL ISSUE: Scuba Diving: Twenty-five Years of Enhancing Diving Safety"

*July/August 2003*

"To Clean the Bay, Clean the River First: Sediments Flowing from River Add PCBs to the Bay"  
 "Feasibility of White Perch Fishery in Green Bay Assessed"

*September/October 2003*

"Working as a Watershed: Planners Urge Cooperation within Natural Boundaries"  
 "Madison Hosts Third International Percid Fish Symposium"

**News Releases** (*November 2002-October 2003*)

<u>Date Issued</u>	<u>Release Headline</u>
02/01/03	Record Low Waters Possible on Great Lakes this Summer
03/11/03	Fisheries Experts to Launch World Sturgeon Conservation Society
04/11/03	Fox River Partners Host 14th Annual River-Bay Clean-Up Day
05/16/03	UW Scientists to Present Update on Status of PCBs in Green Bay
05/21/03	Cleaning Green Bay of PCBs Requires Cleaning Fox River First, UW Scientists Say
05/27/03	UW Sea Grant Receives \$1.9 Million Federal Grant
06/18/03	Don't Get Carried Away This Summer: Beware of Great Lakes Currents
06/30/03	Shipwreck Exploration Chronicled on New Web Site
07/17/03	Experts to Examine Status of Perch Fisheries Worldwide
10/04/03	Citizens Trained to be Fisheries Leaders
10/09/03	UW Water Resources Library Launches Online Information Resource

**TOTAL: 11**

## *New & Updated Web Publications (since October 2002)*

### **Alewife Watch 2003**

[www.seagrant.wisc.edu/outreach/fisheries/Alewife/alewife.asp](http://www.seagrant.wisc.edu/outreach/fisheries/Alewife/alewife.asp)

### **Aquatic Nuisance Species Attack Pack**

[www.seagrant.wisc.edu/outreach/nis/Attack\\_Pack/Attack\\_Pack.html](http://www.seagrant.wisc.edu/outreach/nis/Attack_Pack/Attack_Pack.html)

### **Chicago Sanitary and Ship Canal Aquatic Nuisance Species Barrier Project**

[www.seagrant.wisc.edu/outreach/nis/Barrier/Barrier.asp](http://www.seagrant.wisc.edu/outreach/nis/Barrier/Barrier.asp)

### **Earthwatch Radio**

[ewradio.org](http://ewradio.org)

### **Fish Identification Database (under development, in collaboration with Center for Limnology and WDNR)**

[144.92.62.239/newfishtest](http://144.92.62.239/newfishtest)

### **Lake Michigan Fisheries Forum**

[www.seagrant.wisc.edu/outreach/fisheries/Fisheries\\_Forum/Forum.asp](http://www.seagrant.wisc.edu/outreach/fisheries/Fisheries_Forum/Forum.asp)

### **Nonindigenous Species Outreach**

[www.seagrant.wisc.edu/outreach/nis/index.asp](http://www.seagrant.wisc.edu/outreach/nis/index.asp)

### **Notes from the Field 2003 (in collaboration with Wisconsin Historical Society)**

[www.wisconsinhistory.org/shipwrecks/notes/index.asp](http://www.wisconsinhistory.org/shipwrecks/notes/index.asp)

### **Online Publications Store**

[www.aqua.wisc.edu/publications](http://www.aqua.wisc.edu/publications)

### **Sea Grant Non-Indigenous Species (SGNIS—in collaboration with Illinois-Indiana Sea Grant)**

[www.sgnis.org](http://www.sgnis.org)

### **UW Sea Grant Research—2003-04 Projects**

[www.seagrant.wisc.edu/Research/index.asp](http://www.seagrant.wisc.edu/Research/index.asp)—[www.seagrant.wisc.edu/projects/](http://www.seagrant.wisc.edu/projects/)

### **Wisconsin's Great Lakes Shipwrecks**

[www.wisconsinshipwrecks.org](http://www.wisconsinshipwrecks.org)

### **Wisconsin's Water Library**

[www.aqua.wisc.edu/waterlibrary](http://www.aqua.wisc.edu/waterlibrary)

**"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 2002*

"Studio Safety"—Richard Hoops  
 "Hot Fish from Cold Waters"—Richard Hoops  
 "Piranha without a Permit"—Diane Pansky  
 "Testing the Waters"—John Karl  
 "Crops and Climate"—Richard Hoops  
 "Blue Revolution"—Jill Ladwig  
 "Fish Farewell"—Diane Pansky  
 "Historical Structures"—Diane Pansky  
 "Stump Science"—Matt Hagengruber  
 "Tropical Fish Head North"—Diane Pansky  
 "Let Loose the Dam"—Matt Hagengruber

*December 2002*

"Frightening Phenomena"—Richard Hoops  
 "Rudolph is a Girl"—John Karl  
 "Washer Water"—Scott De Laruelle  
 "The Climate for Corn"—Richard Hoops  
 "Smaller Problems at the South Pole"—Scott De Laruelle  
 "Lost in the Lagoon"—Jill Ladwig  
 "Hard Core Camels"—Diane Pansky  
 "Dear Old Dam"—Diane Pansky  
 "Flashes of Brilliance"—Richard Hoops  
 "Reindeer Range"—John Karl  
 "Salt on the Road"—Diane Pansky

*January 2003*

"Ozone Update"—Richard Hoops  
 "Perc Prohibition"—Richard Hoops  
 "Sea Changes by Satellite"—Diane Pansky  
 "Alien Battles"—Diane Pansky  
 "Feminized Frogs"—Scott De Laruelle  
 "Cormorant Conundrum"—Scott De Laruelle  
 "Uncertain Recovery"—Richard Hoops  
 "Harrowing Times for Hagfish"—Diane Pansky  
 "Trade Target"—Jill Ladwig  
 "Low Yield in the Wild"—Richard Hoops  
 "No Touch Archaeology"—John Karl

*February 2003*

"Climate Changes to Flora and Fauna"—Richard Hoops  
 "Ocean Policy Overhaul"—Diane Pansky  
 "Why Lobsters Don't Ask Directions"—John Karl  
 "Fire & Ice"—Jill Ladwig  
 "Sensitive Seas"—Scott De Laruelle  
 "From Vicious to Vulnerable"—Diane Pansky  
 "Mercury on the Move"—Scott De Laruelle  
 "Local Response to Foreign Species"—Scott De Laruelle  
 "Indonesian Wildfires"—Scott De Laruelle  
 "Oceans in Trouble"—Diane Pansky

*March 2003*

"Islands Hopping"—John Karl  
 "Winter Droughts"—Scott De Laruelle  
 "Global Water Outlook"—Diane Pansky  
 "The Impact of Ice"—Richard Hoops  
 "Inheriting Mutations"—Scott De Laruelle  
 "Politics of Thirst"—Jill Ladwig  
 "Sharp Shark Decline"—Scott De Laruelle  
 "Muddy Bottom Bonanza"—Diane Pansky  
 "Harnessing the Wind"—Scott De Laruelle  
 "Welcome Back, Beavers"—Diane Pansky  
 "Thirsty Farms, Thirsty Planet"—Jill Ladwig

*April 2003*

"Three Decibels a Decade"—Diane Pansky  
 "Yukon Squirrels in a Changing World"—Scott De Laruelle  
 "Past Tense for Perennial Ice"—Richard Hoops  
 "Fish Food"—Richard Hoops  
 "Climate Change and Cholera"—Scott De Laruelle  
 "Deaf Fish"—Diane Pansky  
 "Managing Marlin"—John Karl  
 "Unwelcome Island Visitors"—John Karl  
 "The Back of the Beetles"—Diane Pansky  
 "Drought from Atlanta to Afghanistan"—John Karl  
 "Coral Reef Report Card"—Diane Pansky

*May 2003*

"Pallet Problems"—Scott De Laruelle  
"Freeze Dried and Dead"—Richard Hoops  
"Pillaging Pike"—Scott De Laruelle  
"Warmer than Average"—Richard Hoops  
"Looking More Closely at Hearing"—Diane Pansky  
"Fleas and Pharmaceuticals"—Jill Ladwig  
"Sudden Death for Some Big Trees"—Scott De Laruelle  
"Alaskan Villages on the Move"—John Karl  
"Hyacinth Woes"—Diane Pansky  
"Clearing Out the Ashes"—Diane Pansky  
"Mobil Methane"—Diane Pansky

*June 2003*

"Dust Dilemma"—Scott De Laruelle  
"Arctic Bellwether"—Scott De Laruelle  
"Triad of Trouble"—Scott De Laruelle  
"Dogs Follow Directions"—Diane Pansky  
"World Water Forum"—Diane Pansky  
"Finding Faults"—Scott De Laruelle  
"Wild Coal Fires"—Scott De Laruelle  
"Shared Water"—Diane Pansky  
"Tough Changes"—Richard Hoops  
"Virtual Water"—Diane Pansky

*July 2003*

"Crushed Ice"—Richard Hoops  
"Don't Bet on Wet"—Rachel Sohmer  
"Toxic Troubles"—Scott De Laruelle  
"Runoff Reckoning"—Scott De Laruelle  
"Bright Bird Beaks"—Diane Pansky  
"Massive Changes from Melting Ice"—Richard Hoops  
"The Water We Eat"—Jill Ladwig  
"Wetlands Journey"—Diane Pansky  
"Arsenic Eaters"—Jill Ladwig  
"Great Lakes, Great Changes"—John Karl  
"Marshland Makeover"—Diane Pansky  
"Islands Worry over Rising Waters"—Diane Pansky

*August 2003*

"Conservation Crime Lab"—Richard Hoops  
"Guiding Lights Go Out"—Emily Laughnan  
"Musky Pox"—Rachel Sohmer  
"Easier Life for Traveling Birds"—Emily Laughnan  
"Unchecked Algae"—Emily Laughnan  
"Heroic Beetles"—Emily Laughnan  
"More Milkweed for Monarchs"—Rachel Sohmer  
"Lethal to the Largemouth"—John Karl  
"Crayfish Clone"—Rachel Sohmer  
"Unintended Birth Control"—Jill Ladwig

*September 2003*

"Bright Lights, Big Nuisance"—Emily Laughnan  
"Changing the Wild Relatives"—Richard Hoops  
"Wringing out the Sandy Sponge"—Emily Laughnan  
"Communication and Confusion"—Emily Laughnan  
"Corks and Conservation"—Rachel Sohmer  
"Chainsaws and Butterflies"—Rachel Sohmer  
"Water Seepage"—Emily Laughnan  
"Biological Jumble"—John Karl  
"Fleeting Beaches"—Emily Laughnan  
"Hidden Costs of Outdoor Lights"—Emily Laughnan  
"Pushing Pollution Thresholds"—Rachel Sohmer

*October 2003*

"Roadside Prairies"—Rachel Sohmer  
"Big Bite Out of the Big Fish"—Richard Hoops  
"The Cost of Caviar"—Rachel Sohmer  
"Reef Residence"—John Karl  
"Asian Ozone"—Richard Hoops  
"Gas Leak"—Rachel Sohmer  
"Sea Bottom Subway"—Emily Laughnan  
"A Whale of a Tale"—Emily Laughnan  
"From the Sea to the Sink"—Emily Laughnan  
"Low Oxygen, Less Offspring"—Richard Hoops  
"Hydrogen History Lesson"—Rachel Sohmer  
"Deep Ice Telescope"—Jill Ladwig

## ***Publications Submitted with Project Completion Reports*** ***(November 2002-October 2003)***

### **Project R/BT-12**

"2,3,7,8-Tetrachlorodibenzo-*p*-dioxin Toxicity in the Zebrafish Embryo: Altered Regional Blood Flow and Impaired Lower Jaw Development" by Hiroki Teraoka, Wu Dong, Shuji Ogawa, Shusaku Tsukiyama, Yuji Okuhara, Masayoshi Niiyama, Naoto Ueno, Richard E. Peterson and Takeo Hiraga (*Toxicological Sciences*, 65:192-199, 2002)

"2,3,7,8-Tetrachlorodibenzo-*p*-dioxin Toxicity in the Zebrafish Embryo: Local Circulation Failure in the Dorsal Midbrain Is Associated with Increased Apoptosis" by Wu Dong, Hiroki Teraoka, Koji Yamazaki, Shusaku Tsukiyama, Sumiko Imani, Tomohiro Imagawa, John J. Stegeman, Richard E. Peterson and T. Hiraga (*Toxicological Sciences*, 69:191-201, 2002)

### **Projects R/BT-12 & R/BT-14**

"Binding of Polycyclic Aromatic Hydrocarbons (PAHs) to Teleost Aryl Hydrocarbon Receptors (AHRs)" by Sonya M. Billiard, Mark E. Hahn, Diana G. Franks, Richard E. Peterson, Niels C. Bols and Peter V. Hodson (*Comparative Biochemistry and Physiology, Part B* 133:55-68, 2002)

"The Zebrafish (*Danio rerio*) Aryl Hydrocarbon Receptor Type 1 Is a Novel Vertebrate Receptor" by Eric A. Andreassen, Mark E. Hahn, Warren Heideman, Richard E. Peterson and Robert L. Tanguay (*Molecular Pharmacology*, 62:234-249, 2002)

"Relative Potencies of Polychlorinated Dibenzo-*p*-Dioxin, Dibenzofuran, and Biphenyl Congeners to Induce Cytochrome P4501A mRNA in a Zebrafish Liver Cell Line" by Tala R. Henry, Dorothy J. Nesbit, Warren Heideman and Richard E. Peterson (*Environmental Toxicology and Chemistry*, 20:1053-1058, 2001)

"Characterization of CYP1A1 and CYP1A3 Gene Expression in Rainbow Trout (*Oncorhynchus mykiss*)" by Zhengjin Cao, Julie Hong, Richard E. Peterson and Judd M. Aiken (*Aquatic Toxicology*, 49:101-109, 2000)

"Hemodynamic Dysfunction and Cytochrome P4501A mRNA Expression Induced by 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin During Embryonic Stages of Lake Trout Development" by Patrick D. Guiney, Mary K. Walker, Jan M. Spitsbergen and Richard E. Peterson (*Toxicology and Applied Pharmacology*, 168:1-14, 2000)

"Cloning and Characterization of the Zebrafish (*Danio rerio*) Aryl Hydrocarbon Receptor" by Robert L. Tanguay, Christian C. Abnet, Warren Heideman and Richard E. Peterson (*Biochimica et Biophysica Acta*, 1444:35-48, 1999)

"Reproductive and Developmental Toxicology of Contaminants in Oviparous Animals" by Anne Fairbrother, Gerald T. Ankley, Linda S. Birnbaum, Steven P. Bradbury, Bettina Francis, L. Earl Gray, David Hinton, Lyndal L. Johnson, Richard E. Peterson and Glen Van Der Kraak (In *Reproductive and Developmental Effects of Contaminants in Oviparous Vertebrates* by Richard T. Di Giulio and Donald E. Tillitt, editors, Chapter 5, pages 283-360, SETAC, 1999)

"Levels of Polybrominated Diphenyl Ethers (PBDEs) in Fish from the Great Lakes and Baltic Sea" by Lillemor Asplund, Michael Hornung, Richard E. Peterson, Kaj Turesson and Ake Bergman (*Organohalogen Compounds*, 40:351-354, 1999)

### **Project R/BT-16**

"Induction of Cytochrome P450 1A Is Required for Circulation Failure and Edema by 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin in Zebrafish" by Hiroki Teraoka, Wu Dong, Yoshikazu Tsujimoto, Hiroyuki Iwasa, Daiji Endoh, Naoto Ueno, John J. Stegeman, Richard E. Peterson and Takeo Hiraga (*Biochemical and Biophysical Research Communications*, 304:223-228, 2003)



## 2003 Wisconsin Sea Grant Progress Report

### Project R/MW-80

“Determination of Dissolved Thiols Using Solid-Phase Extraction and Liquid Chromatographic Determination of Fluorescently Derivatized Thiolic Compounds” by Degui Tang, Martin M. Shafer, Kou Vang, Dawn A. Karner and David Armstrong (*Journal of Chromatography A*, 998:31-40, 2003)

### Project R/NI-30

“MRI for Dysbaric Osteonecrosis of Saturation Divers” by Mahito Kawashima, Hiroaki Tamura, Makoto Sasaki, Katsubiro Takao, Kimihiro Yoshida, Motohiko Mohri, Yasushi Taya, Yoshihiro Mano, Motoo Kitano and Charles Lehner (pp. 179-182 In *Proceedings of the 16th Meeting of the United States-Japan Cooperative Program in Natural Resources, Diving Physiology Panel*, Yu-Chong Lin, editor, Honolulu: NOAA National Undersea Research Program, 2002)

“Potential Risk of Osteonecrosis in 4-h Air Decompression from a 24-h Hyperbaric Exposure of 60 fsw (2.81 tm abs): UW Sheep Model Findings” by C.E. Lehner, R.T. Dueland, M.A. Wilson, E.V. Nordheim, L. Vaicekavicius, A.P. Gendron-Fitzpatrick, P.M. Crump and M. Kawashima (pp. 189-192 In *Proceedings of the 16th Meeting of the United States-Japan Cooperative Program in Natural Resources, Diving Physiology Panel*, Yu-Chong Lin, editor, Honolulu: NOAA National Undersea Research Program, 2002)

“Potential Risk to Humans in Emergency Ascent from Hyperbaric Saturation: Sheep Model Findings” by Charles E. Lehner, Michael A. Wilson, R. Tass Dueland, Erik V. Nordheim, Linas Vaicekavicius, Annette P. Gendron-Fitzpatrick, Peter M. Crump and Yasushi Taya (pp. 77-83 In *Proceedings of the 15th Meeting of the United States-Japan Cooperative Program in Natural Resources, Panel on Diving Physiology*, N. Naraki and M. Mohri, editors, Tokyo: Japan Marine Science and Technology Center, 2000)

“MRI for Dysbaric Osteonecrosis of Saturation Divers” by Mahito Kawashima, Hiroaki Tamura, Makoto Sasaki, Katsubiro Takao, Kimihiro Yoshida, Motohiko Mohri, Yasushi Taya, Yoshihiro Mano, Motoo Kitano and Charles Lehner (pp. 55-63 In *Proceedings of the 15th Meeting of the United States-Japan Cooperative Program in Natural Resources, Panel on Diving Physiology*, N. Naraki and M. Mohri, editors, Tokyo: Japan Marine Science and Technology Center, 2000)

### Master's & Ph.D. Theses

**Projects R/BT-12 & R/BT-14:** “Comparative Studies of Aryl Hydrocarbon Receptors in Fish” by Eric A. Andreasen (UW-Madison Ph.D. Thesis, 2001)

**Projects R/BT-12 & R/BT-14:** “Characterization of 2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin Responsive Genes in Rainbow Trout (*Oncorhynchus Mykiss*)” by Zhengjin Cao (UW-Madison Ph.D. Thesis, 1999)

**Project R/MW-80:** “Strong Binding of Copper, Zinc and Lead to Colloids and Natural Organic Matter in Rivers” by Stephen Reed Hoffman (UW-Madison Ph.D. Thesis, 2002)

**Project R/MW-80:** “Analysis of Watershed Features Influencing Trace Metal Distribution between Suspended Particles and Water Using GIS-Based Models” by Ann Wieben (UW-Madison M.S. Thesis, 2002)

## APPENDIX E

### Students and Fellows Supported

November 1, 2002, through October 31, 2003

---

#### *Students Supported*

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

20 Graduate students  
45 Undergraduate students

#### *Degrees Awarded*

Six UW Sea Grant project-related theses were completed during 2002-2003, resulting in the awarding of three Master's degrees and three Ph.D.s:

##### Master's Degrees

**Scott De Laruelle**, Journalism and Mass Communications, UW-Madison, 2003  
*Mr. Richard Hoops, project C/C-2*

**Paul Drevnick**, Biology, UW-La Crosse, 2002  
*Profs. Mark Sandheinrich/Ronald Rada, project R/MW-81*

**Benjamin Vail**, Rural Sociology, UW-Madison, 2002  
*Prof. Thomas Heberlein, project R/PS-54*

##### Doctorate Degrees

**Stephen Lemos**, Veterinary Science, UW-Madison, 2003  
*Prof. Rudolf Tass Dueland, projects R/NI-30, R/NI-31*

**Antony Scott**, Land Resources, UW-Madison, 2003  
*Prof. Richard Bishop, projects R/PS-46, R/PS-51*

**Chester Wilson**, Electrical Engineering, UW-Madison, 2003  
*Profs. Marc Anderson/Yogesh Gianchandani/Michael Zorn, project R/MW-85*

#### *Fellows Supported*

##### Dean John A. Knauss Marine Policy Fellowship

**Karl Gustavson**, Ph.D. graduate, Environmental Toxicology, UW-Madison  
*House Subcommittee on Fisheries Conservation, Wildlife and Oceans, Washington, D.C., 2002*  
*Ms. Mary Lou Reeb, project E/E-42*

## APPENDIX F

### Program Awards and Honors

November 1, 2002, through October 31, 2003

---

- Award Title:** Outstanding Program Award  
**Recipient:** Philip Moy (A/AS-1)  
**Presented by:** Great Lakes Sea Grant Extension Program Leaders  
**Purpose of Award:** Recognition for a multi-institutional Great Lakes Sea Grant Network project of using the HACCP approach to prevent the spread of aquatic nuisance species by aquaculture and baitfish operations.
- Award Title:** Superior Program Award  
**Recipient:** Philip Moy, Stephen Wittman and Jill Ladwig (A/AS-47)  
**Presented by:** Great Lakes Sea Grant Extension Program Leaders  
**Purpose of Award:** Recognition for "Using Mass Media to Inform Anglers about Invasive Species" project.
- Award Title:** President's Award  
**Recipient:** Stephen Wittman (C/C-1)  
**Presented by:** Sea Grant Association  
**Purpose of Award:** Recognition for meritorious service to the national Sea Grant network.
- Award Title:** Teddy Award  
**Recipient:** Winkelman Productions, Inc. (A/AS-47)  
**Presented by:** Michigan Outdoor Writers' Association  
**Purpose of Award:** Recognizing best environmental program segment on the topic of nonindigenous aquatic nuisance species, created with assistance and support from "Using Mass Media to Inform Anglers about Invasive Species" project.
- Award Title:** Award of Excellence  
**Recipient:** James Kitchell (R/LR-82)  
**Presented by:** American Fisheries Society  
**Purpose of Award:** Recognition for career accomplishments—among the AFS' most prestigious.
- Award Title:** National Association of County Agricultural Agents Award  
**Recipient:** Fred P. Binkowski (A/AS-50)  
**Presented by:** National Association of County Agricultural Agents  
**Purpose of Award:** Recognition for participation in and contributions to Aquaculture–Sea Grant Professional Improvement Conference.
- Award Title:** Bill Thrienen Outstanding Service Award  
**Recipient:** Steven E. Yeo (A/AS-50)  
**Presented by:** Wisconsin Chapter of the American Fisheries Society  
**Purpose of Award:** Recognition long-term service to Wisconsin AFS Chapter.
- Award Title:** Merit Award  
**Recipient:** R.E. Peterson (R/BT-16)  
**Presented by:** National Institute of Environmental Health Sciences  
**Purpose of Award:** This is a Merit Award for research that runs from 2000-05 before review.

**Award Title:** Auxiliary Annual Service Performance Award  
**Recipient:** James 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 41 hours of Public Education Instruction in 2002.

**Award Title:** Hilldale Undergraduate Grant  
**Recipient:** Emily Topczewski (R/MW-84)  
**Presented by:** UW-Madison Graduate School  
**Purpose of Award:** Emily wrote a proposal to study how exposure to metals influence the interaction between frog tadpoles and parasites that cause limb deformities. She was awarded one of the competitive grants and performed her study in summer 2003.

**Award Title:** SETAC Travel Award  
**Recipient:** Te-Hao Chen (R/MW-84)  
**Presented by:** Society for Environmental Toxicology and Chemistry  
**Purpose of Award:** Ph.D. student Te-Hao Chen was one of 16 recipients of travel awards to the national meeting in fall 2003. Te-Hao received the competitive travel award based on the abstract that he submitted for the meeting.

**Award Title:** Star Grant  
**Recipient:** Jason Gross (R/MW-84)  
**Presented by:** Environmental Protection Agency  
**Purpose of Award:** Ph.D. graduate student Jason Gross received a U.S. Environmental Protection Agency STAR grant. This is a competitive, prestigious award. Jackson's application, which focused on the impact of metals on amphibians, was strengthened based on results and publications from previous Sea Grant-supported work.

## APPENDIX G

### List of All Active Projects

November 1, 2002, through October 31, 2003

#### ADVISORY SERVICES

- A/AS-1**—Advisory Services: Program Coordination and Field Offices
- A/AS-46**—*Aquatic Nuisance Species NSI*: Aquatic Nuisance Species Attack Pack
- A/AS-47**—*Aquatic Nuisance Species NSI*: Using Mass Media to Inform Anglers about Invasive Species
- A/AS-48**—*Aquatic Nuisance Species NSI*: Transferring Sea Grant Aquatic Nuisance Species Research and Outreach Results to the Nation Using a World Wide Web Server: A Continuing Project, 2001-03
- A/AS-49**—Implementation of Comprehensive, Dynamic GIS for Coastal Management: Linking Agencies for Better Decisions and Public Information about the Coastal Zone
- A/AS-50**—WATERS 2002 – Wisconsin's Aquaculture Technology, Education and Research Services
- A/AS-51**—Great Lakes Fisheries Leadership Curriculum Development
- A/AS-52**—Great Lakes Fisheries Leadership Institute
- A/AS-53**—*Aquatic Nuisance Species NSI*: Sea Grant Non-Indigenous Species (SGNIS) Web Site: Development and Support

#### AQUACULTURE & SEAFOOD TECHNOLOGY

- R/AQ-35**—Stress and Salmonid Fish: Role of Cortisol Metabolizing Enzymes
- R/AQ-36**—Production of Stress-Resistant, Domesticated Yellow Perch for Commercial Aquaculture
- R/AQ-37**—*Marine Aquaculture NSI*: Production of a Best Management Practices Manual for Aquaculture in Wisconsin and the Great Lakes Region
- R/AQ-38**—Endocrine and Environmental Regulation of Growth in Yellow Perch
- R/AQ-39**—Use of Fish Oil for Enzyme-Mediated Production of Value-Added Food Products Containing Omega-3 Fatty Acids

#### BIOTECHNOLOGY

- R/BT-12**—Developmental Toxicity of Dioxin in Zebrafish
- R/BT-14**—Determining the Roles of Multiple Forms of AhR and ARNT in Dioxin Toxicity in Rainbow Trout
- R/BT-16**—Dioxin Developmental Toxicity in Zebrafish
- R/BT-17**—AhR Signaling in Rainbow Trout and Zebrafish

#### COMMUNICATIONS

- C/C-1**—Communications Office and Subprogram Coordination
- C/C-2**—Earthwatch Public Service Radio Program
- C/C-6**—Diving into History: Research and Public Education on Wisconsin's Underwater Archaeological Resources

#### EDUCATION

- E/E-1**—Special Marine Education Programs
- E/E-41**—Recent Advances in Limnology and Oceanography Seminar
- E/E-42**—Dean John A. Knauss Marine Policy Fellowship
- E/E-43-SE**—Madison JASON Project
- E/E-44-SE**—Lake Sturgeon Bowl

#### ESTUARINE & COASTAL PROCESSES

- R/EC-7**—Material Transformations Through a Series of Linked Basins in a Great Lakes Land Margin Ecosystem
- R/EC-8**—Methylmercury Production and Transfer to Benthic Food Webs in Nearshore and Wetland Environments of Southern Lake Superior

**LIVING RESOURCES**

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

**R/LR-84**—Development of a Lake Trout Population Model for Lake Superior

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

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

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

**MICROCONTAMINANTS & WATER QUALITY**

**R/MW-80**—Speciation and Bioavailability of Metals in the Great Lakes Ecosystem

**R/MW-83**—Polybrominated Diphenyl Ethers – A Global Contaminant of Concern in the Great Lakes

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

**R/MW-85**—Enhanced Experimental Methods for Measuring Inorganic Contaminants in Water Using a Micromachined DC Plasma Instrument

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

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

**NEW INITIATIVES**

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

**POLICY STUDIES**

**R/PS-51**—Sustainability, Uncertainty and the Management of the Lake Superior Fisheries

**R/PS-55**—Combining Stated and Revealed Preference Data to Estimate the Economic Value of Recreational Salmon Fishing

**R/PS-56**—Using Survey Data in Hedonic Price Analysis: An Application to the Economic Valuation of Cleaner Water in Green Bay, Lake Michigan

**PROGRAM ADMINISTRATION**

**M/SGA-1**—Program Development

**M/SGA-2**—Program Management

**M/SGA-3**—Ship Time in Support of Sea Grant Research Projects

**Number of Projects Supported: 45**

- 25 Research projects
- 9 Advisory Services projects
- 5 Education projects
- 4 National Strategic Investment projects
- 3 Communications projects
- 3 Program Management projects
- 1 Sea Grant Fellowship project

## APPENDIX H

### Outreach Activities

November 1, 2002, through October 31, 2003

---

#### *Advisory Services Workshops (total: 76 events, est. 6,402 attendees)*

**Project JASON – Channel Islands – GPS**

*Date:* 11/16/2002

*Attendance:* 16

*Location:* Pyle Center, UW-Madison

**Restoring the Cat Island Chain**

*Date:* 1/16/2003

*Attendance:* 35

*Location:* Green Bay, Wis.

**Lake Sturgeon Bowl Pre-Competition Workshop**

*Date:* 11/18/2002

*Attendance:* 10

*Location:* Milwaukee, Wis.

**Vermiculture and Vermicomposting for Recycling  
Perch Culture Biosolids from Recirculating  
Aquaculture Systems**

*Date:* 1/16/2003

*Attendance:* 150

*Location:* Madison, Wis.

**Great Lakes Aquatic Nuisance Species**

*Date:* 11/20/2002

*Attendance:* 300

*Location:* Neville Museum, Green Bay

**Lake Sturgeon Bowl Pre-Competition Workshop**

*Date:* 1/20/2003

*Attendance:* 12

*Location:* Edgerton High School

**Introduction to Ocean Sciences – Chapter 13**

*Date:* 11/20/2002

*Attendance:* 185

*Location:* UW-Milwaukee

**Lake Sturgeon Bowl Pre-Competition Workshop**

*Date:* 1/21/2003

*Attendance:* 22

*Location:* Appleton West High School

**Great Lakes Exotic Species**

*Date:* 11/21/2002

*Attendance:* 28

*Location:* Green Bay, Wis.

**Lake Sturgeon Bowl Pre-Competition Workshop**

*Date:* 1/22/2003

*Attendance:* 23

*Location:* Marshfield High School

**Introduction to Ocean Sciences**

*Date:* 11/22/2002-12/11/2002

*Attendance:* 185

*Location:* UW-Milwaukee

**Boating Skills and Seamanship**

*Date:* 1/28/2003-3/11/2003

*Attendance:* 19

*Location:* South Milwaukee Yacht Club

**Restoration of the Cat Island Chain in Lower  
Green Bay**

*Date:* 12/11/2002

*Attendance:* 80

*Location:* Chicago, Ill.

**Madison Project JASON Telepresence**

*Date:* 2/4/2003

*Attendance:* 63

*Location:* Madison, Wis.

**Introduction to Ocean Sciences**

*Date:* 1/2/2003-1/16/2003

*Attendance:* 7

*Location:* Florida and Bahamas, Atlantic Ocean

**Madison Project JASON Telepresence**

*Date:* 2/5/2003

*Attendance:* 188

*Location:* Madison, Wis.

**Using GIS to Measure Performance Indicators for  
Coastal Management in Wisconsin**

*Date:* 1/8/2003

*Attendance:* 75

*Location:* Charleston, S.C.

**Madison Project JASON Telepresence**

*Date:* 2/6/2003

*Attendance:* 38

*Location:* Madison, Wis.

**Lake Sturgeon Bowl Pre-Competition Workshop**

*Date:* 2/7/2003

*Attendance:* 10

*Location:* Metro High School, Milwaukee, Wis.

**Inventory of Digital Elevation Data Developed by Local Governments in Wisconsin**

*Date:* 2/12/2003

*Attendance:* 60

*Location:* Milwaukee, Wis.

**Transport and Transformation of Methyl Mercury in Contrasting Northern Temperate Watersheds: Integrating New Knowledge Toward Sound Management Practice**

*Date:* 2/12/2003

*Attendance:* 200

*Location:* Salt Lake City, Utah

**Solving the Land Records Jigsaw Puzzle: Bringing GIS Interoperability to Wisconsin**

*Date:* 2/13/2003

*Attendance:* 30

*Location:* Milwaukee, Wis.

**Vermiculture and Vermicomposting for Recycling Biosolids from Perch Recirculating Aquaculture Systems**

*Date:* 2/13/2003

*Attendance:* 41

*Location:* McGuire's Resort, Cadillac, Mich.

**Boating Skills and Seamanship -- Lesson Four**

*Date:* 2/18/2003

*Attendance:* 19

*Location:* South Milwaukee Yacht Club

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

*Date:* 2/18/2003

*Attendance:* 6

*Location:* Lapham Hall, UW-Milwaukee

**Lake Sturgeon Bowl Pre-Competition Workshop**

*Date:* 2/18/2003

*Attendance:* 27

*Location:* Milwaukee, Wis.

**Lake Sturgeon Bowl Pre-Competition Workshop**

*Date:* 2/18/2003

*Attendance:* 20

*Location:* Metro High School, Milwaukee, Wis.

**Intensive Aquaculture Technology (IAT): The Cookbook Version**

*Date:* 2/19/2003

*Attendance:* 75

*Location:* Louisville, Kentucky

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

*Date:* 2/19/2003

*Attendance:* 16

*Location:* Milwaukee, Wis.

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

*Date:* 2/20/2003

*Attendance:* 19

*Location:* Milwaukee, Wis.

**Great Lakes Aquatic Nuisance Species**

*Date:* 3/10/2003

*Attendance:* 500

*Location:* Peggy Notebaert Museum, Chicago

**Vermiculture and Vermicomposting for Recycling Perch Culture Biosolids from Recirculating Aquaculture Systems**

*Date:* 3/13/2003

*Attendance:* 250

*Location:* Stevens Point, Wis.

**NOAA Programs and Resources That Assist Communities with Watershed Planning and Smart Growth**

*Date:* 3/14/2003

*Attendance:* 75

*Location:* Kalamazoo, Mich.

**Great Lakes Water Levels**

*Date:* 3/17/2003

*Attendance:* 45

*Location:* South Milwaukee, Wis.

**Chicago San-Ship Dispersal Barrier**

*Date:* 3/19/2003

*Attendance:* 50

*Location:* Milwaukee, Wis.

**Great Lakes Issues**

*Date:* 4/3/2003

*Attendance:* 55

*Location:* Kenosha, Wis.



**2003 Wisconsin Sea Grant Progress Report**

**Wisconsin Boating Basics**

*Date:* 4/5/2003-4/11/2003

*Attendance:* 39

*Location:* Boy Scouts of America-Milwaukee County Council Office

**Wisconsin's Year of Water**

*Date:* 4/10/2003

*Attendance:* 32

*Location:* Green Bay, Wis.

**Great Lakes Water Levels**

*Date:* 4/14/2003

*Attendance:* 5

*Location:* Port Washington, Wis.

**Wisconsin Boating Basics**

*Date:* 4/15/2003-5/20/2003

*Attendance:* 33

*Location:* Wauwatosa West High School

**Wisconsin Boating Basics**

*Date:* 4/16/2003-5/21/2003

*Attendance:* 31

*Location:* Elm Dale School, Greenfield

**Aquatic Exotic Species**

*Date:* 5/3/2003

*Attendance:* 1232

*Location:* Milwaukee, Wis.

**Wisconsin Invasive Species**

*Date:* 5/3/2003

*Attendance:* 100

*Location:* Manitowoc, Wis.

**Cat Island Chain Restoration in Lower Green Bay**

*Date:* 5/12/2003

*Attendance:* 20

*Location:* Cleveland, Wis.

**Electric Fish Barrier in the San-Ship Canal**

*Date:* 5/15/2003

*Attendance:* 60

*Location:* Chicago, Ill.

**Ecosystem Observation and Recording Activity**

*Date:* 5/19/2003

*Attendance:* 325

*Location:* Oregon, Wis.

**R/V Neeskay Sampling Cruise**

*Date:* 5/23/2003

*Attendance:* 14

*Location:* Milwaukee, Wis., and Lake Michigan

**Methyl Mercury in Lake Superior: Offshore Processes and Bioaccumulation**

*Date:* 6/1/2003

*Attendance:* 75

*Location:* Grenoble, France

**Chicago ANS Dispersal Barrier**

*Date:* 6/3/2003

*Attendance:* 50

*Location:* Thunder Bay, Ont.

**Chicago Dispersal Barrier Project**

*Date:* 6/11/2003

*Attendance:* 30

*Location:* Windsor, Ont.

**Great Lakes Water Levels**

*Date:* 6/16/2003

*Attendance:* 100

*Location:* Sheboygan, Wis.

**Exotic Species in Wisconsin**

*Date:* 6/17/2003

*Attendance:* 3

*Location:* Public Library, Marshall, Wis.

**S/V Denis Sullivan Cruise**

*Date:* 6/17/2003

*Attendance:* 30

*Location:* Milwaukee, Wis., and Lake Michigan

**Great Lakes Ecology**

*Date:* 6/26-27/2003

*Attendance:* 33

*Location:* Milwaukee, Wis.

**History of the Chicago San-Ship Dispersal Barrier**

*Date:* 6/26/2003

*Attendance:* 50

*Location:* Romeoville, Ill.

**Economic Impacts of Great Lakes Aquatic Nuisance Species**

*Date:* 6/27/2003

*Attendance:* 42

*Location:* Milwaukee, Wis.

**The Chicago Aquatic Nuisance Species Dispersal Barrier**

*Date:* 7/10/2003

*Attendance:* 45

*Location:* St. Paul, Minn.

**Wisconsin Aquatic Technology Education and Research Services**

*Date:* 7/15/2003

*Attendance:* 60

*Location:* Green Bay, Wis.

**Rapid Response for Asian Carp in the San-Ship Canal**

*Date:* 7/24/2003

*Attendance:* 60

*Location:* Ann Arbor, Mich.

**Great Lakes Exotics and Fisheries**

*Date:* 7/31/2003

*Attendance:* 15

*Location:* Madeline Island, Wis.

**Aquatic Exotic Species**

*Date:* 8/1/2003

*Attendance:* 350

*Location:* West Allis, Wis.

**Watershed-Level Addition of Mercury Stable Isotopes: A Tool for Understanding Processes from Deposition to Bioaccumulation**

*Date:* 8/13/2003

*Attendance:* 150

*Location:* Minneapolis, Minn.

**From the Lake to the Watersheds**

*Date:* 8/14/2003

*Attendance:* 65

*Location:* Green Bay, Wis.

**The Green Bay Remedial Action Plan**

*Date:* 9/2/2003

*Attendance:* 45

*Location:* Green Bay, Wis.

**Lake Superior Coastal Hazards**

*Date:* 9/10/2003

*Attendance:* 50

*Location:* Herbster, Wis.

**Lake Superior Coastal Hazards**

*Date:* 9/11/2003

*Attendance:* 50

*Location:* Washburn, Wis.

**USCG Auxiliary Instructor Training**

*Date:* 9/16/2003

*Attendance:* 17

*Location:* Milwaukee, Wis.

**Chicago Dispersal Barrier and Asian Carp Rapid Response**

*Date:* 9/19/2003

*Attendance:* 100

*Location:* Ann Arbor, Mich.

**Introduction to Ocean Sciences-Chapter 13**

*Date:* 9/22-26/2003

*Attendance:* 180

*Location:* UW-Milwaukee

**Great Lakes Water Levels**

*Date:* 9/25/2003

*Attendance:* 38

*Location:* Glendale, Wis.

**Baitfish HACCP Workshop**

*Date:* 10/1/2003

*Attendance:* 8

*Location:* Wisconsin Dells, Wis.

**USCG Auxiliary Weather Specialty Course 1**

*Date:* 10/2/2003

*Attendance:* 18

*Location:* Racine Wis.

**Great Lakes Fisheries Leadership Institute**

*Date:* 10/4/2003

*Attendance:* 27

*Location:* Manitowoc, Wis.

**The New Living with the Coast Booklet**

*Date:* 10/10/2003

*Attendance:* 25

*Location:* Kingston, Ont.

**Influence of Lake Michigan Currents and Stratification on Nutrient Availability for Cladophora Growth**

*Date:* 10/15/2003

*Attendance:* 60

*Location:* Cleveland, Wis.

**Future Thinking for Wisconsin Water Resource Management**

*Date:* 10/22/2003

*Attendance:* 25

*Location:* Madison, Wis.

**Water Quality and Public Health**

*Date:* 10/22/2003

*Attendance:* 65

*Location:* Madison, Wis.

**Communications Outreach Activities (total: 34 events, est. 10,585 attendees)**

**National Sea Grant Aquaculture Exhibit (co-sponsor)**

*Date:* 2/18-21, 2003  
*Attendance:* ~3,000  
*Location:* World Aquaculture Society 2003 Conference & Exposition, Louisville, Ky.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 11/1/2002  
*Attendance:* 80  
*Location:* Delevan School for the Deaf

**Wisconsin Logging**

*Date:* 2/12/2003  
*Attendance:* 58  
*Location:* Madison

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 2/17/2003  
*Attendance:* 2,000  
*Location:* Milwaukee Public Library

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 3/4/2003  
*Attendance:* 32  
*Location:* Albany High School, Albany, Wis.

**Wisconsin Logging**

*Date:* 3/4/2003  
*Attendance:* 61  
*Location:* Albany High School, Albany, Wis.

**Marine Transportation**

*Date:* 3/11/2003  
*Attendance:* 28  
*Location:* Madison, Wis.

**U.S. Coast Guard on the Great Lakes**

*Date:* 3/13/2003  
*Attendance:* 31  
*Location:* Madison, Wis.

**Wisconsin Logging**

*Date:* 3/25/2003  
*Attendance:* 3  
*Location:* Mt. Olive Lutheran Church, Madison, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 4/8/2003  
*Attendance:* 35  
*Location:* Lodi Historical Society, Lodi, Wis.

**Wisconsin's Great Lakes Shipwrecks**

*Date:* 4/10/2003  
*Attendance:* 250  
*Location:* Notebaert Nature Museum, Chicago

**Wisconsin's Maritime Trails**

*Date:* 4/17/2003  
*Attendance:* 60  
*Location:* Wind Point Lighthouse, Racine, Wis.

**Wisconsin's Maritime Trails**

*Date:* 4/25/2003  
*Attendance:* 11  
*Location:* Michigan Dept. of History and Archives, Lansing, Mich.

**UW Sea Grant Week 2003: Wisconsin Sea Grant Best Management Practices Exhibit**

*Date:* 4/26-30/2003  
*Attendance:* ~300  
*Location:* Galveston, Texas

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/3/2003  
*Attendance:* 3  
*Location:* Public Library, Mt. Horeb, Wis.

**'Fishing for Answers' UW Sea Grant Exhibit on Aquatic Nuisance Species**

*Date:* 5/3/2003  
*Attendance:* ~400 people visited the exhibit; 102 individuals played the "Fishing for Answers" game  
*Location:* Earth Day, Milwaukee Public Museum, Milwaukee, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/5/2003  
*Attendance:* 50  
*Location:* Kramer Library, Plain, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/5/2003

*Attendance:* 400

*Location:* Nekoosa Middle School, Nekoosa, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/6/2003

*Attendance:* 60

*Location:* Adams Cty Public Library, Adams, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/6/2003

*Attendance:* 60

*Location:* Reedsburg Public Library, Reedsburg, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/7/2003

*Attendance:* 30

*Location:* Baraboo Public Library, Baraboo, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/7/2003

*Attendance:* 15

*Location:* Prairie du Sac Public Library, Prairie du Sac, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 5/8/2003

*Attendance:* 40

*Location:* Angie Williams Library, Pardeeville, Wis.

**UW Aquatic Sciences Center Publications Exhibit**

*Date:* 5/31/2003

*Attendance:* 30

*Location:* WLA Government Information Day, Wisconsin Historical Society, Madison, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 7/23/2003

*Attendance:* 44

*Location:* Peninsula State Park, Fish Creek, Wis.

**'Fishing for Answers' UW Sea Grant Exhibit on Aquatic Nuisance Species**

*Date:* 8/1/2003

*Attendance:* ~1,200 people visited the exhibit; 349 children played the "Fishing for Answers" game

*Location:* Wisconsin State Fair, Milwaukee, Wis.

**Timber Rafting**

*Date:* 8/5/2003

*Attendance:* 41

*Location:* Wisconsin Historical Museum, Madison

**Wisconsin's Maritime Trails**

*Date:* 9/5/2003

*Attendance:* 30

*Location:* Rowley's Bay, Wis.

**Wisconsin's Maritime Trails**

*Date:* 9/11/2003

*Attendance:* 60

*Location:* Odanah, Wis.

**Submerged in History: Wisconsin's Maritime History and Underwater Archaeology**

*Date:* 10/2/2003

*Attendance:* 46

*Location:* UW Plato Historical Society, Madison, Wis.

**Deepwater Archaeology and the 2003 USS Monitor Project**

*Date:* 10/9/2003

*Attendance:* 55

*Location:* Madison, Wis.

**Submerged in History**

*Date:* 10/11/2003

*Attendance:* 32

*Location:* Wisconsin Maritime Museum

**Submerged in History**

*Date:* 10/11/2003

*Attendance:* 40

*Location:* Wisconsin Maritime Museum

**Wisconsin's Water Library Display at WLA Public Relations Exhibit**

*Date:* 10/28-31/2003

*Attendance:* 1,500-2,000

*Location:* Wisconsin Library Association Annual Conference, Milwaukee, Wis.

## ***Education Workshops, Lectures & Seminars***

### **Madison JASON Educator Professional Development Conference (Lubner/Reeb)**

*Date:* November 16, 2002

*Attendance:* 19 teachers

*Location:* The Pyle Center, UW-Madison campus

### **Madison JASON Telepresence Global Conference (Lubner/Reeb)**

*Date:* February 4-6, 2003

*Attendance:* 289 students and their teachers

*Location:* BioPharmaceutical Technology Center Institute, Fitchburg, Wis.

### **Lecture**

#### **Discovering the Unknown Landscape: A History of America's Wetlands (Ann Vileisis)**

*Date:* April 28, 2003

*Attendance:* more than 100 people

*Location:* Birge Hall, UW-Madison campus

### **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. A total of 17 advanced undergraduate students (7) and graduate students (10) were enrolled in the course in 2002-03, with more students attending the open lectures than were officially registered for course credit. The theme for the 2003 series was "Biological Markers and Indicators in the Aquatic Environment." The speakers for the series, listed below, addressed topics ranging from the USEPA Great Lakes SOLEC indicator program to molecular markers in aquatic organisms.

**John Berges**, Dept. of Biological Sciences, UW-Milwaukee

*Topic:* "Bio-Markers and Bio-Indicators: An Overview"

*Date:* January 30, 2003

**Paul Bertram**, U.S. Environmental Protection Agency, Great Lakes Program Office, Chicago

*Topic:* "SOLEC: Indicators of Change in the Great Lakes"

*Date:* February 13, 2003

**Gaylord Nelson**, former U.S. Senator, Wilderness Society

*Topic:* "Beyond Earth Day: What Have We Learned, How Have Things Changed?"

*Date:* March 6, 2003

**Vladimir Novotny**, Dept. of Civil and Environmental Engineering, Northeastern University

*Topic:* "Attainability Analysis and the Clean Water Act"

*Date:* March 13, 2003

**Michael McKay**, Dept. of Biological Sciences, Bowling Green State University

*Topic:* "Trace Metals in the Great Lakes, Toxic or Tonic?"

*Dates:* April 3, 2003 (Recent Advances Seminar)  
April 4, 2003 (Biological Sciences Colloquium)

**Jed Goldstone**, Woods Hole Oceanographic Institution

*Topic:* "Cytochrome P450 Enzymes as Indicators of Environmental Stress"

*Date:* April 10, 2003

**Thomas Mumford**, State of Washington, Dept. of Natural Resources

*Topic:* "Assessing and Monitoring the Puget Sound"

*Date:* April 24, 2003

## APPENDIX I

### Outreach Partnerships

November 1, 2002, through October 31, 2003

---

#### *Advisory Services Partnerships (totals: 25 activities, 219 partners)*

##### **Aquatic Nuisance Species Attack Pack**

Berkshire Regional Planning Commission, Pittsfield, Mass.  
Carolina Biological Supply Company  
Indian Trail Academy, Kenosha, Wis.  
Madeline Island Museum  
NASCO  
Rosholt School, Rosholt, Wis.  
U.S. Fish & Wildlife Service  
University of Minnesota Sea Grant College Program

##### **Assistance to Lake Superior Commercial Fishermen**

All Wisconsin commercial state licensed fisherman on Lake Superior  
Bodin Fisheries, Inc.  
Boutin Fisheries, Inc.  
Red Cliff Band of Lake Superior Chippewa  
Wisconsin Department of Natural Resources

##### **Break-Even Analysis for Raising Yellow Perch in Commercial Recirculating Aquaculture Systems**

Alpine Farms  
Bay Port Aquaculture Systems, Inc.  
Glacial Hills, Inc.  
KD Farms  
North Central Regional Aquaculture Center  
Paragon Aquaculture  
Wisconsin Aquaculture Society member  
World Aquaculture Society member

##### **Chicago Sanitary Ship Canal Fish Barrier and Asian Carp Rapid Response Project**

Canadian Consulate  
Chicago Department of Environment  
Ecological Monitoring, Inc.  
Fish Guidance  
Great Lakes Aquatic Nuisance Species Panel  
Great Lakes Commission  
Great Lakes Fishery Commission  
Great Lakes Protection Fund  
Great Lakes Sport Fishing Council  
Illinois Department of Natural Resources  
Illinois Lieutenant Governor's Office  
Illinois Natural History Survey  
Illinois-Indiana Sea Grant  
Illinois Environmental Protection Agency

##### **Illinois River Carriers' Association**

International Joint Commission  
Mackey & Associates  
Metropolitan Water Reclamation District of Greater Chicago  
Midwest Generation  
Minnesota Department of Natural Resources  
Smith-Root Inc.  
U.S. Army Corps of Engineers—Chicago District  
U.S. Army Corps of Engineers—Rock Island District  
U.S. Coast Guard  
University of Michigan  
University of Illinois  
University of Windsor  
U.S. Environmental Protection Agency  
U.S. Fish & Wildlife Service  
U.S. Geological Survey – Biological Survey  
UW-Milwaukee WATER Institute

##### **Coastal Engineering**

Bayfield County Planning and Zoning Department  
Door County recreational and water quality staff  
U.S. Army Corps of Engineers-Detroit District  
UW-Milwaukee  
UW-Oshkosh  
Wisconsin Coastal Management Program  
Wisconsin Department of Natural Resources

##### **Coastal Habitat Restoration**

Appleton Papers, Inc.  
Baird & Associates  
Brown County Land Conservation Department  
Brown County Port  
Bay-Lake Regional Planning Commission – Harbor Council  
Lower Green Bay and Fox River Remedial Action Plan – Biota & Habitat Work Group  
McDonald Lumber and Warehousing Companies  
U.S. Army Corps of Engineers  
U.S. Fish & Wildlife Service  
Walleyes for Tomorrow  
Wisconsin Department of Natural Resources

##### **Community-Based Water Quality Monitoring in Coastal Watersheds and Great Lakes Estuaries Basin Educators**

## 2003 Wisconsin Sea Grant Progress Report

Fox-Wolf Basin Alliance  
Friends of Our Rivers Alliance  
Friends of the Branch River  
Great Lakes Commission  
Green Bay Public Schools System – Einstein Program  
Lake Michigan Lakewide Management Plan Forum  
Lake Michigan Monitoring Coordinating Council  
Land & Water Conservation departments of Brown,  
Door, Kewaunee, Manitowoc and Sheboygan  
counties  
Lower Fox River Basin Partnership  
U.S. Geological Survey  
UW-Green Bay Lower Fox River Monitoring Project  
Water Action Volunteer Program

### **Diving Duck Use on Lower Green Bay**

Wisconsin Department of Natural Resources  
U.S. Fish & Wildlife Service

### **Fisheries & Nonindigenous Species/UW-Manitowoc Field Office**

American Fisheries Society  
Introduced Fishes Section  
2004 Meeting Planning Committee  
Wisconsin Chapter  
Asian Carp Rapid Response Planning Team  
Chicago Sanitary and Ship Canal Dispersal Barrier  
Advisory Panel  
Friends of the Fox River  
Great Lakes Fishery Commission  
Great Lakes Panel on Aquatic Nuisance Species  
Research Coordination Committee  
Hickey Brothers Fisheries  
Michigan Sea Grant  
Minnesota Asian Carp Barrier Committee  
NASCO Science Supply Company  
Susie-Q Fish Company  
U.S. Fish and Wildlife Service  
Wisconsin Aquaculture Industry Advisory Council  
Wisconsin Commercial Fisheries Task Force  
Wisconsin Department of Natural Resources  
Wisconsin Maritime Museum

### **Great Lakes Fisheries Leadership Institute**

Conservation Congress–Great Lakes Study Committee  
Great Lakes Indian Fish & Wildlife Commission  
Great Lakes Sport Fishing Federation  
Illinois Natural History Survey  
Illinois-Indiana Sea Grant  
Lake Michigan sport fisher Gerald Weiesner  
Lake Superior charter captain Dave West  
Michigan Sea Grant  
U.S. Fish & Wildlife Service  
U.S. Geological Survey  
UW Great Lakes WATER Institute  
Wisconsin commercial fisher Charlie Henriksen

Wisconsin Department of Natural Resources

### **Great Lakes Park Packs**

Wisconsin Environmental Education Board  
Wisconsin Department of Natural Resources –  
Fisheries Education  
Friends of the State Parks  
Private consultant

### **Hazard Analysis & Critical Control Point for the Baitfish Industry**

Michigan Sea Grant  
Minnesota Sea Grant  
Ohio Sea Grant  
Pennsylvania Sea Grant  
U.S. Fish & Wildlife Service  
Wisconsin Department of Natural Resources  
Wisconsin Aquaculture Industry Association  
Wisconsin Fish and Bait Dealers Association

### **Implementation of Comprehensive, Dynamic GIS for Coastal Management**

UW-Madison Land Information and Computer  
Graphics Facility  
Wisconsin Coastal Management Program  
Wisconsin Department of Administration – Bureau of  
Intergovernmental Relations  
Wisconsin Department of Administration – Office of  
Land Information Services  
Wisconsin Department of Natural Resources

### **Lake Michigan Fisheries Forum**

U.S. Fish and Wildlife Service  
Wisconsin Department of Natural Resources  
Wisconsin Federation of Great Lakes Sport Fishing  
Clubs  
Wisconsin Commercial Fisheries Board  
Milwaukee WATER Institute  
Lake Michigan Commercial Fishing Board  
Conservation Congress Great Lakes Study Committee  
Green Bay sport fisher Bill Willis  
Algoma charter captain and restaurateur Lee Haasch  
Door County environmental activist Jerry Viste  
Lake Michigan commercial fisher Mike LeClair  
Lake Michigan sport fisher Chuck Weier  
Door County commercial fisher Charlie Henriksen  
Lake Michigan charter captain Michael Collins  
Green Bay sport fisher Hayward Anderson  
Milwaukee sporting goods store owner Roger Stack  
Wisconsin stream angler Darrel Toliver

### **Recreational Water Safety**

Boy Scouts of America  
City of Greenfield Park and Recreation Department  
Douglas County Fish and Game League  
Douglas County Sheriff's Department

Lake Nebagamon (Wis.) Lake Association  
U.S. Coast Guard Auxiliary 9th Western District  
U.S. Coast Guard Auxiliary Division Five  
Wauwatosa Public Schools  
Wauwatosa Recreation Department  
Wisconsin Department of Natural Resources

**Recreational Water Safety Training**

U.S. Coast Guard Auxiliary Division Five  
U.S. Coast Guard Auxiliary 9th Western District,  
Waukesha  
Wisconsin Department of Natural Resources

**Science of the Great Lakes—Elementary to Post-Secondary**

Center for Great Lakes Studies  
CESA 12  
Consortium for Oceanographic Research and Education  
Continuing Education  
Lake Sturgeon Bowl  
Marquette University  
Medford Public Schools  
Schlitz Audubon Center  
St. Norbert College Ocean Voyagers Team  
UW-Milwaukee Center for International Education  
UW-Milwaukee Geosciences Department  
UW-Stevens Point College of Natural Resources  
Wisconsin Department of Natural Resources  
Wisconsin Historical Society  
Wisconsin Lake Schooner Education Association

**State of the Bay Web Site**

Green Bay Metropolitan Sewerage District  
Lower Green Bay and Fox River Remedial Action Plan  
– Science and Technical Advisory Committee  
University of Wisconsin-Green Bay  
Wisconsin Department of Natural Resources

**Technology Transfer Web Page**

Great Lakes Commission – Great Lakes Information  
Network  
Wisconsin Commercial Fisheries Association  
Wisconsin Department of Natural Resources  
Wisconsin sport fishing clubs

**Transferring Sea Grant Aquatic Nuisance Species  
Research and Outreach to the Nation Using a World  
Wide Web Server**

Illinois-Indiana Sea Grant  
Michigan Sea Grant

**Using Mass Media to Inform Anglers about Invasive  
Species**

Kolter Creations, Milwaukee  
Michigan Sea Grant College Program  
Pennsylvania Sea Grant Project  
Winkelman Productions, Inc., Brainerd, Wis.

**WATERS 2002—The Wisconsin Aquaculture  
Technology, Education and Research Service**

St. Croix Fishery  
U.S. Department of Agriculture – North Central  
Regional Aquaculture Center  
U.S. Department of the Interior – Bureau of Indian  
Affairs  
Wisconsin Aquaculture Association  
Wisconsin Aquaculture Industry Advisory Council  
Wisconsin Association of Vocational Agriculture  
Instructors  
Wisconsin Department of Agriculture, Trade &  
Consumer Protection  
Wisconsin Department of Natural Resources  
Wisconsin Department of Public Instruction

**Waters of Wisconsin Program**

1,000 Friends of Wisconsin  
U.S. Department of Agriculture  
UW System faculty  
UW-Extension  
Wisconsin Academy of Sciences, Arts and Letters  
Wisconsin Coastal Management Program  
Wisconsin Department of Natural Resources  
Wisconsin Lakes Association  
Wisconsin Tribal Nations

**Water Quality/UW-Green Bay Field Office**

Bay-Lake Harbor Council – Bay-Lake Regional  
Planning Commission  
International Association of Great Lakes Research  
U.S. Environmental Protection Agency – Lake  
Michigan LaMP Forum  
Wisconsin Department of Natural Resources

**Western Lake Superior Water Trail**

Barker's Island Marina  
City of Superior Parks & Recreation Department  
Inland Sea Society  
Minnesota Lake Superior Water Trail  
U.S. Department of the Interior – National Park  
Service  
Western Lake Superior Kayaks, Inc.  
Wisconsin Department of Natural Resources



**Communications Partnerships (totals: 36 activities, 126 partners)**

**ANS video news release production & distribution**

Kolter Creative, Milwaukee  
Michigan Sea Grant

**Aquatic nuisance species watch cards (*Round Goby, Purple Loosestrife, Ruffe, Spiny & Fishhook Waterflea, Eurasian Watermilfoil*)**

*Wisconsin County Cooperative Extension Offices:*

Adams County Extension  
Brown County Extension, Green Bay  
Jefferson County Extension  
Marinette County Extension  
Pierce County Extension, Ellsworth  
Sheboygan County Extension, Sheboygan Falls  
Minnesota Sea Grant  
Kenosha County Parks, Bristol  
Palmer Johnson Service, Sturgeon Bay  
Vilas Co. Land & Water Conservation, Eagle River  
Wild Rivers Interpretive Center, Florence  
Wisconsin Department of Natural Resources, Wausau  
Wisconsin Chambers of Commerce:

Baraboo Area Chamber of Commerce  
Manitowish Waters Chamber of Commerce  
Manitowoc Area Chamber of Commerce  
Pierce County Partners In Tourism, Ellsworth  
Spooner Area Chamber of Commerce  
Spring Green Chamber of Commerce  
Superior/Douglas County Chamber of Commerce  
Waupaca Area Chamber of Commerce

*Wisconsin Libraries:*

Algoma Public Library  
Antigo Public Library  
Barrett Memorial Library, Williams Bay  
Bayfield Carnegie Library  
Berlin Public Library  
Brillion Public Library  
Brownsville Public Library  
Chippewa Falls Public Library  
Door County Library, Sturgeon Bay  
Dwight Foster Public Library, Fort Atkinson  
Franklin Public Library  
Hustisford Community Library  
Iron River Library  
Kenosha Public Library  
Kilbourn Public Library, Wisconsin Dells  
Koller Memorial Library, Manitowish Waters  
Marshfield Public Library  
Mazomanie Library  
McMillan Memorial Library, Wisconsin Rapids  
New Glarus Public Library  
Oconomowoc Public Library  
Olson Memorial Library, Eagle River  
Reeseville Public Library

Ripon Public Library  
Rusk County Library, Ladysmith  
Spooner Memorial Library  
Stephenson Public Library, Marinette  
Theresa Public Library  
Viola Public Library  
Winneconne Public Library

**“Diving into History” education project**

Wisconsin Historical Society  
Maritime Preservation & Archaeology Program

**“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

**Ecosystems and Habitats Theme Team**

Sea Grant Association  
Rhode Island Sea Grant

**Fish Bioenergetics Model**

Cornell University  
Marine Studies Consortium (Boston)  
Northland College  
Penn State University  
University of Wisconsin-La Crosse  
River Studies Center/Department of Biology  
University of Wisconsin-Madison  
Center for Limnology

**Great Lakes Ecosystems & Habitat Theme Team**

Great Lakes Sea Grant Network

**Great Lakes Commission**

“Earthwatch Radio” program  
Great Lakes Information Network  
GLIN Advisory Board

**Rip Currents brochures, posters & signs**

North Carolina Sea Grant  
*Wisconsin City, County and State Parks & Public Beaches along Lake Michigan:*  
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
- Sea Grant publications depository**  
Water Resources Library
- Sea Grant publications digitization project**  
UW-Madison Libraries  
Water Resources Library
- Silver in the Environment: Transport, Fate and Effects book***  
Society of Environmental Toxicology and Chemistry  
Eastman Kodak Company
- Strategic national communications planning**  
NOAA Sea Grant Office  
Sea Grant Association
- Wisconsin Week campus newsletter***  
University Communications Office
- Technical Compendium to the Proceedings of the 4th International Symposium on Sturgeon***  
Wisconsin Department of Natural Resources
- "UW-Madison on the Road" outreach program**  
Chancellor's Office  
Wisconsin Alumni Association
- UW Sea Grant speakers for service clubs**  
Speakers Bureau
- Great Lakes Fisheries Leadership Institute**  
National Oceanic & Atmospheric Administration  
Great Lakes Environmental Research Laboratory  
Sea Grant Extension Office
- Great Lakes Fishes posters***  
Michigan Sea Grant
- Living on the Coast booklet***  
U.S. Army Corps of Engineers
- Liquid Assets: Wisconsin's Water Wealth***  
University of Wisconsin-Madison  
Aquatic Sciences Center
- Marine Science Careers***  
Maine-New Hampshire Sea Grant
- National Sea Grant Experts Guide***  
Sea Grant National Media Relations Office
- News releases, clippings and media queries**  
Sea Grant National Media Relations Office  
University Communications Office
- "Notes from the Field" underwater archaeology Web site**  
East Carolina University
- On-line version of *Fishes of Wisconsin* book**  
University of Wisconsin Press
- Proceedings of the 4th International Symposium on Sturgeon**  
Blackwell Verlag Publishing (Germany)
- Protect Our Waters* (ANS brochure)**  
Harvest Studio, Stoughton  
Illinois-Indiana Sea Grant  
Michigan Dept. of Environmental Quality  
Office of the Great Lakes  
Michigan Sea Grant  
Minnesota Dept. of Natural Resources  
Minnesota Sea Grant  
Three Lakes Association (Bellaire, Mich.)  
University of Wisconsin Extension  
U.S. Fish & Wildlife Service  
Lower Great Lakes Fishery Resource  
Wisconsin Department of Natural Resources
- Publications submissions & distribution**  
National Sea Grant Library
- Water Wise boating safety book marketing***  
Alaska Sea Grant
- "Wisconsin Fishes Identification" Web site**  
University of Wisconsin-Madison  
Center for Limnology  
Wisconsin Department of Natural Resources
- Wisconsin Maritime Trails project**  
Wisconsin Historical Society  
Maritime Preservation & Archaeology Program
- Wisconsin's Water Library**  
University of Wisconsin-Madison  
Water Resources Library  
Wisconsin Academy of Sciences, Arts & Letters
- Wisconsin Water Policy Inventory project**  
University of Wisconsin-Madison  
Department of Urban & Regional Planning  
UW-Madison Libraries  
Wisconsin Academy of Sciences, Arts & Letters

**2003 Wisconsin Sea Grant Progress Report**

**World Aquaculture Society 2003 conference exhibit**  
Mississippi-Alabama Sea Grant

**"Year of Water" observances**  
University of Wisconsin-Madison  
Wisconsin Academy of Sciences, Arts & Letters

**Zebra Mussel Watch ANS Card**  
Michigan Sea Grant  
Minnesota Dept. of Natural Resources  
Three Lakes Association (Bellaire, Mich.)  
U.S. Coast Guard (Washington, D.C.)

## ***“Earthwatch Radio” Stations***

As of October 2003, “Earthwatch” had **123 outlet subscribers** in the U.S. and Canada, each of whom receives 260 free two-minute science & environmental news programs per year:

### **ALABAMA**

WNSI-AM, Jacksonville

### **ALBERTA**

CFPE-FM Park Radio, Banff

### **ARIZONA**

KXCI-FM, Tucson

### **ARKANSAS**

KABF-FM, Little Rock

KXRJ-FM, Russellville

### **BRITISH COLUMBIA**

Village 900 CKMO Radio, Victoria

### **CALIFORNIA**

KBPK-FM, Fullerton

Armed Forces Radio and Television  
Services, March Air Reserve Base

KCEA-FM, Menlo Park

KOOX-FM, Oakland

KWMR-FM, Point Reyes Station

KQRP-FM, Salida

Environmental News Network, San Rafael

### **COLORADO**

KRZA-FM, Alamosa

KGNU-FM, Boulder

KDUR-FM, Durango

KSUT-FM, Ignacio

### **CONNECTICUT**

WAPJ-FM, Torrington

### **DISTRICT OF COLUMBIA**

Voice of America

### **FLORIDA**

Radio for Peace International, Miami

WKLN-FM, St. Augustine

### **IDAHO**

ICBVI, Boise

### **ILLINOIS**

WESN-FM, Bloomington

WDBX-FM, Carbondale

Illinois Radio Reader, Champaign

WPCD-FM, Champaign

WZRD-FM, Chicago

WEPS-FM, Elgin

WDCB-FM, Glen Ellyn

WGEL-FM, Greenville

West Central Illinois Radio Info Service,  
Macomb

Radio Information Service, Mount Carmel

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

WMPG-FM, Portland

### **MANITOBA**

CJUM-FM, Winnipeg

### **MASSACHUSETTS**

WHAB-FM, Acton

WZBC-FM, Chestnut Hill

WJUL-FM, Lowell

WAVM-FM, Maynard

WMFO-FM, Medford

WNMH-FM, Northfield

WAIC-FM, Springfield

### **MICHIGAN**

WATZ-AM, Alpena

WLEW-AM, Bad Axe

WAUS-FM, Berrien Springs

i.e. America Network (20 stations), Detroit

*2003 Wisconsin Sea Grant Progress Report*

WKAR Radio Talking Book, East Lansing  
WJMS-AM, Ironwood  
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

**NEWFOUNDLAND**

CHMR-FM, St. John's

**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  
WSJU-AM, Jamaica  
WLVL-AM, Lockport  
In Touch Networks, New York  
WPOB-FM, Plainview

**NORTH CAROLINA**

WZRU-FM, Roanoke Rapids

**NORTH DAKOTA**

KABU-FM, St. Michaels

**OHIO**

WCRS Reading Service, Akron  
WZIP-FM, Akron  
CRRS, Cleveland  
WDPS-FM, Dayton  
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

**VERMONT**

WRMC-FM, Middlebury  
WNUB-FM, Northfield

**VIRGINIA**

Virginia Voice, Richmond

**WASHINGTON**

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

**WEST VIRGINIA**

Allegheny Mountain Radio Network,  
Dunmore

**WISCONSIN**

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

## ***Education Partnerships***

In addition to the educational partnerships listed under Advisory Services and Communications, the following partnership activities were coordinated directly through the Education Subprogram:

### **Madison JASON Schools & Partners**

The Madison JASON Project is designed to excite and engage middle school students and their teachers in science and technology, and to provide professional development for their teachers.

**Nineteen teachers** and almost **500 students** from **12 schools plus two home schools** in the communities of Baraboo, Columbus, Madison, Marshall, Stoughton, Sun Prairie, and Windsor participated in this project in the last year.

#### ***Schools***

Barrie Elementary School

Cherokee Heights Middle School

Columbus Middle School

Fox Prairie Elementary School

Home Schooling (McGinley)

Home Schooling (Night oak)

Marshall Middle School

Platteville Middle School

Sacred Hearts School

Sandhill School

Stephens Elementary School

Westside Christian School

Windsor Elementary School

Wingra School

#### ***Community Partners***

Aldo Leopold Nature Center

Bethel Horizons Nature Center

BioPharmaceutical Technology Center Institute

Henry Vilas Zoo

Madison Children's Museum

Madison Metropolitan School District

Promega Corporation

Wis. DNR MacKenzie Environmental Center

#### ***University Partners***

University of Wisconsin-Madison

Arboretum

Geology Museum

Pyle Center

Space Place

University of Wisconsin-Milwaukee

University Center for Continuing Education

#### ***National Partner***

JASON Foundation for Education

## APPENDIX J

### External Advisory Groups

---

#### *UW Sea Grant Institute Advisory Council, 2003*

**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

**DEA LARSEN CONVERSE**

Chief, Wisconsin Coastal Management Program  
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

**DANIEL O. TRAINER**

Professor Emeritus, Wildlife  
Dean Emeritus, College of Natural Resources  
University of Wisconsin-Stevens Point

**LINDA L. WEIMER**

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

***Committee on Advisory Services, 2003***

**CARMEN AGUILAR** (*Scientist*)  
Great Lakes WATER Institute  
Milwaukee, Wis.

**KAREN GREEN** (*Education*)  
Metropolitan High School  
Milwaukee, Wis.

**JOHN KENNEDY** (*Water Quality*)  
Green Bay Metropolitan Sewerage District  
Milwaukee, Wis.

**JOHN LACENSKI** (*Water Safety*)  
Boating Law Administrator  
Wisconsin Department of Natural Resources  
Madison, Wis.

**DAVID LEE** (*Coastal GIS*)  
Bayfield County Land Information Office  
Washburn, Wis.

**TERRY LYCHWICK** (*Fisheries/NIS*)  
Northeast Region (Lower Fox) District Office  
Wisconsin Department of Natural Resources  
Green Bay, 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.



## ***Technical Review Panels, 2003***

### **Preproposal Review Panel Members, Jan. 14-15, 2003**

**Dr. HALLET J. "BUD" HARRIS**, Professor Emeritus, Natural & Applied Sciences, UW-Green Bay

**Mr. CARLOS FETTEROLF**, (former) Sea Grant National Review Panel / Great Lakes Fishery Commission (retired), Ann Arbor, Mich.

**Mr. LEE KERNEN**, member, SGI Advisory Council / WDNR (retired), Madison, Wis.

**Dr. KEVIN MCSWEENEY**, Professor, Soil Science & Environmental Studies, UW-Madison

**Dr. CARL RICHARDS**, Director, University of Minnesota Sea Grant College Program, Duluth, Minn.

### **Full Proposals Review Panel Members, Aug. 19-20, 2003**

**Dr. DORN CARLSON**, Wisconsin Program Officer, NOAA Sea Grant Office, Silver Spring, Md.

**Dr. EDWARD CHESNEY**, Louisiana Universities Marine Consortium, Chauvin, La.

**Dr. WILLIAM DOUCETTE**, Utah Water Research Laboratory, Utah State University, Logan, Utah

**Dr. GARY FAHNENSTIEL**, Lake Michigan Field Station, NOAA Great Lakes Environmental Research Laboratory, Muskegon, Mich.

**Dr. HOWARD KATOR**, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Va.

**Dr. ZHANJIANG "JOHN" LIU**, Dept. of Fisheries and Biotechnology Laboratory, Auburn University, Auburn, Ala.

**Dr. CARL RICHARDS**, Director, University of Minnesota Sea Grant College Program, Duluth, Minn.

## APPENDIX K

### Mid-Cycle Evaluation Response Report

---

#### *Response to 2001 Report of the Program Assessment Team for the Wisconsin Sea Grant College Program*

The Wisconsin Sea Grant College Program (WSGCP) received an overall rating of “excellent” from its first NOAA Sea Grant Program Assessment Team (PAT). The PAT identified four “Best Management Practices” (BMPs) employed by our program: (1) the development and use of a Web-based project management system, interactive Project Reporting Online (iPRO); (2) the development and use of a codified set of funding decision principles for proposal reviewers, technical review panels, UW Sea Grant Advisory Council members and the program management team; (3) the use of a proposal workshop for prospective principal investigators, and (4) regular surveys to track the postgraduation careers of former UW Sea Grant-supported students. These BMPs were all shared with the rest of the national Sea Grant network during Sea Grant Week 2003 in Galveston, Texas.

The PAT also made six suggestions for improving the program. We responded to these suggestions in some detail in 2001 and clarified a number of issues to the satisfaction of our NOAA Sea Grant program officer. Here we present a progress report of our actions in response to each suggestion since then:

- 1. “WSGCP should incorporate a set of general milestones and benchmarks into its implementation and strategic plans.”** We have addressed these concerns in our 2004-06 Implementation Plan. Detailed milestones and benchmarks are presented on pages 9-11 and 38-39.
- 2. “The strategic planning process should be opened to facilitate the involvement and inclusion of a broad representation of the program’s current potential constituent base in issue identification and program priority setting.”** We have now clarified our strategic planning process, which reflects the fact that we have an open and extremely broad representation of our current and potential constituent base. The process reflects numerous individual and group meetings with constituents from the State of Wisconsin, the Great Lakes region and nationally. The draft of our 2002-06 strategic plan was sent to more than 450 individuals for comments and posted on the UW Sea Grant Web site for public input. The plan was then finalized after a thorough review and comment period involving our Advisory Council and outreach staff.
- 3. “The PAT strongly suggests that the WSGCP Director explore alternative means of ensuring adequate scientific input and review of the program that does not involve Sea Grant-funded faculty.”** The National Science Foundation’s approach served as our model for scientific input and review of our program, so we disagree with this recommendation because we think it unwise to exclude Wisconsin’s best scientists from either advising us or participating in our grant competitions. Nonetheless, we have modified our input and review process to remove even the perception of any conflict of interest. Based on priorities articulated by the national Sea Grant Theme Teams and numerous meetings with current and potential constituents, the UW Sea Grant management staff now assembles a first draft of the strategic plan that is distributed statewide for soliciting input from *all* scientists in the state with regard to their suggestions and recommendations for Wisconsin Sea Grant priorities in each theme area. In addition, we utilize external technical review panels for screening preproposals and selecting projects for funding.
- 4. “The WSGCP should take the opportunity to enhance the diversity of all WSGCP advisory committees to facilitate its interactions with diverse clientele throughout the state.”** Since the PAT visit, we have added new

## **2003 Wisconsin Sea Grant Progress Report**

members to our Advisory Council and the Committee on Advisory Services representing both private sector and local government interests from all parts of the coastal regions of our state (see **Appendix J**).

**5. “We suggest that the WSGCP Director implement an external review of the aquaculture program to provide advice on its future directions.”** While Topical Assessment Team (TAT) reviews are not mandatory, we did make a request to NOAA Sea Grant to schedule and conduct a TAT review of our aquaculture research and outreach program in 2003. However, no NOAA Sea Grant funding was available for a TAT at the time, so we are working with our NOAA Sea Grant program officer to reschedule and organize a TAT during 2004.

**6. “The PAT suggests that WSGCP formalize and prioritize its K-12 science education program activities to provide clearer direction and focus.”** In response to this recommendation, we created a Marine & Aquatic Science Literacy thematic area as part of our 2002-06 Strategic Plan. The national goals and Wisconsin priorities in this theme were then included in our 2004-06 request for proposals. We have asked our Advisory Services education specialist, Dr. Jim Lubner, to serve as our Marine & Aquatic Science Literacy theme facilitator and coordinator for all Wisconsin Sea Grant education efforts. Our education program efforts during the past year are highlighted on pages 7-8 of this document, and our plans for the next biennium are articulated on pages 25-28 and 34-35 of our 2004-06 Implementation Plan.