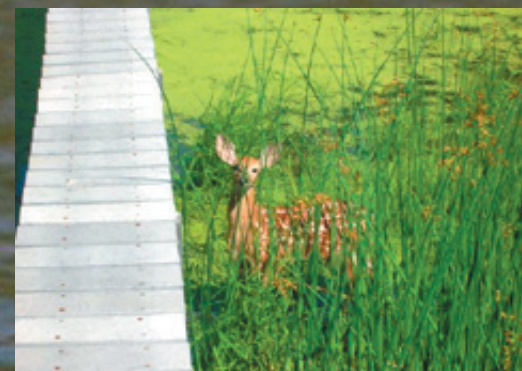




2006 Annual Report for the Wilma H. Schiermeier Olentangy River Wetland Research Park



“Teaching in a ‘living laboratory’ setting has been an emphasis at the Olentangy River Wetland Research Park since its inception.”



All bird and animal photography is courtesy of Jimmie Campbell and Monica Noon.

Executive Summary

This publication is the fifteenth consecutive annual report on teaching, research, service, and development at the Wilma H. Schiermeier Olentangy River Wetland Research Park (ORWRP). It covers progress in calendar year 2006, the thirteenth year of hydrologic operation of the two 2.5-acre experimental wetland “kidneys” on the site, the tenth year of ecological development of our 7-acre mitigation wetland “billabong,” the eighth year of the Sandefur Wetland Pavilion, the sixth year since the restoration of our bottomland hardwood forest, and the fourth year of occupancy of the Heffner Wetland Research and Education Building.

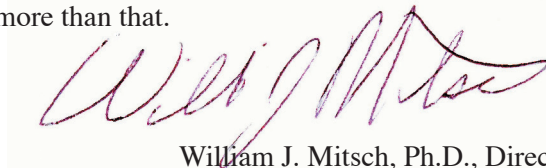
The format for this 2006 annual report is different from the previous 14 annual reports. It became a monumental task to try to capture every data point collected by researchers at the ORWRP and associated wetlands each year. So starting this year, we will summarize overall teaching, research, service, and fund raising as before and will attach all of the papers formally published in that calendar year. In 2006, there are 8 such papers.

Thirty-five courses from 6 OSU Colleges and other Ohio institutions used the ORWRP in 2006 for college courses. One master’s degree and one Ph.D. in wetland science were completed in 2006, raising the total number of theses and dissertations completed at the ORWRP to 50. Short courses on wetland restoration and wetland delineation were taught in 2006 to 36 participants from 14 states. One hundred nine tours or presentations of the ORWRP were given in 2006 to 2700 participants as public outreach. Azzam Alwash presented an indoor version of the Moonlight on the Marsh lecture on May 11,

2006, to an audience of over 200 on restoration of the Mesopotamian Marshlands in Iraq. John W. Day (Louisiana State University) and Doreen Vetter (U.S. Environmental Protection Agency) also presented invited talks in 2006. ORWRP researchers and graduate students presented 24 national and international (Japan, Costa Rica, China, Sweden) papers in 2006, and ORWRP students generated over 270 credit hours of independent study and research.

Grants and contracts totaling \$1.5 million were active at the ORWRP in 2006, including two new projects—one continuing research on hydrologic pulsing effects on wetlands and a statewide network of water quality monitoring through USEPA support, and the other coordinating a 10-faculty research project related to the pending dam removal on the Olentangy River. Donations of over \$200,000 were secured in 2006, including in-kind donation of four acres of land along the Olentangy River that will allow more effective research in the river itself.

The direct economic impact of the ORWRP to The Ohio State University from grants, contracts, development, and short course fees over its 15-year history is over \$8.7 million. Its contribution to wetland management and education of the public and students alike on restoration and protection of wetlands and rivers in Ohio and the country is worth far more than that.



William J. Mitsch, Ph.D., Director
Wilma H. Schiermeier Olentangy River
Wetland Research Park
The Ohio State University



Why Wetlands?



Wetlands are shallow to intermittently flooded ecosystems that are more commonly known by such terms as swamps, bogs, marshes, and sedge meadows. They are now revered and protected as important parts of the natural landscape because of their functions in cleaning and retaining water naturally, preventing floods, and providing a habitat and food source for a wide variety of plant and animal species. Yet it is estimated that more than half of the original wetlands in the lower 48 states have been lost to drainage projects and human development projects. Ohio has lost about 90 percent of its original wetlands.



When we lose wetlands, we lose their ability to provide clean water, prevent floods, and enhance biological diversity. Many organizations are calling for creation and restoration of wetlands to clean up our streams, rivers, and lakes and to recover lost habitat. Five million acres of wetlands in the Mississippi River Basin have been suggested as being necessary to help prevent the dead zone, or hypoxia, in the Gulf of Mexico (Mitsch et al., 2001; Mitsch and Day, 2006). The U.S. Army Corps of Engineers oversees a regulatory program that results in tens of thousands of acres of wetlands being restored and created each year to replace wetlands that are lost to development. Furthermore, the largest wetland restorations in the world, at costs that will exceed \$20 billion, are underway in the Florida Everglades, Louisiana Delta, and Mesopotamian Marshlands.



A National Academy of Sciences panel (NRC, 2001) concluded that much more research is needed before we can be assured that those wetlands that are constructed to replace wetlands destroyed for development can be successful. Even though a recent report by the U.S. Fish & Wildlife Service (Dahl, 2006) suggested that there was a net gain of wetlands in the United States from 1998 to 2004, the definition of a wetland remains controversial, as does the question of whether we can create and restore wetlands.



The Vision

The Wilma H. Schiermeier Olentangy River Wetland Research Park is a university campus facility in Ohio, USA, designed to provide teaching, research, and service related to wetland and river science and ecological engineering. At the research park, we seek to understand: 1) how wetlands function, and 2) if and how we can create and restore wetlands. It is a long-term, large-scale wetland research and teaching laboratory. There is no other facility of its kind on any other university campus in the world, so it also has as its mission the dissemination of wetland science and ecological engineering around the world.

The wetland research park is also a nature park, providing habitat for a diversity of plants and animals for the residents of central Ohio to observe and enjoy. It is indeed possible to have a first-rate “living laboratory” that is also appreciated for its ecology and aesthetics in an urban region. A cooperation between the university and its urban neighbors is symbolic and real at the Olentangy River Wetlands.





History of OSU's Wetlands

The Olentangy River Wetland Research Park is located on a 30-acre site owned by the Ohio State University, immediately north of Dodridge Road and adjacent to the Columbus campus. The site is being developed in several phases:

Phase 1 (1992-1994)—Construction of two experimental wetland basins and their water delivery system;

Phase 2 (1994-1999)—Development of a research and teaching infrastructure at the site, including boardwalks, experimental mesocosms, a plant-material greenhouse, additional wetlands, instrumentation for long-term research, and a visitor pavilion; and

Phase 3 (2000-2003)—Development and construction of the Heffner Wetland Research and Education Building on the site.

Phase 4 (2003-present)—International collaborations, river restoration, and urban ecotourism.

Phase 1 of site development, the construction of two 2.5-acre deepwater marshes and a river water delivery system, was completed in 1994. Pumps were installed on the floodplain to bring water from the Olentangy River to the wetlands and pumping officially began on March 4, 1994. River water has been and continues to be pumped continuously, day and night, into the two wetlands. It then flows by gravity back to the Olentangy River through a swale and constructed stream system. In May 1994, one wetland basin was planted with marsh vegetation typical of wetlands in the Midwest; the other remained as an unplanted control.

Phase 2, establishing the infrastructure for research and education of the site, began in 1994 with the construction of boardwalks in the two experimental wetlands (winters of 1995 and 1996) and ended with the dedication of the Sandefur Wetland Pavilion in 1999. That phase also included the creation of the 7-acre naturally flooded oxbow (called locally our billabong) and construction of the mesocosm compound for medium-scale research on wetland function.

Phase 3, the construction of the \$2.8 million Heffner Wetland Research and Education Building at the ORWRP, began in 2000 with the receipt of \$1.18 million in two Hayes Investment Fund grants from the Ohio Board of Regents. The grants were the result of an effort of a 5-university consortium of Ohio institutions—Ohio State, Wright State, Shawnee State, Youngstown State, and Kenyon College. Additional support for the building was obtained through donations, pledges, and a loan from OARDC. The decision to go forward with building construction was made on December 13, 2001. Construction began in spring 2002 and staff and students moved into the building on March 6, 2003. As the building was created, three additional wetlands were created in the vicinity of the building, including a stormwater wetland that receives runoff from the roof of the Heffner building.

Our current Phase 4 involves establishing regional and international collaborations such as the Global Wetland Consortium (GWC), as well as the construction of a city bike path shelter, experimental streams, and research access to the Olentangy River itself. This phase also involves fund raising to establish long-term endowments that will ensure that the research and teaching site continues to be part of the Ohio State University for a very long time.



Teaching Formal University Courses

Teaching in a “living laboratory” setting has been an emphasis at the Olentangy River Wetland Research Park since its inception. Formal OSU courses include wetland ecology, water quality, ecological engineering, anthropology, architecture, general chemistry, wildlife management, animal ecology, groundwater hydrology, geography, ornithology, geography, and forestry. Thirty-five courses involving 656 students used the site in 2006. Classes were from 6 OSU Colleges (Food, Agricultural, and Environmental Sciences; Biology; Engineering; Math and Physical Sciences; Veterinary Medicine; Social and Behavioral Sciences). Classes from Columbus State also used the wetlands for field trips in 2006. Over 270 credit hours of 999 graduate research was completed in 2006 at the ORWRP.

A total of 50 students have completed dissertations, master’s theses, or honors undergraduate theses with partial or full use of the Olentangy River Wetland Research Park from 1992 through 2006. One master’s student and one Ph.D. student completed their degrees in 2006. While most students writing theses are from Ohio State departments, there have been five students from European universities (two from the UK, three from Denmark), one student from a Chinese university, and one student from a Korean university who have spent time and collected research data at the ORWRP.

Wetland Professional Short Courses

Two short courses were taught in 2006 at the ORWRP— *Wetland Delineation* and *Wetland Creation and Restoration*. The courses are taught in the conference room in the Heffner Wetland Building and attracted 36 participants from 14 states. Participants were primarily from environmental consulting firms and state and Federal agencies and they indicated high satisfaction with the content and location of the courses.



Publications/Scholarly Presentations

Publications from the ORWRP in 2006 included one book, six peer-reviewed papers, two editorials, and two theses/dissertations. Papers were published in *Frontiers in Ecology and the Environment*, *Wetlands*, and *Ecological Engineering*. In total, ORWRP staff and graduate students presented 24 papers in 2006 in the USA, Japan, Costa Rica, China, and Sweden.

The editorial office of *Ecological Engineering*, an international journal dedicated to the creation and restoration of ecosystems, continued to be housed in the Heffner Wetland Building at the ORWRP. The journal received 237 manuscripts from 44 countries in 2006.



Research

Over \$1.5 million in contracts and grants were active at the ORWRP in 2006. The six funded projects included five at the ORWRP: a bottomland hardwood forest restoration supported by Ohio Department of Transportation, two wetland pulsing experiment in the experimental wetlands and billabong supported by the U.S. Department of Agriculture and the U.S. Environmental Protection Agency, funding for renewable solar energy on a bikepath shelter on the site sponsored by the Ohio Department of Development, and restoration of the Olentangy River itself. The Olentangy River restoration project, supported by the City of Columbus, is a multi-researcher project that will examine the river before and after a dam is removed from the river adjacent to Ohio State University's campus.

Wetland and river projects that we continue to be involved with include rehabilitation of the Cuyahoga River and Darby Creek in Ohio, restoration of the Mesopotamian Marshlands of Iraq and Delaware Bay of New Jersey, improvement of water quality with wetlands at EARTH University in Costa Rica, and comparison of methane emissions and carbon sequestration of tropical and temperate wetlands.

We also continue to collaborate on the restoration of the Louisiana Delta, the Florida Everglades, and the Mississippi River Basin and published in 2006, with scientists from University of Vermont and Louisiana State University, a description of what needs to be done in New Orleans and coastal Louisiana to prevent the destruction seen from Hurricane Katrina from ever happening again (Costanza et al., 2006).

Service Public Outreach

The ORWRP was involved in several significant public activities in 2006. On January 19, 2006, John W. Day, Jr., Distinguished Professor Emeritus, School of Coast and Environment, Louisiana State University, presented “The Mississippi River Delta and New Orleans: Post-Katrina humanity and ecology in a time of scarcity” as a special seminar in the Ruth Smart Lobby of the Heffner Wetland Building. The talk was in reference to the aftermath of Hurricane Katrina in New Orleans and was attended by over 100 students, researchers, and members of the public.

The 2006 ORWRP “Moonlight on the Marsh” distinguished lecture, sponsored by the Jerry and Lenora Pausch Foundation, was held in Kottman Hall on campus on May 11, 2006. Azzam Alwash, Director, Eden Again, and coordinator of the restoration of the Meso-



potamian Marshlands in Iraq, presented “The Marshes of Iraq: Past, present, and future” to an audience of 250 students. Finally, on October 6, 2006, Doreen Vetter, Special Assistant for Water, U.S. Environmental Protection Agency, Washington, DC, presented an invited seminar in the Ruth Smart Lobby entitled “The USEPA National Wetlands Office—Its role in wetland policy and protection.” Doreen is an alum of the OSU wetlands program, having received her M.S. in wetland ecology in the School of Natural Resources in 1989. She also met with students to discuss careers in the Federal government.

Formal tours and presentations of the ORWRP continued to be among our popular public service activities in 2006. The ORWRP conducted 109 tours and/or public presentations on the Olentangy River Wetland Research Park in 2006 to almost 2,700 participants. Groups receiving tours ranged from Take Your Child to Work Day students to a group from Cleveland Metroparks. We also hosted the EEOB department at The Ohio State University in their recruitment of graduate students and the College of Engineering in their recruitment and retention of women engineering students. Since 1994, the ORWRP has led over 1225 wetland tours and presentations to almost 24,000 individuals.

An Earth Day Celebration and Volunteer Day was held at the ORWRP on Saturday April 22, 2006. Over 150 students and volunteers came to the event to first see the unveiling of the color drawing of the wetland research park. Then students and volunteers helped with construction of a bioswale, removing invasive shrubs from the bottomland forest, planting trees, and restoring experimental mesocosms. Loosely Strung, a bluegrass band, and 3-Wheel Drive, a rock band, provided entertainment.

Distinguished scientists visited the wetlands in 2006, including: John W. Day (Louisiana State University); Larry Li (University of California Riverside); Jeanne VanBriesen (Carnegie-Mellon University); Azzam Alwash (Eden Again, Iraq); John Melak (University of California Santa Barbara); Hongwei Zhang (Wayne State University); Xia Qing (Tianjin University, China); Doreen Vetter (USEPA, Washington DC); Olarur Arnalds (Agricultural University of Iceland); and John Peterson (Oberlin College). The ORWRP was also the feature reception site for 100 scientists who were visiting Ohio State University for a Mathematical Biosciences Institute workshop on “Uncertainty in Ecological Analysis” on April 4, 2006.



Wetland Research Awards

An endowment to the Olentangy River Wetland Research Park from the Sipp family in the name of Rhonda and Paul Sipp was established at Ohio State University to provide annual awards for students doing research on wetlands and rivers. Gwyn Elaine Boehringer, a doctoral student in the Environmental Sciences Program at Wright State University, won the 2006 Rhonda and Paul Sipp Wetland Award of \$1,000 for her proposed research on trace pollutant bio-degradation in constructed wetlands. She is studying microbial genes involved in the dehalogenation of PCE and its degradation products in wetlands constructed for water quality treatment. Gwyn’s advisor is Dr. Stephanie Smith. Anne Elizabeth Altor, a doctoral student in the Environmental Science Graduate Program at The Ohio State University Olentangy River Wetland Research Park, won the second prize of \$500 to carry out additional carbon research in the ORWRP experimental wetlands during extreme drawdowns and reflooding.



Publicity

The Olentangy River Wetland Research Park and its research and teaching were publicized eight times during 2006 in newspaper articles, press releases, and other publications. Stories appeared in *The Columbus Dispatch*, *Notre Dame Magazine*, and *The Scientist*. The ORWRP also receives attention every home football game as students assist in parking cars at the ORWRP.



Development

The Olentangy River Wetland Research Park has been supported in its 16 years of development (1991-2006) by thousands of private donations to the University. Through December 2006, \$4.3 million in cash and in-kind support has been raised for the wetland project, almost all from corporations, foundations, and individuals. In 2006, there were 387 donations, the most ever, totaling \$212,000. In 2005, there were 377 donations totaling \$208,000. Over the years, over 15% of the donations (equivalent to almost \$700,000) received at the ORWRP have been as in-kind contributions. In-kind support obtained over the years includes donation of eight acres of land on the southeastern corner of the ORWRP adjacent to river, three vehicles including two with four-wheel drive, construction of the billabong wetland, groundwork and gravel for the new building, a paved driveway, and civil engineering for building construction.

Future Directions

A bikepath shelter on the city bikepath that cuts through the ORWRP was constructed in late 2006 and will have solar collectors added to its roof for supplying power to displays related to the wetlands.

Beginning with 2006, emphasis at the ORWRP began to focus in three directions:

- use of the site facilities for continued wetland experiments and river restoration;
- integration of wetland and river science with collaborating Ohio universities; and
- increased collaboration on wetland conservation and restoration throughout the world.

ORWRP's Impact

Through 2006, the economic and academic impacts of the Olentangy River Wetland Research Park (ORWRP) on Ohio State University and the world of wetland science have been significant. In the course of its development and operation, the ORWRP has resulted in the following economic advantages to the University:

Wetland Short Course Fees	\$260,000
Extramural Grants and Contracts	\$4,150,000
Donations	\$4,300,000
Total impact	<hr/> \$8,710,000

Over the period 1992–2006, the project has been responsible for the following academic achievements that cannot always be assigned economic value:

- completion of 50 graduate and undergraduate student theses and Ph.D. dissertations. Most are at OSU but the total includes five from European institutions;
- publication of 134 papers listed in the ORWRP reprint series;
- completion of 15 comprehensive annual reports summarizing research, teaching, and service accomplished at the ORWRP;
- leadership of over 1200 formal wetland tours and presentations for the public to an estimated 24,000 individuals, including K–12 students, university students, garden clubs, campus visitors, and Federal, state, and local public officials;
- provision of a convenient set of campus ecosystems in support of 250 Ohio State University classes in eight university colleges and several courses from other Ohio institutions;
- provision of a controlled research site for more than 120 students doing independent research for theses and dissertations. The ORWRP has supported the research and teaching programs of more than 40 OSU professors and senior researchers from several OSU Colleges and scientists from other Ohio institutions;
- education of 347 agency personnel and environmental consultants in 23 wetland short courses taught since 1996; and
- development of the fields of wetland science and ecological engineering to the point where they have led to significant improvement in Ohio's and the world's environment.

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Donation Support for the Olentangy River Wetland Research Park through 2006

Year	Number of donations	Total amount of donations	In-kind donations*	Endowment donations
2006	387	\$211,559	\$97,909	\$5,722
2005	377	\$207,972	\$4,000	\$2,381
2004	332	\$1,689,049	\$0	\$1,518,536
2003	289	\$361,569	\$71,403	\$50,956
2002	264	\$365,056	\$80,510	\$ 445
2001	319	\$248,416	\$75,000	\$1,140
2000	250	\$237,077	\$31,300	\$97,620
1999	165	\$115,626	\$3,705	\$94,000
1998	149	\$98,839	\$23,624	\$4,415
1997	168	\$78,228	\$13,503	\$300
1996	146	\$221,889	\$18,778	\$4,000
1995	108	\$97,184	\$36,516	\$11,000
1994	86	\$62,686	\$48,744	
1993	46	\$259,206	\$21,215	
1992	7	\$59,347	\$6,327	
TOTAL	3094	\$4,313,701	\$694,889	\$1,790,540

* In-kind includes construction of 7-acre billabong in 1996 (\$170,000), donation of bottomland forest in 2001 and 2006 (\$170,000), earthwork and gravel for building construction (2002-03), paved driveway (2003), civil engineering for building (2003), and vehicles (1999, 2000, 2006)

Funded research projects active at the Olentangy River Wetland Research Park in 2006

RF #	Short title	Funding Source	College	Amount	End date
746414	Research in the humid tropics	U.S. Dept of Energy	FAES	\$482,000	5/31/06
746935	Renewable energy project at the ORWRP	Ohio Dept of Development	FAES	\$24,036	12/31/07
745333	Importance of hydrologic pulsing	USDA	FAES/MAPS	\$272,000	8/31/06
738587	Wetland monitoring and management	Ohio Dept of Transportation	FAES	\$74,967	5/4/06
60009065	Olentangy River wetlands research	U.S. EPA	FAES	\$480,300	10/08
60005536	Lower Olentangy River restoration	City of Columbus	FAES/ENG	\$166,062	7/09



Press coverage of Olentangy River Wetland Research Park in 2006

Date	Title	Publications
April 21, 2006	Earth Day volunteers ready for outdoor fun	The Lantern
April 21, 2006	Earth Day volunteers ready for outdoor fun	onCampus
May 4, 2006	Pitching in for Earth Day	onCampus
May 7, 2006	OSU given grant to study dead zones in Gulf of Mexico	Columbus Dispatch
May 16, 2006	Thanks to the University Community for Your Continued Support of Take A Daughter To Work Day!!	onCampus
Spring 2006	Waist-deep in Ecological integrity	Notre Dame Magazine
Spring 2006	Olentangy River Water Quality	Environmental MONITOR
May 21, 2006	What Price Ecological Restoration?	The Scientist

2006 Publications at the Olentangy River Wetlands

Books

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- Mitsch, W.J., L. Zhang, M.E. Hernandez, A.E. Altor, A.M. Nahlik, C.L. Tuttle, D.F. Fink, and C. J. Anderson. 2006. Importance of hydrologic pulsing on the water quality function of wetlands in Midwestern USA. Proceedings, American Water Resources Association Annual Meeting, Baltimore, MD.
- Nahlik, A. and W.J. Mitsch. 2006. Tropical treatment wetlands dominated by free-floating macrophytes for water quality improvement in Costa Rica. *Ecological Engineering* 28:246-257.

Theses and Dissertations

- Gamble, Debra. 2006. Tree growth and hydrologic patterns in forested mitigation wetlands” Master’s Thesis, School of Environment and Natural Resources, The Ohio State University.
- Hernandez, Maria E. 2006. The effect of hydrologic pulses on nitrogen biogeochemistry in created riparian wetlands in Midwestern USA” Ph.D. Dissertation, Environmental Science Graduate Program, The Ohio State University.

Reports

- Boesch, D.F., L. Shabman, L.G. Antle, J.W. Day, Jr., R.G. Dean, G.E. Galloway, C.G. Groat, S.B. Laska, R.A. Luettich, Jr., W.J. Mitsch, N.N. Rabalais, D.R. Reed, C.A. Simenstad, B.J. Streever, R. Bruce Taylor, R.R. Twilley, C.C. Watson, J.T. Wells, and D.F. Whigham. 2006. *A New Framework for Planning the Future of Coastal Louisiana after the Hurricanes of 2005*. University of Maryland Center for Environmental Science, Cambridge, MD, 48 pp.

Theses and dissertations completed at the Olentangy River Wetland Research Park through 2006

Ph.D. dissertations (12)

- * Maria E. Hernandez “The effect of hydrologic pulses on nitrogen biogeochemistry in created riparian wetlands in Midwestern USA” Environmental Science Graduate Program (2006)
- * Christopher J. Anderson “The influence of hydrology and time on productivity and soil development of created and restored wetlands” School of Environment and Natural Resources (2005)
- Deni Porej “Faunal aspects of wetland creation and restoration” Evolution, Ecology, and Organismal Biology (2004)
- Changwoo Ahn “Ecological engineering of wetlands with a recycled coal combustion byproduct” Environmental Science Graduate Program (2001)
- John J. Gutrich “Ecological and economic analysis of natural capital: Assessing and modeling the substitutability of mitigation wetlands for natural sites” Department of Agricultural, Environmental, and Developmental Economics (2000)
- Michael A. Liptak “Water column productivity, calcite precipitation, and phosphorus dynamics in freshwater marshes” Environmental Science Graduate Program (2000)
- Douglas J. Spieles “Nutrient retention and macroinvertebrate community structure in constructed wetlands receiving wastewater and river water” Environmental Science Graduate Program (1998)
- Randall J.F. Bruins “Modeling of flooding response and ecological engineering in an agricultural wetland region of Central China” Environmental Science Graduate Program (1997)
- Neal E. Flanagan “Comparing ecosystem structure and function of constructed and naturally occurring wetlands: Empirical field indicators and theoretical indices” Environmental Science Graduate Program (1997)
- Robert W. Nairn “Biogeochemistry of newly created riparian wetlands: evaluation of water quality changes and soil development” Environmental Science Graduate Program (1996)
- Naiming Wang “Modelling phosphorus retention in freshwater wetlands” Environmental Science Program (1996)
- Paul E. Weihe “Colonizing and introduced vegetation in created riparian wetlands: Establishment during the first two growing seasons” Environmental Science Graduate Program (1996)

Master’s theses (23)

- Debra Gamble “Tree growth and hydrologic patterns in forested mitigation wetlands” School of Environment and Natural Resources (2006)
- Cassandra L. Tuttle “The effects of hydrologic pulsing on aquatic metabolism in created riparian wetlands” Environmental Science Graduate Program (2005)
- Amanda M. Nahlik “The effects of river pulsing on sedimentation in two created riparian wetlands” Environmental Science Graduate Program (2005)
- Rebecca Swab “Effectiveness of *Lonicera maackii* removal from a bottomland hardwood forest in central Ohio” School of Environment and Natural Resources (2005)
- Tracy J. Tenwalde “Averting and treatment costs regarding nitrogen risk in public water supplies in Columbus, Ohio: Implications for wetland nitrogen sequestration” Department of Agricultural, Environmental, and Development Economics (2005)
- Eric Lohan “A methodology to ecologically engineer watersheds for nitrogen nonpoint source pollution control” Environmental Science Graduate Program (2004)
- Mark Dilly “Atrazine fate in a created wetland” Environmental Science Graduate Program (2003)
- Sarena M. Selbo “Hybridization between native and introduced populations of cattail and big bluestem: Conservation implications” Evolution, Ecology, and Organismal Biology (2002)
- Cheri Higgins “Ecosystem engineering by muskrats (*Ondatra zibethicus*) in created freshwater marshes” Environmental Science Graduate Program (2002)
- Amie M. Gifford “The effect of macrophyte planting on amphibian and fish community use of two created wetland ecosystems in central Ohio” Environmental Science Graduate Program (2002)
- Daniel F. Fink “Efficacy of a newly created wetland at reducing nutrient loads from agricultural runoff” Environmental Science Graduate Program (2001)
- Matthew Cochran “Effect of hydrology on bottomland hardwood forest productivity in central Ohio (USA)” Natural Resources (2001)
- Sarah K. Harter “Patterns of short-term sedimentation in a freshwater created marsh” Natural Resources (1999)
- Sharon A. Johnson “Effects of hydrology and plant introduction on first-year macrophyte growth in a newly created wetland” Natural Resources (1998)
- Lisa J. Svengsouk “First-year response of *Typha latifolia* L. and *Schoenoplectus tabernaemontani* (K.C. Gmel.) Palla to nitrogen and phosphorus additions in experimental mesocosms” Environmental Science Graduate Program (1998)

- Kathleen D. Metzger “Self-design of a fish community in a created riparian freshwater marsh: A simulation model” Environmental Science Graduate Program (1997)
- John S. Koreny “Hydrology of a constructed riparian wetland system: Characterization and predictive modeling” Environmental Science Graduate Program (1996)
- Uygur Özesmi “A spatial habitat model for the marsh-breeding red-wing blackbird (*Agelaius phoeniceus*) in coastal Lake Erie wetlands” Environmental Science Graduate Program (1996)
- Doreen M. Dudek “Tree growth responses to streamflow in a bottomland forest in central Ohio” Natural Resources (1995)
- Steven F. Niswander “Functional analysis of a created in-stream mitigation wetland: hydrology, phosphorus retention, and tree growth” Natural Resources (1994)
- Renée F. Wilson “Progress and success of five mitigation wetlands in Ohio” Natural Resources (1995)
- Karen M. Wise “Evaluation of acid mine drainage control by a constructed wetland in southeastern Ohio” Natural Resources (1994)
- Frank D. Voss “Groundwater investigation of Ohio State University wetland site” Geodetic Science (1993)

Undergraduate honors theses (10)

- Katherine E. Kleber “Fish population and movement within planted and naturally colonizing experimental wetlands, autumn 2000” Natural Resources (2000)
- Erika A. Filippi “The role of soil organic matter on denitrification potential in newly created wetlands” Natural Resources (1998)
- Bonnie F. Elfritz “A comparison of natural wetlands with a constructed wetland using the Floristic Quality Assessment Index” Natural Resources (1998)
- Kimberly K. Schamp “Groundwater patterns before and after wetland construction at the Olentangy River Wetland Research Park” Natural Resources (1997)
- Nicole L. Vorwerk “Comparison of three years of pH values between planted and unplanted wetlands at the Olentangy River Wetland Research Park” Natural Resources (1997)
- Rainie D. Gardner “Fish recruitment in the Olentangy River constructed wetlands” Natural Resources (1997)
- Tonya Cheek “Effect of fish on wetland water quality” Natural Resources (1996)
- Andrew W. Wehr “Early water quality of created wetlands at the Olentangy River Wetland Research Park” Natural Resources (1995)
- Michael E. Berkal “Hydrology and water chemistry of the Olentangy River in Worthington (Franklin County), Ohio, and their potential effects on a future constructed wetlands facility downstream in Columbus, Ohio” Natural Resources (1992)
- Douglas G. Stuart “Intensive water quality sampling in two constructed riparian wetlands” Natural Resources (1992)

Theses/research at other universities (6)

- Chuan Li “Research in forests at Xiashu urban forest in Jiangsu province, China” College of Forest Resources and Environment, Nanjing Forestry University, China (in progress)
- Rikki Bronnum “The effects of alachlor on denitrifying bacteria in mesocosms and created wetlands in central Ohio, USA” Master’s Thesis, Environmental Chemistry, University of Copenhagen, Denmark (2001)
- Hojeong Kang “The significance of enzyme activities in wetland biogeochemistry” University of Wales, UK (1999)
- Pernille Mortensen and Pernille Lanzky “Water quality improvement in a constructed wetland” Thesis, Royal Danish School of Pharmacy, Copenhagen, Denmark (1996)
- Rebecca Smith “Nitrogen transfer in groundwater in the riparian zone of the Olentangy River, Columbus, Ohio” Thesis, Cambridge University, Cambridge, England, UK (1996)



Formal university course use of Olentangy River Wetland Research Park in 2006

Quarter	Course	Enrollment	Instructor	College
Winter 2006	CHEM 221 Analytical Chemistry	40	Susan Olesik	MAPS
	CE/FABE/ENR 618 Ecological Engineering Science	48	Jay Martin/Virginie Bouchard	ENG/FAES
	ENR 797B Wetland and River Restoration	12	William Mitsch	FAES
	ENR 693 Independent Research-ORW projects	3	William Mitsch	FAES
	ENT 102 Insect Biology II	10	Dave Horn	BIOL
	ENR 999 Graduate Student Research	6	William Mitsch	FAES
	VMC 700.08 Preventive Medicine	15	Cliff Monahan	VETSCI
	Biology 135 Columbus State	20	Mort Javadi	Columbus State
	ENR 760 Ecosystem Modeling	6	William Mitsch/Li Zhang	FAES
ENR 893 Independent Study-Graduate	12	William Mitsch	FAES	
Spring 2006	EEOB 322 Introduction to Ornithology	86	John Condit	BIOL
	VMC 700.08 Preventive Medicine	26	Cliff Monahan	VETSCI
	LARCH 323 Landscape Construction: Water in the Landscape	8	Brooks Breeden	ENG
	LARCH 622 Landscape Design Implementation	38	Brooks Breeden	ENG
	GEOG 210 Physical Geography and Environmental Issues	60	Kendra McSweeney	MAPS
	ENR 999 Graduate Student Research	3	William Mitsch	FAES
	ES 999 Environmental Science Research	3	William Mitsch	BIOL
	GEOG H410 Global Climate and Environmental Change	22	Ellen Mosely-Thompson	SBS
	ENR 510 Natural History of Ohio	20	David Johnson	FAES
	CHEM 221 Analytical Chemistry	8	Susan Olesik	MAPS
	ENR 893 Independent Study-Graduate	4	William Mitsch	FAES
	FABE 652 Ecosystems for Waste Treatment	12	Jay Martin	FAES
Summer 2006	ENR 999 Graduate Student Research	6	William Mitsch	FAES
	EEOB 210 Native Flora	15	Liz Harris	BIOL
	VMC 700.08 Preventive Medicine	12	Cliff Monahan	VETSCI
	Biology 135 Columbus State	20	Mort Javadi	Columbus State
Autumn 2006	VMC 700.08 Preventive Medicine	12	Cliff Monahan	VETSCI
	GEOG 210 Physical Geography and Environmental Issues	45	Bryan Mark	SBS
	GEOG 490 Introduction to Biogeography	3		SBS
	NR 725 Wetland Ecology and Management	40	William Mitsch	FAES
	EEOB 661 Conservation Biology	21	John D. Harder	BIOL
	ENR 999 Graduate Student Research	9	William Mitsch	FAES
	ENR 893 Independent Study-Graduate	9	William Mitsch	FAES
	FABE 999 Graduate Student Research	1	Jay Martin	FAES
	EEOB 999 Graduate Student Research	1	John Harder	BIOL
	Total Number of Students	656		
Total Number of Courses	35			

OSU given grant to study dead zones in Gulf of Mexico

Rep. Deborah Pryce said last week that she has secured \$500,000 for an Ohio State University research initiative investigating the problem of so-called dead zones in the Gulf of Mexico.

The Upper Arlington Republican said Friday that the money has been included in the 2007 Interior Department spending bill approved last week by the House Appropriation Committee's interior subcommittee, which virtually assures the OSU funding of being included in the final House bill. The same amount for the same research was included in the 2006 spending bill approved by Congress.

The money for the coming year would again go to OSU's Olentangy River Wetland Research Park, which is working to

assess the problem of hypoxia, an area of oxygen-depleted water that kills off fish and other marine life, in the Gulf of Mexico. Dead zones also afflict other bodies of water.

OSU researchers will be working on "solving one of our hemisphere's most pressing environmental problems," Pryce said in a statement.

Compiled by Jack Torry and Jonathan Riskind of the Dispatch Washington bureau.

jtorry@dispatch.com
jriskind@dispatch.com

Earth Day volunteers ready for outdoor fun

Jordan Galloway

Posted: 4/21/06

Nature still exists.

Though easily forgotten in the swell of High Street traffic and the mazes of concrete walkways, the sound of hundreds of frogs in the pond outside the Schiermeier Olentangy River Wetland Research Park serves as a reminder.

"It's a little piece of ecological heaven on the Columbus campus," said William Mitsch, director of the research park.

With Earth Day tomorrow, staff at the wetlands continue preparing for volunteers slated to descend upon the park Saturday morning in the hopes of bettering the environment.

Earth Day began on April 22, 1970. This year marks the 36th annual day of environmental awareness.

"I'm a true product of Earth Day," Mitsch said. "I got excited about saving the environment years ago at an Earth Day event."

Volunteering starts at 8:30 a.m. and will continue until noon. The park is located at 352 Dodridge St.

The majority of work at the wetlands centers on planting new trees and plants, cleaning up the grounds and performing maintenance work in the forest.

"There's 13 acres of forest along our site, and we're going to be taking out an exotic plant called honeysuckle," Mitsch said. "We actually grind it up and then use the wood chips for some of the trails."



Spring 2006

Environmental MONITOR

Olentangy River Water Quality

Located within the quickly developing area of northern Columbus, and southern Delaware County, the Olentangy River is a tributary of the Scioto River in Ohio. It is positioned within a 1/2 hour drive for over 1.5 million Ohio residents. Despite rapid housing and business development around the Columbus area, the Olentangy River has seen an improvement in water quality, as it was upgraded to an exceptional warm water habitat by the Ohio Environmental Protection Agency.

Recently, the Ohio State University's Wilma H. Schiermeier Olentangy River Wetland Research Park (ORWRP) contacted NexSens Technology to install a water quality monitoring station with radio telemetry in the Olentangy River. Using a NexSens 4100-ISIC spread spectrum radio and a YSI 6600 sonde, OSU researchers are able to monitor the water quality data from their research facility. The suite of measurement parameters include: temperature, conductivity, dissolved oxygen, pH, ORP, turbidity, chlorophyll and water level.

This station is a complement to the NexSens real-time wetland monitoring system already in place that covers the 25 acre marshy wetland.

During the recent installation, NexSens engineers mounted a secure deployment pipe to a unistrut mounted on the side of a bike path bridge. The structure along the side of the bike path for Ohio State students, so it was essential that the water quality station did not disrupt the student traffic. Additionally, the deployment pipe features a locking well cap to prevent the water quality measurement sonde from being vandalized or stolen.

Having the deployment pipe at the top of the bridge also means that wetland researchers are able to maintain the sensors without entering the river. This is especially beneficial during periods of high water and the frigid winter months. The deployment pipe is equipped with a tethered breakaway system to allow for harsh river conditions – if too much debris builds up against the pipe, it will break away, but the deployment apparatus and water quality sonde will be contained by a stainless steel cable.

Having all these structural safeguards is very helpful to wetland researchers, but perhaps the most beneficial aspect of the NexSens water quality station is the ability to monitor data from their newly constructed campus wetland research building. Dr. William Mitsch, Wetlands Scientist and director of the ORWRP, had this to say about the real-time wetlands data: "It is the ecological analogy of seeing the score of a game as it is happening as opposed to reading about it the next day." Thousands of people visit the ORWRP every year to observe wildlife, conduct research, and enjoy the beautiful landscape. The ORWRP is not just a research park; it is also open to the general public. It is located immediately north of the Ohio State University campus, and it is open daily to the general public from 9:00am to sundown.

Water monitoring system installed on OSU bikepath bridge

May is Wetland Month
 In conjunction with the School of Environment and Natural Resources Seminar Series please plan to attend the indoor version of the Oletangy River Wetland Research Park's

Moonlight on the Marsh Distinguished Lecture

Thursday, May 11, 2006
 3:30 - 4:30 p.m.
 103 Kottman Hall

Reception to Follow — A reception for Dr. Alwash will be held in the lobby of the Heffner Wetland Building at the Oletangy River Wetlands, 392 W. Dodridge, starting approximately 15 minutes after the seminar concludes.

The Marshes of Iraq: Past, Present, and Future

Azzam Alwash
 Director, Eden Again

Encompassing an area larger than the Florida Everglades, the Mesopotamian wetland ecosystems were mostly destroyed during the 1990s. The United Nations has described the destruction of the marshes "as one of humanity's worst engineering disasters." The extensive marshlands of Mesopotamia represent a unique component of our global heritage and are the most extensive wetlands in the Middle East. The seas of reed beds were home to the ancient communities where human civilization began more than 5,000 years ago. Scholars regard the marshes as the site of the biblical "Garden of Eden," the "Great Flood," and the birthplace of the patriarch Abraham.

Dr. Azzam Alwash was born in Kut, Iraq, and spent much of his youth in Nassariya on the fringes of the marshlands of Mesopotamia. His father, a district irrigation engineer, allowed his son to accompany him on trips into the marshlands. In 1978, Dr. Alwash left Iraq as a result of the harassment of the Baathist regime. He earned a B.S. at California State Univ., Fullerton and Ph.D. at the Univ. of Southern California. He worked for 20 years as a soils and environmental engineering consultant in southern California. In 1998, he and his wife, Dr. Suzanne Alwash, a geologist, started Eden Again to bring attention to the environmental disaster caused by the drying of the marshes in Iraq.

After Iraq's liberation, Dr. Alwash quit his consultancy practice to direct the Eden Again operations in Iraq which was transformed into Nature Iraq to encompass the entire environmental health of the country. He now lives permanently in Iraq, dividing his time between Baghdad, the marshlands, and international speaking engagements.

Dr. Alwash has given testimony to the Committee on International Relations of the U.S. House of Representatives and is a frequent participant in public discussions on the need for restoration, such as at the INTECOL/ESA joint ecology conference in Montreal in August 2005. With 40% of the marshes already restored, Eden Again is focused on building international support for Iraq to not only assure the survival of this world heritage site, but to expand it and make a world eco tourist and historic destination site.

For more information: 614/292-9774 or mitsch.1@osu.edu

Sponsored by:
 Lenora and Jerry Pausch Foundation
 The Wilma H. Schiermeier Oletangy River Wetland Research Park
 School of Environment and Natural Resources

WETLAND SEMINAR

Friday October 6, 2006
 1:30-2:30 pm
 Heffner Wetland Building Lobby
 Oletangy River Wetland Research Park

The USEPA National Wetlands Office—Its Role in Wetland Policy and Protection

Doreen M. Vetter
 Special Assistant for Water
 Office of the Administrator
 U.S. Environmental Protection Agency

Doreen earned her B.S. in Natural Resources in 1986 and her M.S. in Wetland Ecology (Natural Resources) in 1989, both at The Ohio State University. While at OSU, she was chosen as a Dean John A. Knauss Marine Policy Fellow in Washington DC. She joined the USEPA National Wetlands Program in 1990 where she focused on improving the science used in decision-making for wetland protection. In 1998, she established and chaired the National Wetland Monitoring and Assessment Workgroup to integrate wetland monitoring into existing surface water monitoring programs. Currently, she is on detail from her position as Senior Advisor in the Wetlands Division and serving as Special Assistant to the USEPA Administrator.

For more information: (614) 292-9774 mitsch.1@osu.edu

Sponsored by:
 Wilma H. Schiermeier Oletangy River Wetland Research Park
 School of Environment and Natural Resources

Earth Day Celebration & Volunteer Day

at the
**Wilma H. Schiermeier
Olentangy River Wetland Research Park**
352 W. Dodridge St., (north of Chemical Abstracts)

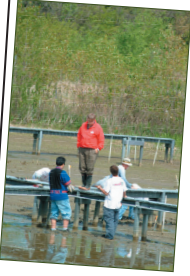
Saturday, April 22, 2006
8:30 a.m. – noon

Early Bird Special Event

A bird watch is scheduled for 8:00 a.m. for those who arrive early. This bird walk will be led by volunteer birder Bernard Master.



RAIN or SHINE!



Come Join us at this "Earth Day Event"

Visit one of the most beautiful locations in central Ohio and do your part on Earth Day to help OSU students, wetland researchers, and the environment with the following projects:

- Construct a bioswale to prevent runoff pollution
- Pick up unsightly litter at the 30-acre wetland research park
- Eradicate the invasive woody shrub Asian honeysuckle from our bottomland hardwood forest
- Plant deciduous trees to beautify the wetland research park
- Plant native wetland plants
- Restore experimental mesocosms (small experimental wetlands) for future wetland research

Bring your own work gloves, tools (large and hand shovels, planting bars, etc.), tree loppers or tree trimmers. We will have a few extra tools for those volunteers who don't have their own.

FUN FOR EVERYONE!

- Bring your family and friends
- Water & refreshments will be provided
- Try to carpool as parking is limited

Special Ceremony

We will have an unveiling of a beautiful color drawing of the Schiermeier Olentangy River Wetland Research Park at 9:00 a.m. in front of the Heffner Wetland Building. Free postcard-size prints to the first 200 people who come.

Sponsors

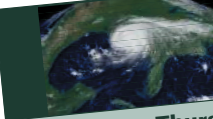
Schiermeier Olentangy River Wetland Research Park
Ecological Engineering Student Society
School of Environment and Natural Resources
College of Food, Agricultural, and Environmental Sciences
OSU Chemistry Department
OSU Department of Environmental Sciences
OSU Department of Veterinary Preventive Medicine
Friends of Lower Olentangy Watershed (FLOW)
Ohio Sea Grant and Stone Lab
OSU Food, Agricultural, and Biological Engineering Department
Bartzelle – Energy, Transportation, Environment Division
OSU Evolution, Ecology, and Organismal Biology Department
OSU Department of Geography



For more information contact the Wilma H. Schiermeier Olentangy River Wetland Research Park,
Ohio State University, 352 W. Dodridge St., Columbus, OH 43202; Tel: 614/247-7384;
Email: noon5@osu.edu



A Special Seminar at the **Wilma H. Schiermeier Olentangy River Wetland Research Park** The Ohio State University



Hear about the cause and the aftermath of Hurricane Katrina in New Orleans and coastal Louisiana, what can be done ecologically and socially to prevent a reoccurrence, and how decreased energy supplies and climate change could change our ability to adapt.

Thursday, Jan. 19, 2006
7:00 - 8:00 p.m.

The Ruth E. Smart Wetland Lobby
Heffner Wetland Research and Education Building
Wilma H. Schiermeier Olentangy River Wetland Research Park
The Ohio State University
352 W. Dodridge Street

The Mississippi River Delta and New Orleans: Post-Katrina humanity and ecology in a time of scarcity

John W. Day, Jr.
Distinguished Professor Emeritus
School of Coast and Environment
Louisiana State University

John W. Day, Jr. is on the faculty of Department of Oceanography and Coastal Sciences in the School of the Coast & Environment, Louisiana State University where he has been for over 30 years. He is one of the most knowledgeable coastal ecologists in the country, has written over 200 papers on estuarine and coastal ecology, is first author of the textbook "Estuarine Ecology" and has advised over 50 graduate students at LSU. He currently serves on an advisory committee to the U.S. Army Corps of Engineers on post-Hurricane Katrina restoration in the Louisiana Delta and has collaborated on coastal wetlands and restoration in Mexico, Netherlands, France, and Italy. John received his Ph.D. in Marine Sciences from University of North Carolina.

Voluntary donations can be made at the seminar to OSU Hurricane Relief Efforts Fund.

Refreshments will be served following the seminar

For more information
mitsch.1@osu.edu
614-292-9774



Sponsored by:
Wilma H. Schiermeier Olentangy River Wetland Research Park
School of Environment and Natural Resources

Wilma H. Schiermeier Olentangy River Wetland Research Park

Heffner Wetland Research and Education Building
352 W. Dodridge Road, Columbus, OH 43202-1574 USA
(near intersection of Olentangy River Road and Ackerman Road/Dodridge Road)

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home page: <http://swamp.osu.edu>

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ORW Staff

William J. Mitsch, Ph.D., Professor of Environment and Natural Resources and Director
Li Zhang, Ph.D., Assistant Director
Active Research Faculty: Jay Martin, Ph.D., Richard Dick, Ph.D., Allison Snow, Ph.D., John Harder, Ph.D., M. Siobhan Fennessy, Ph.D., Adjunct Associate Professor of Environment Science
Assistant to the Director: Monica Noon
Site Engineer: Matt Ripley
Technicians: Angela Adams, Kyle Chambers, Chris Cooley, Rachael Mauk, Sherr Vue (lab coordinator)
MS Students: Blanca Bernal, Kurt Keljo, Chelsea Korfel, Joni Lung, Charissa Young
Ph.D. Students: Jinguo Gao, Jung-Chen Huang, Amanda Nahlik, Keunyea Song, Kay Stefanik, Evan Waletzko
Volunteers: Amanda Guenther, Ken Herman, Kate Jones, Alex Prange Allison Sendelbach

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Heather Allen, MAPS
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Wilma H. Schiermeier Olentangy River Wetland Research Park
The Ohio State University



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