Leave flood plains free of development

It is with regret and concern that I read in The Dispatch about the recent urban flooding problems in central Ohio and elsewhere. This has to be a tremendous burden on those who are in flood-prone areas and on our emergency relief system and city resources. Developments that are built on flood plains are disasters waiting to happen.

The creation and restoration of flood-plain wetlands and the protection of flood-plain forests can be effective for mitigating such events. While our own Olentangy River Wetland Research Park on Ohio State University's campus could not have prevented the downstream flooding in Columbus this past week, we estimate that at least 6.5 million gallons of floodwater were stored by the recent flooding in our wetlands rather than in Columbus basements and parking lots.

If only we had a policy of preserving and restoring more of these ecosystems up and down the Scioto and Olentangy Rivers!

And of course these wetlands have other values for the urban population. They result in water-quality improvement as we have observed for a decade as water passes through our campus wetlands before going back to the Olentangy River. And they provide great natural vistas and habitat that supports fish, amphibians, muskrats, beaver, 150 species of birds, and even a few snapping turtles. And those critters don't seem to mind the flooding.

WILLIAM J. MITSCHE
Professor of Natural Resources,
Environmental Science and Ecological Engineering
Ohio State University
Columbus
Huge conference focuses on eco-technology in Taiwan

BY CHIU YU-TZU
STAFF REPORTER

Ecological engineering methods adopted in Taiwan to not only restore sites damaged by natural disasters such as typhoons and earthquakes, but also ensure ecological sustainability, are very innovative, according to foreign experts attending an international conference sponsored by the Public Construction Commission (PCC) yesterday in Taipei.

The two-day 2004 International Conference on Eco-Technology is the largest-ever in this field held in Taiwan. Yesterday, the venue of the conference, organized by the National Taipei University of Technology (NTUT), was filled with more than 1,000 eco-technology foreign and local experts from governmental agencies, private research organizations and universities.

According to PCC Vice Chairman Kuo Ching-chiang (郭清江), selected foreign invitees have an excellent international reputation in eco-technology related fields, from whom Taiwan can glean up-to-date knowledge in order to further improve the quality of construction carried out locally under the concept of ecological sustainability.

William Mitsch, a professor of Natural Resources and Environmental Science of the Ohio State University, earlier spent a few days making field trips to construction sites adopting ecological engineering methods in Taiwan.

"I found methods used here are quite innovative because they are created to suit the domestic biological and weather conditions," Mitsch told the Taipei Times.

Mitsch said one of Taiwan’s advantages in the promotion of ecological engineering was the government’s strong backing. According to Kuo, concepts of ecological sustainability have been incorporated into post-disaster reconstruction projects since a devastating earthquake hit Taiwan on Sep. 21, 1999. In the wake of the earthquake, remote mountainous sites with loose geological structures were damaged by torrential rains during typhoon seasons.

In Kuo’s representation, he screened before-and-after photos comparing disaster areas restored by the adoption of ecological engineering methods.

“These ecologically friendly constructions were carried out by victims in the community, who not only found new courage to move on but also rediscovered the importance of living in harmony with nature,” Kuo said.

Taking reconstruction work on the Houfanzekeng River in Shuanghsi township, Taipei County as an example, Kuo said many senior citizens said the “new” river brings back pleasant memories from their childhood.

The site is just one of places local experts introduced to their counterparts from the US, Germany, Austria, Japan and the Netherlands, and others. On Tuesday and Wednesday, Walter Chen (陳偉彥), associate professor of the Department of Civil Engineering at NTUT, showed foreign experts several construction projects, including a 2.45km spillway tunnel construction in Rueifang, Taipei County, as well as Guandu Nature Park.

Hung Ju-jiang (洪吉江), professor emeritus of civil engineering at National Taiwan University, told the Taipei Times that Taiwan had gained its own experience from the recent promotion of ecological engineering in reconstruction work.

International conferences were good platforms to share this knowledge, he said.
OHIO STATE WETLANDS PROFESSOR WINS PRESTIGIOUS WATER PRIZE

COLUMBUS, Ohio – Years of studying wetland behavior have paid off for Ohio State University professor Bill Mitsch, who today became co-recipient of the prestigious 2004 Stockholm Water Prize.

For water scientists, winning the Stockholm Water Prize is equivalent to winning a Nobel Prize, said Mitsch.

Mitsch, a professor of natural resources and environmental science at Ohio State University, shares the award with Sven-Erik Jörgensen, a professor in environmental chemistry at the Danish University of Pharmaceutical Sciences in Copenhagen. The two will receive their prize – $75,000 each – at an August ceremony in Stockholm. His Majesty King Carl XVI Gustaf of Sweden will present the awards.

Mitsch, who directs the Olentangy River Wetlands Research Park (ORWRP – see sidebar) on Ohio State's campus, is the fifth researcher from a U.S. institution to receive the Stockholm Water Prize since its inception in 1990.

"This is a truly great honor for Bill and for the university," said Ohio State University President Karen Holbrook, who nominated Mitsch for the award. "While his
Years of studying wetland behavior have paid off for Ohio State professor Bill Mitsch, who became co-recipient of the prestigious 2004 Stockholm Water Prize March 27. For water scientists, winning the Stockholm Water Prize is equivalent to winning a Nobel Prize, Mitsch said.

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Mitsch, who directs the Olentangy River Wetlands Research Park (ORWRP) (see sidebar) on Ohio State's campus, is the fifth researcher from a U.S. institution to receive the Stockholm Water Prize since its inception in 1990. This is a truly great honor for Bill and for the university," said President Karen Holbrook, who nominated Mitsch for the award.

"While his accomplishments speak for themselves, and his reputation among his peers is unparalleled, receiving this award represents years of diligence, determination and patience. We are extremely pleased that his efforts have been recognized internationally," Holbrook said.

A native of Wetlands, Mitsch has spent much of his 30-year career studying both these ecosystems and how to preserve them. He is a leading authority on several federal and state wetland protection initiatives, including the Clean Water Act and the Endangered Species Act. He has participated in several federal-level studies—among them a respected national research council study that addressed the issues of wetland destruction and remediation in the United States.

Mitsch is also a key researcher in addressing the annual hypoxia problem that recurs in the Gulf of Mexico. Each spring, the rise of nitrogen and other chemicals that flow into the Mississippi River watershed ultimately turn more than 7,000 square miles of the Gulf of Mexico into an oxygen-depleted "dead zone," a condition known as hypoxia. Creating wetlands in the Midwest would help decrease this runoff, and lessen the effects in the Gulf. But it takes time and patience to fully learn how an ecosystem behaves, Mitsch said.

"One thing I've learned from 30 years of this work is that it's far more important to look at ecosystem behavior long-term," he said. "Quick results just aren't sufficient to answer the question as to whether a wetland we create is a success or failure. Further Time is important in ecology."

"For instance, we need even more now than the decade we have already invested to study the wetlands. The ORWRP before we can continue to determine its wetland behavior needs much more research. That's one reason why it's so important to have this facility on a university campus."

Each year, an international nominating committee under the auspices of the Royal Swedish Academy of Sciences recommends a Prize Laureate to the Stockholm Water Foundation, which presents the award. The Stockholm International Water Institute, a think tank concerned with the escalating global water crisis, administers the activities of the Stockholm Water Foundation.

"Receiving this award is a wonderful honor, representing three decades' worth of research," Mitsch said. "It is the highest recognition one can receive in the field of wetlands, and it is a true testament to the importance of wetlands in our world."

Mitsch is editor of the journal Ecological Engineering, which he founded in 1992. He has also authored several books on ecological engineering and wetlands management.

ORWRP celebrates 10 years

In a city known for shopping malls and extensive residential development there sits a mecca of sorts, a 30-acre wetland research park just north of the Ohio State campus that attracts birds, animals and researchers.

The Olentangy River Wetland Research Park (ORWRP) celebrated its 10th anniversary in March. The 30-acre complex of marshes and wet forests is a kind of natural supermarket for aquatic and terrestrial wildlife, which come here to eat.

"It's one of the most distinct living laboratories on any college campus in the country," said Bill Mitsch, director of ORWRP and a professor of natural resources and environmental science. "It's also a prime way to study the long-term behavior of these ecosystems."

Wetlands are often called the "kidneys of the landscape," because they filter environmental pollutants, provide flood control and clean the ground water supply. And they're being destroyed at an alarming rate—more than 50 percent of the wetlands in the United States have disappeared in the past 200 years.

Put simply, the loss of wetlands means the loss of the ability to provide clean water, to keep rivers and lakes in check and to enhance biological diversity. The ORWRP features three marshes and 13 acres of wet woods. Two of the main marshes are experimental. At two-and-a-half acres each, these kidney-shaped areas give Mitsch and his fellow researchers clues as to how man-made vs. natural wetlands behave. Ten years ago, volunteers planted one marsh—the "man-made" marsh—with wetland vegetation and left the other "natural" marsh unplanted. Mitsch said he will wait 20 years if he must to compare the similarities and differences between the two marshes.

"Given that amount of time, we should be able to determine the benefits and drawbacks of artificial wetlands," he said. "We've got about 10 years left for this experiment.

Mitsch calls the third marsh a "billabong," after the Australian term for a type of resevoir wetland. This seven-acre, seven-year-old billabong is considered a mitigated wetland because it was built to compensate for the loss of about three acres of wetlands in a neighboring county.

In January, the billabong held back millions of gallons of Olentangy River flood water that otherwise might have ended up in someone's basement," Mitsch said. "And flood water that passes through this wetland is generally cleaner when it leaves."
Wetlands harbor research

By Monique Wingard
Lantern staff writer

Important environmental research is being conducted in the 30-acre Olentangy River Wetland Research Park, which lies just north of Ohio State's campus.

For 10 years, the park has provided a safe haven for wildlife and an area for researchers to conduct various studies.

"It's one of the most distinct living laboratories on any college campus in the country," said William Mitsch, director of the Olentangy River Wetland Research Park and professor of natural resources and environmental science, in a statement.

Mitsch is also the 2004 recipient of the Stockholm Water Prize, which is a global award presented annually to an individual, institution, organization or company to recognize outstanding research, actions or education that protects water and improves the awareness of it as a valuable resource.

Regional and whole-ecosystem scale, field ecology/biogeochemical processes, mesoscale and modeling, are some of the subjects being researched at the park.

Mitsch said this type of research is being done to save the planet.

"It's the only way to find out how research works," Mitsch said. "The research park is just one big lab."

With the help of graduate student Chek Higgins, Mitsch was able to research the effects of muskrat activity on plant biomass and species richness in two constructed wetlands.

"We wanted to see if there were any patterns in real versus man-made wetlands," Higgins said.

She also said the wetlands used for the research were not even 10 years old before the population of muskrats began to grow.

"Muskrats make a lot of changes in wetland areas."

Water pollution and quality is also being actively researched.

"This is a big project, and a huge issue around the world," said Li Zhang, assistant director of the Olentangy River Wetland Research Park.

"This will be the kind of research that's really applicable, and people will be able to see results," Higgins said.

In 1994, the first part of the research park was completed with the help of student volunteers and donations. It consists of two 2.5-acre deep-water marshes and a river water delivery system.

"Alumni and friends of the university offered great support," Mitsch said. "It's great to have people invest in you like that."

Guided tours are available to groups of three or more people, and the route to conduct a self-guided tour is available online. The park is open daily to the general public from 9 a.m. to sunset.

Since the Olentangy River Wetland Research Park is both a public and research park, visitors are asked not to disturb anything.

For more information, contact the Olentangy River Wetland Research Park at 247-5984.
The Olentangy River Wetland Research Park 2004

A frog peeks above the surface of one of the man-made ponds at Ohio State University’s Olentangy River Wetland Research Park.

Wetlands regaining lost ground

By Jamie Pforte

William Mitsch is used to the noise of Columbus but he is the wetlands director at Ohio State University. And he has helped turn the Ohio Valley into the lab for environmental engineers and ecologists to get out of hand. It’s time to let Mother Nature win the race.

Mitsch’s office oversees the Olentangy River Wetland Research Park, a 30-acre site that includes stormwater wetlands designed to help improve water quality.

The marsh has become a spawning,患病, breeding place, especially near Mitsch’s home in Upper Arlington, the marsh has become home to red-winged blackbirds and Green Herons, hoppers, frogs and painted turtles, muskrats and minks, and hundreds of other species, both fish and fowl.

Mitsch’s approach to wetland management is one that considers both environmental and social issues.

The park is part of the Community for a Sustainable Urban Wetlands Demonstration Project, a partnership between Ohio State University, the Columbus Audubon Society and the city of Columbus.

In August, Mitsch will collect the award — which takes the form of a silver plate — and $7,500 from the International Wetlands Congress.

Mitsch and his students in Columbus have been conducting experiments since 1984 to study the effects of wetlands on water quality.

The project has been a success, with the marshes improving water quality by 20 percent.

In the early 1990s, Mitsch and his students began to dig a series of small lakes in the park, and monitored the water quality.

At the end of the year, water from the Olentangy River was flowing into both basins, and while the water was cleaner, it was not as clear.

Two years later, both basins were back in use.

“Could not be better than the others,” Mitsch said.

New techniques and tools have been developed.

The difference is in the water quality, but the changes in the marshes are evident.

For instance, the marsh has been drained in the fall, but leaves are still sticking out in the water, providing a home for fish.

Nature has made its way in the wetlands, providing a home for cranes, herons, muskrats, turtles and hundreds of native plants.

“Mother Nature likes to take her time,” Mitsch said.

See WETLANDS Day A4
WETLANDS

By A. J. Connell

Two wetlands studies of nutrient loss and deposition in the Mississippi River basin have been conducted. The studies indicate that wetlands are an important source of nutrients and deposition in the Mississippi River basin.

   - Study area: Caddo Lake, Texas
   - Findings: High nutrient loads in the lake

   - Study area: Mississippi River basin
   - Findings: Nutrients entering the river

**Appendix: 2004 Press Clippings**

**EMERGENCY MEDICINE**

Treatment turns out better when you plan for the worst

In a recent study of patients with severe respiratory failure, those who were given a detailed description of the treatment plan fared better than those who were not. The researchers found that patients who were well-prepared were less likely to become agitated and more likely to recover.

**ASTRONOMY**

Planets getting act together for a heavenly performance

May is the best time of year to observe the planets in our solar system. On this date, Saturn is at its highest point in the sky, making it easier to observe its rings.

**GEOLOGY**

New exhibition showcases colorful minerals of Ohio

Ohio is famous for its colorful minerals. This exhibition features a variety of minerals found in Ohio, including amethyst, quartz, and tourmaline.

**TOM BURNS**

From the laboratory to the space station

Tom Burns is an astrobiologist who has worked on Mars missions. He is currently working on a project to develop a beacon that could be used to detect life on Mars.

**DARK GRIFFITH**

Astronomer for the Ohio State University Observatory

Tom Burns
director of the OSU observatory

"The importance of this work cannot be overstated. It will help us understand the nature of the universe and our place in it."
2004 Stockholm Water Prize Laureates

Meet the Stockholm Water Prize Laureates

On August 19, the world-renowned ecologists Sven Erik Jørgensen of Denmark and William J. Mitsch of the USA will receive the 14th Stockholm Water Prize from the hands of HM King Carl XVI Gustaf of Sweden. Jørgensen, professor of environmental chemistry at the Danish University of Pharmaceutical Sciences in Copenhagen, and Mitsch, professor of natural resources and environmental science and director of the Olentangy River Wetland Research Park at The Ohio State University in Columbus, are being honored for “their pioneering development and global dissemination of ecological models of lakes and wetlands, widely applied as effective tools in sustainable water resource management.”

Stockholm Water Front interviewed Sven Erik Jørgensen and William J. Mitsch to learn more about them as individuals, and to delve deeper into the accomplishments—and challenges—they faced during their distinguished careers.

Professor Sven Erik Jørgensen

Professor Jørgensen, how did you feel when you found out you won the 2004 Stockholm Water Prize?

I was of course very happy. It is always nice to get positive feedback about your work. I was also positively surprised, because I did not expect to get the Stockholm Water Prize, because mainly researchers with a technological viewpoint have won the Prize. My field—ecology, ecological modelling, ecosystem reactions to pollution and ecological engineering—has never been awarded.

What are you most proud of, professionally speaking?

That I started the scientific journal Ecological Modelling in 1975 and it has been a success. Also, my own contribution to ecological modelling. I have for the last 10 to 15 years been able to develop models that can account for the flexibility, adaptability and variability of ecosystems.

I am also proud that I have insisted for over a decade that the various ecosystem theories—with contributions from Hutchinson, H.T. Odum, Y. Srivastava, R. Ulanowicz, R.C. Patten, Felix Müller, James Kay, Eric Schneider and my own research group—are consistent, form a pattern, and can be used to explain ecological observations. It is becoming more and clear that I was and am right: we do have a nice ecosystem theory, if we put the various contributions together.

How did you become interested in natural resources and environmental sciences?

As a 13-year-old I was an amateur astronomer and was participating in a project that required photographing double stars. It was at the Urania Observatory under the leadership of astronomer Luplau Larmen. I started studying astrophysics in 1953 but was afraid that because of the few positions available as astronomers in Denmark, there would be no job for me after my studies. I finished therefore a masters programme in chemical engineering in 1958, but I was still research minded. When I became involved in the recovery of proteins from wastewater in the mid 1960s, I became so fascinated with the idea to recover waste material that I applied for a position as assistant professor at The Danish University of Pharmaceutical Sciences. At that time the researchers had the right to choose their own research, and I used my research time to develop new methods to treat wastewater. In 1972 I heard at a water conference in Jerusalem about ecological modelling and I became even more fascinated in the idea to synthesise one’s knowledge about an ecosystem and the impact on the ecosystem in an ecological model. I have always found it fascinating to try to get an overview of a complex problem. Tables, equations and graphs talk to me. So, from 1972 ecological modelling...
Meet Professor Jørgensen

Remember in this context, that the time spent for applications and reviews does not bring scientific results but rather satisfies only administrators.

What does the future hold for lake, river and wetland restoration and ecological modelling?

During the last decade, the water quality of some lakes in developed countries has improved considerably – unfortunately not for all lakes, but for some. It has been acknowledged that good environmental management requires the use of a proper combination of environmental technology, cleaner technology, eco-technology and ecologically sound planting. It is a matter of respecting and understanding nature. You cannot violate the law of nature. Do not try because nature will always win. If you have this attitude you can solve the problem.

I hope that the good solution will inspire more environmental managers to understand the possibilities of using combinations of the entire spectrum of available pollution abatement methods.

I hope of course also that developed countries will understand that it is their duty to support the developing countries with the needed economic support and the know-how, based on their experience.

Ecological modelling is used widely today in environmental management in the developed countries and is already used in the developing countries, but will inevitably be used there more in the future. We will always get better and better models. As I mentioned, I have developed a model which can account for the flexibility, adaptability and variability of ecosystem – I call it "structurally dynamic models" – but there will also come other improvements that will make the ecological and environmental models more and more reliable.

Today, structurally dynamic models are much more reliable than, for instance, economic models. Sometimes our knowledge is, however, not sufficient to set up prognoses, but the model can anyhow give us a good overview of the system and the problem and can indicate where we need more knowledge.

What types of differences exist between the challenges for ecological modelling in the developed world and in the developing world?

Probably both the developed and the developing world will use ecological models more and more, but of course ecological models are used to a much higher extent to day in the developed world. The increase in the use of ecological models in the developing world will therefore be more significant. At the same time, as mentioned, the developed world will develop better and better and more and more reliable models that will quickly replace the old models also in the developing world due to globalisation.

Your definition of ecological engineering is "the design of sustainable ecosystems that integrate human society with its natural environment for the benefit of both." How well accepted is this concept, and how well is it being implemented?

Ecological engineering (or eco-technology) is increasingly applied. It has been realised in environmental management that you need not only environmental technology, but also cleaner technology, eco-technology and ecologically sound planning to be able to offer a proper solution to many environmental problems.

Unfortunately, in the abatement of the non-point pollution due to agriculture, there is still not sufficient political will to understand that it is necessary to solve also.

A four-year-old Sven Erik Jørgensen.

and the understanding of ecosystems and ecological reactions have been my passion and integrated and dominated my life.

Who are some of your role models?

As a teenager, Jannsen and my high school mathematics professor were my role models. As an adult I do not think one has a role model, but rather some people you admire more than others. I have always admired Einstein and Niels Bohr for their contributions to the modern world picture.

What did you find hardest to accomplish within your career?

To get funding for my many good ideas. I find that reviewers of research applications often do not support original ideas, because the reviewers are afraid of supporting research that does not give an unequivocal result with a high probability, and original ideas are so far from the traditional research ideas that a reviewer cannot evaluate the possibilities for success properly.

In addition, original ideas will inevitably have less chance for success than traditional ideas, but if they in spite of the odds succeed, they will provide significant results. Researchers use too much of their precious time today to apply for research money. More and better results in science could probably be obtained for the same money if researchers would get a certain amount of research money every time he or she published a paper in an international peer-reviewed journal. This would keep the good researcher going without losing precious time for research applications.

University days for the 21-year-old future Stockholm Water Prize Laureate.
Meet Professor Jørgensen

I like to travel and bring with me back a video from the travels, while my wife is taking photos. I swim every morning from mid-May to late September. I play chess. I like theatre, ballet and opera and a good film, but to be honest I have had too little time lately to be able to go much to theatre or cinema.

I do not see much TV – on an average day I see only the news. I like to be well informed about what is going on in the world.

Where is your favourite place to travel to for vacation?
I like very much Western USA, where the nature is so beautiful. It is easy in the USA to rent a car and find a motel or hotel when you want to stop for the night.

Last year my wife and I were in Washington and Oregon states, where the nature is unique. We saw the beautiful coast of Oregon, Crater Lake – the clearest lake in the world – and Mount St. Helen. Incredibly beautiful!

We like also to go on safari in Africa or snorkel in a coral reef in Africa, Australia or the Caribbean. In Europe, we like very much Northern Italy because the cultural density is so high.

Professor Jørgensen during his 1997 visiting professorship at Kyoto University.

Please tell us a little more about your family. Have they all become wetland ecosystem experts and is your research a topic during family dinners?
I would not say that wetlands are discussed very much in the family, but we are often discussing environmental issues and ecology.

I am sure that all members of the family are more concerned about environmental problems than the average Dane. We are discussing during family dinners the latest scientific achievements and the hottest environmental issues.

My wife Mette is bioanalyst at a hospital and my son Morten has just finished his education in information technology. They are both very positive to my work and research – maybe because I have to discuss it.

What do you try to convey to your students as a basic "take home" message for future scientific work?
I always tell my masters and PhD students this: in science everything is allowed, provided you always tell the truth and the entire truth about your results and the references that you used as basis for your research.

What do you like to do in your spare time?
On average, I read one novel and one scientific book per month. I read also about history, I like to bike in nature. I have five lakes and five forests within five kilometres from my house and like to follow the seasonal changes in my environment on my tours. I like good art and take friends to art exhibitions a few times per year.
I am also proud of seeing ecological engineering start to develop as an interdisciplinary “profession” in the world, even while knowing it will take many more years for ecology and engineering to merge their fields seamlessly. Professor Jørgensen and I collaborated on this in many respects. Third, I am proud of the accomplishments of the 60 or so graduate students and postdoctoral researchers who persevered to complete their degrees and assignments through my lab and who are now doing well in their professions. Eleven are now professors elsewhere; a statistic I am particularly proud of. Fourth, the footprint of the 12-hectare Olentangy River Wetland Research Park at The Ohio State University will be on that university campus for a very long time. Bringing the wetlands to the students rather than taking the students to the wetlands has enabled us to educate so many more students at the USA’s largest university.

Who are some of your role models?
My advisor H.T. Odum at the University of Florida was the person who brought me into systems ecology as a Ph.D. student. His systems view of the world and recognition of the importance of thermodynamics in both nature and society still influence me every day in my work. His book Environment, Power and Society, published just as I arrived at University of Florida in 1971, is one of the great books of the 20th century in my view, its concepts were overwhelming in simplicity and clarity of how the world and society work. My father, William H. Mitsch, a career electrical and welding engineer, influenced me heavily on being able to fix, build and repair. I simply transformed those approaches from the garage and shop to the landscape—and I am still pretty good at fixing things in the garage and shop, too! We were proud that my dad wrote a thesis at University of Notre Dame on “Theory and Practice of Television” in 1933. I still tell our friends that our Dad invented TV.

A third influence on my life has been the friendships I have developed with members of my Olentangy River Wetlands advisory board, several of whom will attend the 2004 Stockholm Water Prize ceremony. They have influenced me greatly on the importance of philanthropy and giving when one has the resources to do so. Perhaps that influence is in keeping with another figure at Ohio State University whom I was only able to meet once before he died in 1987 but whose philosophy influenced me greatly. Wayne Woodrow “Woody” Hayes, a successful, driven, yet ultimately tragic coach of the football team at Ohio State University. His words to the graduating students at Ohio State in March 1986, presented a
Appendix: 2004 Press Clippings

Meet Professor Mitsch

What does the future hold for lake, river and wetland restoration, and ecological modelling? (challenges, future applications, etc.)

Lake restoration as well as wetland restoration and creation are on the verge of an explosion as ecological engineering of the landscape progresses in the 21st century. From the restoration of the Florida Everglades and the Delaware Bay salt marshes to the Skern River restoration in Jutland, Denmark, large restoration projects – they are certainly ecological engineering – of the landscape are becoming more prevalent as we “give back to nature” some of the landscape that we have polluted, drained and manipulated in the agro-industrial age of the 19th and 20th centuries. In the USA, we are now discussing ecological restoration of water quality, ecology and hydrology of the Mississippi-Ohio-Missouri Basin, a 3-million square kilometre basin which drains 40% of the USA. This level of restoration is needed to improve water quality and ecology of the downstream Gulf of Mexico along Louisiana’s coastline.

Ecological modelling, of course, is the most important tool for predicting these ecological engineering projects both before we do them but also even after they are started. The modelling allows us to quantify and describe the important ecological processes that are involved. Furthermore, ecological modelling allows us to establish appropriate monitoring and research programs and ask the right questions.

...
What types of differences exist between the challenges for ecological modeling in the developed world and in the developing world?

The challenges of modeling in each case are quite similar in terms of the data needs and ecological processes for which data are needed. But the data are much harder to get in the developing world because of the lack of sufficient and appropriate laboratories and research facilities and because of under funded institutions of higher education. To some degree, those lack of data and institutions are compensated for by the higher degree of enthusiasm by scholars and students in the developing world to work hard in the modeling part of the project.

With the increased ability to find and exchange data on the internet and computer availability everywhere, there will be a time when data in developed countries can be used by those in developing countries, and data monitored in developing countries can be used by participants in developed countries in an equal way for modeling. We are unfortunately not there yet.

Your definition of ecological engineering is “the design of sustainable ecosystems that integrate human society with its natural environment for the benefit of both.” How well accepted is this concept, and how well is it being implemented?

This 2004 definition, which is a small improvement over the original definition that Sven Erik Jørgensen and I provided in our first ecological engineering book in 1989 (Ecological Engineering: An Introduction to Ecotechnology; J. Wiley) is now being widely accepted. The newly established American Ecological Engineering Society (AEES) now has on its website (http://aeesociety.org/) mission statement to “promote the development of sustainable ecosystems that integrate human society with its natural environment for the benefit of both by fostering education and outreach, extending professional development and associations, raising public awareness, and encouraging original research.”

Our 1989 and slightly different definition is supported by the International Society of Ecological Engineering (IEES, http://www.iees.ch): “Ecological Engineering has been defined as ‘the design of the human society with its natural environment for the benefit of both’” (Mitsch & Jørgensen, 1989). Ecological engineering integrates various existing environmental fields such as classical ecology, agro-ecology and restoration ecology. The skills of these fields are used to design low-impact systems for waste treatment, food and energy production, habitat restoration and other benefits. Ideally, ecologically engineered systems should provide useful services for human society while at the same time retaining their function as an ecosystem. Ecological engineering also tries to introduce ideas which have grown out of ecology into engineering, such as “systems thinking.”

What do you try to convey to your students as a basic take home message for future scientific work?

Firstly, that good things happen to those who work hard, often 50 to 60 hour work weeks are needed; ecosystems do not take weekends off.

Secondly, “don’t just stand there, measure something.” Sometimes students are paralyzed of starting scientific inquiry until all details of their hypotheses and proposals are correct and reviewed by committees, etc. This waiting to try something is an indication that the student will not be innovative or ultimately successful.

Thirdly, the other admonition I give, as told to me by Gene Odum, “If you don’t publish the work, you haven’t done it.”

Fourthly, I have also given many of my former graduate students advice a year or two after they first get past the initial heady excitement of being hired by a university or agency and find that all is not a smooth and graceful as they are at the early stages. I tell them that to feel defeated, outnumbered by colleagues, and frustrated at lack of support, all is normal. In fact, it probably means that you are on the verge of doing something right. Stay there for the long haul and things have a way of working out. And they usually do. Einstein was right.

Scientific research is 10% inspiration and 90% perspiration.

The fifth and probably the most important message: Enjoy what you are doing!

Please tell us a little more about your family. Have they all become wetland ecosystem experts and is your research a topic during family dinners?

I met my wife Ruthmarie in Chicago while I was a senior at nearby University of Notre Dame in South Bend, Indiana. We were married in her hometown of St. Paul, Minnesota in 1970 and went off to graduate school together at University of Florida where we both achieved doctorates (hers is in medieval French). Our careers have taken us to teaching/university positions in Illinois, Kentucky/southern Indiana, and for the last 19 years, Ohio.

Our three daughters were all born in different US states. They all certainly know more about wetlands than the average citizen. All three daughters have helped on volunteer projects at the Olentangy River wetlands when they were young (planning wetlands, painting bird pictures, etc.). The OSU wetlands were sometimes referred to by them as our 4th child.

What do you like to do in your spare time?

I have become interested in “water gardening” in my backyard and have two systems currently; a slowly flowing stream and a more palustrine wetland. I have toyed with these systems intercepting the runoff from the roof so that it does not transport nitrates to the Ohio river systems and ultimately to the Gulf of Mexico. So perhaps my hobby is not far from my profession!

I am a pianist as well but do not get as much opportunity to play as I have in the past. I live through my daughters, who are brilliant pianists.

Where is your favourite place to travel to for vacation?

I very much enjoy vacationing in southwest Florida. Even though we have been crowded with “snowbirds” like us seeking warm weather, it has some of the most beautiful surroundings anywhere—coastlines and beaches, mangrove swamps, Everglades, cypress swamps and pine forests. And the real birds, too.

I have enjoyed travelling around the world and among my favourite places are China (for the people and the absolutely wonderful history), New Zealand (all green and blue), and, honestly, Copenhagen and Stockholm in Scandinavia. I also enjoy travelling in Western Europe, and am particularly interested some day to return to the great cities in Baden Württemberg, Germany, for an extended stay to look for the Mitsch genes.
El Instituto Agroecológico Mediterráneo de Zaragoza y el Instituto Pirenaico de Ecoloxía en el Campus de Aula Dei han organizado esta semana un curso sobre ingeniería ecológica aplicada a la restauración de ecosistemas mediterráneos. Para impartirlo, han contado con dos ponentes de primera categoría: los profesores Sven Erik Jorgensen y William J. Mitsch, que acaban de ser galardonados con el premio Estocolmo del Agua. Este premio se otorga por el Stockholm International Water Institute (SIWI) desde 1990, y con él se reconoce la labor de investigadores individuales o de instituciones por trabajos y estudios relacionados con la mejora de los recursos hídricos del planeta. El SIWI señaló el «desarrollo pionero y difusión global de los modelos ecológicos de los lagos y de las tierras bállenas, aplicadas extensamente como herramientas eficaces en la generación de un recurso sostenible de agua» como justificación para premiar a los profesores Jorgensen y Mitsch.

PRINCIPIOS BÁSICOS
Entre los objetivos principales de este curso se encuentran explicar los principios básicos en los que se fundamenta la ecoloxía, así como presentar las herramientas ecotecnológicas que se están aplicando para la mejora medioambiental, las bases ecológicas y el alcance de su potencial de aplicación. Durante el curso también se presentarán y comentarán casos de estudio en los que se hayan aplicado ecoloxía para discutir sobre su modo operativo y sus resultados. De este modo, dentro del programa concreto del curso se tocan temas como la clasificación de las aplicaciones ecológicas, las herramientas y las transformaciones entre ecosistemas, la creación de ambientes para la mejora medioambiental y el control de la salud de los ecosistemas, con su aplicación a la restauración de ecosistemas, con su aplicación a la restauración de riberas.

APLICACIÓN

Autocontrol de los sistemas naturales
La ingeniería ecológica, de la que los profesores Jorgensen y Mitsch son dos máximos especialistas mundiales, consiste en la aplicación de las leyes de la ingeniería de los sistemas naturales y de las capacidades ecológicas de sus componentes biológicos como solución a los problemas ambientales. Esta disciplina surgió como alternativa a las tecnologías convencionales que se han aplicado intensivamente durante el último siglo con el objeto de controlar el funcionamiento de los ecosistemas naturales y que, en muchas ocasiones, han desestabilizado el equilibrio natural de las comunidades de organismos y su integración en el territorio de forma sostenible, aprovechando su capacidad de autorganización.
'Wetland Heaven'

Mitsch's efforts at OSU's living laboratory consistently draw international accolades

By ABIGAIL DUDLEY

'They look like two enormous kidneys. They even act like two kidneys.

But put together, they’ve been Ohio State University Professor William Mitsch’s heart for more than a decade.

At 2/12 acres each, these “holes in the ground” are the experimental wetlands that inhabit OSU’s Olentangy River Wetland Research Park just north of the Columbus campus.

According to Mitsch, the park’s director, their odd shape is a reminder of how similarly wetlands function to actual kidneys.

Wild bergamot, a member of the mint family, and other wildflowers, vegetation and trees natural to an Ohio wetlands propagate the research park off of Duckridge Street.

Wetlands have the ability to naturally clean and retain water — for which they have been praised in recent years.

“We call them nature’s kidneys,” said Mitsch, an Upper Arlington resident.

The information was not new to Mitsch, who has his doctorate in natural resources and environmental science, when he came to OSU to teach in 1986.

Mitsch knew then that this was an important concept for people to learn.

“This field didn’t even exist 20 years ago,” Mitsch said of wetland research.

With nearly half of the original wetlands in the lower 48 United States wiped out by drainage and development projects, clean water, flood prevention and enhancement of biological diversity are key concerns in their absence.

That’s why Mitsch began lobbying for a university wetland research park in the early 1990s when he learned of 10 available acres of land OSU had formerly used for agricultural endeavors.

The sell was tough at first when university officials suggested creating such a park at a more remote location.

Mitsch remained persistent that the park needed to be as close as possible to campus.

“So you can influence 50,000 students,” Mitsch said.

In 1994, persistence paid off.

Phase one of the research park which included a river water delivery system and the two experimental wetlands — one with planted vegetation and the other without — was completed.

And, one might say, Mitsch has been swamped over since.

In 10 years the Olentangy River Wetland Research Park has grown in scope and reputation.

The living laboratory consistently draws international accolades and visitors and about 24 OSU courses from six different college departments use the park for research.

About three years ago — thanks to federal legislation implemented in the late 1980s which declared lost wetlands to be “replaced” in a nearby area —

Ohio State University graduate student Chris Anderson washes his feet in one of the labs inside the research facility after returning from the ponds where he was collecting samples for lab study.

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Public tours

Awareness of the research park as well as its popularity have increased since its inception.

In the early 1990s, the park's staff led less than 20 guided tours of the facility, Mitsch said. Last year, the number of guided tours rose to about 150.

To schedule a staff-led tour call 614-247-7984. Prior to a tour, people are encouraged to visit the Web site: swamp.ag.osu.edu/OWR.htm for general information and park rules.

People can also take self-guided tours, which are less inclusive, daily from 9 a.m. to sundown. A walking trail is available as well as a bicycle path that connects with the Olentangy River bike path.
A great blue heron takes a break on one of the boardwalks that traverse the wetland research park.

The mitigation project was compensation for a development in Fairfield County.

A bit north of the “kidneys,” some work was done on the wetland’s circulatory system a few years ago when four holes were created in the river’s levy to restore natural flooding conditions to the park’s “bottomland forest.”

“It was a quadruple-bypass for the forest,” Mitsch said.

Recently, from within the bogs and marshes of the research park, the prestigious Stockholm Water Prize arose.

Mitsch, and a fellow colleague and friend, Sven Erik Jorgensen of Denmark, are the selected recipients of the annual prize that is awarded for outstanding achievements in water science management or education.

The pair are scheduled to receive the award from King Carl XVI Gustaf of Sweden at a ceremony Aug. 19 in Stockholm.

Mitsch said the award is akin to a Nobel Prize for his field.

“We’re thrilled about it,” Mitsch said.

Through the years, Mitsch has become an international advocate for wetland research by traveling the world and teaching others about the environmental benefits of wetlands.

Yet he is quite content strolling the planks between the experimental wetlands and the billabong back at OSU musing at what he, or nature, rather, has created.

“Eventually you have to let mother nature be part of the design,” Mitsch said. “We call it wetland heaven.”
Award winning professor wetlands expert

Bill Mitsch engineered OSU wetlands, says much more in ecology's future

By Ryan Green
Latern staff writer

Though he is not often seen by students traipsing through woods and high grass, Ohio State Professor Bill Mitsch is one of the top wetlands researchers in the world.

Bill Mitsch, a professor of environmental science and ecological engineering, has been at OSU for almost 20 years. Possessing many ecological awards, he recently won the 2004 Stockholm Water Prize for contributions to the world’s lakes and wetlands. He shared the award with his counterpart, Professor Svend Jorgensen from the Danish University of Pharmaceutical Sciences.

‘It’s a very important and prestigious prize in water research,’ Jorgensen said.

The two friends met in 1981 and have co-written multiple books.

“It’s always a pleasant atmosphere when working with Bill Mitsch,” Jorgensen said.

Mitsch started working in Chicago in the early 1970s after receiving his bachelor’s in engineering from Notre Dame University.

The company he was working for was a fairly big polluter, and I got all excited about helping them solve all their problems,” he said.

At that time, Mitsch knew little about ecological engineering, so he applied to the University of Florida’s graduate school.

“When I got to Florida, with all the beauty in nature and the biology of the land, I got involved in wetlands,” Mitsch said.

He received his master’s in environmental engineering from the State University of New York in 1972. By 1973 he had his doctorate in environmental engineering sciences at the Howard T. Odum Center for Wetlands at the same university.

Mitsch came to OSU in 1986 as a professor of natural resources and environmental biology and science. Mitsch has worked on many projects while at OSU, but none is more impressive than the Olentangy River Wetland Park he created and directs.

“It’s sort of a microcosm of the university,” Mitsch said. “It’s what professors are supposed to do.”

He said professors do three things.

“We teach, we do research and we do services. I can’t think of a better setting to do all three than this. It’s our big giant lab out here.”

The Olentangy River Wetland Research Park is north of campus on Dodridge Road. It sits on 30 acres of land once used by OSU for experiments, Mitsch said. He said the university stopped using the land and instead conducted smaller experiments in a laboratory setting because the land was too wet.

“What? Too wet? Perfect. It’s supposed to be wet,” Mitsch said.

He said he lobbed for land close to OSU, and the Dodridge Road area was suitable. But he said his idea did not dominate over night.

“The idea came to me in 1989 but really got going in 1991,” he said.

Mitsch said the digging began in 1993, and the first drop of water was put into the wetlands in 1994.

“Dr. Mitsch is an innovative thinker,” said Cheri Higgins, an OSU doctoral candidate in the school of natural resources. “He has the brains behind the wetlands park. You’ve got to be cutting edge to think ahead of your time the way he does.”

The wetland park is composed of two experimental kidney-shaped wetlands, a stormwater wetland, wetlands, outfalls, a bioswale pond, an oak savannah and the newest creation — the 9,000 square foot Hettich Wetland Research and Education Building.

“Our goal is to get all 50,000 students to — some time in their four years here at OSU — take a class or be exposed to our facility here at the wetland park,” he said.

Describing an experiment at the park, Mitsch said, “We decided to create some floods, so we scheduled them for the first seven days of each month from January through June.”

He said graduate students knew when everything was to occur and were able to set up their instruments and measure whatever they wanted.

“First we brought the wetlands to the students, then we built the Hettich building 50 yards away, and lastly we scheduled the floods for them. You can’t have it any better than that,” Mitsch said.

He said the park is his greatest accomplishment as an ecological engineer.

“This is the greatest facility of its kind, and we’re lucky to have it here at OSU,” he said.

Save for a few minor projects, such as building a small shelter for hikers and creating a system to get information concerning the park to the general public, (“the”) master plan at the wetlands park is pretty much finished,” he said.

He said he and the graduate students who work at the wetlands park give over 150 tours each year to visitors, mostly non-ecology majors.

“I appreciate the fact that 98 percent of the people who come through here are not ecologists,” Mitsch said.

Winston Bash, an OSU alumus and former director of OSU’s Food Industry Center, was on a tour July 21.

“Everything I come here I either see something or learn something new — and usually both,” he said.

Mitsch’s future in large-scale ecological recreation, he said.

“The grandaddy of them all would be tackling the Mississippi River Basin. Fixing a nitrogen problem that occurs when nitrates from fertilizers get into the Mississippi River and flow to the Gulf of Mexico where it creates a dead zone called hypoxia,” he said.

He said the dead zone is about the size of New Jersey, and a possible solution is in using wetlands.

“Wetlands happen to be a system that takes nitrates out of the water,” he said, adding that if people designed a landscape to have wetlands filter the chemical out before it gets to the stream or river, the problem might be stabilized.

For now, however, Mitsch continues to research and inspire future ecologists throughout the country.

“Everyone knows Bill Mitsch. He’s the top wetlands ecologist in the world.”
Cream of the crop
Columbus architects' group gives nod to six designs in annual contest
Friday, December 10, 2004
Mike Pramik
THE COLUMBUS DISPATCH

NBBJ
Merit Award: Heffner Wetland Research and Education Building, Ohio State University

Architectural projects ranging from the Ohio Supreme Court building to a 19th-century barn were honored yesterday by the Columbus chapter of the American Institute of Architects. The association recognized six projects at its 29th annual awards program. It was held at the Knowlton School of Architecture at Ohio State University. Four projects are in central Ohio, one is in Cincinnati and one is in Toledo.

The winners:
Honor awards

Moody Nolan, for Heritage Park, developed for the city of Westerville. The 12-acre park includes the adaptive reuse of the 19th-century Everal Barn, a farmhouse and related buildings that once were owned by Westerville industrialist Charles Everal.

Feinknopf Macioce Schappa Architects, for the Ohio Judicial Center, 65 S. Front St. Feinknopf Macioce led the interior and exterior renovation of the 1930s Modernist-style building, which is the new home of the Ohio Supreme Court.

NBBJ, for the Heart Center of Greater Cincinnati at the Christ Hospital. The hospital underwent a renovation and received an addition. The work aided in patient arrival, consolidated the cardiology-services department