

ej
A magazine
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Misguided tour

A growing ecotourism
industry is wreaking
environmental havoc

An ecotour de force

Spanning the globe, *EJ* explores the growing ecotourism industry



Kristen Tuinstra, a master's student in the School of Journalism at Michigan State University, is editor of *EJ*.

The United Nation's Environment Programme says it won't hurt the natural environment if it's done right. The World Tourism Organization says it will help local people in smaller, developing countries improve financially.

It's ecotourism and this is the year for it—the UN has named 2002 the International Year of Ecotourism. In theory, the endeavor is a nice idea. In 1998, the UN Department of Economic and Social Affairs, along with the World Tourism Organization, declared that 2002 would be ecotourism's year. The group claimed that encouraging ecotourism would in turn encourage a “better appreciation of the inherent values of different cultures, thereby contributing to the strengthening of world peace,” as well as “provide a source of income for many people.”

These statements are understandable and many would agree.

But with the disintegrating Australian Great Barrier Reef and littered national parks to name a couple, the negatives of ecotourism are abundant. If international ecotourism is upped, that's a lot of potential natural damage caused by tourists.

According to a manual written by the UN Environment Programme, “(e)cotourism is responsible travel to natural areas that conserves the environment and sustains the well being of local people.” Is this possible... really?

Scores of nongovernmental organi-

zations are working on programs requiring ecotourism companies, such as boats touring the Galapagos Islands, to be certified. The word “ecotourism” and certification are the growing hand-in-hand buzz-words.

IN THIS ISSUE

Our theme package of articles focus on ecotourism—its lucrative and damaging effects. Read ahead to find out how four reporters view ecotourism in Australia, China, India and Mexico. Leading the section off is an article written by **Eric Freedman**, who questions the ethical angle of writing about sacred or natural places—the more people who know about the place, the more traffic these areas endure, the more damage is done.

Jim Detjen, Director of MSU's Knight Center for Environmental Journalism, recently returned from a five-month stint in China, where he was a Fulbright fellow at Nankai University in Tianjin.

Two international students offer their viewpoints on their own countries' efforts to encourage ecotourism. **Susana Guzman**, a second-year master's student from Mexico, reports on views exerted by non-profit organizations and ecotourism companies in Mexico. **Arvind Diddi**, an MSU Ph.D. student from India,

describes the wildlife in India's jungles and the country's position on ecotourism—India is ready to pounce on Americans' tourism budgets.

Besides the theme group of articles on ecotourism, we have an article on the controversial issue of pesticide usage at golf courses. **Brian McKenna**, executive director of Local Motion, unearths the facts rarely reported on the game of “gowf.”

The grape berry moth, one of Michigan grapes' worst enemies, is the subject of **Natalia Botero-Garces'** article. The author is a Ph.D. student focusing her dissertation on entomology—the grape berry moth, in fact.

Stephen Meador, a second-year master's student, wrote two articles on heated issues: fuel cell technology and carbon sequestration. Meador, a former employee of the National Oceanographic and Atmospheric Administration, details efforts made for CO₂ storage and carbon emissions standards.

TOUR DE FORCE

The UN's efforts to increase ecotourism have left some wondering if it has bitten off more force than it can chew. Is it possible to grow a country's finances, especially a developing country, while simultaneously reducing damage to natural areas?

to the editor | reader comments

“I am very impressed with your program's new magazine. Wow!”

■ Emilia Askari,
Public Health Writer,
Detroit Free Press

“Congratulations to all on *EJ*'s excellent quality and beautiful new look. Interestingly, we also covered the thylacine project (*EJ*, Winter 2002) in the current issue of *Audubon*.”

■ Sydney Horton,
Research Editor,
Audubon magazine

“Great job on the *EJ* redesign! I just picked up my copy.... Very professional design—kudos to all involved!”

■ Christine Manninen,
GLIN Webmaster,
Great Lakes
Commission

“Absolutely fabulous! I loved it! I was really impressed.”

■ Tracey Glazener,
reader

“I needed to read the Techno Kids article (*EJ*, Winter 2002) because lately I've been feeling tension and tingling in my wrists, but didn't know why. After going to the doctor, I found out I have tendinitis.”

■ Name withheld



Wish you weren't here

A proliferation of articles on ecotourism destinations has increased tourist traffic. Locals are now asking writers to cut back on the promotional stories. **page 16**

Beyond the Great Wall

With its doors now open to the West, China is experiencing rapid growth in its tourism trade. But away from the bustling cities is a China still primitive and undeveloped. **page 18**

Mex appeal

Mexican ejido communities have long been sanctuaries of nature and culture. But now the government is promoting those areas to adventure tourists. **page 21**

Jungle fever

With its rich tradition of animal worship and nature preservation, India is host to an abundance of flora and fauna—and it hopes to capitalize on that natural beauty. **page 25**

also | featured stories

Grapes of wrath

Michigan grape growers have long relied on pesticides to protect their crops from the grape berry moth. But new regulations have reduced the number of effective chemicals available to growers, and increased restrictions on remaining products.



page 10

Trees company

Industry has been producing harmful carbon dioxide for years, and now companies are taking steps to clean up their act. Trees, soil and water all provide natural solutions to the growing carbon storage problem. **page 27**



Sub-par for the course

Golfers have come to expect lush fairways and greens on beautifully maintained courses. What few consider, says Brian McKenna, are the harmful effects of the turf-enhancing chemicals used to produce such verdant pastures. **page 12**



Bottleneck on electric avenue

Fuel-cell vehicles have been heralded for years as the solution to America's ever-growing emissions problem. But recent action by Congress and the Bush administration have helped ensure that the country's gas-guzzling culture won't be displaced just yet. **page 30**



et cetera | departments

Campus: Filmmaker Jim Jabara, commentary from Terry Link **page 4** . . . **From the Director:** Jim Detjen in China **page 6** . . .

Names in the News: Latest update on the people of the Knight Center **page 7** . . . **Lakes:** Seney National Wildlife Refuge, endocrine disruptors **page 8** . . . **Nature Essay:** "River Sins" by Nate Matthews **page 34** . . . **Resource:** Online information on this issue's story topics **page 35**

Cover photo by Jeremy Herliczek

Special thanks to Molly Stump for modeling



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Field and screen

Documentary filmmaker will bring world vision to MSU class

By Tyler Sipe

His office is two worlds. One, an office adorned with various plaques showing his accomplishments in documentary film, various pictures of exotic wildlife and a room full of video production equipment. His second office is one that gives him a sense of euphoria, that of being out in nature and enjoying the life accompanying it.

"You can never explain to anyone the feeling of waking up in the morning and riding an Asian elephant," said Jim Jabara, who is owner and creator of Our Small Planet, an award-winning natural history film production company in East Lansing, Mich.

Born and raised in Northern Michigan, Jabara attributes much of his environmental passions to his early childhood development in Michigan's north country. Throughout his youth, Jabara enjoyed hiking through the woods, fishing and rafting.

"I think it's my childhood that brought me the great appreciation for nature and wildlife that has taken me down the environmental path."

And that environmental path has been an amazing and long path of visiting beautiful and exotic locales to document different wildlife.

One site in particular stays within Jabara's mind incessantly: his first documentary assignment 12 years ago.

"Nepal will always be dear to my heart," he said of his experience in the tropical low-



Photo by Tyler Sipe

Documentary filmmaker Jim Jabara has more than 20 years experience producing nature films. This fall, he teams up with Knight Chair of Environmental Journalism Jim Detjen to teach a class on environmental filmmaking. "I hope to learn what are the issues students feel are important and become a better mentor through their insight," Jabara said.

lands of the Royal Chitwan National Park in the Terai region of Nepal. "Sleeping in the foothills of the Himalayan Mountains really makes an impression on you.

"Everything about that country is very beautiful and very spiritual."

Jabara has more than 20 years of professional experience and over a dozen documentaries under his belt. His experiences in those years have left him with incredible stories and memories.

One such story occurred along the Karnali River in Nepal.

Jabara and a local tour guide climbed up a tree to get a shot of a male Asian elephant. The tour guide insisted that the climb up the tree was a bad idea, after telling Jabara several stories of irate elephants killing local people.

Jabara took the guide's word, but persisted up the tree to get

"I think the picture comes naturally. I believe it is possible to have a spiritual level with nature."

Jim Jabara,
owner and creator, Our Small Planet

the shot for his documentary on the three Asian subspecies of elephant. After filming the elephant for about 30 minutes in the tree, the two decided to get a closer look at the elephant through the tall grass surrounding him.

The elephant lay there silently, eyeing the two cautiously from 20 yards away, while throwing dirt on his large body to cool down under the hot sun.

Suddenly the batteries ran out in Jabara's camera, so the two decided to call it quits temporarily. As they walked away, something provoked the animal, perhaps a broken twig, recalled Jabara.

"In an instant, we heard the elephant get up and charge our way," Jabara said. "The two of us had about 30 to 40 yards to run down the river."

And that's what they did, running for their lives, sliding down the steep river bank and ruining Jabara's video equipment in the process.

While all this was happening, Jabara's wife, Josephine, sat in horror across the riverbank watching the action unfold through her binoculars.

"I could see the whole time that the elephant was watching Jim like a hawk," Josephine said. "Looking and listening, looking and listening."

"That's when I decided to get in the canoe, but not after taking a snap shot of the elephant on top of the riverbank."

While Jabara and the tour guide made it safely across the river, the elephant stood at the top of the riverbank cliff, stomping his feet into the ground. The elephant then proceeded to butt its head into the large tree the two had been filming from, emphasizing the enormous command of power he really had over the two relatively powerless humans.

"It's these stories that we have together and that we can tell our kids," Josephine said.

But to understand the stories, you have to understand the roots of Jabara's production life, which began at Michigan State University. In 1978, he earned a Bachelor of Arts in environmental education.

"A couple of years ago, we were at an alumni dinner (for Education alum)," Jabara said. "The crazy thing is that environmental education is extinct."

Jabara said he accumulated much of his video production knowledge from telecommunication and film classes, and his environmental education degree helped him write the script for many of his informative documentaries for TV and children's programming.

He is taking his experiences to start a new generation of wildlife documentaries and not let the knowledge he garnered become extinct like many of the animals he brought to the attention through television.

In fall 2002, Jabara will team up with MSU's Knight Chair of Environmental Journalism Jim Detjen to instruct environmental filmmaking.

The course will involve production as it applies to professional environmental motion pictures: the sound, the narration, use of interviews and how to piece the overall package together as an environmental story.

"I hope they walk away with a tape they can show some agency or potential employer," Jabara said. "I hope to learn what are the issues students feel are important and become a better mentor through their insight."

"I think the picture comes naturally. I believe it is possible to have a spiritual level with nature."



GUEST COMMENTARY • TERRY LINK

Forget Wall Street, focus on environmental stock

It is not an infrequent occurrence to hear reports of stock prices, inflation and Gross National Product (GNP) numbers with most news broadcasts these days. Most daily newspapers have a business section or at least a page devoted to business issues. There's a saying that you are what you measure, so by that standard how do we appear?

Look at what the media tell us:

"The Dow Jones tumbled 170 points on heavy trading of more than one billion shares."

"Consumer confidence is lagging, dropping 0.2 percent from last month's figure."

"Wholesale prices rose 2.3 percent for the month, hinting that demand for products may once again signal a rebound in the economy."

Given this standard then, that we are what we measure, it should be no surprise that we have become "homo economus." By constantly trying to measure wealth by GNP and stock prices, we tend to idolize consumption, while we devalue much of what gives life its true meaning—namely our connections to each other and with the marvelous and mysterious spinning sphere that provides us with life.

Why, for instance, do we hear no reports of the Earth Charter in our daily news? A search of the Lexis-Nexis General News database finds only seven articles related to the charter in the past six months. This despite the fact that it was discussed at the United Nations Rio+ 10 Summit in Johannesburg and before the UN General Assembly. Given the U.S. government's recent go-it-alone practice, perhaps it's not surprising that a document that picks up where the Universal Declaration of Human Rights leaves off is not discussed on Capitol Hill let alone in the press.

The Earth Charter is the product of a decade long, worldwide, cross-cultural conversation about common goals and shared values. Its 16 principles address not only ecological integrity, but also social and economic justice, democracy, nonviolence and peace, and care and respect for the community of life. The U.S. Conference of Mayors has endorsed it as have hundreds of organizations and communities from around the world. Why is the charter so invisible in this country?

I believe it's past time for our daily press to give citizens equivalent daily reports on the health of our biosphere. Why not report on the spread or decline of disease in humans, animals and plants? Or give regular updates on receding glaciers, severity of storms or increased rider-

ship on mass transit and its effect on reducing pollution? A daily report might sound like this:

"Energy consumption was up briskly in June. But on a bright note the percentage of power generated from renewable resources climbed 25 percent faster than the overall increase. This has resulted in an overall drop in greenhouse gas emissions despite the rise in overall consumption."

How about we start reporting not only raw agricultural statistics production but also the implications of those numbers, such as, "Michigan saw its consumption of lettuce produced locally climb 19 percent from last year, perhaps because local growers were more effective in marketing locally grown food. This boost in the state economy is welcomed. The diminished transportation need of locally produced food has other advantages for state residents. The reduction of air pollution, traffic congestion and noise with a simultaneous increase in the freshness of produce is a bigger benefit for consumers."

We must understand that the condition of our air, land and water is more important than fluctuations in our stock portfolios. Making environmental information more prominent and regularly available as we do with stock prices and business reports would be a step toward crucial mindfulness.

We might even copy a Wall Street/business reporting model and highlight a socially or environmentally responsible firm or organization that is developing products, services or processes that help build more sustainable communities. We need all the hope we can find.

We need to nourish the entrepreneurial spirit towards community solutions. And we need the mass media to give more of its news hole to report daily on the indicators of total community health, not simply the sterile financial numbers. If we were to give at least equal play to the natural world, we might just create a future where all will flourish. We ignore our environment at the peril of our children and grandchildren. By offering regular daily doses of the health of our planet, the media will be a more responsible partner in its recovery. By making visible more measures of what we value, we just may nurture a transformation to a more sustainable society.

Terry Link is director of the Office of Campus Sustainability, adjunct faculty member with the Liberty Hyde Bailey Scholars program and a librarian at Michigan State University.

from the director | jim detjen

Promoting a worldwide culture of peace



Jim Detjen is a professor and director of the Knight Center for Environmental Journalism at Michigan State University. He is the founding president of the Society of Environmental Journalists and was president of the International Federation of Environmental Journalists from 1994 to 2000.

I returned to the United States in mid-July after spending nearly six months teaching at Nankai University in Tianjin, China as part of a Fulbright Scholarship. It was a remarkable experience in so many ways. I lectured about American journalism in newsrooms and at universities throughout China.

At Nankai University I taught a course in environmental journalism. My students were wonderful—bright, curious, hardworking and idealistic. They also had an excellent command of the English language.

In teaching in a developing country it is important to be resourceful. We lacked many of the things taken for granted in America. At many universities it was nearly impossible to obtain audiovisual equipment—such as an overhead projector, TV or VCR. Our access to the Internet was limited, both because of the shortage of computers and because many Web sites were blocked by Chinese censors.

So, I learned to take advantage of opportunities as they came up. During a bus tour of a scenic gorge north of Beijing, I accidentally met a young Australian, Mark Wayland. He had traveled from his home in Melbourne, Australia to work on an innovative UNESCO project, called the Culture of Peace News Network.

The goal of this news network is to create a culture of peace and nonviolence around the world by encourag-

ing people to communicate with individuals in many countries through e-mail and Web sites. It is his belief—and one that I agree with—that much of what people know about other countries is through negative reports in the news media. For example, news organizations usually report almost exclusively about famine, disasters, political unrest and other problems in other nations. But by only reporting negative news, people's views about these countries are skewed in unfavorable ways. Rather than cherishing the cultural differences between nations, people become fearful of them and this contributes to a climate of distrust and hate. The goal of the Culture of Peace News Network is to communicate about everyday life in many different countries and to explain cultural differences through the eyes of average citizens.

My students wrote essays about many aspects of Chinese life for the Peace News Network. They wrote about the winter snow festival in Jilin, China; eating dinner outside at sunset with their families in rural China; observing fireworks with their friends; playing the piano during the Chinese spring festival; watching meteorites soar through the night sky and listening to the heartbeats of their boyfriends.

Mark and I edited these essays and posted many of them on the Culture of Peace News Network for people from

around the world to read. Similar stories about life's simple pleasures have been written by participants in Russia, France, Spain, Greece, Jordan, Japan, Argentina, Australia and the United States. These articles provide a remarkable view about life around the world and show that the positive values most people share are far greater than their differences.

When I've talked about this project with friends, some journalists wonder if the Peace News Network is really journalism. After all, some of the "news values" that journalists traditionally look for include conflict, controversy, timeliness and celebrities.

Most of the stories posted on the network don't involve famous people, conflicts or controversy. Instead of being timely, these articles deal with timeless themes. These articles don't deal with negative aspects of a culture; instead they celebrate the positive aspects of life.

By traditional journalistic values, these stories aren't newsworthy. Yet, they capture a sense of everyday life in China, Russia, Jordan and other nations that is usually lacking in the news media and in popular culture. They show signs of joy and hope and real community around the world in contrast to the daily barrage of conflict, violence, sex, celebrities and commercialism that appears in much of the mass media.

Eric Utne, the founder of *Utne Reader* magazine, wrote a beautiful essay on the media in a book called, "Imagine: What America Could Be in the 21st Century," which was edited by Marianne Williamson. In it he makes the provocative statement that the popular media "have been the principal destroyers of community around the planet over the last 100 years."

He argues that the mass media "barrage us with an unrelenting cascade of mindless entertainment and commercial drivel." He notes that the mass media's emphasis on controversy, violence, sex and celebrities are undermining community by distracting us with information that separates us from our neighbors.

Photo by Connie Detjen



Jim Detjen lectures about life in America to students at a middle school in Tianjin, China, in May 2002.

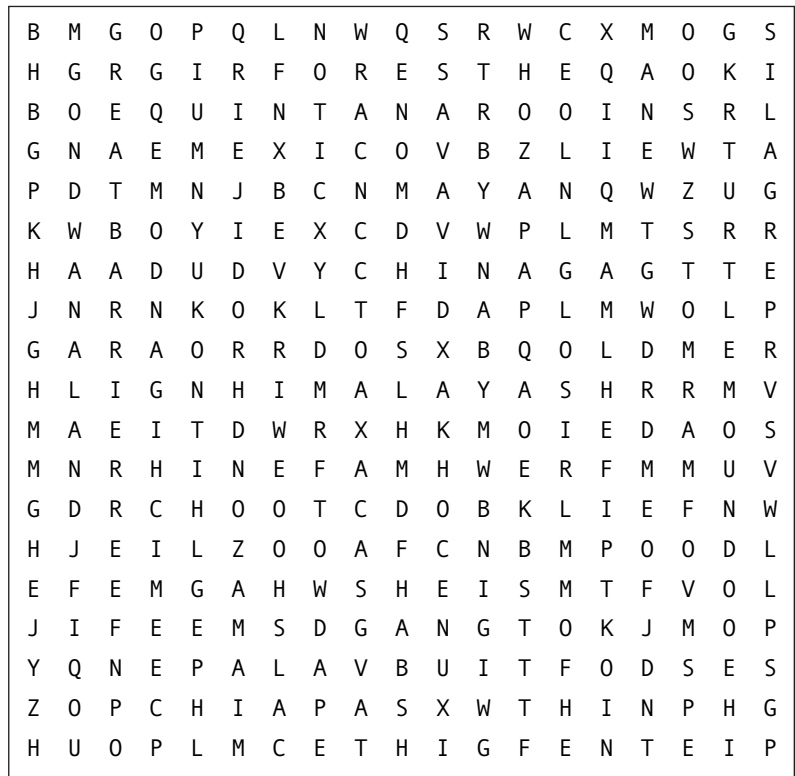
continued on page 33 ►

Word Search: Places in EJ Magazine

created by Kristen Tuinstra

Find the following places mentioned elsewhere in this issue of *EJ*. Words can be found horizontally, vertically, diagonally and backwards. The solution can be found on page 33.

- | | |
|---------------------------|---------------------|
| Amazon | Marmots |
| Chiapas | Mayan |
| China | Mexico |
| Ejido | Michigan |
| Gangtok | Monsoon |
| Gir Forest | Nepal |
| Gondwanaland | Oaxaca |
| Great Barrier Reef | Quintana Roo |
| Himalayas | Turtle Mound |
| India | Yukon |



NAMES IN THE NEWS

LAUREN BURDICK, a graduate of South Lyon High School in Salem Township, Mich., and winner of the high school environmental journalism \$1,000 scholarship, served two years on her school newspaper as a columnist, reporter and news editor. She is now a freshman at MSU's School of Journalism. In high school, Lauren ran cross-country, was secretary for the National Honor Society and tutored a fourth-grader. She enjoys travelling and has visited Australia, New Zealand and Central America. She visited two rainforests and snorkeled along the Great Barrier Reef. Someday she hopes to write for a newspaper or magazine.

JIM DETJEN spent five months in China on a Fulbright fellowship, teaching the first environmental journalism course in China at Nankai University in Tianjin. He gave more than 30 lectures throughout China on environmental journalism, freedom of information and news media ethics.

ARVIND DIDDI recently traveled to Australia to serve as the teacher's assistant for Professor Folu Ogundimu for the study abroad course Australia's Media and Environment. While in Australia, he went bungee jumping and parasailing.

ERIC FREEDMAN, assistant journalism professor, taught at the International Journalism Faculty of Uzbek State World Languages University in Tashkent as a Spring 2002 Fulbright senior scholar. His classes for undergraduates included Modern International Reporting, Feature Writing, the Art of Reporting and the country's first course on environmental and science journalism. Journalism students in Uzbekistan lack textbooks, a comprehensive library and easy Internet access, and their classes are traditionally more theoretical than practical, a legacy of seven decades as part of the Soviet Union before independence in 1991.

SUSANA GUZMAN is working on her master's thesis, which is a sur-

vey of Mexican Environmental Journalists. She is also putting together a Latin American Conference for Environmental Journalists in Mexico, which is scheduled for January 2004. She enjoyed a brief trip back to Mexico, her home country, to visit her friends and family before heading back to MSU.

JEREMY HERLICZEK is a master's student studying visual journalism at MSU, and a photography instructor at MSU and Lansing Community College. When not freelancing as a photojournalist, he conducts documentary photography workshops aimed at helping communities learn more about themselves. He is also a partner with The Global Workshop, LLC, a cross-cultural communication company.

STEPHEN MEADOR has a master's in environmental engineering and worked for the National Oceanic and Atmospheric Administration for 10 years as a commissioned officer. He served on three research ships that traveled all over the world, including Antarctica. He also was involved in hazmat response in New York

Harbor. After graduation, he hopes to work for public radio or television, or be a freelance science and environmental magazine writer.

ALEX NIXON is a first year master's student in the environmental journalism program. He received a B.S. in biology from St. Lawrence University and has spent the past two years working for two scientists studying the biogeochemistry of the Hudson River. His other interests include skiing, rock climbing, photography and hiking with his dog Chopper. Upon completion of his degree, he hopes to start a career as an environmental journalist at a major newspaper or magazine.

TYLER SIPE is a photojournalism junior emphasizing in environmental studies. This fall, he will be photo editor for MSU's *The State News*, the largest collegiate newspaper in the nation. His ultimate goal is to be a photographer for a newspaper or *National Geographic*.

CORBIN SULLIVAN is a first year master's student in the environmental journalism program. Corbin received a B.S. at the University of Wisconsin-Madison, where he was

a regular contributor to the science section of the *Daily Cardinal* school newspaper. He is continuing a research internship with Marshfield Clinic and hopes to work for *National Geographic* or a similar magazine upon completion of his degree.

KRISTEN TUINSTRA is working on her master's project, which is a five-year business plan for *EJ*. She received the 2002 Rachel Carson Award for Environmental Journalism last spring.

RANDY YEIP completed his master's in journalism at MSU in May and was named the School's Outstanding Graduate Student. He runs a design consulting business, Raydar Media, and recently finished a redesign of the *Hillsdale* (Mich.) *Daily News*. He also redesigned the Web site for the Knight Center for Environmental Journalism (environmental.jrn.msu.edu). He continues to serve as art director for *EJ*. In conjunction with the Michigan Press Association and the MSU School of Journalism, Randy is planning a newspaper design seminar for the spring.



If you seek a pleasant peninsula...

UP's Seney National Wildlife Refuge offers abundant opportunities

By Erik McGregor

Great Lakes residents have outdoor adventure accessible to them by simply getting in the car and driving. In a few hours they can be at a tranquil lake fishing for bass, wading into a productive trout stream or in a dense patch of wilderness.

For those who want to be away from it all and witness nature at its finest, Michigan's Upper Peninsula may be the destination for them. Lured by a vision of vast stretching timber, swamps, rivers and lakes intertwined with wildlife few people have ever seen, outside a zoo or documentary, millions of people flock to the UP.

Visitors bring their family, boats, camping gear and all other equipment imaginable on their journey into the unknown. They also bring money with them, and lots of it. According to MSU Extension's tourism team, an estimated \$5.1 billion in 1996 was spent in the UP, thanks to tourists. Almost immediately after one crosses the bridge it becomes apparent that small towns near the Mighty Mack thrive on tourists.

Speeding across I-2, the main highway running east and west, you get a breathtaking view of the coastline with its randomly dispersed, uninhabited islands offshore. What you also see, even if you don't want to, are the many signs designed to pinch a penny out of every traveler on the road.

The signs for pasties are the most unavoidable, almost outnumbering the visitors, fol-

lowed by maple syrup, "up north" relics and, of course, motels upon motels. All along the southern shore vendors, shops and motels are desperately searching for the next passerby who might stop at their stand, store or motel to spend a few bucks.

For those who venture less than an hour from the bridge this is all they will see, a stretch of tourist towns. The gas stations and fast food joints aren't out of reach for them, so they aren't out of their comfort zone. But for us, we will pass all of this. We will go headlong into the less populated and commercialized UP.

The Mackinaw Bridge Authority reported that 4,755,886 vehicles crossed the bridge in 2000. For those who pass the tourist towns in search of something more secluded the trip could take eight hours or more. Fortunately for myself, and many others, the trip will not be that long. Just a couple of hours after crossing the bridge one can come to rest at the Seney National Wildlife Refuge (SNWR).

Located five miles south of Seney, Mich., the refuge is over 95,000 acres that is host to a multitude of wild attractions. Locally, SNWR is known as the Great Manistique Swamp because of the expansive swamps and bogs in the area. More than 100,000 visitors come to SNWR each year in search of a verity of wildlife and wilderness landscapes.

The refuge's diverse landscape enables it to support many of the



A gaggle of geese take flight over a serene body of water at the Seney National Wildlife Refuge in Michigan's Upper Peninsula.

"The wildlife comes first, then the public uses, never the other way around."

Tracy Casselman,
manager, Seney National Wildlife Refuge

popular animals to which tourists are attracted. Some of the more sought after animal attractions include ducks, bald eagles, ospreys, loons (the largest reproductive population in the continental 48 states), trumpeter swans, otters, beavers, pine martens, black bears, moose and wolves. With so many of these species on the endangered or threatened species list it's no surprise thousands of people are drawn to the area.

With the arrival of people comes money, along with problems and concerns for the protection of wildlife and natural resources. Litter, illegal camp-

ing, hunting, fire and overexposure are all issues the refuge officials must address.

Tracy Casselman, Seney National Wildlife Refuge manager, oversees the refuge and decisions that relate to how much, or little, the public is allowed to utilize the area. Casselman became the manager of the refuge after he moved from New Jersey about a year ago. With Casselman's transition came a new and different set of challenges than what he was accustomed to as the Deputy of Forsythe and Cape May National Refuge. Both the refuges in New Jersey are quite a bit smaller

Photo by Erik McGregor

than SNWR (Cape May is 8,000 acres and Forsythe is 43,000 acres), but the number of tourists that visit the NJ refuges is much larger.

SNWR has up to 50,000 automobiles travel the auto tour route (open May 15–Oct. 15) in any given year, whereas New Jersey has up to 250,000 automobiles on its tour route. Casselman says, “The difference is night and day (between Michigan and New Jersey). There are more people in one county (of New Jersey) than the entire UP.” During a particular winter in New Jersey, one snowy owl increased the visitors by 500 percent for the month of December, he said.

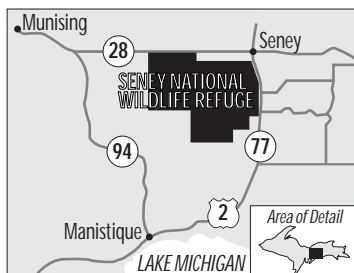
“There is little or no vandalism in the refuge, only half- to a dozen incidents and a few game violations per year,” Casselman says.

Casselmann doesn’t find things like beer parties and drugs in SNWR like he found in the New Jersey refuges. “Last year someone cut a lock to a trail and set up camp for the night,” he says. Still, Casselman and his staff must make what they call “compatibility determinations” on behalf of the wildlife.

The staff must assess every proposed human activity and determine if that will have a negative effect on the land or wildlife. As a result of compatibility determinations there is no camping, horseback riding or snowmobiles allowed on the refuge. Activities of that nature are not worth the impact on wildlife, Casselman says.

Other activities, like the autoroute, have been deemed acceptable. Casselman says, “Certainly there is an impact on the wildlife but it’s worth the tradeoff.” He continues, “The wildlife comes first, then the public uses, never the other way around.”

When a problem with the autoroute arises, there are certain measures that can be taken to eliminate them. For example, last year the autoroute was detoured because it came within twenty feet of a bald eagle’s nest.



Fish in Great Lakes spawning research, but still no young

Researchers blame endocrine disruptors for population's inability to reproduce

By Aaron Johnson

There didn't seem to be anything wrong chemically with the fish in some of the Michigan lakes.

Yet World Wildlife Foundation senior scientist Theo Colborn and other researchers never saw the fish populations spawn any young.

“The only reason young’uns were being produced was because we were stocking the lakes,” she says.

After some studies, the culprit turned out to be a chemical disrupting the hormones in the adult fish—not the direct effect associated with other “nasties” like PCBs or dioxins.

“These things don’t cause cancer and that’s why we thought they were safe,” Colborn says. “We were misled.”

Since 1962, with the publication of Rachel Carson’s “Silent Spring,” scientists have noted the major role of chemical pollutants in the environment.

But an outgrowth of research on the Great Lakes has connected them all—PCBs, dioxins, some flame retardants, plasticizers, even Carson’s most despised, DDT.

“Actually they didn’t know DDT was an endocrine disruptor until just recently,” Colborn says. “It is quite a powerful anti-androgen and we didn’t even know there were anti-androgen chemicals until about seven years ago.”

DDT and a growing list of other chemicals have all been found to be endocrine disruptors, a broad term that covers any chemical that interferes with an organism’s hormone system.

Endocrine disruptors first came to the attention of the public after Colborn authored the 1997 book “Our Stolen Future,” which helped her win the Rachel Carson Leadership Award.

The book was the result of Colborn’s work on a technical book on the subject and her experience in 1997 working on a team looking at the state of the Great Lakes.

Until then, Colborn said many of the chemicals had been thought to be safe since they didn’t cause cancer but evidence of birth defects caused the issue to be pursued.

“The individuals aren’t constructed the same way,” she says. “They don’t function the

same way. You’ve got immune systems that don’t work the same way. You’ve got brains that don’t work the same way.”

The chemicals normally don’t affect adult individuals but even small concentrations during early developmental stages can cause birth defects.

In humans, such defects include childhood diabetes, childhood arthritis and autism, which has increased 100 percent in the last 30 years.

And much of the development in the study of the chemicals has remained where it started—in the Great Lakes, says Tracy Easthope, director of the environmental health project at the Ecology Center in Ann Arbor, Mich.

“The reason why the focus on the Great Lakes is because they have a long residence

time, they stay around here because the lakes aren’t flushed out all that often,” she says.

“It’s a particular ecosystem, it’s an interesting place to study them.”

Although several lists of endocrine disruptors exist, regulations are hard to put in place. The U.S. Environmental Protection Agency is working to come up with a system to test potential endocrine disruptors.

Current efforts are focused on verifying a list of assays, which could then be used to test a list of chemicals, EPA environmental scientist James Kariya says.

Such efforts would go a long way to solidifying what the problems are and how to deal with it since there is still no course of action to guide companies thought to be contributing.

Business public issue leader for Dow Chemical Mark Walton says Dow probably is creating endocrine disruptors but there is no way to know if the company is causing any problems.

“Dow produces a lot of chemicals,” he says. “And some of them might be on lists that some would suspect to be endocrine disruptors but there’s been no evidence that they are at the exposure levels you’d expect that we might emit from one of our plants.”

“These things don’t cause cancer and that’s why we thought they were safe. We were misled.”

Theo Colborn, senior scientist, World Wildlife Foundation

Grapes of wrath

Michigan grape growers keep a watchful eye on the grape berry moth

By Natalia Botero-Garcés

“Did you catch any bugs yet? Are they flying?” are questions researchers in entomology (the study of all six legged creatures) get all the time. Now, it is Rick Brown of Lawton, Mich., who wants to know if there are any grape berry moths flying. This insect is not new to him. Brown has dedicated his life to the culture of juice grapes.

Michigan has around 12,000 acres of juice grapes, mainly in Berrien and Van Buren counties, in the southwest region of the state, where the proximity to Lake Michigan creates conditions that allow fruit production. Rolling vineyards meet the woods in this region favored by gusty winds and mild temperatures. The small hills appear combed by trellises where the vines rest and grow under the sun during the summer. Even in winter, when only snowmobiles can get nearby, the vineyards look healthy and clean, every row glistening in the sun.

Each year, around 70,000 tons of juice grapes are harvested, ranking Michigan the third grape producing state in the country, behind California and New York. These grapes go to the juice company Welch’s in Lawton, where trucks heavy with harvested grapes arrive throughout September and October to deliver their load. They are met by testing personnel, who sample each one-ton bin before the grapes are accepted.

WHEN THEY'RE NOT ACCEPTED

Growers like Brown must pass quality standards set up by the government and required by the company so that juice of good quality can be made. These include clarity, sugar content in the berries, adequate berry maturity and damage levels below a certain level. In all cases, the grape berry moth plays a critical role: since not only is there a threshold of less than 0.5 percent of the berries’ weight in damaged grapes allowed per load, but also because the presence of the worms inside the berries induces diseases like botrytis and black rot, which diminish the sugar content of the sample. Any load that does not comply with U.S. Department of Agriculture standards will be rejected.



Photo by Paulus Seares

Without the use of pesticides, grape growers suffer serious damage to their crops. “The [grape] berry moth is one of our top four or five pests,” said Rick Brown, a grape grower from Lawton, Mich.

For Michigan grape growers, a rejected load for any of those reasons can only mean one thing: disaster. The grapes will usually be disposed of back in the vineyards, to decompose on the ground.

“I remember a whole vineyard that wasn’t even harvested,” says Brown. “The people at the company went in there and told the grower the grapes were too poor to be accepted.” Apparently, the grower had thought nature would do its job with his grapes and protect them from harm if he didn’t spray. It didn’t work.

Brown is a third generation grape grower. His grandfather started growing grapes in 1923. Rick Brown tends to some 170 acres, half of which are his or his relatives’ grapes and the other half are leased. He

has seen advances in equipment, such as improved mechanical harvesters that provide a more uniform and cost-effective harvest. He has seen trends shift, from a demand for fresh market grapes to more processed grapes, and has had to replant and change accordingly.

“The [grape] berry moth is one of our top four or five pests,” he says. “If you didn’t do anything to control it, you’d lose the whole crop.” And although there is no record in Michigan of the grape berry moth losses, he suspects that it would probably be high. Even assuming a conservative 10 percent reduction in yield to grape berry moth and the associated diseases, this pest would cost the Michigan grape industry \$1.8 million per year.

BERRY MOTH'S COURTING RITUAL

In this romantic setting, among grape leaves and tiny clusters of flowers, researchers believe boy meets girl, girl likes boy, for the grape berry moth.

Or not quite like that: with this moth, the female chooses. In a particularly interesting sexual behavior, female moths emerging from their cocoons do not need to look for males because they possess a special "sexual weapon"—a pheromone they use to attract them.

Pheromones are chemicals emitted by insects in order to communicate with members of their species, in this case, to communicate sexual availability and location. The female releases pheromone by exposing a gland she has on the tip of her abdomen. The wind helps carry the pheromone away, much like a wisp of smoke, to be encountered by a lucky male or maybe more. Male moths follow the "plume" back to its source and find the female. After a few courtship behaviors, mating then takes place.

Rufus Isaacs, an entomologist at MSU, likens the pheromone-finding episode to what happens with people at a bar. "In a bar full of odors, a woman wearing a particular perfume will attract men who like her scent. A man may smell many things at a bar, but will follow the perfume until he meets the woman who wears it," says Isaacs.

CAPTURING AND TAMING THE MOTH

The importance of the fact that female grape berry moths attract males with a scent did not escape researchers, who in 1954 were able to synthesize the pheromone in the laboratory and test it in the field. Rubber lures that were soaked in this man-made sex pheromone are used today as bait to attract males into traps lined with a sticky substance to capture them.

It is through this trapping system that the first appearance of the moth can be detected. "We put these traps in vineyards before April 20, which is the earliest we have seen this moth come out. Once we have caught the first male, we can monitor the moth's presence and have an indication of when to start taking preventive measures," says Keith Mason, a technician at MSU's Small Fruit Entomology Laboratory, who is in charge of conducting pesticide experiments, among others, in Michigan vineyards.

Management of grape berry moths involves pesticide applications, typically an organophosphate or carbamate. While insecticides often are the most effective and inexpensive method of controlling insect pests, there are some unintended consequences of

What is a grape berry moth?

Endopiza viteana, the moth's Latin name, is classified in the Tortricidae Family, Order Lepidoptera (the same as all butterflies). In spite, or because, of its coloring, it is difficult to see grape berry moths on grapevines because they scarcely measure more than an inch and spend their days on the underside of leaves.

This insect is a native of eastern North America, where it remains the single most important pest of cultivated grapes. Since it can only feed on grapes, the moth evolved in woods where wild grapevines grow on trees. After the logging trend of the past century and today's urban sprawl, wild grapes are also found on roadsides and hedges, near houses and barns, and on electricity cables, growing wherever they can find physical support.

Some people use wild grapes like ivy is used, to cover garden hedges and decorate backyards. In spring, the bloom decorates the vines, and later the appearance of berries creates a Mediterranean look that can be called romantic.



Photo by Natalia Bolten-Carros

their use. The long-term environmental impacts of pesticides are of greater and greater concern to the public and regulators. Residues on agricultural workers and in food are driving a reexamination of chemical use in food crops. New regulations by the U.S. Environmental Protection Agency have reduced the number of effective chemicals available to growers, and increased restrictions on remaining products.

"The government is taking away chemicals that do a good job and are safe to use and leaving us with the problem," says Brown. To him, environmentalists are too removed from the real situation. "Meanwhile, other countries ship in their product and they are not subjected to the same regulations we are," he continues, "which allows them to compete with a cheaper international product. What can we do?"

Growers must use the few available pesticides in the most efficient manner. Spraying too little may mean a pest outbreak, but spraying too much can fuel development of a critical problem in agriculture, that of resistance in insects.

FIRST MOTH SIGHTING

Finding the first moth is important for growers because they need to plan their management schedule for the growing season. But decisions, most of them depending on the weather, are not taken in the same way. Some growers will spray if they believe (mainly through hearsay) that grape berry moths will cause damage before harvest. Others, like Bryan Cronenwett of Lawton, spray according to what they see in their vineyards, tailoring their spray program to their scouting for damage.

"There is a lot of damage on that end," he signals at a vineyard edge right next to

very dark and lush woods. The first row of trees presents a drastic contrast with the organized rows of vines. They tower over them and bring shade in the summer and fallen leaves in the fall. Over the branches, wild grape grows and thrives, pulling the trees down by their sheer weight.

These wild habitats near vineyards are cited as responsible for grape berry moth damage in grapes. Researchers in New York and Ontario established a few years ago that proximity to woods is a risk factor for infestation by grape berry moth in a vineyard. Typically, edges of vineyards that border woods show four to 10 times more damage than any other place in the vineyard. However, one thing that boggled New York scientists is how so much damage can be found at a vineyard edge where few moths are caught. Their guess was females were flying in from the woods, where there are wild grapes, and laying their eggs on the vineyard grapes. Because males are attracted to the trap, but females are laying the eggs, so few grape berry moths were caught in the woods or at the vineyard edge.

MSU's Small Fruit Entomology Laboratory have come up with a different theory. Work carried out by a graduate student showed the height at which the traps are placed could be more relevant than thought before. In studies during 1999, traps were hung at the edge of woods at four heights: five, 10, 20 and 30 feet above the ground. The idea was the moths were flying higher to reach wild grapes climbing on trees, sometimes higher than 50 feet. About 70 percent of the moths caught during that summer were caught at 30 feet high, compared to only 6 percent of the moths caught at five feet.

continued on page 32 ►

Sub-par for the course

Duffers, beware—lush fairways and greens come at a cost

"My kilt's stuck in the rough, and my pebble's gone down a rabbit hole!"

In the 15th century Scottish game of "gowf," players hit a stone around a natural course of rabbit runs, ravines and gullies using a stick or club. The coastal landscape was etched by sand dunes and hollows formed by strong winds and seawater.

How times have changed. Today golfers drive with titanium clubs and gasoline carts on an unnatural, sanitized grass surface. The world's estimated 50 million golfers are inordinately influenced by the sport's premier event—the staid Master's Tournament in Augusta, Georgia—to expect unblemished perfection on the course.

When CBS showcased the 2002 Master's last April they displayed impeccable greens of expensive "bent grass," which gives the ball added speed—but only because agronomic specialists trim the greens to 1/8 inch to achieve the desired effect. Unknown to many, Augusta closes down for six months after the tourney, in part to let the grass recover.

In contrast, Scottish gowfers relished imperfection. Their swings were thoroughly adapted to the coast's craggy dispositions. Rabbit runs—open tracts where hares linked their burrows in the dunes—were perfect fairways for the early golfers. Foxes and hunters expanded the runs as time went by.

Golf courses have expanded exponentially in the 20th century, displacing foxes and hunters. There were 10,848 golf courses in the U.S. in 1970. By 2000, this had increased to 17,108, according to the National Golf Foundation. The links cover enough land to encompass the states of Delaware and Rhode Island combined, about 4,000 square miles. Moreover, in 2000, each U.S. golf course used enough water to satisfy the needs of 8,000 people for a year, according to the National Geographic Society.

Worldwide there are more than 25,000 golf courses covering roughly 11,000 square miles, about the size of Maryland. In Japan, the numbers are telling. After WWII there were only 23 golf courses. By 1994 this had ballooned to about 1,700. Golf courses are one of the fastest growing types of land development in the world.

In this obsessive quest for tee, an invasive species called *Homo Sapiens* gobbled up forests, destroyed wetlands, expunged native flora and fauna, including insect pollinators necessary for species diversity, and, less emphasized in public discourse, have most probably seriously harmed human health, via endocrine system insults and cancer.

As a result, golf course development has emerged as a major social and environmental issue across the world, igniting activists. The Global Anti-Golf Movement was ushered in on World No-Golf Day, April 29, 1993, following a three-day conference on Golf Course and Resort Development in Penang, Malaysia. The three sponsoring organizations were Japan-based Global Network for Anti-Golf Course Action, the Malaysia-based Asia-Pacific People's Environmental Network and the Thailand-based Asian Tourism Network.

The Anti-Golf Movement Manifesto calls for an immediate moratorium on all golf-course development, an open, public environmen-



UNEARTHED

A closer look at health and environmental issues

BY BRIAN MCKENNA

tal review/audit of existing courses and the conversion of existing courses into public parks. The Manifesto rejects "the myth of 'pesticide-free' or 'environmentally friendly'" golf courses. "We appeal to golfers to be fully informed and aware of the adverse environmental, health and social impacts of golf tourism," they implore.

The movement recently suffered a tragedy. On March 4, 2000, two anti-golf activists were killed in the Philippines by unidentified men believed to be private security guards. The victims were opponents of a grand real estate development project in Nasugbu, Batangas, about 80 kilometers south of Manila.

The anti-golf movement might as well be taking place on Mars, for all the golf industry is concerned. Nearly 1,000 new courses are planned this year and some industry proponents hope for 200 million golfers worldwide soon. In his 2001 offering, *Fore! Play, The Last American Male Takes up Golf*, comedian Bill Geist calls the game, "white middle class crack," as a partial explanation.

Denial is another part of the puzzle. I recently interviewed a Michigan golf groundskeeper who asked me incredulously. "What's wrong with golfing? Why does everyone pick on us? We are environmentalists too."

"When I apply pesticides I use the minimal amount suggested," he said. But then he made it clear that he intended to use one hazardous pesticide until its legal phase-out in a few years, rather than substituting a less-toxic or non-toxic alternative right now.

The groundskeeper pointed to the United States Golf Association, the American Society of Golf Course Architects and several professional golfers, like Arnold Palmer, who have made efforts to save natural ecosystems, improve pesticide application practices and conserve resources. These efforts were inspired by Audubon International, the Garden Club of America and the U.S. Department of Interior, among others. Instead of fighting the golf industry they are working to foster an environmental ethic among golf course managers. They've been at it for about ten years now.

But that ethic is heavily resisted. The Michigan Turfgrass Environmental Stewardship Program was established in 1998 to promote "green" practices among reticent golf courses, where owners are used to the old way of doing things. It's a cooperative project between the Michigan Department of Environmental Quality, Michigan State University and the Michigan Department of Agriculture. For a bargain basement fee ranging from \$75 to \$150 dollars, a golf course can voluntarily become a member, attend a workshop and receive a site visit where a confidential three-year environmental action plan is developed. The program provides training on leaking underground storage tanks, pesticide and fertilizer storage, pesticide handling application and mixing and loading pads. The program also works to enhance wildlife habitat and promote native vegetation on golf course properties.

The result? As of August 2002, after four years in operation, just 198 of the estimated 900 Michigan golf courses have participated in a workshop, just 22 percent, despite the hard work of Michigan Turfgrass educators. Even fewer of the 198 have ever had a site visit.

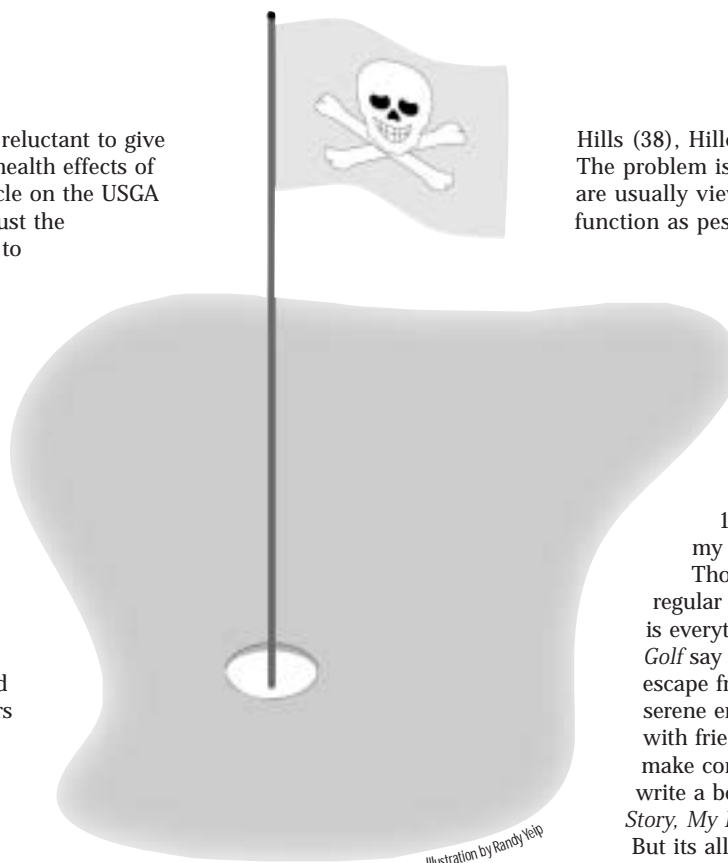
In fact, the golf industry is quite reluctant to give credence to issues like the human health effects of pesticides. A July/August 2002 article on the USGA Web site, "Just the Facts, Ma'am, Just the Facts," claims that, "it is a mistake to assume that because pesticides kill certain pests, they are necessarily a threat to non-target wildlife or humans."

But there is ample evidence of dangerous health effects associated with golf courses, and/or with pesticides. A 1997 occupational health study found that golf course superintendents die more frequently from cancer than the general population. The study was conducted by researchers at the University of Iowa's Institute of Agricultural Medicine and Occupational Health, who compared the mortality of a cohort of members of the Golf Course Superintendents Association of America to the general U.S. white male population. Significant excess mortality was found for four types of cancer: brain, lymphoma (non-Hodgkin's), prostate and large intestine. Death from diseases of the nervous system was also found in excess. The study did not reveal that pesticides were the cause, but it does suggest that something about the golf course environment, perhaps pesticides, was a contributing factor.

Another recent groundbreaking study in *Environmental Health Perspectives* (June 1998) did specifically point to pesticides as a cause of health problems. In their study comparing children in two comparable Mexican villages, one with heavy pesticide use, the other with little, Drs. Louis and Elizabeth Guillette found that pesticides can undermine intelligence, impact behavior, and diminish reproductive capacity. The sobering fact is that these deficits occur without any obvious signs of poisoning.

We still do not have a very good accounting of the amounts of pesticides that golf courses apply, but a 1982 U.S. Environmental Protection Agency survey found that the average golf course used more than nine pounds of pesticides per acre—which was about three times the amount used on most farms at the time. Over the years, the EPA has banned 42 different pesticides, including aldrin, DDT, dinoseb and vinyl chloride. Others are called restricted-use, meaning they must be applied by or under the direct supervision of a certified applicator. Restricted-use chemicals are acutely toxic to farm workers and applicators, as well as various mammals, birds and aquatic animals. They have environmental effects long after suspended use. Golf courses commonly use known or suspected carcinogens like atrazine, 2,4,-D and carbaryl.

Pound upon pound of pesticides end up in adjacent rivers, lakes and streams. According to the National Golf Foundation the top names for courses are: Riverside (46), Lakeview (40), Rolling



At the very least, an educational effort is required to change the cultural perception of the golf course, from a holy land free of pests, disease and dandelions to a bountiful ecological refuge.

Hills (38), Hillcrest (37), and Lakeside (37). The problem is that these rivers and lakes are usually viewed as "water hazards," and function as pesticide receptacles.

I myself love golf, the miniature kind. I remember as a lad of six tugging on my father's shirttail one Saturday morning, asking for an advance on my weekly allowance of 25 cents to play a second game of putt putt after I failed to get the required hole-in-one at Hole 18. When he said no, I bawled my eyes out.

Though I have not played on the regular courses, I imagine that golfing is everything that books like *The Zen of Golf* say it is. It's a meditation, an escape from the hustle and bustle, a serene enclave to share camaraderie with friends. It's a hoot! Enough to make comedienne like Bill Murray write a book about it called *Cinderella Story, My Life in Golf*.

But its allure does not diminish the need to reckon with criticisms of organizations like Michigan Turfgrass and the Global Anti-Golf Movement. We need more parks and fewer golf courses. At the very least, an educational effort is required to change the cultural perception of the golf course, from a holy land free of pests, disease and dandelions to a bountiful ecological refuge. Part of this effort might involve something as simple as placing a sign near a bunker alerting a golfer that the rare Kirkland warbler relaxed by that jack pine tree on its aerial journey from the

Bahamas to Michigan. Or to know, as is true for the Detroit Country Club, that there are 70 American Elm trees untouched by Dutch elm disease on the property.

But education and persuasion go only so far. We need something much stronger. It's important to recall that gowfing was outlawed in Scotland in 1457 by King James because, he said, people were fooling around playing golf when they should have been practicing archery for national defense.

Ralph Nader, in his 2000 Presidential run, came close to such a call. When asked whether he played golf, he said, "I never envisioned the purpose of life as taking a piece of metal and pushing it toward a hole. People ought to be pushing children out of poverty."

He's got a point.

Maybe a brief moratorium would be a good thing. Today there's no need to refine archery skills. However, a ban might encourage some putters to forsake the club for a stint as a Nader's Raider, or eco-warrior.

Fore!

Brian McKenna is executive director of Local Motion, an organization devoted to improving health by using fewer toxins. He holds a B.A. in communication arts and an M.A. in anthropology from Temple University, and a Ph.D. in medical anthropology from MSU. He has taught political science and had a stint as development specialist for NPR's Fresh Air@Terry Gross.

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Photos from top to bottom:

- 1. Jim Detjen (center) with environmental journalists at the International Federation of Environmental Journalists 1998 Annual Conference in Sri Lanka.*
- 2. Great Lakes Environmental Journalism Training Insitute participants enjoy a tour of the National Oceanographic and Atmospheric Administration.*
- 3. A NOAA scientist shows journalists invasive species observation techniques.*
- 4. At the 2000 Society of Environmental Journalists Conference, students buried a time capsule containing items popular at the time. The capsule will be opened in 2050.*

For more information on the environmental journalism program or to subscribe to EJ, complete the following form and send it to: Barb Miller, 382 Communication Arts Building, Michigan State University, East Lansing, MI 48824-1212.

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COVER STORY



Misguided tour

PHOTO BY
JEREMY HERLICZEK

A growing ecotourism industry is causing environmental concerns for sensitive areas. Though profits from the trade are attractive, the damage tourists cause to natural habitats is raising eyebrows.

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**WRITERS: WISH
YOU WEREN'T HERE**
by Eric Freedman

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**CHINA: BEYOND
THE GREAT WALL**
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MEXICO: MEX APPEAL
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INDIA: JUNGLE FEVER
by Arvind Diddi

Heavy tourist traffic has some telling writers:

'Wish you weren't here'



BY ERIC FREEDMAN

ECOTOURISM IS HOT AMONG TOUR AND ATTRACTION OPERATORS, it's hot among outfitters and it's hot among the public. It's also hot for environmental, outdoors and natural resources journalists, yet we writers must be aware that our very coverage may raise ethical concerns—as well as the potential for stories about those concerns.

But first, what is ecotourism or “green” tourism?

There are more definitions than fingers on my hands, and it overlaps but isn't synonymous with “adventure tourism,” which makes a uniform definition even tougher to find. I like this one from the Ecotourism Association of Australia: “ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmental and cultural understanding, appreciation and conservation.” The Indonesia International Rural and Agricultural Development Foundation, which operates several eco-lodges, proposes this comprehensive list of principal components: dependent on the natural environment; contributes to conservation; ecologically sustainable; features interpretation and education; incorporates cultural considerations; and provides a “net return or benefit” to local communities.

In this context, we often think of Costa Rican rainforest lodges, Caribbean reef diving expeditions and eastern African wildlife photo safaris. However, ecotourism opportunities abound in the United States and Canada as

well, such as rafting, camping and hiking through Dinosaur National Monument in Colorado and Utah, canoeing and fishing in the Yukon, kayaking in the Boundary Waters Wilderness of Minnesota.

Now look at some of the key challenges that ecotourism poses for outdoor writers, whose stories and photos

What we present and how we present it can raise public awareness of habitat and environmental threats, creating a political constituency for conservation of natural and cultural places. But at the same time, coverage creates risks, such as unintentionally spurring overuse that damages irreplaceable resources...

motivate some readers and viewers to participate and provides vicarious experiences and feel-good emotions among others.

What we present and how we present it can raise public awareness of habitat and environmental threats, creating a political constituency for conservation of natural and cultural places.

But at the same time, coverage creates risks, such as unintentionally spurring overuse that damages irreplaceable resources—the old adage of “loving our parks to death” comes to mind. For example, there's fear that the mere presence of too many divers and pleasure boats harms Australia's Great Barrier Reef.

Other environmental threats encompass sewage disposal from remote lodges into rivers and lakes, release of fuel from boats, trail erosion from too many mountain bikes or hiking boots, collection of endangered plants, increased access for poachers and inadvertent introduction of nonnative, invasive species.

Another concern: What will happen when ecotourism becomes mass tourism? That may force limits on the

Eric Freedman is an assistant professor of journalism at Michigan State University. His books include *Great Lakes, Great National Forests: A Recreational Guide* (Thunder Bay Press). In 2000 and 2001, he led MSU's study abroad program on Australia's Media, Environment and Culture. E-mail him at freedma5@msu.edu.

Ecotourism in Australia

Five students in Michigan State University's Summer 2001 program on Australia's Media, Environment and Culture created a Web page about popular, ecologically sensitive ecotourism destinations. Here are some of their observations.

Kakadu National Park in the Northern Territory

By Lauren Jones

There are many benefits to ecotourism in this nature reserve. To start, it helps people become aware of other cultures. Visiting Ubirr lets people experience Aboriginal rock art and hear Aboriginal myths and legends. The people who inhabit the land care deeply about the area and are willing to teach those who yearn to learn. As Bill Neidjie, a traditional Aboriginal land owner said, "My people...Not many. We getting too old. Young people...I don't know if they can hang onto this story. But, now you know this story. You responsible now. You got to go with us to Earth. Might be you can hang onto this story. To this Earth."

This is his call to understand and pass on the stories. Ecotourism helps do just that.

Along with the positive effects that ecotourism brings to Kakadu, there are some obvious negative effects. The large number of people who travel through Kakadu come with a price. Pollution from vehicles, litter and trampling of precious plants are among the many adverse effects of tourism. Also, if Bill Neidjie's words aren't taken seriously, a huge part of Australian culture could be lost. People who visit Kakadu must

respect this precious heritage and help pass it on to others. Ecotourism has many benefits. However, if abused, the delicate system may vanish forever.

The Blue Mountains of New South Wales

By Kali Keller

Ecotourist activities in the Blue Mountains consist of abseiling (rapelling), bushwalking (hiking), camping and swimming. With tourism peaking during the winter months of June and July, it is not only one of the largest tourist attractions in New South Wales, but it is the third-largest employer for nearby towns.

With the increase in popularity, there has also been an increase in deterioration of land due to misuse by visitors, especially campers and bushwalkers. Campers dispose of litter improperly, illegally mutilate trees for firewood and drive in unauthorized areas, while bushwalkers destroy vegetation and leaf litter, reducing the quality of the Blue Mountain experience.

The Daintree Rainforest of Queensland

By Valerie Underwood

The communities surrounding the Rainforest strive to be leaders in pre-

serving this unique area through tourism. They depend on the funds provided by this industry, but they also take the opportunity to educate visitors about the importance of the wetlands. The Aboriginal people of the land also want visitors to understand their culture. Many are concerned that some tourism companies don't respect their desires to tell their own stories of the history of the land.

Uluru (Ayers Rock) in the Northern Territory

By Sarah Spaniol

Ayers Rock is a site where many ecotourists come to visit. Every year 500,000 tourists journey to the Rock to learn about the rich history that surrounds it. Ecotourism has many benefits. It focuses on personally experiencing nature in ways that lead to greater understanding and appreciation. It also integrates opportunities to understand nature into each experience. Tourism is the world's largest industry, affecting the lives of millions of people. While it can bring benefits, these are seldom spread evenly. People who live in many tourist destinations are now counting the cost of development that has failed to put their interests and rights on a par with their visitors: Livelihoods are lost, religions and cultural traditions debased and environments degraded.

Ayers Rock is an example of how tourism can have a negative impact. Because the Rock has such spiritual meaning to the Aborigines, there has been controversy over the amount of

tourists who come visit and climb it. The Aborigines ask that tourists abstain from climbing the sacred rock but every day many tourists ignore their pleas. In addition, there are a few deaths a year among tourists climbing the Rock. While there is an area consensus that the climbs should stop, Kathy Cooper, a guide with the only Aboriginal-owned tour group said, "Commercial decisions take precedence over culture. Many operators actually fear they would lose a large share of the market if the climbs were stopped." Many tourists come to Ayers Rock not being well informed about the sanctity of the Rock and its people.

The Great Barrier Reef in Queensland

By Carolina Olego

The sustainability of Great Barrier Reef tourism and recreation is based on quality and continuity. A quality experience must be provided for visitors, while improving the quality of life of the host community and protecting the quality of the environment. For sustainability, the tourism industry must also ensure the continuity of the natural resources it uses and continuity of visitor interest. Ninety percent of tourism activity takes place in only 5 percent of the entire Great Barrier Reef area. Management plans strictly regulate visitor numbers and specify exact locations that can be visited. Ecotours now include marine biologists, and the captains of the ships are tested about their knowledge of the area, ensuring safe navigation around the coral.

■ *Essays edited by Eric Freedman*

number of visitors, as Grand Canyon rafters and Boundary Waters canoeists know. Or it may make it impossible for government agencies and nonprofit organizations—particularly cash-strapped foreign ones—to adequately safeguard the resources.

What roles do industry and government tourism departments play in distorting ecotourism, and do we writers play into their hands by succumbing to hype? "Greenwashing" is sometimes used in the context of mega-corporations that clear pristine forests to build energy-hungry, water-hungry resorts and fail to invest much of their earnings locally. They may boast of recycling and solar-heated water, but their overall environmental impact is more negative than positive.

Certainly, we can write about efforts by government, industry and local communities to regulate and control development. When I was last in Australia, for example, there was an effort underway to give Great

Barrier Reef tour operators 15-year rather than six-year permits. The effort was intended to simultaneously spur ecological sustainability and give them more economic security for long-term operations.

How do we report and write in light of individual and cultural ethical dilemmas? Some of us have confronted this question in deciding whether or not to publicize the location of a little-known fishing or camping spot we personally treasure, or to highlight a place with a spiritual or religious meaning.

When I was writing a recreational guidebook to the national forests of the Great Lakes region, a U.S. Forest Service information officer asked me to omit Turtle Mound—an easily accessible spot within Minnesota's Chippewa National Forest that is sacred to local Native Americans—although it was already on the National Register of Historic Places. I agreed not to write a planned sidebar focusing on Turtle Mound but decided I couldn't fully serve

my readers without at least mentioning the site. Was I right or wrong?

Finally, do local people and community organizations play a significant role in the management and operation of the resource? Do local people act as interpreters, investors, guides and managers or do they merely do the grunt work? By setting land aside in reserves, parks and preserves to cater to tourists, does ecotourism cut these people off from traditional sources of subsistence such as fishing and hunting? Does it demean their places of spiritual and ritual importance?

Of course, we're not solely responsible for the public impact of what we accurately write, film or photograph. Nor should fear about the possible reactions of other people dissuade us from presenting the truth. However, when it comes to covering ecotourism, we do need to exercise our professional judgment and skills in a conscientious, informed manner. 🌍



Beyond the Great Wall

Away from the bustling cities, tourists see a China still primitive and undeveloped

PHOTOS AND STORY BY JIM DETJEN



XI'AN, CHINA—INSIDE A DUSTY CAVE AN elderly Chinese peasant sleeps on a board next to his cow, not far from the home-made coffin he has built for himself. Inside another cave a family watches soap operas on a small black and white television that has been ingeniously hooked up to the cave's only electrical outlet.

Many thousands of Chinese peasant farmers live inside primitive caves like these that have been carved out of mountains half an hour northwest of this city, China's ancient capital. The caves provide inexpensive housing with natural air conditioning and heating; the interior of the caves remain cool in the summer and warm in the winter.

During the past five years an increasing number of tourists have

come to visit these cave villages to witness how peasant farmers eke out a living in rural central China. "I want to show visitors how the real people in China live," says Clarence Guo, a tour guide who regularly drives western tourists to see these cave dwellers.

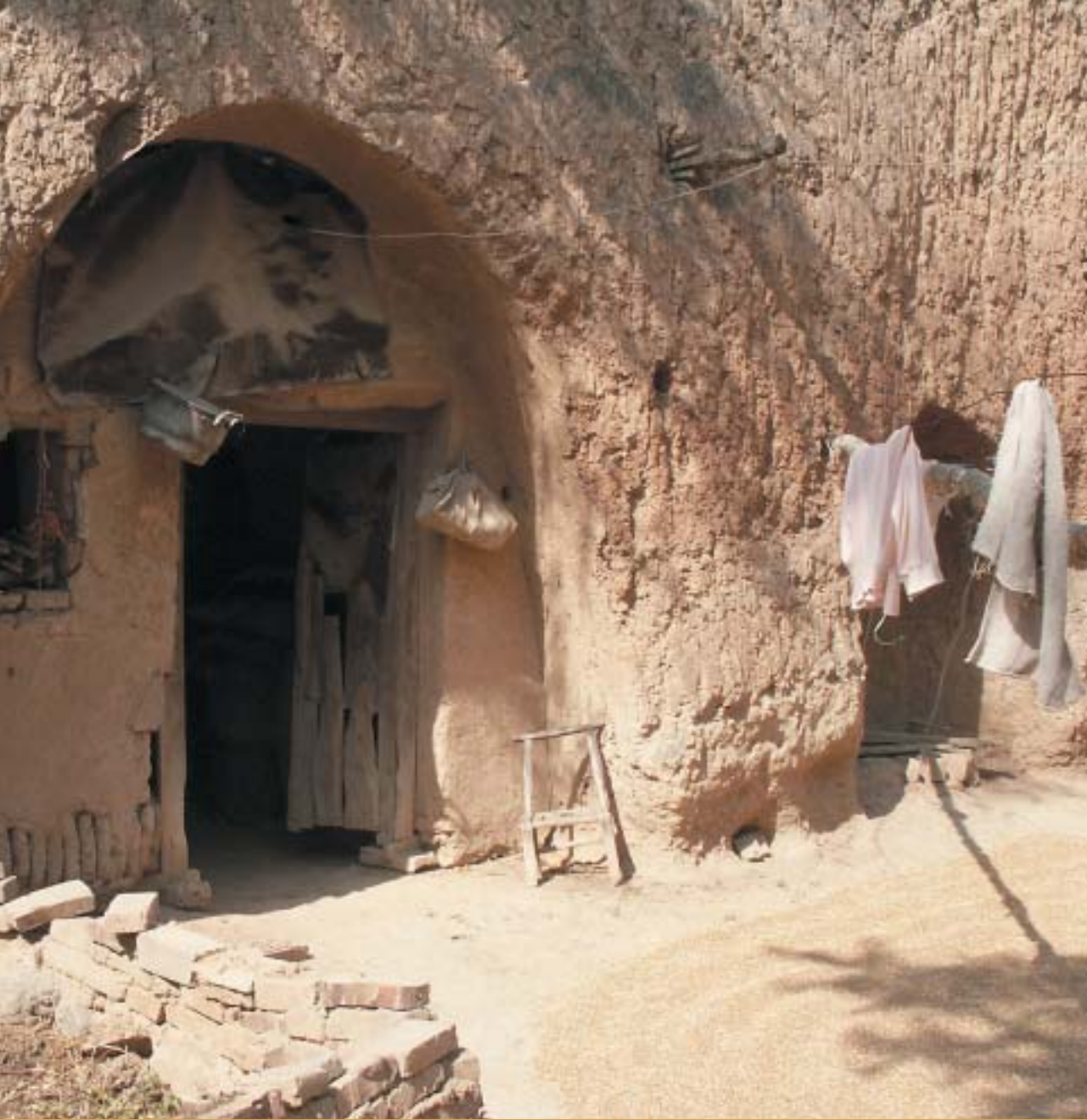
Guo's tours appeal to visitors who want to experience first hand what life in China is really like. Other tour guides take westerners on bike rides or rock climbs through the spectacular mountainous scenery near Guilin in southern China; on treks to see giant pandas at the Wolong Nature Reserve in southwest China; or on hikes to see the 3,000-foot deep Tiger Leaping Gorge in Yunnan Province.

These tour guides are part of a still

tiny but rapidly growing niche of the Chinese tourism market known as ecotourism. There are no hard figures on the size of this market here because Chinese officials keep no statistics on this fledgling field.

"Ecotourism is quite small and has a long way to go in China," says Professor Li Tianyuan of the tourism department at Nankai University in Tianjin, China. "But there has been growth in the ecotourism industry, particularly in scenic regions such as Tibet, Inner Mongolia and the Xinjiang Uygur Autonomous Region in Northwest China."

While information about ecotourism is hard to come by in China, statistics about the rapid growth of the tourism industry in China are not. During the past quarter century



Thousands of Chinese farmers still live inside caves carved into the hillsides of central China. Their interiors provide natural air conditioning and heating; they remain cool in the summer and warm in the winter.

as China has opened up to the outside world, the tourism industry has grown rapidly.

Chinese tourism officials say that the amount of dollars spent on tourism soared 26 times from \$617 million in 1980 to \$16.2 billion in 2000. The number of international visitors to China has grown more than 25 times during the same period from 5.7 million people in 1980 to 83.4 million people in 2000.

China is now the fifth most popular tourism destination for international visitors, according to Chinese travel officials, and by 2020 will surpass both France and the United States to become the world's most popular travel destination.

Interest in China is expected to increase dramatically during the

"Ecotourism is quite small and has a long way to go in China. But there has been growth in the ecotourism industry, particularly in scenic regions such as Tibet, Inner Mongolia and the Xinjiang Uygur Autonomous Region in Northwest China."

Professor Li Tianyuan,
Nankai University tourism department

next decade as a result of China's entry into the World Trade Organization and the selection of Beijing as the site of the summer Olympics in 2008.

But while China's economy is growing rapidly, it is still a developing country and faces many hurdles in attracting tourists. Only a small percentage of hotels meet western standards and the nation's basic tourism

infrastructure of highways, airports, toilets and other facilities are still far beneath the standards expected by many tourists.

In addition, China's violations of human rights, press censorship and a lack of democratic institutions also frighten away some westerners who are fearful of traveling in a country with a long history of suspicion of foreigners.



Giant pandas, such as this one at the Shanghai Zoo, are a major tourist attraction.

Bicycling is an important form of recreation in Yangshuo, China. Tourists flock to this region to view the dramatic landscape.

“People should have a right to obtain a better life and develop their local economy. The problem comes, however, when a local culture is so changed that its community traditions are destroyed.”

Professor Li Tianyuan, Nankai University tourism department

According to the International Ecotourism Society, ecotourism is defined as “responsible travel to natural areas that conserves the environment and sustains the well-being of local people.”

While that goal is laudable, is it really possible to attract tourists to pristine natural areas and not affect the environment or lifestyle of local people?

For example, a small number of visitors to see the cave dwellers near Xi’An may have relatively little impact on the rural community. But if busloads of tourists come to see these tiny villages, more and more peasants will stop farming and spend their time selling postcards and other wares to tourists, experts fear. As a result, the agricultural way of life will decline.

“More and more tourists will change the people’s lifestyle and their culture will be lost,” says Professor Li. “This is especially true in many of the most scenic areas of southern and southwestern China where many minorities live.”

But Professor Li says that this is not necessarily entirely bad. “People should have a right to obtain a better life and develop their local economy. The problem comes, however, when a local culture is so changed that its community traditions are destroyed.”

Another concern is that an

increased number of visitors and the expansion of the tourism industry will harm the local environment. For example, some rice farmers in the Guilin area of southern China have complained that bicyclists and rock climbers have damaged their fields. More tourists have also increased the amount of litter and their cars have created more air pollution in some scenic regions, officials say.

Increased tourism may have already affected one of China’s most famous inhabitants—the giant panda. According to a study published in *Science* magazine in April 2001, increased tourism has contributed partially to the loss of panda habitat in the Wolong Nature Reserve in Sichuan Province in southwestern China.

Only about 1,000 giant pandas remain in the wilderness and 10 percent of them live in the Wolong reserve, which was created in 1975. The wild panda population in the reserve plummeted from 145 animals in 1974 to just 72 in 1986. The researchers say that this dramatic loss is partly due to the loss of panda habitat as a result of an increase in the number of people living in the area since the reserve was established.

Human activities that have harmed the panda habitat include increased harvesting of wood for fuel,

increased farming, housing construction and tourism.

Jinguo Liu, a researcher at Michigan State University and one of the authors of the study, says that trees in higher elevations of the reserve were cut down as a result of more people living in the area. The destruction of trees in these higher elevations affected the pandas because this is where many pandas have traditionally lived.

But researchers at another university, Charles Sturt University in Australia, said last year that increased tourism has helped increase the population of giant pandas at the Qinlin Nature Reserve Group in Shaanxi Province in southern China.

During a 13-year period the number of tourists to this reserve increased from almost none to more than 600,000 a year. When this area of the province was proclaimed as a protected area, the main source of income for people in the area—logging—came to an end. Since that time 20,000 hectares of bamboo has been regrown, improving the habitat for pandas and increasing their numbers. At the same time a thriving tourism industry was developed, providing income for the loggers who had lost their jobs, according to Johannes Bauer, a wildlife ecologist at Charles Sturt University. 🌐

Mex appeal

Mexican communities that were once sanctuaries of culture and nature are fast becoming destinations for adventure tourists

BY SUSANA GUZMAN



MEXICO IS ONE OF THE 12 COUNTRIES WITH major biodiversity in the world. About 10 percent of the different types of the earth's plants and animals are located in the Mexican territory—with a variety of climates, ecosystems and habitats, ranking from deserts to rain forests. Nevertheless, ecotourism is not common for the majority of the Mexicans. Yet the image of Mexico's traditional tourists visiting the big hotels in the Pacific and Atlantic coastal areas prevails in many people's minds.

Ecotourism is a relatively new activity developed a decade ago mainly by environmentalists and entrepreneurs interested in conservation with practically no governmental support. Now, the Vicente Fox administration announced in April that ecotourism activities will be promoted in some of the 127 Mexican natural protected areas.

This new trend of tourism brings to Mexico new opportunities and fresh rev-

enue. (Recently all ecotourists pay a tax.) However, there are some alerting voices saying that this economical activity does not take into account the environmental degradation that could be accelerated by tourists. On the other hand, local people could be hurt by ecotourism in their areas, rather than benefit from it.

A PUBLIC INITIATIVE IN MEXICO

Since a decade ago, alternative tourism—adventure and ecological—has been implemented by non governmental organizations and small entrepreneurs to conserve the natural resources. Also intended to be included in this alternative tourism vision are local communities. These NGOs and alternative travel agencies knew Americans' and Europeans' delight for international nature.

In the early 1990s, a Mexican environmental organization was started to promote organic tropical agriculture and ecotourism

in the Lacandon Rainforest. The group, called Dana, implemented the projects among four Mayan ejido communities in Chiapas (southeast Mexico). An ejido (pronounced eh-heedo) is a plot of land owned by many different households, sort of like co-op land-owning. These four Mayan communities' lands surround Lake Miramar, the largest of the Lacandon Rainforest's lakes.

Located in the Montes Azules Biosphere Reserve, the region is the habitat of tapirs, monkeys, jaguars, crocodiles and migrant birds from Canada and the United States, as well as the Lacam Tun Island archaeological site. The activities there are many: watch birds, snorkel, camp, canoe, raft and swim in the Miramar Lake.

"We have six to eight tourists visiting every day during the summer. They are primarily 22- to 40-year-old American and European *mochileros* (backpackers). About 60 percent are women and 40 per- ▶



A biker stops to chat with a young Mexican girl wearing a traditional Mexican dress—with modern tennis shoes.

cent are men,” says Fernando Ochoa, a spokesperson for Dana. “Domestic tourists do not have the tradition of ecotourism. It is new for young Mexicans.”

Ochoa explained that 176 of 800 families living in the Emiliano Zapata ejido are participating in the project. There is a tourism commission among the members of the Emiliano Zapata ejido. They guide the tourists around the rainforest either on foot or horseback for \$10. Now they are working to include a tour to visit 76 families that own organic farms. The revenue from this activity goes to a health fund for women and children. Last year they raised \$1,400, which was up from the \$600 earned two years ago.

Recently, Dana received funds from the National Indigenous Institute of Mexico to build an 18-person *cabana* (motel) on the Emiliano Zapata ejido. Ochoa says the secretary of tourism of Chiapas has never supported them. “They only congratulated us because we were the first organization to advise them that we were going to build the *cabana*.” Apparently, organizations normally don’t tell the tourism department because of additional taxes they could incur.



Camping is becoming more and more popular in Mexico, along with star gazing.

GARBAGE, A BIG PROBLEM

In 1995, a year after of the insurgency of the Ejercito Zapatista of the Liberacion Nacional (which was a group developed to overthrow the government) against the Carlos Salinas de Gortari administration, the Mexican military settled in the Lacandon Rainforest. The settlement of the military in the region brought negative impacts to the environment, denounces Ochoa, because they built roads through the rainforest.

“With the military presence came roads and commerce, but they did not bring at the same time education. Disposable plastic came in high scale, with no recycling program.” Moreover, there is no system of gathering garbage at all. The problem is that traditionally the inhabitants burn the garbage in their backyards, then they bury it. “People are not aware that it is a big problem. The education level average here is sixth grade.”

Ochoa explained that Ocosingo, the second largest Mexican *municipio* (municipal) where the four ejidos are a part, is about nine hours away from the military post.

ENTREPRENEURS INTERESTED IN CONSERVATION

Ecotourism, promoted by entrepreneurs gives additional incomes to local communities. Ecocolors is a small family business owned by Kenneth and Miriam Johnson on the Yucatan Peninsula in southeast Mexico. “We have a collaboration agreement with different local communities, especially with the Chunyaxche (Choon-yan-shay) Mayan community, to offer tours to the Sianka’an (See-ahn-kahn) Natural Protected Area,” said Kenneth Johnson.

Every year, his ecotourism travel agency attracts about 2,000 tourists. The cost for an ecotourism adventure ranges from \$250–2,500. Four kinds of tourists visit the rainforest ecosystem:

- 40- to 70-year-olds who have a strong interest in conservation and generally only stay one day;
- 40- to 80-year-olds interested in bicycle racing, have extra money and time to travel;
- 30- to 70-year-olds interested in adventure and culture;
- and national and international students learning about environment and conservation.

Kenneth Johnson is also the Mayan Riviera president of AMTAVE, “the official organization that represents companies and projects that are dedicated to the promotion of alternative tourism in Mexico.” During a July 2001 conference, Johnson said ecotourism companies have increased from eight in 1994 to 400 in 2001. In his experience, the strong investment is in training and labor, more than infrastructure and equipment.

“The industry needs to recognize that the introduction of ecotourism to peripheral economies, its development process, its role in conservation and its impacts have not been fully studied nor understood and therefore it needs regulation.”

Domingo Medina,
natural resource management scholar

Ron Mader is a journalist who has also promoted ecotourism in Mexico and other Latin American countries through his Web site *Planeta.com*. In 1999, the secretary of tourism awarded the site containing listservs, online forums, directories, books, articles and people interested in ecotourism gathered there. “*Planeta.com* is a clearing-house for practical ecotourism around the globe. As a travel resource center, we host a variety of online forums and conferences and have published more than 10,000 pages of features and scholarly reports,” reads the Web site.

SUSTAINABLE DEVELOPMENT TOURISM: NEW POLICY

In April, Leticia Navarro, the secretary of tourism (nicknamed *Sectur*) and Victor Lichtinger, the secretary of the environment and natural resources (nicknamed *Semarnat*) signed the agreement of the 2002 United Nation’s International Ecotourism Agreement.

Six governmental institutions contribute to the project with about \$28 million (254 million pesos) to promote ecotourism activities in natural protected areas managed by the *Semarnat*. Infrastructure, workshops, printed materials, information exchange events, environmental education and promotions are among the activities in which authorities request involvement. The *Semarnat* informed the public that *Sian Ka’an* (*See-en Keh-Ahn*), a reserve in Quintana Roo (*Keen-ta-na Row*) in southeast Mexico, will be the first integral ecotourism center.

For Angel Nieva, director of *Asesores en Desarrollo Turístico Sustentable* (Sustainable Development Tourism Advisors), the agreement “has no precedent because it is the first time the *Semarnat* and *Sectur* worked together in coordination to promote ecotourism.” However, he hopes some of this money would be used for training in and promotion for the rural areas.

In a *Planeta.com* document posted in March, Nieva pointed out among the strengths of Mexican ecotourism are the annual *Expo Aventura y Ecoturismo* (Ecotourism and Adventure Expo) in Mexico City, the 2000 National Policy and Strategy for Sustainable Development of Tourism (as a result of a national public consults from *Sectur*), and the Official Guide of Adventure Tourism, Ecotourism and Rural Tourism Destinations published by *Sectur*.

ECOTOURISM RISKS

Although a new stage for ecotourism is emerging in Mexico, the land property regulation, the inclusion of the indigenous people and the preservation of biodiversity are some challenges to be faced.

“Ecotourism is a myth,” asserts Fernando Ochoa of Dana. In his experience, this activity represents only additional incomes because the indigenous people are farmers or peasants. “Ecotourism is part of a diversification of their incomes of the communities, we do not intend to change their culture.” Corn, cocoa, beans and pork are the products they cultivate for themselves. Furthermore, he said, ecotourism is not an activity Mexicans commonly participate in.

On the other hand, he explained, 95 percent of the areas where ecotourism can be developed are the communities of indigenous people. The problem is that there is a big problem regarding the land property. Of the four ejidos they have been working on ecological projects, only Emiliano Zapata is legally constituted. The funds Dana got to do an environmental assessment impact could be applied only in Emiliano Zapata, thus constraining the ecotouristic efforts to limited inhabitants.

“The challenge many Latin American countries face is the forces pushing for the development of ecotourism are catalyzing and incorporating pristine peripheral rural, natural and cultural places (especially indigenous peoples) into the global economy without being prepared to manage for social, cultural and environmental change,” explains Domingo Medina, a scholar in natural resource management and a community development assistant for indigenous people in Latin America. “The industry needs to recognize that the introduction of ecotourism to peripheral economies, its development process, role in conservation and impacts have not been fully studied nor understood and therefore it needs regulation.”

In March, an International Forum of Indian Tourism was held in Oaxaca (pronounced *WĀ-hĀ-kĀ*), Mexico. The attendants alerted that tourism is expanding to remote areas where fragile ecosystems with biodiversity remain. Mountains, deserts, islands and rainforests are the new destinations for the tourism industry. They explained that problems can arise from tourists visiting these areas, such as people illegally collecting plants, animals and archeological objects. 🌍

Who was Emiliano Zapata?

A Mexican revolutionary, Zapata fought in guerrilla actions during and after the Mexican Revolution (1911–17). Specifically, Zapata fought to recover the ejidos (Indian communal system of land ownership) from the haciendas, which are private landowners. Zapata adopted the slogan “*Tierra y Libertad*,” meaning “Land and Liberty.”

He was the son of a peasant who trained and sold horses. Orphaned at 17 years old, he was forced to look after his brothers and sisters. In 1897 he was arrested after participating in a protest by the peasants of his village against the hacienda that had taken over their land.

For more information, go to www.zapatistas.org.

Job Opening: *Assistant Director and Environmental Journalist in Residence* *Knight Center for Environmental Journalism* *Michigan State University*

THE SCHOOL OF JOURNALISM AT MSU INVITES APPLICATIONS FOR THE POSITION OF ASSISTANT DIRECTOR AND ENVIRONMENTAL JOURNALIST IN RESIDENCE AT THE KNIGHT CENTER FOR ENVIRONMENTAL JOURNALISM. ¶ We are seeking an experienced journalist and educator who can extend and help further develop one of the world's foremost centers in environmental journalism. ¶ Candidates should have at least a bachelor's degree and significant journalism experience, preferably in the field of environmental journalism. ¶ This three-year appointment will begin in January 2003. ¶ The assistant director will work closely with Jim Detjen, the Knight Center director, to carry out teaching, research and outreach projects for the Knight Center. ¶ Salary competitive and commensurate with experience and qualifications.



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JUNGLE FEVER

With its rich flora and fauna, India is poised to capitalize on the growth of ecotourism

From being viewed as the land of sex, snakes and sadhus to a country taking rapid strides in the field of information technology and other areas of science, India has experienced a sea of changes in its image.

But it continues to be the land of diverse natural beauty where Rudyard Kipling's *Jungle Book* characters—Mowgli, Baloo and Shere Khan—leaped to life. Gifted with rich flora and fauna widely spread across the peninsula in different climatic zones,

India makes an ideal destination for ecotourism. ►

BY ARVIND DIDDI

In the north snow-capped Himalayan range among houses are rare animals like ibex, musk deer, snow leopard and exotic birds. With a mix of coconut grooves, brackish water and tropical forests, southern states are similar to the Caribbean islands and Amazon jungles.

Having a vast potential to be developed and promoted as an ecotourism destination, India has positively responded to the United Nations' declaration that 2002 is the International Year of Ecotourism.

Indian media, quoting a recent presentation of International Ecotourism Society at Manhattan, reported that some parts of South Asia, like Nepal, have been in the ecotourism business for 15 to 20 years. Reportedly, it has the best-developed adventure and ecotourism infrastructure. But in the rest of the South Asian countries like India, Pakistan, Bangladesh and Sri Lanka, political and religious tensions and natural disasters such as the Gujarat earthquake in northwest India in January 2001 or frequent flooding have slowed the growth.

Speaking at the presentation, Fergus McLaren, director of the International Year of Ecotourism project, says ecotourism is still in the nascent stage in these parts, but could be developed in another 10 to 15 years. Parts of northeast India have enormous potential, as do national parks such as Gir Forest and Corbett National Park.

MARKETING ECOTOURISM TO AMERICANS

Unlike Southeast Asia, which has been on the radar of North American ecotourists, the task for South Asian tour operators is determining how to market their destinations. "The American traveler does not have a great deal of experience or awareness of South Asia," McLaren says. "It hasn't been marketed very well to Americans, so it is not very well understood." The challenge is to promote the country as an ecotourism destination, rather than an exotic, historical and cultural country that it is usually perceived as.

According to a report issued by the Indian Tourism Department, ecotourism is the fastest growing segment of the tourism industry that attracts between 40 to 60 percent of about 2.5 million international tourists visiting India annually. India's total earning from the tourism sector is about \$3 billion, which accounts for a mere 0.64 percent of the global market.

The general perception of India as being the land of ancient culture and heritage is rooted in the fact that Indians have built a unique relationship with nature. The tradition of animal worship and other elements of nature originate from the primitive fear of wild animals and natural calamities. Thus, the need to propitiate those that present danger to India's wildlife.



Photo by Jim Dejean

This Asian elephant, which resides in a Sri Lankan reserve, is the type of elephant found in India.

INDIA IN THE BUFF

Seldom has a culture been so deeply and consistently associated with animals and trees as India. The association was probably also catalyzed by the geological events that took place millions of years ago as Gondwanaland—which included Africa, Antarctica, Madagascar, Australia and South America—became separated and drifted across the globe on its molten crust, to crash slowly, but with titanic force, into Eurasia. The Indian plate has continued to thrust under Eurasia and the Himalayas, which have risen in several great upheavals. The great height reached by the range in the late Pleistocene era created a weather barrier, which is responsible for India's unique monsoon climate and creation of vast diversity of ecosystems in the country.

The diversity of plants, animals and natural beauty is preserved in India's 247 sanctuaries and 55 national parks, which provide opportunities to see a variety of wildlife. Forest reserves in the northeast, northwest and central parts of the country are home to majestic Indian tigers and leopards. In the extreme northeast, Manas Wildlife Sanctuary is a great shelter for Indian one-horned rhinoceros.

NO KINDLE OF KITTENS HERE

The forest reserves in the northeast also contain typical tropical grassland animals like gaur or jungle bison, chital or spotted deer, rhesus macaque, assamese macaque, stump-tailed macaque, striped hyenas, jackals, tigers and elephants.

The forest reserves in the north are the places best reflecting the Himalayan wildlife,

which includes musk deer, yaks, bharal or blue sheep, Himalayan marmots, Himalayan ibex, hangul or kashmir stag, brown and black bear, chukar partridges and monal or impeyan pheasants. For bird lovers, forest reserves in the northwest include Siberian cranes, great Indian bustard, peacock, dusky horned owl, crested serpent eagle, a myriad parrots and parakeets. And the offshore islands Lakshadweep and Andamans provide a unique serenity and beauty with their own ecosystem surrounded by colorful coral reefs and marine life.

What makes the jungles of India different from African forests is the absence of large assemblages of animals. This is because the forests are thick and animals of such closed environments are generally shy and retiring, living in small, scattered groups or as solitary individuals. Most mammals are largely nocturnal, but it is relatively easy to spot diurnal birds.

One has to seek the specimens here, and this makes it necessary to know where they would be most likely to reside and hide. High temperatures usually put them off and they prefer to rest in the shade. Therefore, the best time for safari is in the early hours of morning. Generally, night safaris are not permitted to avoid interfering with the hunting time of the nocturnal animals. This is the reason a tourist visiting the Gir Forest in northwest India in the afternoon usually finds the Asiatic lions lazing under tree shade. As most animals are not easily seen on a hot sunny day, this may sometimes convey a false message that there are hardly any animals in the forest.

MONSOON SIGHTINGS

Indian environment and vegetation are largely dependent on the monsoon season, which clearly affects the availability of food and water. This in turn reflects on the distribution and visibility of the animals. During monsoon season the forests are covered with lush green foliage. But during lean months when rainfall is scanty, most of the national parks close to take up restoration works like desilting the water holes and planting saplings. Therefore, the best time to visit Indian forests is between October and June.

Recently, an Indian newspaper reported, "India is committed to promoting sustainable tourism development, which does not come at the cost of the environment. The courts and the state governments are religious when it comes to preserving ecology. Ecotourism is a segment of the nature tourism market. It includes travel for enjoying culture or nature, through trekking, hiking or observing wildlife and volunteer or service vacations." 🌿

Arvind Diddi, an international student from India, graduated from MSU with a Master of Arts in Journalism. He will begin working on his Ph.D. in Mass Media at MSU this fall.

Carbon storage solutions abound for CO₂ producers

TREES COMPANY

BY STEPHEN MEADOR

FORESTS AND SOILS COULD BE A SHORT-TERM Band-Aid for global warming by sequestering manmade carbon.

"No one is saying that they provide the answer," says Dr. G. Philip Robertson, professor of crop and soil sciences at Michigan State University. "However, they do buy us some time."

Carbon sequestration involves long-term storage of carbon dioxide, or CO₂. CO₂ is one of six "greenhouse gases" that help make the earth inhabitable by trapping heat from the sun. Many climate scientists now predict, however, that rising levels of greenhouse gases may be creating an enhanced greenhouse effect, or global warming.

In January 2001, the Intergovernmental Panel on Climate Change reported that the 1990s was the warmest decade in the Northern Hemisphere in the past 1,000 years. The National Oceanic and Atmospheric Administration estimates that CO₂ concentrations are now higher than they have been in more than 400,000 years. While many scientists

"It essentially buys time until economical carbon conservation technologies can be developed."

Dr. G. Philip Robertson,
professor of crop and soil sciences, Michigan State University

believe that there is a connection between rising global temperatures and greenhouse gas levels, the extent of this connection is still uncertain.

Carbon dioxide is produced naturally through biological respiration and decomposition of organic matter. However, the majority of atmospheric CO₂ is now produced through human activities, such as combustion of fossil fuels and landscape alterations, like deforestation. Scientists estimate that humans add about six billion tons of CO₂ to the atmosphere every year, with about one-fourth of that produced by the United States.

Reducing CO₂ concentrations in the atmosphere may be one way to reduce the

threat of global warming, either by reducing emissions or by capturing and storing atmospheric CO₂. Reduced emissions can come about through increasing energy efficiencies or by increasing reliance on renewable energy sources, such as solar and wind power. Sequestering carbon can be accomplished naturally, as with the planting of forests that metabolize CO₂ during photosynthesis. It can also be accomplished through more direct means. Many look at sequestration as a complement to reducing CO₂ emissions, not a stand-alone carbon management strategy.

"It essentially buys time until economical carbon conservation technologies can be developed," Robertson says. ▶

Carbon is stored both terrestrially and non-terrestrially. Terrestrial sinks include soils and vegetation, while the oceans and fresh water bodies provide non-terrestrial sinks. In addition to planting new forests and conserving existing forests, carbon can be sequestered by improving agricultural tillage practices and taking marginal cropland out of production. One idea for more direct sequestration involves capturing CO₂ from stationary sources like factories and power plants, and storing it permanently.

Power plants account for about one-third of all carbon dioxide emitted to the atmosphere worldwide. Researchers are now looking at the possibility of using very thin membranes that capture CO₂ but let other exhaust gases pass through. Once captured, the gas could be injected into underground geological formations like unmined coal beds, rock caverns, salt domes and depleted oil and gas fields, as is now being done in the North Sea.

Another possibility being studied involves the solidification of CO₂ into a permanent hydrate. By exposing CO₂ gas to a mild acid and minerals, such as olivine and serpentine, and then applying pressure for a short period of time, the resulting solid stores the CO₂ permanently.

While carbon sequestration techniques like these could provide a complementary CO₂ strategy, many policy makers say the emissions side of the equation will eventually need to be addressed. To date, all CO₂ emissions programs in the U.S. are voluntary. The U.S. Department of Energy (DOE) has a voluntary emissions reduction program called Climate Challenge. Electric utilities are encouraged to reduce greenhouse gas emissions and report them to the DOE for potential credits against future mandatory requirements. In April, the Senate intro-

duced an amendment to the energy bill that would create a voluntary greenhouse gas registry that also provides credit for past and future emissions reductions. In five years, the proposed program would become mandatory if 60 percent of the total national greenhouse gases being emitted were not being reported voluntarily.

Another potential CO₂ management strategy involves the development of a market-based approach, creating carbon credits that can be traded nationally or internationally among emitters. In this scenario, generators of CO₂, such as utilities and industries, would be issued emission allowances. If they could not meet these allowances by reducing their emissions, they could purchase surplus allowances from more efficient emitters or buy offset credits from landowners that plant forests or adopt certain farm conservation techniques. Robertson said the global carbon market is currently under development, with carbon exchanges being tested right now in Chicago and New York.

Robertson foresees the day when carbon will be sold as a commodity, just like corn and soybeans, which farmers could depend on as another source of income. They could be paid to take marginal land out of production or adopt conservation tillage practices, both of which reduce CO₂ emissions. Although some farmers are now being paid in Iowa to implement conservation measures as part of the test market, Robertson said it is not enough to encourage new farmers to do the same. He said until the Kyoto Protocol is ratified, financial incentives will not be there for producers.

"Once the markets are created, we will find out quickly what it will take for farmers to change their practices," he says.

Still, all of these efforts may not be suffi-

Green and smoky white

Despite sprawling natural areas, University's carbon emissions far outpace storage

Is Michigan State University a carbon source or sink? Dr. Frank Telewski, curator of the W. J. Beal Botanical Garden, recently conducted a carbon sequestration review of the MSU campus. He looked at acreage of pavement and buildings, tilled fields, tree plantations, natural areas and green space. Using carbon uptake parameters for different land cover types, he determined that about 4,800 tons of carbon are sequestered annually on the campus of MSU.

How did this compare to MSU's emissions? Telewski said less than three percent of MSU's carbon emissions were being sequestered by campus sinks. He was only able to look at CO₂ emissions from the MSU power plant, which amounted to more than 165,000 tons of carbon per year. Other significant sources of CO₂, such as campus vehicles and farm animals, were not included in his study. The results may not be too surprising because the campus-owned area is relatively small compared to its energy needs.

Telewski emphasized that although his estimates were "quick and dirty," substantial differences in his initial carbon uptake estimates would not begin to balance the amount of CO₂ emitted by MSU.

"The campus sequesters only a fraction of the CO₂ that it produces," Telewski says.

cient. In November 2000, researchers from the United Kingdom predicted in *Nature* that forests and soils will become net producers of carbon by 2050 because of increased decay from global warming. 🌍

Water world

Changing global climate conditions could drastically limit the intake of big 'C' in the deep sea

According to scientists from the Woods Hole Oceanographic Institute, the oceans hold about 95 percent of the carbon that is actively circulating in the biosphere. Because of this, oceans play the dominant role in the regulation of CO₂ levels in the atmosphere. CO₂ is now being produced faster than the oceans can soak up. Except for the possibility of injecting captured CO₂ into geologic formations beneath the ocean bottom, increasing the amount of carbon the oceans store naturally is unlikely.

CO₂ is absorbed and distributed in the oceans by a conveyor belt-like process. Atmospheric CO₂ dissolves more readily

in cold water than it does warm water, so cold surface waters nearer the earth's poles capture CO₂ more readily than do warm, tropical waters. As these cold, dense, CO₂-rich surface waters sink to the bottom, they are slowly transported by deep currents to warmer regions.

As CO₂ is distributed throughout the oceans, phytoplankton convert it into organic material through photosynthesis. Some of the carbon is metabolized up the food chain, while some of it dissolves in the water or sinks to the bottom. All of these processes act to create a gradient of increasing carbon concentrations with depth, which helps main-

tain the oceans' ability to digest more carbon at the surface.

The oceans' capacity to act as a long-term carbon sink depends on some key physical phenomena. As water temperature increases, the solubility of CO₂ decreases. Therefore, if global warming causes ocean temperatures to increase, the capacity of these waters to take in CO₂ could decrease. Scientists from the Lawrence Livermore National Laboratory predict global warming could hinder the ability of the oceans to take up CO₂ in another way. If precipitation increases because of global warming, the surface waters of the polar oceans could become

less dense and decrease the efficiency of this pathway of CO₂ into the ocean.

Carbon dynamics of the oceans are also affected by key chemical and biological processes. As the amount of atmospheric CO₂ increases and causes the dissolved CO₂ in seawater to increase, the water's ability to take up additional CO₂ decreases. CO₂ also makes seawater more acidic, threatening coral reefs and shells that are made up of calcium carbonate. However, some scientists predict that increased CO₂ levels could stimulate phytoplankton uptake and moderate the impact of this change.

A dirt cheap solution

Erosion control practices reap benefits for environment, agriculture industry

Soil provides a huge potential for sequestering carbon. Dr. G. Philip Robertson, professor of crop and soil sciences at MSU, says sequestering carbon in soils has certain advantages over forests. First, there is less risk of catastrophic loss of stored carbon, like what could occur in a forest fire. There is also less risk from a change in landscape management, or from the often inevitable need to harvest a forest resource.

Robertson says other advantages include increased soil fertility, improved nutrient cycling and availability, reduced reliance on synthetic fertilizers and reduced water pollution. Some agricultural soils that have been plowed for 30 or 40 years have lost up to half of their original carbon content, making them ripe for carbon sequestration. However, research indicates they will never be able to retain as much carbon as they did originally.

Soil carbon is both organic and inorganic, although most carbon near the soil surface is in an organic form. Carbon can be stored in soils as both living biomass and biological residue. Humus is one type of soil residue that provides particularly effective carbon storage because it is very resistant to biological decay. It can persist for decades.

Like forests, soils can be carbon sources as well as sinks. Because most organic carbon is concentrated in the top layer of soil, it is particularly vulnerable to the effects of erosion. Organic material is more easily oxidized when it is exposed, and oxidation increases emissions of CO₂. Reducing wind and water erosion on cropland allows biomass and residue to be retained in the soil longer, thus reducing CO₂ emissions. In a 1999 report to the Greening Earth Society, Dr. David Wojcik estimates that about 100 billion tons of carbon originally contained in soil has been lost globally—primarily from agriculture.

Robertson says in the U.S., addressing the soil erosion problem no longer requires additional research but implementation of existing solutions. Many have been developed, including creating buffer strips, maintaining stream riparian areas and managing crop cover and residue.

Conservation tillage, which limits plowing used to control weeds and mix soil, is a common and effective erosion control practice. Robertson says that nearly 60 percent of farmers in the U.S. now use some sort of conservation tillage, which does not cause a "productivity penalty." Aside from carbon trading test markets like one in Iowa, farmers are generally not paid to use conservation tillage methods. The rewards for these farmers are still economic, however, in terms of conserved soil and moisture.

Without formal economic incentives for adopting carbon-friendly farming techniques, expecting farmers to participate voluntarily may be unrealistic. Farmers are still rewarded for "taking as much product off the land as possible," Robertson says. A system of carbon credits should be put into place that would pay farmers for taking CO₂ out of the environment, he continues. This could be done through tillage management, or by taking marginal cropland out of production and converting it into land cover like forests, wetlands or grasslands.

In the United States, some existing farm programs aimed at conservation have an added benefit of reduc-

ing CO₂ emissions. The Conservation Reserve program pays farmers to remove marginal croplands, like those on highly-erodible soils, from production. Similarly, the Wetlands Reserve Program pays farmers to restore farmland that was once wetlands to its former state. Robertson says these programs could serve as models for new programs aimed at paying farmers for sequestering carbon. He adds, however, that there is a finite amount of farmland that should be taken out of production.

"The most efficient thing to do in terms of global warming might be to turn all of this land into forest, but we can't eat forests," he says. "It's not a practical solution."

Give and take

Forests may collect CO₂ from producers, but eventually they send it right back out

Forest ecosystems play a dual role in carbon dynamics, acting as both carbon source and sink. The U.S. Forest Service estimates global deforestation is responsible for "up to one-third of carbon emissions to the atmosphere, and ranks second only to the burning of fossil fuels as a source of CO₂ emissions." They also add, however, that forests serve as a "huge carbon sink."

All carbon taken up by forests is not stored permanently. About one-half of carbon used by trees goes into leaf production, while the other half goes into woody vegetation. Researchers at Duke University studying trees in North Carolina recently discovered that carbon in leaves is stored only temporarily. Once leaves fall and begin decaying, the carbon they contain is cycled back into the atmosphere in about three years. The study was published in the May 2001 issue of *Nature*.

The U.S. Department of Agriculture estimates that newly planted or regenerating forests, in the absence of major disturbances, will take up carbon for 20 to 50 years after they are established—although this is dependent upon the species and growing conditions. But trees can only absorb carbon up to a point. Once this saturation limit is reached, trees may no longer act as sinks.

Forests can quickly change from carbon sinks to carbon sources. Large amounts of carbon are released when forests are cleared and the wood debris is burned or allowed to decay naturally. Tropical deforestation, often associated with slash-and-burn agriculture, is occurring at an alarming rate of almost one percent a year globally. Reducing this rate of destruction would have a significant impact on carbon emissions, as would improving traditional forestry management practices. These improvements could include waiting longer between tree harvests, leaving more



Photo by Jeremy Herliach

Trees such as this will store CO₂ in their leaves for about three years, according to researchers at Duke University. After that, it's released back into the atmosphere.

trees in harvested areas and not burning wood debris.

What effects might increased levels of atmospheric CO₂ have on forest growth? Those same pine trees in North Carolina might provide a clue. Researchers examined growth rates for trees exposed to slightly increased levels of CO₂. For three years, these trees grew faster than trees exposed to normal levels of CO₂, but then reverted to traditional growth rates after that. Growth rate was also affected by available nutrients, leading the U.S. Forest Service to suggest that fertilizing trees could be one way to keep trees growing faster in a higher CO₂ environment. Fertilizing trees is common on tree plantations in the southern U.S.

The Kyoto Protocol addressed the use of forests for carbon sequestration. During negotiations, some industrialized countries are allowed to use pollution-reduction credits for planting forests that would offset their CO₂ emissions. Some environmental groups opposed the inclusion of forests, fearing it would encourage the harvesting of old growth forests that would be replaced with faster growing trees.

BOTTLENECK ON ELECTRIC AVENUE

BY STEPHEN MEADOR

If you're planning to drive a fuel cell vehicle in the near future, don't clear out a space in your garage just yet. Congress and the Bush Administration have ensured that America's love affair with gas-guzzlers will endure, at least for now.

That was the take-home message from a few of the automotive technology experts that participated in a recent panel discussion hosted by Ira Flatow of National Public Radio. Flatow's radio show, called Science Friday, was broadcast live from the campus of Michigan State University on March 15. Four local experts discussed options for increasing automotive fuel efficiencies and reducing pollu-

tion, including fuel cell vehicles, hybrids, and improved internal combustion engines. Sen. Carl Levin (D-Mich.) also participated in the discussion remotely.

A FUEL CELL FUTURE?

Advanced technology vehicles have been a racy topic for nearly a decade. The Partnership for a New Generation of Vehicles (PNGV) was a cooperative pro-



“The hybrid is the only thing I see on the near term horizon that would be a significant improvement over the standard car.”

Michael Flynn,

University of Michigan's Transportation Research Institute

gram between the federal government and the automotive industry that began in 1993. The goal of PNGV was to develop an 80 miles per gallon vehicle that was safe and affordable. During eight years of research, U.S. automakers were able to build vehicle prototypes that approached or met the 80-mpg goal. However, in August 2001 the Bush administration dropped PNGV, citing affordability and emissions problems with the prototypes. PNGV was replaced by the Freedom Cooperative Automotive Research program, whose vehicles will be designed to run on hydrogen-powered fuel cells.

Panelist Robert Culver, executive director of the U.S. Council for Automotive Research and an employee of Ford Motor Company, says fuel cell cars like those developed for the Freedom program should appear within a decade or two. He says the federal government should create demonstration fleets that can prove the capabilities of fuel cell vehicles, move them toward a “marketable cost” and spur the development of a hydrogen fuel infrastructure like that which now exists for gasoline.

Finding ways to economically convert source fuels into hydrogen while keeping the resulting pollutants in check will be one challenge to building that infrastructure. Potential source fuels include fossil fuels, plant biomass and renewables, such as solar and wind energy. According to host Flatow, some Midwestern farmers are anxious to erect windmills in their fields and generate income by selling energy back to the power grid, energy that might someday be used to produce hydrogen fuel.

MSU's Engine Research Laboratory Director Harold Schock questioned the practicality of converting plant biomass, noting that a bumper crop of soybeans in the U.S. would only produce enough hydrogen to keep all the buses in the country running for about one week. He said it now costs at least 160 times more to produce one unit of energy through fuel cells than it does using internal combustion engines. He estimated it would be at least 20 or 30 years before fuel cell vehicles were economically viable and commonplace.

“I would be very happy if I lived long enough to see a fuel cell vehicle on the highway,” he says.

MSU's Hybrid Program

Officials at MSU are not waiting for an oil shock or environmental crisis before trying out advanced technology vehicles. At the request of the University Committee for a Sustainable Campus, MSU's Automotive Services Department recently purchased four hybrids that are now part of the fleet.

According to Terry Link, Director of the Office of Campus Sustainability, the vehicles get about 20 mpg more than most of the other fleet cars while reducing greenhouse gas emissions. He likes the way they drive and requests them at every opportunity. Link said one problem, however, was that the hybrids being used now are foreign.

“I suspect we would buy more if domestic automakers were building them,” he said.

Charles Griffith, Automotive Project Director at the Ecology Center of Ann Arbor, says that a loss of efficiency occurs when converting any source fuel to hydrogen and that natural gas would probably be the most viable hydrogen fuel source. He says residential and commercial buildings will probably utilize fuel cells before automobiles. While discussion of fuel cell technologies is needed, he adds, it should not shift attention from more viable and less glamorous alternatives that can reverse the current trend toward lower fuel economy in the U.S.

HIGHWAYS FULL OF HYBRIDS

One of these alternatives is hybrid vehicles, which are currently on the market in small numbers. Hybrids are powered by two energy sources, such as diesel and electricity or gasoline and electricity. They increase fuel efficiency by capturing excess energy that is generated while the vehicle is being powered by its internal combustion engine, storing this energy in batteries and using it later when the car is being powered electrically. According to the panelists, potential near-term improvements in hybrids include smaller batteries and lighter vehicle structures.

Michael Flynn of the University of Michigan's Transportation Research Institute says U.S. automakers are not highly profitable even in good years. He says they will probably not make substantial investments in “transitional technologies” like hybrids, choosing instead to concentrate their

research on fuel cell vehicles. Although Ford will soon be offering a hybrid version of its Escape sport utility vehicle, only the Japanese are currently selling significant numbers of hybrids, such as the Honda Insight and the Toyota Prius. Flynn notes that foreign manufacturers are probably not yet seeing a profit on hybrids.

PLACE YOUR BETS

Concentrating on fuel cell research could be dangerous for U.S. companies if the technology does not pan out or if it comes too late. UM's Flynn says that by focusing too narrowly on long-term “Holy Grail” fuel cells, U.S. automakers could be at risk in the short term if oil supply or environmental “shocks” suddenly increase demand for transitional vehicles like hybrids, a demand that could only be met by the Japanese.

“The hybrid is the only thing I see on the near term horizon that would be a significant improvement over the standard car,” Flynn says.

MSU's Schock agrees that U.S. automakers were failing to focus on the near term. “There is a crisis looming in the next five to 20 years,” he says.

WHATEVER HAPPENED TO MPG?

Still another alternative for improving fuel economy is improving the efficiency of today's internal combustion engines. Because hybrids incorporate internal combustion engines, advances in this area would go hand-in-hand with further hybrid development. Although U.S. automakers spent millions to increase fuel efficiencies of internal combustion engines during PNGV, the resulting technologies have yet to be implemented extensively in American-made vehicles. MSU's Schock notes that about 60 percent of energy produced through today's internal combustion is lost from the engine before it reaches the transmission.

“There is tremendous potential for gain and improvement in the combustion of these engines,” he said.

The Ecology Center's Griffith suggests the federal government's push toward fuel cell vehicles may be an attempt to provide political cover for legislators who recently voted down increasing the Corporate Average Fuel Economy (CAFE) standards. ▶

Established by the Energy Policy and Conservation Act in 1975, CAFE standards dictate the average vehicle fuel efficiencies U.S. automakers must meet.

The fuel economy stakes are high for a number of reasons. More than 40 percent of the oil consumed in the U.S. each day goes to fuel cars and light trucks. Decreasing consumption would not only decrease U.S. dependence on foreign oil and reduce the pressure to drill on sensitive public lands, it would also substantially reduce the amount of greenhouse gases and other pollutants being emitted into the atmosphere. The Sierra Club estimates that a Ford Excursion SUV, which gets about 13 mpg, will generate about 134 tons of carbon dioxide over the life of the vehicle, compared to about 27 tons for a Honda Insight hybrid, which gets about 45 mpg—that's a difference of more than 100 tons.

On March 13, the Senate rejected an amendment to the energy bill offered by Sens. John Kerry (D-Mass.) and John McCain (R-Ariz.) that would have increased the combined CAFE standard for cars and light trucks from 24 mpg to 36 mpg by 2015. Light trucks include pickup trucks, minivans and sport utility vehicles. In 2001, sales of light trucks exceeded sales of passenger cars for the first time ever, due primarily to the popularity of SUVs. Light trucks are held to less stringent fuel efficiency and emissions standards than passenger cars due to a loophole in the Clean Air Act. These standards were set years ago when light trucks were used primarily as agricultural and commercial work vehicles, and not as passenger vehicles like they are today.

Instead of the Kerry-McCain Amendment, senators adopted an amendment put forward by Sens. Levin and Christopher Bond (R-Mo.) maintaining the current CAFE standards of 27.5 mpg for passenger cars and 20.7 mpg for light trucks. The Senate voted separately to exempt pickup trucks from any future increases in CAFE standards. In addition to maintaining the current standards, the Levin-Bond Amendment tasked the National Highway Traffic Safety Administration (NHTSA) with exploring new fuel efficiency standards. After the vote, Sen. Lott (R-Miss.) called it a victory for consumer choice, while Sen. Kerry said that it was a move backward.

THE SENATOR FROM DETROIT

Sen. Levin joined the Science Friday discussion via telephone. He says the 36-mpg standard included in the Kerry-McCain Amendment was an "arbitrary number," and determining new standards should be left to experts, not Congress. Citing a recent National Academy of Sciences (NAS) study, he says increased CAFE standards had

Happy Hybrid Customer

Could hybrids take off in the future, especially if U.S. automakers start building them? Seattle resident Anne Lynch has owned a Toyota Prius for nearly one year and is sold on the concept. In addition to "great gas mileage," safety, and fewer emissions, she said the hybrid "has to be the way of the future." Lynch was also lured by the 10-year warranty offered on the hybrid system, as well as the three years of testing that Toyota conducted in Japan before exporting the car to the United States.

"They have been tested pretty extensively, and that was a big comfort to know it wasn't a brand new thing that may have undiscovered problems," she said.

Lynch added she also enjoys being one of a select group of hybrid owners.

"It's like a little club," she said. "We all wave at each other when we pass on the road."

compromised passenger safety in the past, and any changes to the current standards must take into account safety, as well as cost and technology. Levin adds that the CAFE system now limits the number of American-made vehicles that can be sold while ignoring the number of foreign vehicles sold that are of equal size and efficiency, discriminating against U.S. automakers and autoworkers.

"That's what the CAFE system has done," he says. "It gives a discriminatory advantage to no-more-efficient imported vehicles."

In response to Sen. Levin's comments, MSU's Schock says if American and foreign vehicles are being treated differently, it is the responsibility of Congress to provide a remedy. UM's Flynn adds that when the Big Three automakers were recently asked what they thought was "reasonably attainable" in terms of improved fuel efficiencies, they said 33 mpg for passenger cars and 25 mpg for light trucks was possible by 2009. Flynn says Congress could have explored using these lower numbers as short term goals, but instead limited their debate to the higher mpg number specified in the failed Kerry-McCain Amendment which would have taken effect much later.

The Ecology Center's Griffith questions the wisdom of tasking the NHTSA with developing new standards, noting its lack of resources and expertise, its oversight by an "auto-friendly White House" and its reluctance to address the issue in the past. He adds that the number one recommendation of the NAS study quoted by Sen. Levin was that decisions about fuel efficiency standards, while difficult, should be made by elected officials.

"That's the very advice that now Congress is ignoring," he says. 🌱

Grapes of wrath: continued from p. 11

TRAP HEIGHT SOLVED

Further research on height effect was conducted to assess the moth's distribution in the woods and in the vineyard. In 2000, by testing with traps at different positions ranging from inside the vineyard to inside the woods, it became clear that moths are found in different areas at different times of the season, which means traps should be deployed accordingly.

In the early stages of the growing season, there are more grape berry moths inside the woods and at their edge than in the vineyard. Later in the season, more moths are caught in the vineyard than anywhere else. This would mean that the grape berry moth is probably coming out of the woods as the season progresses, where they end the season and cause the greatest damage.

In 2001, moths were monitored at all heights in the woods and vineyard. By looking only at the traps that are hung five feet above the ground, the moth population seems to be shifting from the woods into the vineyard during the growing season. But when other heights are considered, this population shift is no longer perceived, since more moths are found inside the woods throughout the whole season. However, inside the vineyard, there is a relative increase in moth numbers during the season that peaks around harvest.

This could mean that instead of a population shift, there is an expansion of the moths' habitat, either because it needs new food sources, or because the vineyard grapes offer a new place to lay eggs and more food for the future larvae.

Information like this about grape berry moth biology and behavior is needed to improve management procedures, including better and more efficient use of pesticides. Mating disruption, the use of sprayed pheromones to confuse the males in their search for a female, will be challenging to use if the largest numbers of moths are inside woods where this practice is not allowed. Timing of insecticide applications may be done according to information from the traps by hanging them high in trees instead of near the ground. Resistance may be less of a concern since a continuous influx of moths from the woods would ensure susceptible genes are introduced into the vineyard, lessening the effect of insecticide selection pressure. This may not sound reassuring to growers, but to researchers, the delay of or avoidance of resistance is a benefit.

Natalia Botero-Garcés is a Ph.D. student in Entomology. Her dissertation focuses on grape berry moths.

Detjen: continued from p. 6

"Think about what life was like before the advent of commercial media," he writes. "People got their news from one another, through storytelling and small talk and shared observation. You'd learn when to plant, what the weather meant, and the gossip about what was happening in the community. There was little interest in the notion of celebrity; outside the circles of political leadership there were few nationally famous people."

During my sabbatical in China I read fewer newspapers and magazines and watched far less television than I usually do in the United States. This is because not many TV programs, newspapers or magazines were available in English and my knowledge of Chinese is minimal. I got much of my news about the world from in-depth conversations with friends, e-mail messages and letters and direct observations about life in China. I read more books. I played more board games with my wife and children. It is amazing how much time and energy is freed up by ignoring the mass media and how informed you can stay by simply keeping in touch with your neighbors and friends.

Is there something intrinsic about the mass media that requires it to focus on the negative? Some would argue that the commercial mass media must concentrate on these themes in order to ensure large audiences and profits for the advertising-driven corporate media.

But there is ample evidence that there is a hunger in people for more uplifting fare. Look at the success of Oprah Winfrey, the *National Geographic* magazine, environmental and science magazines, religious and spiritual literature and many other genres.

I've argued for a long time that the news media should write more about success stories and solutions to community problems. Societies around the world are experimenting with new ways to solve environmental and economic dilemmas, to foster education and to promote real community.

A few years ago *Utne Reader* invited its readers to let them know whether they'd like to meet subscribers in their area. Nearly 10,000 people responded and soon more than 20,000 people all over North America were meeting monthly. As a result, people married, started schools and new cooperative enterprises were formed.

Similar experiments have been tried by newspapers and television stations in the United States as part of the movement

known as public or civic journalism.

Efforts such as the Culture of Peace News Network are underway around the world. People are using desktop publishing, community-access television stations and online computer conferences to find solutions, bring about connections with other people and to bring meaning to their lives.

In his essay, Utne asks, "Imagine what life would be like if every magazine, every newspaper and every radio and television station the world over made community a top priority?"

Imagine. We might see a day when the mass media helped people to really know their neighbors, to learn more about cultures around the world and to assist citizens in working together to find solutions to seemingly insurmountable problems.

To find out more about the Peace News Network, call up the following Web site: <http://www.cpn.org>.

• • •

Two pioneers who increased awareness about nature and the environment in very different ways died in August.

The first was Eugene P. Odum, a retired professor at the University of Georgia who is widely considered the father of modern ecology. When he began teaching in 1940, ecology was seen as a minor subdivision of biology. He argued that ecology was not a branch of anything but was, in fact, an integrated discipline that brought all of the sciences together. He saw the world as a series of interlocking communities, or ecosystems, each of which embraced a "unique strategy of development."

He was the author of one of the field's classic textbooks, *Fundamentals of Ecology* and other seminal books in the field. I still refer regularly to several worn copies of his books on my book shelf. I first studied them in an introductory ecology course that I took more than three decades ago. Odum was 88 when he died on August 9.

The other pioneer was Galen Rowell, a mountaineer and nature photographer, who was killed with his wife Barbara in a plane crash in Bishop, Calif. on August 11. Rowell was a brilliant landscape photographer who used natural light to create stunning photographs of mountains in Nepal, India, Tibet, China, Alaska and the High Sierras in California. He published 16 books of photographs, including his 1986 best seller, *Mountain Light: In Search of the Dynamic Landscape*. He also was an adventurous and courageous mountain climber who scaled many of the world's highest and remotest mountains to capture hauntingly beautiful images. He was returning from a photography workshop to the Bering Sea when he died at the age of 61.

JOB OPENING DIRECTOR OF THE SCHOOL OF JOURNALISM AT MICHIGAN STATE UNIVERSITY

THE POSITION: The School of Journalism at Michigan State University invites applications and nominations for the position of Director of the School of Journalism. We are seeking a collegial leader with an established background in journalism and/or journalism education to direct one of the nation's largest and oldest accredited journalism programs. Candidates should have credentials suitable for appointment to the rank of full professor. Salary is competitive and commensurate with experience and qualifications. The appointment will begin in the summer of 2003.

THE PLACE: The School of Journalism has an established reputation for research and scholarship as well as a record of consistent innovations in curriculum development and outreach activities. It is the home of several specialized programs, including the Knight Center for Environmental Journalism, the Victims and the Media Program, the nation's first university CNN student bureau and overseas programs in Great Britain, Mexico, Australia and the West Indies.

APPLICATION PROCEDURE: Applicants should submit a letter of interest, a curriculum vitae or résumé and three letters of reference to: Professor Fred Fico, 305 Communication Arts and Sciences Building, Michigan State University, East Lansing, MI 48824. Tel: (517) 355-4489. FAX: (517) 355-7710. E-mail: fredfco@msu.edu. Web: www.jrn.msu.edu

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Solution to Word Search, page 7

B	M	G	O	P	Q	L	N	W	Q	S	R	W	C	X	M	O	G	S
H	G	R	G	I	R	F	O	R	E	S	T	H	E	Q	A	O	K	I
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G	D	R	C	H	O	O	T	C	D	O	B	K	L	I	E	F	N	W
H	J	E	I	L	Z	O	O	A	F	C	N	B	M	P	O	O	D	L
E	F	E	M	G	A	H	W	S	H	E	I	S	M	T	F	V	O	L
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Z	O	P	C	H	I	A	P	A	S	X	W	T	H	I	N	P	H	G
H	U	O	P	L	M	C	E	T	H	I	G	F	E	N	T	E	I	P

River sins

Reminiscences of a lifelong angler teach new lessons

By Nate Matthews

I was seven when I discovered the battered smelt dipping net. It was sitting in a dark corner of my dad's tool shed, the steel mesh of its basket rusting and covered with dust.

It worked best in the river. I would hold it by the baskets open to the current and face backwards—gripping its circular frame. Shuffling my feet kicked detritus up the water column, and I would sweep the gaping meshwork upstream through the clouding sediment like a baleen mouth.

By digging deep, dragging the metal edge through the waterweeds, across and under the ancient logs rotting new shapes in the sand, I could lift dripping loads of river bottom into the sunshine and spread them across the dock for sorting.

Everything in those loads was black, or wet and mud covered. I focused on movement. At each glistening twitch I would dig with a twig until its cause appeared, some small life twisting from the muck like a mud-borne fetus.

Each motion was different. The small fish moved in fading spasms as they suffocated. Insects struggled, confused by the new gravity of the air. Worms and leeches curled and twisted, searching blindly for bits of wood and leaf to hide beneath. Everything was frightened and pulling away from the sun.

Only the crayfish lifted their claws in defiance. Hard shelled, intimidating, demanding respect, they scuttled backwards to drop off the dock's edge if you didn't have the courage to stop and pick them up for examination.

One snipped me once, as I grasped it poorly behind the thorax. Its blue claws hurt. A living fossil torn from the pre-rock riverbed, dragged into the light unwilling, and poked by a curious finger.

Our Michigan house rose from that riverbank. Across the sandy shallows a small forest of flooded saw grass and sapling had formed inside a meander. It was perfect amphibian habitat, and frogs—leopard frogs, green frogs, bull frogs, wood frogs and spring peepers—stared, ate and mated in its sun-striped shadows. I stalked them there.

My mom called me the bog-stomper. I must have looked immensely frightening to those small creatures, some strange seven-year-old giant with long limbs and quick hands—the young of a predatory primate playing in the water.

Stalking frogs is an art. You have to look

Reminiscing. I am always tempted to lay out only sunny childhood memories for review, like prized photographs on a table for admiring.

It is tempting to reject the darker prints as aberrations. Guilt is a hard thing, but it's how I learn.

for their eyes as they peek periscopically from cover. Approach from the blind spot, from the rear. Step slow, move slower, never look away or they will vanish.

If you grab a frog around the hips, curling your fingers in front of the kicking legs and below the yellowed belly, even its slippery skin can't save it.

My tenth spring, in New York now, while chasing fish in the shallow, weeded bay of the lake across the street, I got a hook stuck deep in my hand. It was a big hook, mean looking, one of nine on the lure I was using. It hurt, digging deep into the meat under my thumbprint. The point grated against my bone.

It hurt worse when the female largemouth bleeding on the rest of those hooks jerked with righteous vengeance. Twelve inches of green-scaled muscle and bright red gill flopped unstopably on the grass while I struggled to hold her still, crimson from my thumb dripping across her distended white belly. Between paroxysms of fury her flat, round eyes stared into mine, grimly flashing retaliation.

I deserved that pain—how many fish have I caught, to not know what the tug of a hook feels like. And fishing in the spring, during the spawn? It took seven needles of Novocaine to numb my thumb at the hospital, but earlier, as I tried to separate us from that steel embrace, eggs had dribbled from her gravid belly.

The other day I walked out onto MSU's Agriculture Hall fire escape, looking for a place to sit and reminisce in the warm weather during my lunch break.

There was a fly out there, large and iridescent; resting on a metal railing in the heat of the sun. Not many people go to that place, and I startled it. Buzzing, it circled my head for a while, angrily protesting the invasion of its territory. I sat down and forgot it.

A few minutes later, sitting on the steps and blankly staring, some premonition made me look up. Inches away, on a piece of strut work, that angry fly stared at me, demanding recognition. It buzzed at my face, star-

ting me, then flew off.

Reminiscing. I am always tempted to lay out only sunny childhood memories for review, like prized photographs on a table for admiring. It is tempting to reject the darker prints as aberrations. Guilt is a hard thing, but it's how I learn.

The old bass was large. She lived in the one-acre pond behind our house in Spencer, and had been there a long time. I was 13 when we moved to that house, and it took me two years to kill her.

I started the chase with a fly rod, but she showed no interest in feathered deceits. When worms didn't work I tried spoons, then stick-baits, then plastic frogs, jigs.

The pond was small; the smallmouth's only cover was the deep water. I saw her every time she came to the surface to feed on the real frogs and insects inhabiting its reeded edges. Every movement in the water drew her attention. Only my imitations drew her snubs, and my frustration built.

I took to catching her progeny, stunted six-inch bass that had overpopulated the pond, then impaling them for bait. She ate them, too big a meal to pass up, but ripped them off the hook where I couldn't see her. I never even pricked her; she was untouchable, a ghost fish.

It was a crayfish that finally finished her off. It was big, and angry when I picked it up, but I knew now how things were done. Its big claws strained backwards, reaching for revenge, but my hook pierced the joint between its thorax and tail.

There was bright sun that day, and white beams shafted toward the bottom, illuminating curtains of sediment suspended in the water. A pendulum cast, and the crayfish settled through them, fading, legs and tail fins splayed apart to slow its descent.

She materialized then, directly beneath that falling fossil. A mottled golden mouth, formed from shadow and gaping with anticipation. As she inhaled, gulping water, the hook sank deep into her gullet, and I had her.

Links to learning

From ecotourism to fuel cell vehicles, online resources for more information

Endocrine Disruptors page 9

World Wildlife Foundation

www.worldwildlife.org/toxics/pubres/links.htm

The group's link to further information on toxic chemicals is broad—including links to PBS's special on how endocrine disruptors have influenced the environment, EPA's screening and testing committee and a variety of nongovernmental organizations and articles. Read more about these hormone obstructors here.

Society of Environmental Journalists

www.sej.org/resource/index4.htm

A plethora links to technical information on and profiles of various chemicals, such as DDT, PCB and PBB, are included on this Web page. Environmental health, material safety data and chemistry journals are just several of the hundreds of links on SEJ's resources page.

Ecotourism page 15

International Year of Ecotourism

www.uneptie.org/pc/tourism/ecotourism/documents.htm

Volumes of articles and press releases have been written about the International Year of Ecotourism—it even has a manual. The manual offers suggestions on how to become involved to make 2002 the year of ecotourism.

Environment Network

www.unep.net

This is where to get the numbers. Click on GEO Data Portal, then you'll be asked for a keyword. We typed in "tourism" and followed the flashing screens and answered the questions until we downloaded the number of international, national and regional tourists visiting each country worldwide. You can also get the information in graph or map form. In 1999, the U.S. had almost 48.5 million international tourists.

Rainforest Alliance

www.rainforest-alliance.org/programs/sv/stsc.html

This group has developed the Sustainable Tourism Stewardship Council, a proposed team that would require tour boats and other means of tourism to be accredited as eco-friendly ecotour leaders. Their Web site claims that "(e)nvironmentally and socially concerned tourists are typically well educated, professional, have a good grasp on technology such as the Internet, and usually rapidly learn of and recognize quality products."



International Year of Mountains

www.mountains2002.org

UNEP has also named 2002 the International Year of Mountains. "We are all mountain people," reads their campaign slogan. We may not all live in the mountains, but they're crucial. Fresh water collects in the mountains, trickling down to ground-level rivers, streams and lakes. Mountains are both a setting for relaxation and war zones, as in the Balkans or Afghanistan.

Carbon Sequestration page 29

Intergovernmental Panel on Climate Change

www.ipcc.ch/pub/reports.htm#sprep

Read about the effects of carbon dioxide in the IPCC's Emissions Scenarios booklet. "By 2100 the world will have changed in ways that are difficult to imagine—as difficult as it would have been at the end of the 19th century to imagine the changes of the 100 years since," begins the scientific prediction of the future—depending on whether we use fossil fuel, non-fossil fuel or a balance of both.

National Oceanic and Atmospheric Administration

www.ogp.noaa.gov/mpe/gcc/fy99_00/johnson99.htm

Three NOAA scientists studied how carbon is transferred from air to ocean, and how carbon is distributed in the ocean. To read more about what they found, go to the Web site.

Lawrence Livermore National Laboratory

en-env.llnl.gov/asd/c-cycle.html

Scientists at LLNL developed the self-proclaimed world's first complete models of carbon exchange between the ocean/atmosphere and the land-surface/atmosphere in order to compare carbon dioxide concentration.

Greening Earth Society

www.greeningearthsociety.org/reference.htm

As explained in Stephen Meador's article on carbon sequestration, Green Earth Society's "Dr. David Wojcik estimated that about 100 billion tons of carbon originally contained in soil has been lost globally—primarily from agriculture." A helpful page of links to more information is the group's reference site. You can find further information on how carbon sinks work and various other articles, as well as links to Web sites, such as the government's Carbon Dioxide Information Analysis Center and the Center for the Study of CO₂ and Climate Change.

Fuel Cell Technology page 32

Toyota Prius

www.toyota.com/html/shop/vehicles/prius

With a self-proclaimed 48 mpg average (52 mpg city, 45 mpg highway), the Prius combines a gasoline engine with an electrical motor to run the vehicle. Starting at a cost of almost \$20,500, the "Prius runs nearly 75 percent cleaner than the standard for Ultra Low Emission Vehicles," according to its Web site. Read more about one of the first hybrid vehicles here.

Ecology Center

www.ecocenter.org

Not only does this organization's Web site offer updates on issues like automobile manufacturers' licenses to emit toxic chemicals into the air, it also offers environmental education for teachers and kids.



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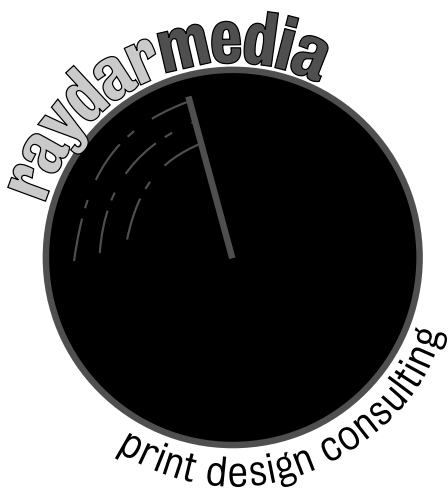
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