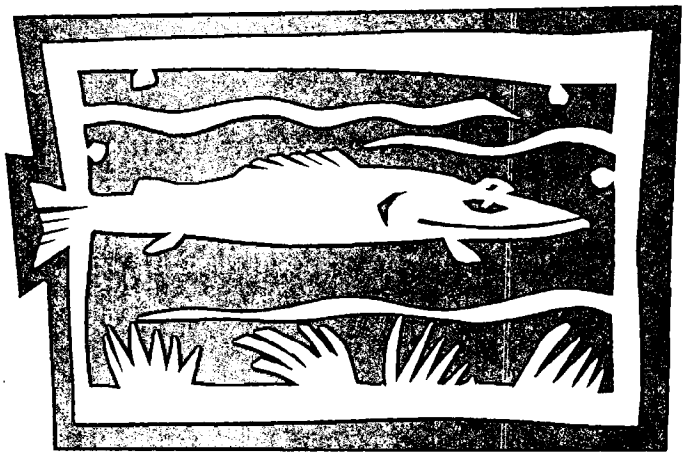
GREAT LAKES NEWS

Great Lakes United—an international coalition to conserve and restore the Great Lakes/St. Lawrence River ecosystem



Great Lakes fish stocking: A tool for sustainability?

by Jennifer Nalbone

What are the consequences of stocking hatchery-reared fish in the Great Lakes? Can we make a transition to a naturally reproducing fishery?

Find out all this and more in the just-published technical proceedings of Great Lakes United's 1999 path-breaking "meeting of the minds" conference, "Taking Stock of Our Future."

Fish stocking is a double-edged sword, capable of both positively and negatively impacting the Great Lakes ecosystem. Fisheries managers and scientists, basin environmentalists, tribal fish agencies, and anglers have varying views on how stocking should be employed. Great Lakes United's "Taking Stock" conference provided a forum for expressing those differences and helping bridge them using a scientific common ground.

After a basinwide collapse of top predator fish populations in the 1950 and 1960s, due mainly to sea lamprey predation and over fishing, fish stocking helped to

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Pataki, Engler, Harris oppose relaxed basin diversion rules

by Reg Gilbert

The most serious flaw in the Annex 2001 proposal by the U.S. state governors to protect the regional from bulk water export and diversion and wasteful water use may be on its way toward removal from the document.

In an April press conference with Ontario Premier Mike Harris, New York Gov. George Pataki criticized the objectionable provision in the "Annex 2001" proposal, a relaxing of the U.S. governors' current diversion veto authority to allow certain diversion of a million gallons per day or less.

"I do not intend to sign it"

Said Pataki of the annex in response to a reporter's question, "I do not intend to sign it on behalf of the citizens of New York until significant revisions are made," particularly with respect to the diversion exemption.

Reiterating longstanding provincial dismay with the proposed exemption, Harris for the first time said the province would not sign the annex unless it was modified. "Without New York and without Ontario, it's not going to proceed," he said. "We stand firm that we need

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Some serious fun!

Great Lakes United's Annual Meeting

"Looking Ahead: Politics and Action"

The weekend of June 8, 9, and 10, 2001

University of Windsor, Ontario

GLU annual meeting: Politics and action in 2001

by Maureen Sileo

This year's annual general membership meeting takes place in a challenging political climate for those of us dedicated to protecting and restoring the Great Lakes-St. Lawrence River ecosystem. Federal, state and provincial policies are shifting in ways that compel Great Lakes activists to restrategize.

What are the next steps along the road to clean production, restored native fish communities, wise water use, safe energy and real clean-up? What are our best tools? Who are our most effective allies? How do we reach them? Our plenary speakers are well positioned to help answer these questions.

Great Lakes United needs you to help plan our coalition's agenda for the coming years.

Facility, room, board

We are holding our meeting at the University of Windsor, on the Detroit River, in the shadow of the Ambassador Bridge. The campus is easily accessible from the major interstate highways and the Detroit airport.

A weekend stay with lodging, meals, and registration, costs C$200, US$128. A Saturday day pass, which includes registration, lunch and dinner, costs C$106, US$68. Call Bonnie at (716) 886-0142 for other packages or more i nformation.

Conference registration takes place in the main foyer of Vanier Hall. Residences offer single or double accommodation with centralized washroom facilities, air conditioning and daily maid service. Great food will also be provided. Their culinary team is committed to offering excellent cuisine and service.

Plenary panel

Our plenary panel discussion is on "Challenges and opportunities for Great Lakes activism." Our speakers can certainly address this topic comprehensively:

Allegra Cangelosi is senior policy analyst and ecosystem team leader for the Northeast-Midwest Institute, a private, non-profit, research organization dedicated to economic vitality, environmental quality, and regional equity for Northeast and Midwest states. Allegra has coordinated national and regional efforts to enact ecosystem protection legislation; built and maintained the bipartisan Congressional Great Lakes Task Forces, which comprise members of Congress with a common interest in promoting a Great Lakes agenda; and been a liaison between Washington and Great Lakes regional policy communities on Great Lakes environmental issues. Since 1996 Allegra has worked with the Great Lakes Ballast Technology Demonstration Project and has been a member of a ballast water working group connected with the International Maritime Organization.

Dean Jacobs is executive director of Nin.Da.Waab.Jig, the Walpole Island Heritage Centre, which serves as the research department of the Walpole Island First Nation. Dean is a member of the International Joint Commission's Council of Great Lakes Research Managers. Dean has served six elected terms on the Walpole Island First Nation Council of Three Fires. Dean is also a former board member of the Ontario Heritage Foundation, Ontario Historical Society, and the Premier's Council.

Elizabeth May is executive director of Sierra Club of Canada, a member of the board of directors of the International Institute for Sustainable Development, and former vice chair of the National Round Table for the Environment and Economy. In1986, Elizabeth worked as senior policy advisor to the Canadian federal environment minister.

Taking action in the coming year

Saturday afternoon will focus on our four areas of work:

The *Habitat and Biodiversity* session will be a strategy and action meeting with a presentation on "The current status of the fight against exotic species introduction in the Great Lakes." This session will examine how close we are to implementing new ballast water management technologies on board ships and the continuing threats of chemical ballast water treatment. We will also discuss what is needed in the upcoming reauthorization of the U.S. National Invasive Species Act, including the definition of ballast water discharge standards. Finally, the task force will outline strategies for coordinating U.S. and Canadian grassroots organizations on the issue. For more information contact Jennifer Nalbone at (716) 886-0142 or jen@glu.org.

Our *Clean Production* session will have a presentation on "Successes and Opportunities for Clean Produc-

GREAT LAKES UNITED

19th Annual General Meeting, June 8-10th, University of Windsor, Ontario

"Looking Ahead: Politics and Action in the Great Lakes"

———Friday, June 8———

12:00 Field trip: Walpole Island marsh

4:00 Registration

5:00 Dinner on your own

7:00 Talking circle & local groups report

9:00 Reception

———Saturday, June 9———

7:00 Breakfast

8:00 Registration

9:00 Welcome

9:15 GLU in review - Executive Director and Board President

Board nominations and policy resolutions accepted

9:45 **Panel: Challenges and opportunities for GreatLakes activism**

Allegra Cangelosi, Senior Policy Analyst, Northeast-Midwest Institute

Dean Jacobs, Executive Director, Walpole Island Heritage Centre

Elizabeth May, Executive Director, Sierra Club of Canada

12:00 Lunch

1:00 **Strategy Sessions I**

- □ *Clean Production*
  Presentation: Successes and opportunities for clean production in the Great Lakes: Mercury and the Clean Car Campaign
  —Update and next steps
- □ *Biodiversity & Habitat*
  Presentation: Exotic species introductions in the Great Lakes
- □ *Sustainable Waters*
  State and provincial reforms to prevent bulk water export and diversion
  —Update
  —Debate: Differing national approaches
  David de Launay, Director, Lands and Heritage Branch, Ontario Ministry of Natural Resources, and other officials
- □ *Healthy Communities*
  Planning Session
  —Strategizing on challenges to overcome to create a truly healthy community in the Great Lakes basin

3:00 Break

3:15 **Strategy Sessions II**

- □ *Clean Production*
  Presentation: Successes and opportunities for clean production in the Great Lakes: Emerging issues
- □ *Biodiversity & Habitat*
  Resolutions and strategizing on habitat and biodiversity issues
- □ *Sustainable Waters*
  Panel: Water use: Sprawl, conservation, diversion
  Strategy: A basinwide agenda for water use reform and ecosystem restoration
- □ *Nuclear-Free Great Lakes*
  Presentation: The viability of renewable energy leading to a rapid phase-out of nuclear power generation
  —Update and next steps

5:15-6:30 **First Nation and Labor Caucus Meetings**

7:00 Barbecue dinner

Presentation of John Manty Award

8:30 Entertainment

———Sunday, June10———

8:00 Breakfast

8:30-9:30 **Board elections** - *Voting table open*

9:00 Business Meeting call to order

New business and election results

9:15 President and Executive Director's report

9:35 Treasurer's report

9:45 **Policy resolutions**

Debate and voting

10:15 **Task force and caucus plans for 2001-2002**

11:45 Adjourn

tion." The task force will convene experts from around the basin to determine the next steps in our efforts to shift away from end-of-the-pipe solutions to clean production. We will feature health experts on mercury, successes from the Clean Car and Health Care Without Harm Campaigns and more. Please take advantage of this great opportunity to discuss how we as a basinwide community can work together to ensure that dangerous toxins are phased out of industrial practices and that companies are responsible for the toxic products they put in commerce. For more information, contact Stephane Gingras in Canada at (514) 396-3333 or gingras@glu.org or Alexandra McPherson in the United States at (716) 886-0142 or alex@glu.org.

GLU's *Sustainable Waters* task force session will begin with an update on the many significant developments in water quantity and flow protection that have appeared in the last year. Next a panel of basin waters officials will grapple with the issues currently being debated among the U.S. states and between the states, Canadian provinces and Canadian federal government on the best way to protect the region's waters in the long term from export, diversion, and wasteful use. In our second session the task force will engage a panel addressing the connection between water use and commercial and residential construction sprawl. Finally, task force members and meeting attendees will consider a basinwide agenda for water use reform and ecosystem restoration. For more information contact Reg Gilbert at (716) 886-0142 or reg@glu.org.

The *Healthy Communities* Task Force session will be a planning session focused on revitalizing the task force. This task force was originally established to ensure implementation of the Remedial Action Plans for the Great Lakes basin's forty-two designated toxic hot spots. This session will provide ask attendees to engage in intensive brainstorming to set an agenda for a revitalized task force focused on overcoming the barriers to creating truly healthy communities in the Great Lakes Basin. For more information contact Lynda Lukasik at (905) 560-1177 or lynda.lukasik@sympatico.ca.

The *Nuclear-Free Great Lakes* Task Force meeting will have a presentation on "Shifting the Focus: The Viability of Renewable Energy Leading to a Rapid Phase-Out of Nuclear Power Generation." The task force, which has been intervening in licensing hearings for nuclear reactors, will strategize on the specifics of phasing-out nuclear power. For more information contact Ziggy Kleinau at (519) 795-7725 or cfre@web.ca.

Nuclear rennaissance?

by Kyle Rabin, Environmetnal Advocates

"Anyone who advocates nuclear power as a solution to our energy problems should be shut up in a padded cell," exclaims longtime anti-nuclear activist Harvey Wasserman in a recent and widely-published Molly Ivins' editorial titled "Our Fake Energy Crisis: What Really Happened in California." Sadly, the Bush-Cheney administration is now taking steps to enable a nuclear power revival.

No commercial nuclear power plants have been built in the United States in 25 years. It is only now, with a new Republican White House, and under the guise of an "energy crisis," that the nuclear industry has seriously explored building new plants. More than two decades after the Three Mile Island nuclear reactor accident, five utility companies are working to re-energize the nuclear power industry. Construction of as many as five new plants is planned for undisclosed sites in the United States. Applications are expected at the federal Nuclear Regulatory Commission in the near future.

The nuclear industry's rhetoric is familiar: "inherently safe," "too cheap to meter," and "no environmental impact." Nothing could be further from the truth. Even without factoring in unknown future costs for radioactive waste management, health impacts, and reactor accidents, some forms of renewable energy, conservation, and efficiency are usually cheaper and always safer and cleaner. Furthermore, new reactor construction does not help us with our current energy woes. Building a new nuclear power reactor anywhere in the United States would take a minimum of five years. Even with a site approved tomorrow, and zero public opposition, the physical act of getting a new reactor on line could take up to a decade.

The fact that policymakers are even entertaining the notion that nuclear power has a future is troubling. Remember what happened with the Shoreham plant on Long Island. New nuclear power plants will end up costing Great Lakes ratepayers billions and billions of dollars.

Vice President Cheney's cabinet-level Energy Policy

Development Group, which is expected to deliver its findings to the president in May, is seriously studying how to revive the waning industry. "Nuclear has to be part of the equation," says one Bush insider referring to what many are describing as an "energy crisis." As it turns out, Cheney's energy task force has built-in ties to the nuclear industry. A key member of the task force, Energy Department official Joe Kelliher, was a longtime nuclear power lobbyist. Another connection: Roy Coffee, who worked as Governor Bush's lobbyist in Washington, was recently hired by the Nuclear Energy Institute, the industry's front group. Nuclear executives have enjoyed extraordinary access to the energy task force, meeting repeatedly with top Bush officials, including economic adviser Larry Lindsey and Energy Secretary Spencer Abraham who mentioned new nukes in a major "energy crisis" speech in late March. At the meetings, the executives laid out their case for a nuclear comeback.

And in Canada?

by Ziggy Kleinau, Citizens for Renewable Energy, and Margaret Wooster

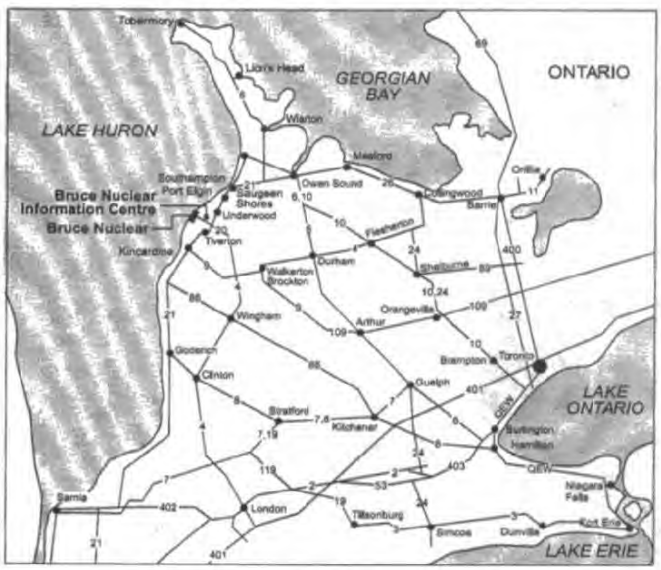
We recently intervened at a public hearing held by the Canadian Nuclear Safety Commission concerning the licensing application of Bruce Power to operate Bruce A and Bruce B Nuclear Generating Stations, a combination of eight nuclear reactors on the eastern shores of Lakes Huron that together constitute the largest nuclear generating plant in the world. Bruce Power, a subsidiary of British Energy, is a new entity in Canada with no experience operating heavy water reactors such as the CANDU variety found at Bruce. This was one of the

The Bruce nuclear complex on the shores of Lake Huron

photos, graphic Ontario Power Generation

points we raised in our testimony, along with calling attention to British Energy's poor safety record in the U.K.according to a 1999 Nuclear Installations Inspectorate report.

In 1997 Ontario Hydro took eight of its nuclear reactors, including Bruce A, offline and was said to be considering decommissioning them. However, since then, new operating licenses are in the process of being issued to four thirty-year-old reactors. This is extremely troubling given the age of these facilities; the many problems associated with their outmoded heavy water reactor (Chernobyl style) technology; the "profits first" mentality as the industry is privatized; and continuing proposals to burn weapons-grade plutonium or MOX (Mixed Oxide) fuel in these commercial reactors, with all the additional hazards associated with transporting highly radioactive waste.



Alternatives

The clean, safe alternatives are out there! Distributed generation from wind turbines putting out electricity as low as three cents per kilowatt hour with no pollution or neadly wasate to worry about or pay for.

Every south-facing roof can be outfitted with solar shingles generating electricity right at the user's residence, as is already the case in some communities in Germany. With these viable new technologies and cutting the 30 percent of electricity that is wasted, every nuclear plant in North america could be phased out in this decade!

Aquaculture: Friend or foe?

by Jennifer Nalbone

"Aquaculture," the breeding and harvesting of fish, is a growing industry in the Great Lakes basin.

At its best, the industry provides jobs and a regular supply of clean fish for human consumption while reducing pressures on struggling native fish populations and on the environment as a whole.

But at its worst, aquaculture can contribute to the destabilization of native species and could significantly damage the Great Lakes ecosystem.

As a young industry in the Great Lakes region, aquaculture needs to immediately take on working "at its best"—beneficially for the economy and the environment. Great Lakes aquaculture must be developed sustainably.

Sustainability

The term *sustainable* is commonly used to promote certain practices, technologies, communities or businesses that may or may not, in fact, be sustainable. A modern day sustainable community or industry recognizes that it exists within, and depends on, a dynamic ecosystem with finite resources. Due to the changing nature of ecosystems, in particular the Great Lakes aquatic ecosystem, a sustainable industry must develop methods to adapt to changes as they occur.

Many aquacultural practices being used in this region can be considered as moving towards sustainability. Researchers are working to reduce excess nutrients in fish feed and the volume of feed consumed. This reduces

nutrient loading in effluent waters and total production resources needed. Best management practices limit exotic species infestations, minimize disease outbreaks and reduce pollution. Settling ponds can serve as wastewater treatment for inland facilities. Inland and open water sites can be rotated and allowed to remain fallow to promote aquatic habitat recovery and site reuse. Recirculating water technology allows for pollution control and reduces overall water consumption. As a result of best management practices, some very carefully maintained sites have even reported positive nutrient enrichment to aquatic habitat and local increases in biodiversity.

photos: LaDon Swann, Illinois Indian Sea Grant

Stocking juvenile fish into a net pen

Environmentally unsustainable practices

Sustainable aquaculture practices are critical because of the industry's documented problems with escapes, pollution, disease, and the spread and introduction of exotic species for Great Lakes aquaculture.

Escapes

Large and chronic escapes of fish from aquaculture compromise the survival of wild fish populations. The Great Lakes states' aquaculture industry profile consists mainly of inland facilities, which usually allow a low but real chance of fish escape. In 1999, there were fewer than 15 open water aquaculture facilities in the Great Lakes basin located in provincial waters of Lakes Huron and Ontario, and the St. Lawrence River.

Even with the current low number of caged facilities in the Great Lakes, large-scale escapes are a reality. A net pen escape in Lake Ontario released more rainbow trout than the province stocks in a year (about 360,000 yearlings escaped after a 1997 storm event versus about 225,900 rainbow trout stocked in the same year). Large-scale escapes in the Great Lakes raise serious ecological concerns on the potential displacement of native or naturalized fish populations as well as concerns with disrupting the predator-prey balance that is closely managed by lake fisheries managers. According to Dr. Chris Wilson, a research scientist in aquatic biodiversity and conservation with the Ontario Ministry of Natural Resources, "Escapes of this magnitude pose threats to naturally reproducing fish in the lakes, in that escapees can compete for food resources with residents and add significantly to existing pressure on prey species. Domesticated fish typically behave more aggressively than wild fish, and can potentially displace resident fish during spawning. If the escape is large enough, these behaviors could severely damage naturalized populations. Where native species are cultured, additional consequences could include the potential loss of locally adapted populations or stocks. In addition, accidental releases of large numbers of cage-cultured fish pose significant disease risks, as these fish could act as both reservoirs and vectors for disease outbreaks."

Without improvements to open water facilities to prevent large-scale escapes, further growth of open water aquaculture only increases chances of subsequent ecological impacts. Verifying the large volume and continued expansion of provincial open water facilities, David McLeish of the Ontario Ministry of Natural Resources stated, "Cage culture operations on Lake Huron now produce close to the same biomass of fish as is harvested by the Ontario commercial fishery (all species). We are currently processing an application for what will be the largest aquaculture operation on the lake and once this facility begins operation production from cage culture could soon surpass that of the commercial fishery."

In response to continued interest in using the Great Lakes to culture fish, Brister and Kapuscinski from the Institute for Social, Economic and Ecological Sustainability are developing an "Environmental Assessment Tool for Caged Aquaculture. The Environ-

mental Assessment Tool is being developed to determine the suitability and environmental effects of an aquaculture facility at any given open water site. To avoid serious ecological and industrial impact, a moratorium on new open water aquaculture facilities should be established until a proven method for environmental assessment can be used to critically examine the suitability and placement of new facilities in the Great Lakes.

Pollution

In the mid-1990s, large-scale algal growth and depletion of dissolved oxygen caused by open water caged aquaculture were reported in the LaCloche Channel of Lake Huron. Water quality impacts included significant phosphorous loadings of 1.2 tonnes phosphorous, 7 tonnes nitrogen and 38 tonnes solid waste—almost double than targets set for total phosphorus loading reduction from nearby Severn Sound Area of Concern's Penetnag Bay. The Penetnag Bay remediation target would reduce average annual phosphorus loading by 0.74 tonnes, mostly through improvements to sewage treatment plants.

Aquaculture nutrient loading may not cause lakewide problems in Lake Huron, whose average total phospohrous load is approximately 4,799 tonnes, but localized water quality impacts have been a reality. Open water facilities are located in nearshore areas, areas also stressed by land based runoff and discharges, as well as being areas heavily used by plants and animals, including humans. Addressing the impacts of aquaculture effluent varies according to site, type of facility, and practices used in similar facilities. The discharge carrying capacity of both the receiving water bodies and their larger watershed must be assessed to determine the amount of effluent a site can absorb from a facility, or a watershed can absorb from cumulative sources.

Disease

Disease outbreaks in North America have been associated with infected stocked or escaped fish, as well as contaminated hatchery waters. Bacterial kidney disease in non-native trout populations in Wyoming has been associated with the stocking of infected hatchery reared trout. Wild brook trout populations in Michigan have been reported to be infected with whirling disease downstream from an infected hatchery

Initial introduction of parasites or pathogens into the wild through stocking, accidental escapes, or waterborne transfer is difficult to scientifically prove. However, the primary challenge and focus should be to determine what factors trigger a disease outbreak and to prevent outbreaks, if not initial infection. As disease can contaminate entire aquaculture facilities as well as infect and decimate wild populations, disease is a threat that all stakeholders are interested in preventing. Adoption of and adherence to consistent basin wide policies is the best means to address the threat to the Great Lakes basin as a whole from disease transmission.

Exotic species

Exotic species infestations have had and continue to have catastrophic impacts in the Great Lakes. They have caused substantial population changes in native fish species and community stability. Exotic species are considered the second highest threat to biodiversity in the United States and the greatest threat to the native fish in the Great Lakes. For this reason, native species should be used for aquaculture propagation, sites should be well maintained and exotic species use should be forbidden until it is proven that they will not be established in the region.

For example, the use of an exotic species of carp to clean snails out of southern U.S. aquaculture facilities currently poses a significant environmental threat to the Great Lakes. The black carp was recently permitted into southern ponds, despite its propensity to escape, migrate, significantly modify aquatic habitat, displace native species and prey on struggling native bivalve populations. If the black carp escapes from southern ponds, they can gain access to the Great Lakes region though the Mississippi and Chicago Rivers. According to Dr. Leo Nico of the U.S. Geological Survey and author of "Risk Assessment on Black Carp (Pisces: Cyprinidae), "Black Carp would have no difficulty surviving and probably becoming established in open waters in the Great Lakes region. Based on their habitat requirements, it may be necessary for the fish to have access to large tributary streams for spawning, but they could spend much of their lives in lakes and other larger water bodies."

Besides, the effectiveness of this exotic, potentially invasive fish as a pond cleaner is questionable. "Research to date suggests that black carp may not be particularly

efficient in controlling snail populations in U.S. aquaculture facilities," said Nico in his risk assessment. The southern states and bodies who allowed this exotic species to be introduced into U.S. waters have prioritized industrial desires over environmental threat, and without even investigating effectiveness or viable alternatives.

When considering exotic species introductions, methods of risk assessment are typically employed, but these methods are far more questionable in this context than in other applications for risk assessment. The ecological risk of exotics is neither possible to know fully beforehand nor proportionally comparable to risk of exotic species introduction.

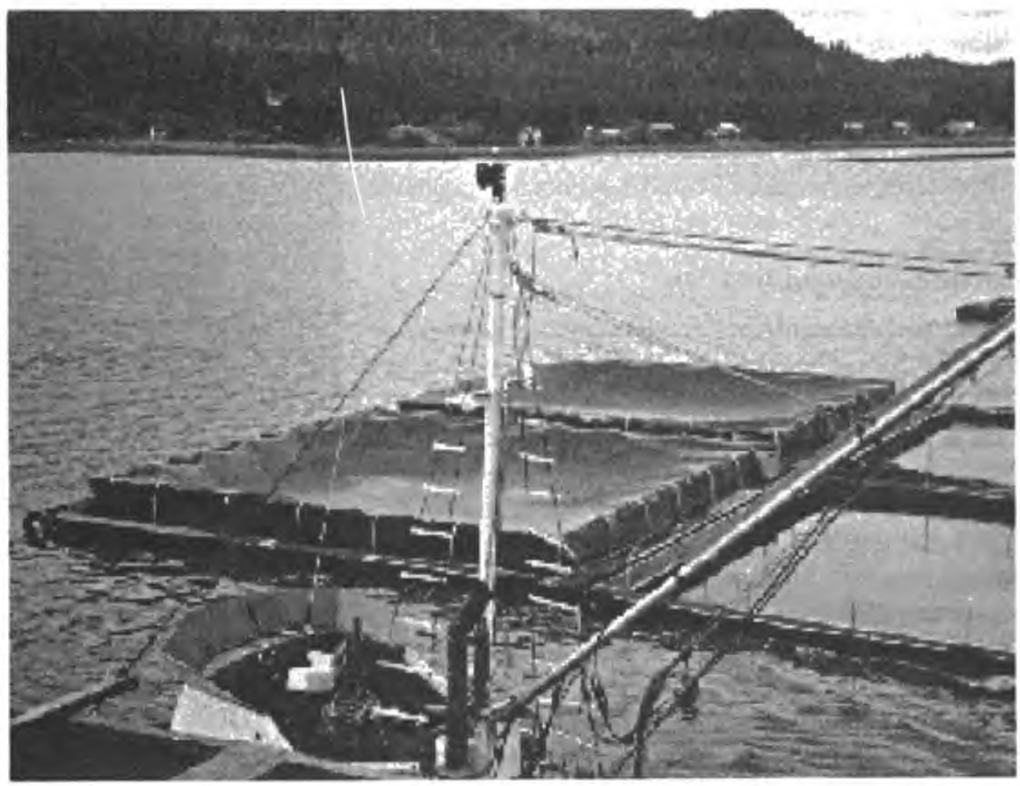
According to Jason Van Driesche, from the Institute for Environmental Studies, University of Wisconsin-Madison, "Most people consistently fail to understand how fundamentally different risk is in a biological context than it is in any other context. That is, the consequences of making mistakes with biological introductions are far more serious than they are with any other kind of environmental risk.

"Most people use the standard framework to evaluate risk of invasion as they do for risk of chemical exposure; that is, they assume that if you reduce risk by 95 percent, you've reduced impacts by 95 percent. For example, if you reduce exposure of people to carcinogens by 95 percent, each person's risk of developing cancer would drop (all else being equal) by 95 percent as well. But a very different model applies if you are talking about biological invasions. Because of the self-spreading and self-multiplying nature of a successful invasion, reducing risk by 95 percent does not serve to reduce impacts by 95 percent. It simply yields a 5 percent risk that you will have 100 percent impact. Essentially what we need to get across is the permanence and self-spreading nature of biological invasions. We have to think not in terms of minimizing the possibility of invasion in high-risk situations, but rather in terms of avoiding high-risk situations."

Issues in genetic diversity

Ecological impacts such as those discussed above also threaten the genetic integrity of already struggling native Great Lakes fish populations. Native, or indigenous, gene diversity is a product of natural selection, yielding a suite of adaptive traits essential for survival. Native genetic diversity is essential for species, populations, individuals in a population, and even genes in the individual to promote survival during adverse environmental conditions. The remaining native genetic diversity in the Great Lakes basin contains the fundamental building blocks needed to restore sustainable naturally reproducing fish communities. Within aquacultural practices, preventing farmed fish escapees, exotic species introductions, pollution and disease are all neces-

Open-water net pens



sary to protect the remaining genetic integrity in the Great Lakes. While arguably not the major factor contributing to loss of genetic diversity in this region, the growing aquacultural industry has the potential to increasingly contribute to the disruption or elimination of genetically coded traits necessary for species adaptation and survival.

The impacts of introducing cultured fish or exotic species into wild populations include direct and indirect genetic interactions. Direct genetic effects include the transfer of genes from stocked or escaped fish to wild or native populations. Genetic transfer, the gene flow from the gene pool of one species into the gene pool of another, can cause introgression. While a very small amount of gene transfer (<0.1%) can be considered to increase the capability for adaptation due to the introduction of new genetic variations, a larger amount of gene flow can reduce genetic diversity and negatively impact wild fish populations. The ultimate threat is that gene flow continues until one gene pool is completely replaced by another.

Influxes of cultured fish or exotic species can also reduce genetic diversity in the wild population without direct transfer of genes. Introduced individuals can cause indirect genetic effects by reducing the size of a wild population through food or resource competition, habitat occupation or modification, or disease transferal or activation. Pollution can also contribute to decreases in wild population size, especially in localized areas. The resulting reduction in overall wild population size can alter selective forces and cause a reduction in genetic diversity.

Genetically modified fish

Given the potential genetic effects, genetically modified fish should not be allowed at any site from which they might escape. In the wild, environmental conditions "manipulate" genetic signatures to promote survivability. Genetically modified genes have usually been manipulated to produce characteristics that will maximize economic profit—such as size and growth rate. Such characteristics have unknown, questionable and in many cases demonstrated negative adaptive value to species that have evolved into specific ecological niches. Like the risk of exotic species introduction, using risk assessment to determine risk of modified gene transfer into wild populations cannot adequately assess ecological risk. For a problem for which there is no solution, the only acceptable risk is zero.

There has been widespread concern and opposition to the use of genetically modified organisms, including transgenic fish. The American Fisheries Society, International Indian Treaty Council, Great Lakes United and other organizations have all adopted policy resolutions on the restricted use of genetically modified organisms. The American Fisheries Society's policy statement 21, regarding transgenic fish states, "Based on current understanding of community-level impacts of stocking non-transgenic piscivorous fish, the release of certain transgenic fishes, especially those exhibiting substantially altered performance, could destabilize and reorganize aquatic ecosystems. Because aquatic ecosystems function through complex interactions involving transfers of energy, organisms, nutrients, and information, it is reasonable to expect difficulty in predicting the

Harvesting fish from a pond facility

community-level impacts of releasing transgenic fishes that exhibit one or more type of phenotypic change. Further, releases of sterile transgenic fish would still involve short-term risks because sterile fish might alter community dynamics through processes such as competition and altered predation. "

Conclusion

The regional aquaculture industry has many practices that should be further promoted and implemented, and many practices that need serious modification in order to lessen aquaculture's contribution to stressors that cause the loss of biodiversity and genetic diversity in the Great Lakes. If not already doing so, inland and open water aquaculture should:

- Perform better site assessments as part of each facility application, including a site-specific prediction of carrying capacity
- Use native fish species for local sources for aquaculture production and maintenance where there exists any chance for escapement.
- Require a consistent, routine monitoring and reporting program for disease control, species containment and effluent release, and
- Develop, implement and require best management practices and new sustainable technologies

Dialogue between many industries and environmental groups has often been heated. However, with effort, differences in viewpoints can be used by stakeholders to identify ways for the Great Lakes aquaculture industry to promote its sustainable development. Indeed, sustainable practices can assure that catastrophic impacts do not someday yield social backlash that could seriously damage the regional industry.

For a more detailed report on this subject, complete with references, contact Jennifer Nalbone at Great Lakes United's Buffalo office.

Next issue: An interview with Jeffrey Malison, director of the Department of Aquaculture at the University of Wisconsin – Madison and an environmentally responsible fish farmer.

Michigan considers Perrier

by Andy Guy, Michigan Land Use Institute

The term "Perrier" is, like Nike's swoosh emblem, the quintessential mark of its trade. Just as we associate athletic shoes with Nike, the world's largest footwear company, North Americans connect the Perrier Group of America, a division of the world's largest food company (Nestle, S.A.), with the most essential beverage on earth—water.

This connection may intensify at the expense of the Great Lakes water supply. Perrier proposes to construct facilities in either Mecosta or Osceola counties, located in central Michigan, which would withdraw 700,000 gallons per day – perhaps more – of groundwater that naturally flows through the heart of the Muskegon River watershed. The company would consume more groundwater than any other bottling facility in the state. Some embrace the proposal as an opportunity to diversify the local economy with a clean, stable industry.

Perrier plans to spend $60 million on facility development and promises to start with 45 workers earning an hourly wage topping out at $18. A local group of residents calling themselves Citizens for Jobs, Opportunity, and the Environment emerged in support of the project along with economic development authorities.

Perrier drills a test well in Osceola County, Michigan

photos: Patrick Owen, © Michigan Land Use Institute

An Osceola County spring threatened by Perrier's proposed pumping

Moreover, the state Economic Development Corporation cautiously helped Perrier establish contacts in the region.

Perrier's proposal comes as numerous issues are being dropped on the Great Lakes water supply like giant explosive projectiles. Population growth promises more thirsty people. Boom! Climate change threatens to redistribute water around the globe. Bang! Dwindling political representation means less power to legislate Great Lakes protections. Boom! Water scarcity problems already have occurred in Michigan. Kaboom!

With so much heavy artillery bombarding the Great Lakes bunker, Perrier's proposal to withdraw, for free, 500 gallons of water per minute is like lobbing in one more live grenade. Right now, that grenade threatens to blow Michigan's laudable conservation goals right out of the water.

The state's lawmakers and natural resource managers continue to treat Great Lakes water as if we are living in an age of limitless supply. Michigan appears content to permit an infinite number of groundwater withdrawals—nearly 10,500 wells to date—regardless of pumping rates and absent any sound scientific understanding of the resource.

Is this smart? Hardly. In fact, the state's Legislature and environmental officials need to immediately consider modernizing state water policy because of the following ten absolutely crucial factors.

First and foremost, groundwater is a linchpin of Michigan society. The state withdraws more than 700 million gallons of water per day for domestic use, to grow food, and to make industrial products. This reliance is unique. Forty-five percent of Michigan's population depends on subsurface water supplies and the state has more private wells than any other in the United States. Further, more new wells were drilled in 1998 in Michigan than in any year previously recorded, showing that demand is rising.

Second, the state identified this sharp rise in local demand as a problem nine years ago when a special task force was convened to assess the risks confronting Michigan's quality of life. Coordinated by the state Department of Natural Resources, the task force generated a report titled *Michigan's Environment and Relative Risk*, in which the mining of groundwater for consumptive use was recognized as one of the most troublesome and poorly understood challenges to managing the state's water.

Third, the report was right on target. Groundwater overdraft – the difference between consumption and replenishment – already has led to conflicts in parts of Saginaw and Kent counties. Many residents have been forced to re-drill wells at their own expense and, consequently, economic development remains stymied by moratoriums on new irrigation wells in several Saginaw County townships. This in a region surrounded by a Great Lakes system that comprises six quadrillion gallons of fresh water.

Fourth, these water shortages confirm that the science of groundwater hydrology in the Great Lakes region suffers from a serious lack of information, as was noted in a recent report by the International Joint Commission, an organization created by the United States and Canada in 1909 to resolve water issues

between the two nations. Scientists are not certain how much groundwater exists in the region, or how the resource flows in and out of the interconnected system of "aquifers" – the underground water formations pressurized by the weight of the layers of sand, gravel, and stone that lie above and below.

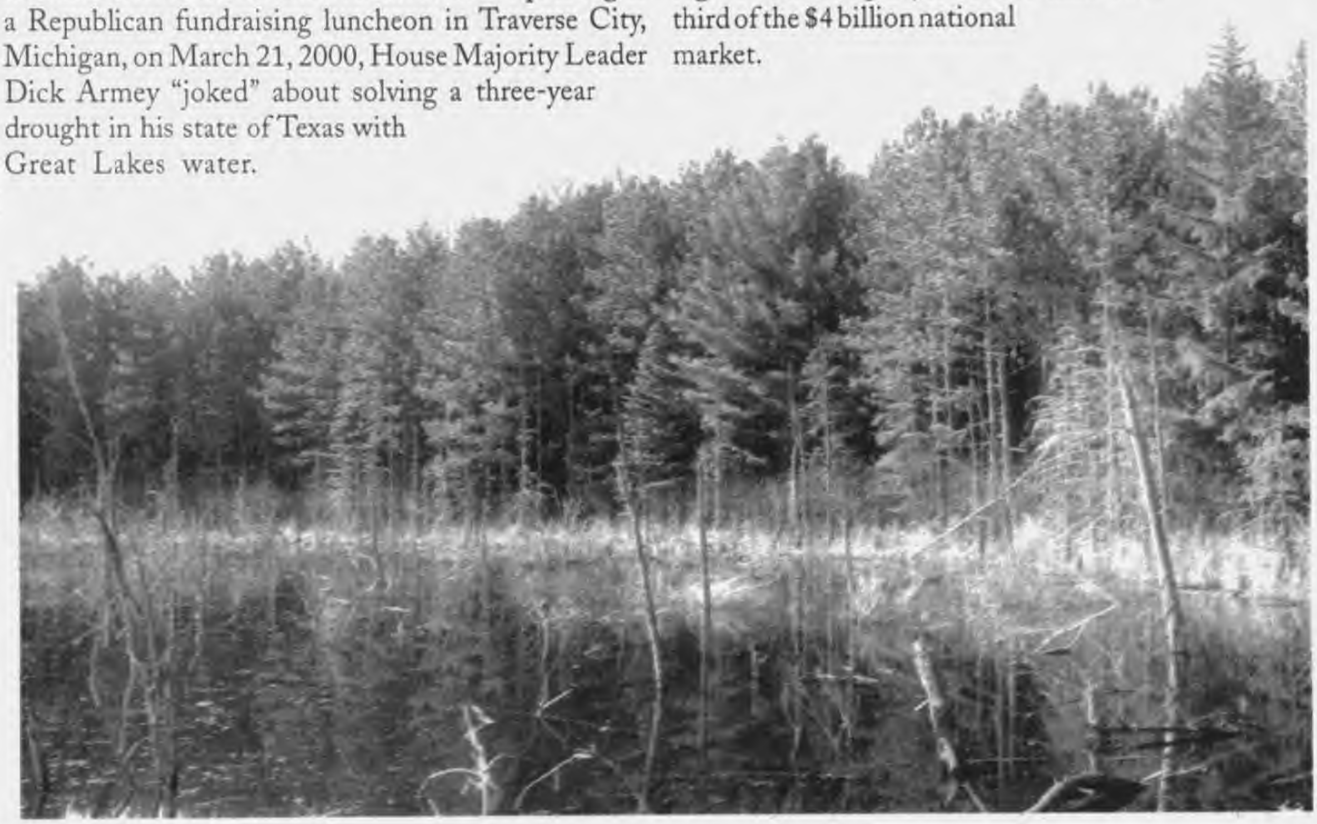
Fifth, ground and surface waters are inextricably connected. Moreover, scientists predict that surface water levels will fall. Last year the U.S. Environmental Protection Agency coordinated a vast assessment of national climate change predictions. The Great Lakes portion of the assessment predicted a possible drop in Great Lakes water levels of as much as three feet in thirty years, eight feet in the next hundred years.

Sixth, political power is ebbing in the Great Lakes, falling away from Midwest states and towards the gradually drier, and increasingly thirsty West and Southwest. Every Great Lakes state, with the exception of Minnesota, lost congressional representation with the 2000 census. At the same time, Arizona, California, Nevada, Colorado, and Texas all gained representation.

Seventh, this political realignment already threatens to erode Great Lakes conservation efforts. Speaking at a Republican fundraising luncheon in Traverse City, Michigan, on March 21, 2000, House Majority Leader Dick Armey "joked" about solving a three-year drought in his state of Texas with Great Lakes water. With a candid remark that foreshadows future diversion pressure, Armey said, "I'm from Texas and down there we understand that whiskey is for drinking and the water is for fighting over. If we get [federal control over Great Lakes water], we're not going to be buying it. We'll be stealing it. You are going to have protect your Great Lakes."

Eighth, domestic demand is not the only threat. Globally, water consumption rose sixfold between 1900 and 1995—more than double the rate of population growth—and continues to grow rapidly as agricultural, industrial, and domestic demand increases. According to research by the World Bank, within twenty-five years nearly two billion people will live in regions that experience absolute water scarcity.

Ninth, the success of the bottled water business is a clear indication of this growing demand. The industry is the fastest growing beverage market in the nation, a trend that is expected to continue indefinitely, with Perrier leading the charge. The company is nearly three times larger than its closest competitor, manages 75 springs across the United States alone, and sales exceeding $1.5 billion per year, more than one-third of the $4 billion national market.



An Osceola County wetland threatened by Perrier's proposed pumping

And tenth, water-bottling facilities in particular may pose a unique threat to Great Lakes conservation efforts. According to the International Joint Commission, when water is "captured" and entered into commerce, it may attract obligations under international agreements. Undoubtedly, Perrier's operation would shift some degree of decision-making away from the sovereign state of Michigan and toward global markets.

To be certain, international trade laws—the worldwide General Agreement on Tariffs and Trade, the North American Free Trade Agreement, and the potentially forthcoming Free Trade Area of the Americas—should be amended to allow their members to protect Great Lakes water. Further, water in its natural state (for example, in lakes, rivers, or aquifers) should be excluded from the scope of these trade agreements.

For ten compelling reasons, then, Perrier's arrival should encourage Michigan, and each Great Lakes state, to shape its new identity in the global economy. Like oil to Iraq, rain forests to Brazil, and lobsters to the northeastern seaboard, water is the Great Lake's unique and exhaustible resource. Reconciling Perrier's water-for-profit motive with the laudable public goal of reasonable water conservation will be difficult, but necessary.

As former Congressman Jim Wright wrote in his 1966 book titled *The Coming Water Famine*, "The crisis of our diminishing water resources is just as severe (if less obviously immediate) as any wartime crisis we have ever faced. Our survival is just as much at stake as it was at the time of Pearl Harbor, or the Argonne, or Gettysburg, or Saratoga."

To best conserve the clean, fresh water supply of the Great Lakes and avoid the impending global water war, Michigan must develop the awareness, the legal tools, and the modern public policy that is absolutely necessary to survive in a world that is changing so dramatically.

Bringing clean production to North America

by Alexandra McPherson

More than a hundred environmentalists, union members, auto representatives and government officials from Canada and the United States convened in Windsor, Ontario for Great Lakes United's Extended Producer Responsibility (EPR) and the Auto Industry workshop in February.

Internationally renowned experts from Europe and North America shared "real world" experiences showing how EPR policies can reduce the environmental footprint of the auto industry.

This past summer, Europe passed an EPR directive mandating manufacturer take-back of cars when they are removed from commerce. The take-back mandate forces automakers to be responsible for the toxic substances used in the cars by drawing the critical link between car disposal impacts and auto design decisions.

For example, as documented in Great Lakes United's report *Toxics in Vehicles: Mercury*, released with the Ecology Center and the Center for Clean Products and Clean Technologies, mercury applications in cars are responsible for mercury contamination in our water and food.

In 1993, Sweden banned most uses of mercury to alleviate the problem. Bo Swaner came to the workshop and shared with the hundred plus participants in the room how Saab Automotive Company dealt with the mercury challenges in the early nineties as well as how they are dealing with the demands of the new European Union directive.

Gary Davis from the University of Tennessee's Center for Clean Products and Clean Technologies spoke to the need to export European EPR models to North America. The Automotive Manufacturers Alliance challenged the usefulness of EPR in the United States and Canada. The workshop achieved its primary purpose, which was to heighten the profile and effectiveness of EPR initiatives and have a constructive dialogue on how to advance EPR in North America.

Tom Corbett of the New York Department of Environmental Conservation explained the state's program

photos Jim Muffoe

Clockwise from top left, Tom Corbett of the New York Department of Environmental Conservation, Bo Swaner of Saab Automobile Corporation, and a hood light assembly containing a mercury switch

to remove mercury-containing hood and trunk light switches from municipal fleets and from individual passenger vehicles via partnerships with automotive repair shops.

Hudson River cleanup: Template for the Great Lakes?

by Chris Walbrecht,
Citizens Campaign for the Environment

A contaminated sediment cleanup planned for the Hudson River in New York state might set a pattern that could significantly advance the cause of sediment remediation around the Great Lakes.

The outcome of the Hudson River cleanup plan will influence the way the U.S. Environmental Protection Agency treats sediment clean up decisions in the Great Lakes. General Electric, the principally responsible party for the PCB contamination problems in the Hudson, has tainted the science on dredging through a misinformation campaign to avoid cleaning up its mess. It is in our best interest to insure that the EPA proposes a clean up plan based on sound science, as it will set a precedent for removing historical contaminants elsewhere in the country.

The headwaters of the Hudson River can be traced to pristine Lake Tear of the Clouds located in a large tract of "forever wild" area in the High Peaks Wilderness of the Adirondack Park in upstate New York. In the shadow of Mount Marcy, the highest point in New York State, the river starts its fantastic journey to the sea. Cascading over numerous waterfalls and chunks of glacial rock, the river picks up mountain water that provides the force and feeds communities with drinking water and recreational opportunities. The river swiftly moves through canyon gorges now again lined with forests.

The Hudson served as a transport system to get timber from the Adirondacks to the mills through the mid- to late 1800s before this area was permanently protected.

Shortly after flowing from the Adirondacks, the Hudson passes through farming communities, which historically has provided water for farming and transport of goods to market. The Hudson River Valley remains an agricultural stronghold and the river continues to supply water for irrigation for vineyards, produce and dairy farms. Because of its diversity, historic and economic value the Hudson River was designated as America's first National Heritage River.

It took the river a long time to rebound from the destructive forces of timber clear cutting practices. But it wouldn't be the last commercial abuse it would struggle with for survival. On came the industrial revolution and the electronic age and new chemicals. Communities like Fort Edward and Hudson Falls, old milling villages that once relied on timber harvesting became new industrial centers in the mid 1900's for production of electrical equipment. General Electric Company For a company like GE, the river served as a conduit for industrial waste disposal and served as a waste transport system for industrial pollution. GE widely used Polychlorinated Biphenyls (PCBs). PCB fluid provided an insulator to keep transformers cool. Sloppy handling during the manufacturing process, dumping, spilling and just total

disregard for the river led to massive contamination from Fort Edward to New York City.

The EPA declared PCBs probable human carcinogens in 1977. The manufacture of PCBs was subsequently banned and intentional discharges shortly ceased at the two GE plants north of Albany. By that time, over 1.1 million pounds of PCBs had been released into the Hudson River resulting in a devastating impact on the river ecosystem. The contamination spread throughout the river system finding its way into the food chain. PCBs contaminated a variety of living species including fish, birds and humans. The PCBs adhered to silt particles and settled in concentrated pools where they remain today. The Hudson River, pristine at its source remains the largest superfund site in the nation measuring over 200 miles long.

Like contaminated sediments in Areas of Concern around the Great Lakes, PCBs have had a negative impact on local economies through the loss of commercial and recreational fisheries, restrictions on navigable waterways and decline in tourism. Fish consumption warnings for PCBs are still in effect for the stretch of river from the Battery in New York City to Fort Edward. North of the Federal Dam in Troy, possession and consumption of fish is illegal due to PCB contamination. So it seems a plan for cleanup would be welcome from communities along the river.

In December of 2000, after a ten-year study, the United States Environmental Protection Agency conducted a ten-year study that was released in December of 2000. The study documented the need to remove PCBs in the Hudson River protect human health. The EPA subsequently proposed a cleanup plan. *The cleanup plan, called the Hudson River PCBs Feasibility Study and Proposed Plan*, requires the removal of 2.65 million cubic yards of contaminated sediments from the river bottom. Over 1,000 anxious citizens of the Hudson Valley showed up at the release event to hear the details.

If the proposed plan is approved, GE will be required to remove PCB contaminated sediments from 40 different locations called "hotspots" on the river bottom stretching from the Federal Dam in Troy 40 miles north to Fort Edward. The estimated cost of the cleanup is $460 million and EPA says it can be completed in 5 years. EPA projects that removing these sediments will result in a dramatic reduction of PCB fish consumption warnings within 8 years. If successfully executed, the PCB removal project could be a national and global model as a landmark of progress in removing historical contaminants.

GE, a huge multinational corporation boasting yearly profits of over $130 billion, has decided they will be persistent in their fight to halt the proposal and have mounted a multi million-dollar public relations campaign by contending that the river's biological and hydrologic process will cleanse away the PCBs. GE is actively working to persuade communities and local government along the Hudson that the PCB removal will be more harmful and that the natural process has done a good job. Scientific modeling indicates that relying on the river's natural process to remove PCBs will mean fish will be unsafe to eat until at least 2072.

With the latest political change in Washington, it is uncertain what the final outcome for the Hudson will be. To date there have been five public hearings in communities along the Hudson River with strong support for PCB removal at some and strong opposition at others.

Citizens Campaign for the Environment is actively mobilizing its members and supporters in the Hudson Valley to demonstrate their support for the cleanup. So far CCE has generated over 700 written comments to EPA from members of the public. Organizations and individuals should send comments to: Hudson River PCBs Public Comments, U.S. EPA, 290 Broadway, 19th Floor, New York, N.Y. 10007. For more information contact Chris Walbrecht of CCE at (914) 997-0946 or log onto CCE's website at www.citizenscampaign.org.

Member News

New members!

Welcome to Great Lakes United and thank you so much for strengthening the coalition:

Individuals

Robert Berger, Buffalo, NY
Alison Clarke, Duluth, MN
Sarah Ellis, Toronto, ON
Sherry Gordon, Syracuse, NY
Daniel & Jacqueline Gregory, Fly Creek, NY

Dan Keifer, Rochester Hills, MI
Kenneth Koehler, Akron, NY
Robert Miller, Buffalo, NY
Syed Naqvi, Belmont, MI
Christine Perreault, Goetzville, MI
William & Patricia Townsend, Amherst, NY
Jerry & Carolyn Voight, Owosso, MI
Craig Wardlaw, Jerseyville, ON
Domenick White, Rochester, NY
Anne Wilson, Trumansburg, NY

Organizational Members

CAW Durham Regional Environment Council, Oshawa, ON
CAW Local 199, St Catherines, ON
CAW Local 4268, Waterford, ON
ENJEU et Environmental Jeunesse Inc., Montreal, PQ

Workplace gifts

Those of you who choose to give through your workplaces, through either the State Environmental Federated Appeal (SEFA) or through the Combined Federated Campaign, your help is valued greatly and helps our programs run as efficiently as they do. Thanks so much.

Wish list

Can you help us obtain these needed items? They are not quite in our budget at the moment, but we'd sure still like to have them.

- 8-line, 12-station phone system
- High volume photocopier
- Volunteers! Work at home for GLU!
- **Good** office chairs
- Digital still and video cameras
- A high-quality tape recorder
- New IBM compatible personal computers

Member profiles

Lyle Toohey

Lyle is president of the League of Women Voters of Buffalo/Niagara, a non-partisan, volunteer, grassroots organization whose mission is 1) to encourage citizens to be informed, active participants in the political process and 2) to influence public policy through education and advocacy.

Throughout its eighty-year history the LWV has strongly supported environmental causes and legislation. Our League is an active member of the Lake Erie Basin Committee, a coalition of local and state Leagues bordering Lake Erie. The league shares GLU's concern for proper stewardship of our valuable natural treasure, the Great Lakes.

"As someone with an environmental conscience," Lyle wrote us, "I depend upon GLU to keep me updated about events and legislation that impact the ecosystem, our health and our quality of life." Keep up the good work!"

Lyle is also a member Erie County Commission on the Status of Women and of the Greater Buffalo All-America City Committee.

Save the Oak Ridges Moraine Coalition

Save Oak Ridges Moraine Coalition was founded in October 1989 as a coalition of existing community-based groups and individuals concerned about threats to the Oak Ridges Moraine, one of the last continuous corridors of greenspace left in southern Ontario. The moraine is under increasing development pressures because it borders the expanding Toronto metropolitan area, the most densely populated section of Ontario.

In 2001 these development pressures are stronger that ever and the need for a legislated protection plan for the entire moraine urgent. The grassroots STORM coalition now includes hundreds of individuals and over twenty-five member groups.

The moraine plays an essential role in maintaining the quality and quantity of water resources in the Greater Toronto Area. Over sixty-five rivers and streams flowing north and south have their headwaters in the moraine, and over 250,000 people depend directly on the moraine as the source of their drinking water.

In addition, the Oak Ridges Moraine provides an accessible recreational and conservation opportunity for the residents of the GTA. The soon-to-be-completed Oak Ridges Moraine Trail, the large regional forest and conservation lands, and coldwater fisheries add im-

mense recreational value.

In preparation for the Ontario Legislature's new sitting in April, STORM, the Federation of Ontario Naturalists and Earthroots are working in collaboration with other environmental organizations on a joint Oak Ridges Moraine Take Action Campaign. In a recent speech Premier Mike Harris acknowledged the need to curb urban sprawl across Ontario. STORM will be working to make sure that protecting the moraine remains the number one priority for this government.

For more information connect to www.stormco.org or contact Debbe Crandall at info@stormco.org or (905) 880-3465.

Our Endowment Fund

Who would have thought back in the 19th and 20th centuries that the water itself would become the most precious resource of the 21st century?

For almost 20 years Great Lakes United has been looking after the water. Not only at the current problems facing this ecosystem, but the issues advancing on horizon as well. Solutions such as: cleaner production technologies and materials; restoring the habitats and wildlife that contribute to the overall health of the ecosystem; protecting water flows from over-consumption, whether in the form of export, diversion or misuse will take a long time.

That's why we started an endowment fund last summer with the Community Foundation for Greater Buffalo: to ensure that Great Lakes United will be around for years to come.

Please consider investing in the future of the Great Lakes. Give a gift to Great Lakes United Endowment Fund. Just indicate on your check that that is what it's for, and we'll do the rest, including sending you a charitable receipt. And thanks to all, especially the Community Foundation for Greater Buffalo, for helping to get us started.

Talk o' the Lakes

United Nations POPs treaty to be signed

Last December Great Lakes United joined forces with organizations around the basin and the country to hold the United States accountable for negotiating a strong global treaty to ban twelve "persistent organic pollutants," or POPs, the worst toxic substances known to society. Many POPs circulate globally in the atmosphere and in large quantities. The Great Lakes receive these substances via the air, sometimes in very significant amounts.

We were successful in strengthening the United States' position during final negotiations in December, ultimately resulting in a strong global treaty.

This May nation states will convene in Sweden to sign the treaty, known as the Stockholm Convention on Persistent Organic Pollutants. President Bush recently announced his willingness to sign the treaty and see that it is ratified in the United States. Environmental Protection Agency Administrator Christine Todd Whitman will be attending the signing ceremony in Sweden to further signify that the United States is serious about the treaty.

We see this as a major win for the environment, in particular the Great Lakes, as many of the targeted pollutants in the treaty, such as PCBs and dioxin, are also pollutants we are trying to eliminate in the Great Lakes.

Many thanks to all the organizations and individuals who kept the pressure on the United States through the December treaty negotiations and also through the change in administration.

. . . *safe fish preparation*

continued from back page

these parts away.

5. **Bake, broil, grill, roast, boil or poach the remaining meat.** Do NOT fry the fish (this locks in the fat, which is high in PCBs).

6. **Throw away any left over juices or grease, including the water in which the fish was boiled or poached.** Do NOT use them to make a soup or stock.

«Safe varieties of fish, caught in safe areas, are generally considered safe fried and with the skin left on.

Using these methods for cleaning and cooking your fish will help to **reduce** the amount of chemicals stored in the fat of the fish (PCBs).

Chemicals found in the fish meat (mercury) will **not** be reduced by methods of cooking or cleaning the fish. It is never possible to remove all of the chemicals from a fish.

Choosing safer types of fish and less contaminated places to catch them is the best way to reduce potentially harmful chemicals in fish.

. . . *no looser rules on diversions*

continued from cover page

to protect . . . the quantity of water in the Great Lakes."

In mid-April Michigan Gov. John Engler criticized the exemption in a letter to Council of Great Lakes Governors chair Gov. Tom Ridge of Pennsylvania. Québec also opposes the provision.

Annex 2001, an amendment to the 1985 Great Lakes Charter, is expected to be revised and signed by the eight Great Lakes governors and two premiers at their annual meeting, which usually takes place in late spring or early summer.

The exemption provision of Annex 2001 potentially allows an unlimited number of diversions with relatively little scrutiny and possibly serious cumulative environmental damage.

The proposed annex is a response by the Great Lakes states and provinces to the possibility, raised after an abortive 1998 Lake Superior water export proposal, that U.S. constitutional and international trade rules may limit the power of governments to prevent damaging water export and diversion requests. See www.glu.org for fact sheets and reports on the Annex 2001 process and the threat of export and diversion projects to the Great Lakes basin.

Pataki's statement follows two months of hearings on the draft annex, which was released in mid-December. Although the Pataki administration helped negotiate the annex with the other states, participants at three state hearings on the document consistently condemned the annex's exemption provision. Speakers at hearings

held in Pennsylvania, Michigan, Indiana and Ohio during January and February also widely condemned the exemption. A few speakers in Ohio and Indiana favored the exemption. The other Great Lakes states, Minnesota, Wisconsin, and Illinois, accepted written comments on the annex.

Support for diversion exemption

States with municipalities located along the borders of the Great Lakes basin, particularly in Wisconsin, Indiana, and Ohio, would benefit in the short term from the proposed exemption, because it would relax the current, relatively strict diversion approval system. The exemption could allow near-basin communities to save money by using basin water for new housing and commercial developments without having to pay for returning the water to the Great Lakes basin. Near-basin communities whose groundwater requires substantial treatment could also take advantage of the exemption to inexpensively replace their water supply. Under the current diversion approval system only one diversion request, at Akron, Ohio, has been formally approved in the last fifteen years.

The exemption provision of Annex 2001 potentially allows an unlimited number of million-gallon diversions to proceed with little scrutiny and possibly serious cumulative damage to the Great Lakes basin ecosystem. Equally important, the exemption also undermines the overall effectiveness of Annex 2001 as a whole.

The annex is intended to comport basin water use law with domestic and international trade rules. Acting on a legal theory commissioned by the states in 1999, Annex 2001 hopes to ultimately prevent most damaging export and diversion requests by shifting regional water use law to an environmental protection basis and applying the new law without discrimination to users both in and out of the basin.

The theory is that few diversions, which return no water to the basin, could pass a strong environmental protection test. At the same time, being nondiscriminatory and intended for an acceptable purpose—natural resource conservation—the new water use laws could pass inspection by international trade tribunals and the U.S. Supreme Court. But the exemption is conspicuously inconsistent with both the rest of Annex 2001 and the legal theory that underpins it, because it is defined by amount—one million gallons—rather than environmental effect. From the point of view of international trade and U.S. commerce law, that omission might suggest that the annex process is merely a veiled attempt to prevent export and diversion for the economic benefit of the region, but with no true intent to protect the basin environment.

For more information on the Annex 2001 process, contact Reg Gilbert at reg@glu.org or connect to www.glu.org.

. . . *Taking stock of fish stocking*

continued from cover page

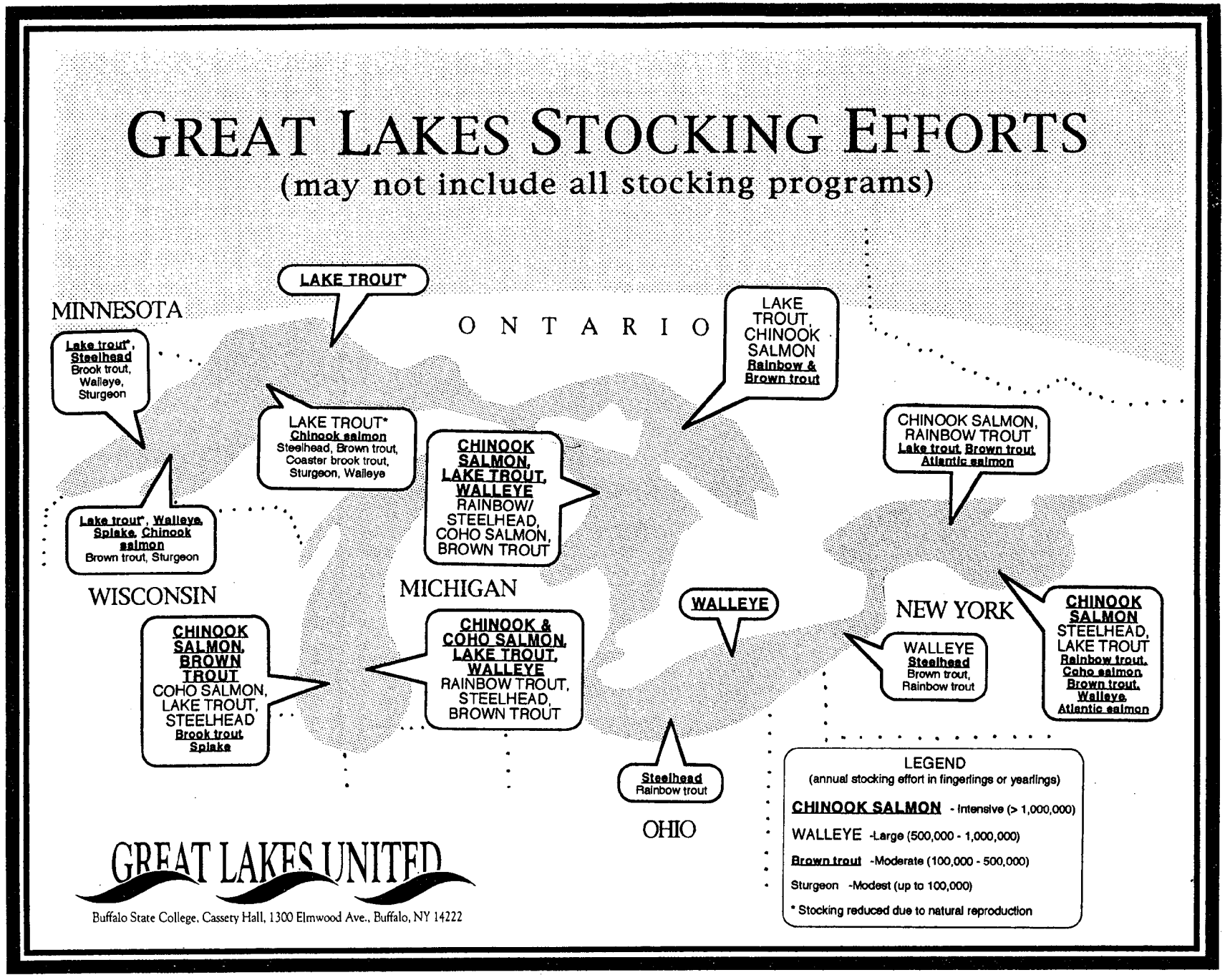
reestablish the Great Lakes aquatic food web (trophic structure) and subsequently created a billion-dollar sport fishery. Fish stocking is also currently being used to help restore and rehabilitate struggling native populations, such as the coaster brook trout, lake trout and U.S.-listed endangered lake sturgeon.

But long-term intensive stocking in the lakes can damage the genetic integrity of both stocked and unstocked Great Lakes fish populations, undermining the long term sustainability of naturally reproducing populations and the genetic information necessary for reestablishment of native fish populations. Concerted effort must be focused on using the tool of stocking discriminately, to make a transition to a sustainable, naturally reproducing Great Lakes fishery.

The proceedings

The *Taking Stock of Our Future* conference proceedings, currently being published by Great Lakes United with very generous support from the Great Lakes Fishery Commission and Trout Unlimited, consist of papers from five expert speakers examining Great Lakes fish populations in the context of conservation biology, genetics, aquatic ecology, and practical fisheries management, and from the perspective of a tribal band leader.

The proceedings also include in-depth critiques by the conference attendees of current fisheries management objectives for each of the upper Great Lakes.



Map created for Great Lakes United's "Talking Stock" conference by Tom Diggins, Ph.D., Sate University College at Buffalo

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printed on bleached paper for the fourth and last time. our next issue will use a Scandanavian stock that is 100 percent recycled, process-chlorine free. it is allegedly the only paper available in northeastern North America that both meets our environmental requirements and comes in large rolls used on the "web" presses that print our newletter

Biodiversity

In the first paper of the proceedings, "Biodiversity of Great Lakes Fishes," Dr. Mart Gross and Michael Berends of the University of Toronto define the importance of biodiversity to the Great Lakes and assess the current, but changing, nature of native species in the lakes.

Setting the tone for following papers, Gross and Berends state, "A return to the biodiversity of Great Lakes fishes to its pre-European settlement era is not a possibility nor necessarily an appropriate objective. Conserving biodiversity and its processes should be the principle goal of Great Lakes management policy. Within this goal, the many benefits and values that arise from biodiversity can be utilized both today and tomorrow."

The conference's second paper is "The Effects of Fish Stocking on Genetic Level Biodiversity," by Drs. John Epifano of Virginia Commonwealth University, Fred Utter of the University of Washington and David Philipp of the Center for Aquatic Ecology. The paper is a critical review of the genetic effects of fish stocking on wild fish populations in recipient watersheds.

The paper examines the need to protect genetic integrity of wild fish populations and explores the trade-offs of genetic risk assessment. The authors explain both direct and indirect genetic interactions between wild and stocked fish, with a focus on the less widely understood indirect genetic interactions (genetic interactions that are not dependant on individuals breeding) that nonetheless can pose significant risks to wild fish populations. Epifano, Utter, and Philipp conclude with recommendations for guiding fisheries management decisions, including a recommendation to minimize genetic effects of stocking fish by minimizing the transfer of species

across historical boundaries, that is, minimizing stocking non-native fish into the Great Lakes.

Ecological impacts

"Aquatic Community Ecology and Species Change in the Great Lakes" by Dr. J. Ellen Marsden of the University of Vermont reviews the general principles of aquatic community ecology and applies these principles to the recent changes that have occurred in the Great Lakes because of accidental and deliberate addition of exotic species. Marsden warns, "When an ecosystem is repeatedly perturbed, recovery cannot occur, and the system is constantly in a state of change . . . a highly disturbed ecosystem lacks predictability and is, therefore, difficult to manage. Humans develop expectations of what benefits can be derived from an ecosystem (for example, sport fishing for a particular species) and therefore, engage in management to sustain those benefits even in the face of ecosystem alterations that may no longer support them."

Salmon stocking

Building on Marsden's assertion that ecological uncertainties and instability in the lakes cause unavoidable risks, Dr. Mike Jones of Michigan State University presented "Managing Salmonine Stocking Programs in the Great Lakes: Balancing Ecological Risks and Social Preferences." Jones looks at the ecological issues mangers face in making stocking decisions, including balancing interactions between stocked fish and prey fish they rely on, assessing the reversibility of management actions, and examining how well suited stocked fish are to the lakes into which they are being stocked. Jones concludes, "Big changes are risky, but failing to make changes is not avoiding risks."

A tribal perspective

In "Cultural and Social Impacts of Fish Stocking on the Great Lakes Region" Chippewa of Nawash band leader Paul Jones examines an aboriginal position on fish stocking. Chippewa of Nawash believe intentional stocking contradicts respect for the Creator and undermines the economic ability of the tribe to catch native fish. Jones recounts the historical exclusion of aboriginal people from participating in fisheries management decisions and describes current efforts by the Chippewa of Nawash to become more involved politically in fisheries management. Jones details the tribe's opposition to the current practice of intentionally stocking exotic salmon to support recreational fisheries.

Critiques of "Fish Community Objectives"

The proceedings also include in-depth critiques of the current "Fish Community Objectives"—goals for managing fish populations—for each of the upper Great Lakes: Michigan, Huron and Superior.

These critiques provide recommendations for changes to current fisheries management that would work towards the goal of establishing sustainable lake fisheries and ecosystems. Made by the knowledgeable and diverse group of conference attendees, the recommendations address the serious need to use fishery management and stocking as a tool to strive towards sustainability; the unstable and changing Great Lakes aquatic ecosystem; and the desire to maintain the lakes fishery as a resource for public use.

As Mike Jones states in his paper on salmon stocking, "As managers, scientists and citizens, I believe we need to take a long-term view and seriously examine the opportunities to learn from our decisions while respecting short-term needs of resource users so that we can make better, wiser choices in the future."

The *Taking Stock* proceedings also contain contact information for fisheries management agencies, the lake committees, and other influential fisheries decision makers, making the document a resource book for anyone interested in conveying their thoughts to appropriate fisheries management decision makers.

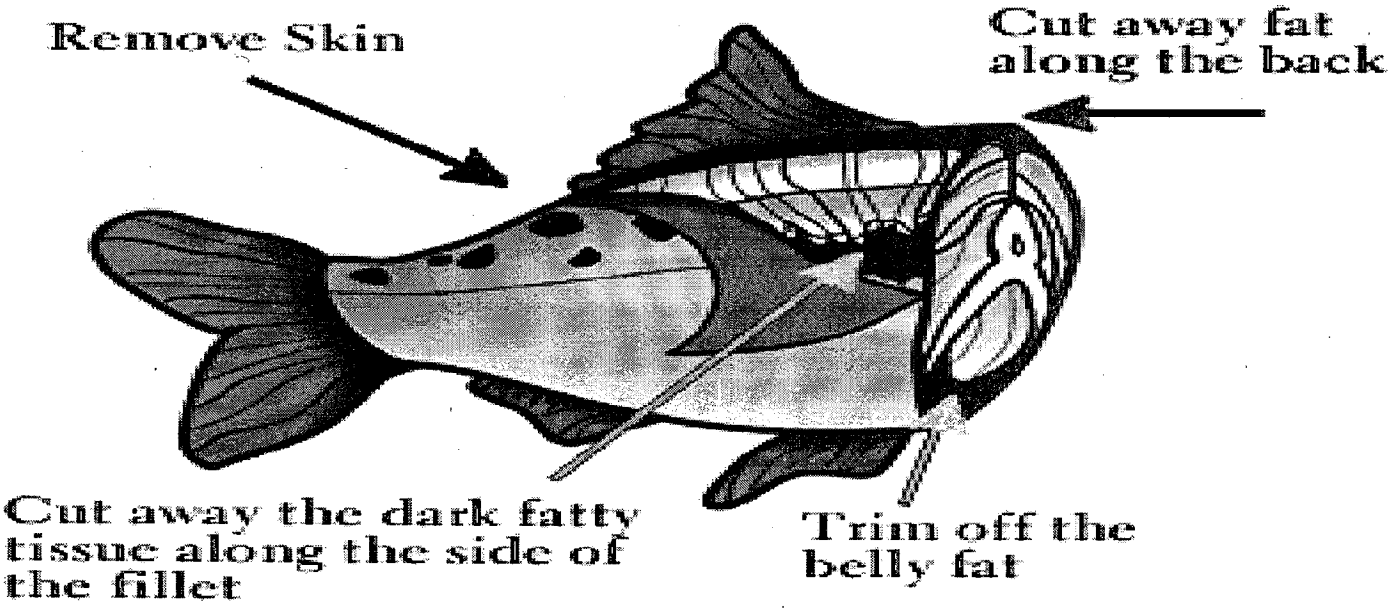
Great Lakes United would like to see wider public input to fisheries management and resultant scientifically sound fisheries-management decisions that better include the concerns of all Great Lakes stakeholders. A healthy, diverse Great Lakes ecosystem will provide an excellent public fishery resource.

However, we must realize the limitations of the lakes in the composition and volume of fish they can support for human consumption: the lakes need deliberate and protective management aiming toward transition to sustainability.

If you would like a copy of the *Taking Stock* proceedings, please contact the Great Lakes United office or download it from www.glu.org in late May.

It's fishing season: You need . . .

Tips for preparing fish safely



by the Lake Erie Forum

Fish is a source of protein and low in saturated fat. However, all five Great Lakes contain advisories concerning consumption of lake fish. Get the benefits and reduce the risks of eating lake fish by using these tips for preparing them. If you do, you can substantially reduce your exposure to toxic chemicals such as PCBs.

1. Choose smaller (younger) fish and leaner types of fish whenever possible.
2. Cut along the bone to remove the bones and fat.
3. **Cut off the skin, where much of the fat is stored.**
4. **Remove the belly fat and the fatty meat under the stomach of the fish and cut out a v-shaped wedge to remove fat along each side of the fish** — fatty areas are darker in color on fish like salmon and trout but may be lighter on other fish, such as bass and walleye. **Throw**

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In this issue

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