THE FUTURE OF THE GREAT LAKES PARK TRAINING INSTITUTE

Many see the Great Lakes as a resource to be used for the greater good of humanity. Some states in the South West believe that this resource should be piped to their water hungry region. This could be disastrous for the lake, as it takes 190 years for all the water in the lake to turnover. Only 1% of the water in the Great Lakes is derived from precipitation and runoff. Pumping vast quantities of water from the Great Lakes, coupled with the threat of global warming, could cause a dramatic decrease in water levels, thus adversely affecting the ecosystems these lakes harbor.

From 1800 to 1970 logging runoff and sewage dumping were the principal contributors to pollutants in the Great Lakes. The Clean Water Act (1972) helped clean up our Great Lakes.

- During the 1970’s it was discovered that laundry detergent contributed to high levels of phosphorus in the Great Lakes. Ten years later, this problem was eliminated.

Problems in the last fifteen years:

- The number one problem that the Great Lakes face is the threat from invasive wildlife species crowding out native wildlife species.
- The Sea Eel Lamprey and the Zebra Muscle are examples of the most threatening invasive species in the Great Lakes.
- The Zebra Muscles are causing harmful, sun blocking, algae blooms that kill aquatic plant life. These muscles came to the Great Lakes from ocean vessels.
- Invasive species are eliminating food sources for commercial and sport fish in the Great Lakes.
- Federal Regulations from the National Aquatic of Invasive Species Act now requires ocean vessels to be cleaned before entering the Great Lakes.
- As temperatures rise from global warming invasive species will become more successful; this situation will dramatically and negatively affect the Great Lakes ecosystems.
- Every eight months a new invasive species is discovered in the Great Lakes.
Great Lakes:

Past,
Present,
Future

February 20, 2008
Some look at the Great Lakes and see...

The world’s largest freshwater ecosystem.
Others look at the Great Lakes and see...

A reservoir that can be tapped for ‘the highest and best use.’
Too many of us have seen...

A resource too big to jeopardize...

...which is what was thought of the Great Lakes state forests before they were logged in two generations.

...and the stratospheric ozone layer, the oceans and many other vast resources.
So what’s so big about the Great Lakes?

The numbers tell part of the story...
10,900 miles of shoreline
(44% of Earth’s circumference)
6,000,000,000,000,000,000,000 gallons of water
(that’s 6 quadrillion)
95 percent of fresh surface water in the United States
18 percent of fresh surface water on Earth
(10 percent in Lake Superior alone)
The Great Lakes are essentially...

A CLOSED SYSTEM
It takes the average water molecule 190 YEARS to leave Lake Superior.
Only 1 percent of Great Lakes water is replenished each year by nature.
Political Geography

- 2 nations
- 8 states, 2 provinces
- Thousands of municipalities
- 3 regional commissions:
  - IJC
  - GLFC
  - GLC
GL Governance Chart?
Do we need a “Great Lakes Czar(ina)?
A Water Quality History
Exploitation Era

- 1800-1970
- Lumbering
- Typhoid
  - Raw sewage dumped near water intakes
- Manufacturing/chemical boom
“Four Acres of Carp Corpses on the Kalamazoo” -- 1953
Recovery

- 1970-1990
- DDT, PCB bans
- Sewage upgrades
- Clean Water Act permits
- Phosphorus controls
Great Lakes phosphorus pollution *before* government action

![Graph showing phosphorus loading over time](image-url)
Great Lakes phosphorus pollution after government action
New challenges

- 1990-2008
- Visible improvements lead to disinvestment
- Not all systemic problems addressed
- Biological pollution: invasives
- Political backlash against rules
Cumulative number of invaders

Ricciardi (2001), CJFAS, in press

Time period

1810-19
1830-39
1850-59
1870-79
1890-99
1910-19
1930-39
1950-59
1970-79
1990-99
Invasives: Water Quality Impact?
Controlling invasives

- Lawsuit vs. EPA
- NAI SA (National Aquatic Invasive Species Act) – 2011 deadline
- New Michigan law, other state actions
- Shipping industry opposition
1,854 Beach
Closing
And Advisory
Days 2003
“It now appears that the Great Lakes’ ecological response to the human sources of stress is resulting in what might be termed adaptive pathological syndrome leading to ecosystem meltdown in the most affected areas of the basin.”

-- Prescription for Healthy Great Lakes
Ecosystem Breakdown

• Decline of food web base in Lake Michigan

• Research by Dr. Tom Nalepa (GLERL/NOAA)
Great Lakes Park History

- Indiana Dunes, 1916-1966
- Sleeping Bear Dunes, 1958-1970
- Apostle Islands
Remaining Shoreline Opportunities:

Great Lakes Shoreline Recreation Area Survey

Dept. of Interior
1959
Climate change and the Lakes

Temps rising, especially in winter

Winters are shorter

Spring comes earlier

Shorter duration of ice cover

Extreme rainfall events more frequent
Lakes and rivers freezing later, thawing earlier

Modified from Magnuson et al. 2000

Freeze

Breakup

Modified from Magnuson et al. 2000
More frequent extreme RAIN

Frequency of Heavy Precipitation in the Great Lakes Region

(a) 24-Hour Events

(b) 7-Day Events

Reproduced with permission from Kunkel et al. (1999) Journal of Climate
Changes in Plant Hardiness Zones

Great Lakes: 1990 - 2006

1990
-40 to -30 °F
-30 to -20 °F
-20 to -10 °F
-5 to -10 °F

2006
-40 to -30 °F
-30 to -20 °F
-20 to -10 °F
-5 to -10 °F

Average Minimum Temperatures

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Changing Character of Great Lakes, Streams, Fish

• Coldwater fish will decline, cool- & warm-water species move north

• Ecosystem disruptions compounded by invasions of non-native species

• Summer lake stratification increase, more dead-zones and fish kills
Low Water: $$$ Impacts

- Reduced Lake Superior cargo:
  - 1 inch reduction: 135 tons of grain
  - 6,000 tons, 10% of capacity

- Dredging
  - 3,000 cubic yards at Duluth’s ADP grain elevator last winter
Effects of 40 years of irrigation on the Aral Sea
(80% volume reduction, more than doubling of salinity; devastation of fisheries, local climate change)
Shrinking Great Lakes?

- One model: 3-5 foot drop Michigan-Huron by 2050
- Reduced ice cover equals increased winter evaporation (Superior)
- Other factors:
  - ‘Leak in bathtub’ St. Clair River
  - Chicago diversion
Superior: Water Warming Twice As Fast As Air
Guarding the Great Lakes

- 1985 - Great Lakes Charter
- 1998 - Nova Group controversy
- 2001 - Annex 2001
- 2005 - Great Lakes Compact
Compact provisions

• No new diversions and exports
• Except -
  – Straddling communities
  – Straddling counties
  – Unlimited bottled water
Straddling the Basin

Waukesha, Wisconsin
Compact Process/ Status

- Eight states must enact identical law
- Congress then ratifies
- President signs
- Minnesota first to ratify (2/07)
- Illinois, NY since
- 5 to go
Water as Political Issue

- Candidate Bill Richardson: Midwest ‘awash in water,’ should share with West
- Atlanta praying for rain
- Sunbelt states will gain Congressional seats after 2010
- National Water Commission policy
“One hundred and fifty years ago we had a resource in the Great Lakes region that was considered inexhaustible. It lasted barely two generations. This was the White Pine forest. The White Pine of this century is Water.”

-- Frank Ettawageshik, Chairman, Little Traverse Bay Bands of Odawa Indians
Water Trends

- By 2025, 3 billion people in 52 countries with insufficient water
- U.S. one of top 5 depleters of groundwater (Ogallala Aquifer)
- Population growth in states surrounding the lakes increases pressure
Bottled water
(private ownership, public resource)

- Nova Group 1998
  - 50 tankers per year of Lake Superior water (156 mgy)
- Nestle 2001, 2005
  - 2 projects, 300 mgy
The Only Inexhaustible Resource:

The Passion of Citizens for The Lakes
More information:

http://healthylakes.org
http://greatlakes.org
http://www.davedempsey.org

• Phone: 612-767-2444, 651-291-0187
• E-mail: davedem@hotmail.com