

## THE EFFECTS OF DIVERSION OF GREAT LAKES WATERS ON THE ECONOMY AND ENVIRONMENT

In the past, proposals have surfaced to divert large quantities of Great Lakes water to the arid west, New York City, or to the Mississippi or Ohio Rivers. Recently, diversions to provide a drinking water supply for municipalities near, but outside of the Great Lakes watershed have been approved or are pending a decision. Government officials acknowledge that dozens more municipalities (outside the Great Lakes watershed) would find diversions of Great Lakes water a desirable alternative to their current low quality well water supplies.

Here is a summary of the detrimental effects of multiple diversions on the Great Lakes' economy and environment.

1. Great Lakes water levels would be permanently lowered. While diversion by one small municipality may not be measurable, diversions by dozens of municipalities will be. The cumulative long-term effect of lowered water levels would lead to these additional impacts.
2. Receded beaches, shorelines, docks and shipping/boat accesses, reduced waterfront property values and tax receipts.
3. Possible reduced hydropower output.
4. Shallower navigational channels, requiring more dredging, and an additional burden for taxpayers.
5. Increased exposure or disturbance of contaminated sediments, leading to reduced water quality, more fish contamination and threats to human health.
6. Loss of productive fish spawning areas and therefore reduced fishing opportunities and fishing industry revenues.
7. Loss of productive coastal wetlands, with reduced waterfowl production, hunting opportunities and reduced recreation industry revenues.
8. Greater demand to construct costly water control structures downstream to prevent water level reductions, another burden for taxpayers.
9. International relations between the U.S. and Canada, will be affected, since Canada would have to bear the negative effects and costs of U.S. actions. (NOTE: The Canadian federal government in a February 26, 1990 letter declared its opposition to the Lowell, Indiana diversion).
10. Reduced Great Lakes outflow could lead to saltwater encroachment up the St. Lawrence River which could contaminate the drinking water of Montreal and Quebec.

-The state of Michigan in a December 12, 1989 letter to Wisconsin's governor avoided taking any position but chose to take "no formal role in your decision" because it is not covered by the Great Lakes Charter [evidently unaware of his approval required by P.L. 99-662]. Thus, Michigan abstained rather than give approval.

◆Michigan's letter is also questionable as constituting Michigan's "approval" because it came from Michigan DNR director, not the governor, as required by law.

◆Michigan conditioned their abstention (as opposed to a veto) on "our understanding, based on communication between WDNR and MDNR staffs, that this [Pleasant Prairie] diversion request is unique and that there are no known similar problems...with the potential for future diversion requests." The intention to allow a Kenosha diversion was apparently known to WDNR, Kenosha, and Pleasant Prairie at or around that time.

The Kenosha diversion, therefore, constitutes a "known similar problem with potential for future diversion request." This further puts in question the status of Michigan's abstention.

Despite the lack of unanimous approval by the eight governors, Governor Thompson sent a letter to Pleasant Prairie's Administrator on December 19, 1989 referring to the December 12, 1989 letter from Michigan "which represents Michigan's consent" (!)

The Wisconsin Governor's December 19, 1989 letter was then referred to in the February, 1990 Compliance Agreement between Wisconsin and Pleasant Prairie as follows:

"On December 19, 1989, the governor of the state of Wisconsin authorized the requested diversion from Lake Michigan."

We fail to see how Michigan's abstention -- the last of the responses to be received from the five of the seven states who replied -- could finalize the "unanimous" approval required under P.L. 99-662.

## A Strategy for the Great Lakes

### Preliminary Proposal from Federal Agencies

#### Background

Six federal agencies are directly involved in developing and delivering the federal Great Lakes Action Plan (GLAP). The plan is one component of a much larger effort to restore and protect the Great Lakes basin ecosystem - an effort which involves provincial agencies, non-government organizations, individuals and governments south of the boarder.

The Great Lakes Water Quality Agreement between Canada and the United States, sets out the governments' obligations and Canada's Green Plan now offers guidance for action.

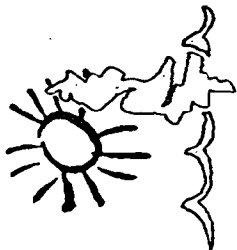
Strategic advice has been provided in a number of ways over the last five years. Reports such as "A Prescription for a Healthy Great Lakes" ; Great Lakes, Great Legacy?"; "Towards an Ecosystem Charter for the Great Lakes, St. Lawrence"; and "Broken Agreement", have identified areas where governments must place emphasis. Recommendations from the International Joint Commission have been offered at regular intervals. Federal agencies have also had the benefit of specific, direct advice from the Great Lakes Action Plan Strategic Advisory Committee.

Having heard this advice, staff in the six agencies directly involved in the GLAP have prepared their preliminary proposal for a strategic framework designed to help manage the challenges before them. This framework, and some of the issues it helps to bring into perspective, are to be the focal points for discussion with non-government advisors on March 2.

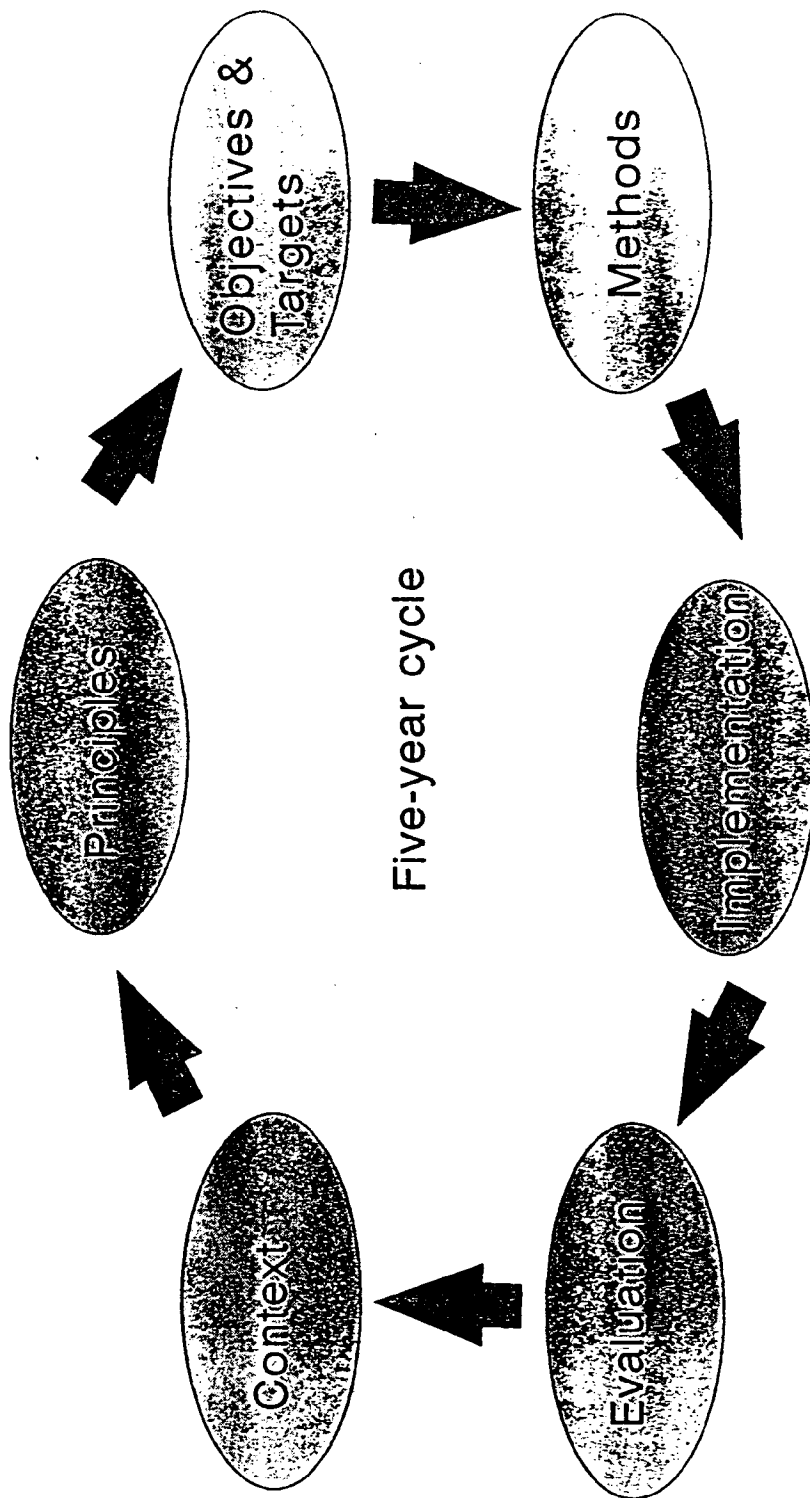
#### Questions

The following questions are intended to help focus discussion of the strategic framework on March 2. Participants are invited to add their own questions as well.

- 1) Are the goals and objectives shown in the framework common to all the "stakeholders" in the Great Lakes?
- 2) Are specific five-year targets valuable in assigning priorities in a scenario where resources are limited? Are the targets cited in the framework ones on which all can agree?
- 3) Is it clear how the framework can be used to clarify accountability?  
Is there a better way?
- 4) Could the framework be more results-oriented? If so, how?



**ELEMENTS OF A GREAT LAKES STRATEGY**



# PRINCIPLES

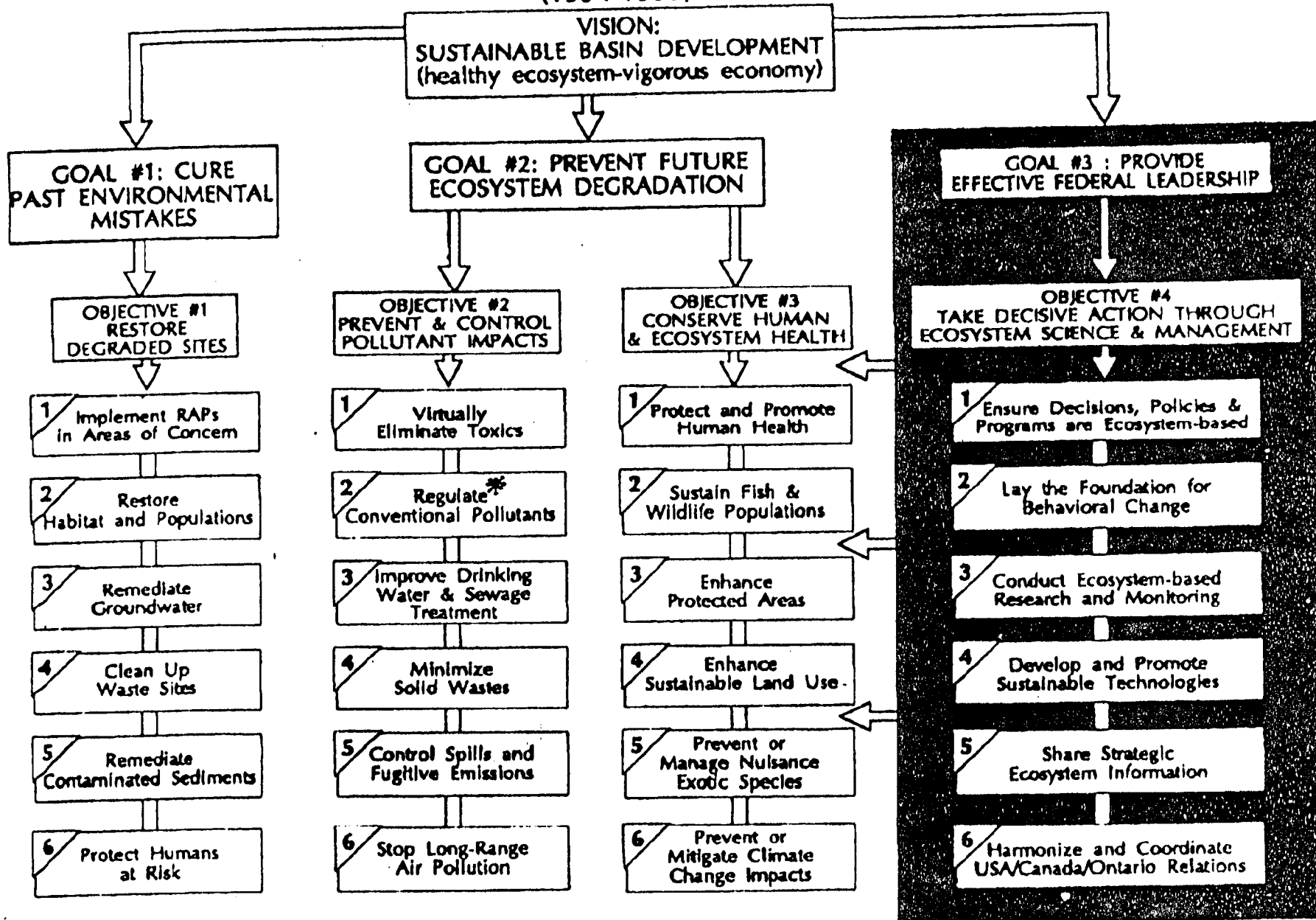
- o SUSTAINABLE DEVELOPMENT IN PARTNERSHIP
- o ECOSYSTEM APPROACH
- o ANTICIPATE AND PREVENT
- o POLLUTER PAYS, USER PAYS
- o FULL-COST PRICING
- o EACH GOVERNMENT WORKS WITHIN ITS OWN JURISDICTION
- o FEDERAL GOVERNMENT WILL BE TRANSPARENT, INCLUSIVE, ACCOUNTABLE AND WILL PROVIDE:

STRATEGIC SCIENCE & TECH. DEVEL.  
ECONOMIC ANALYSIS  
NATIONAL CONSISTENCY & LEADERSHIP BY EXAMPLE  
GLOBAL STRATEGIES  
ACTIONS RE: PRODUCTS IN COMMERCE

# CONTEXT

- o 18% OF WORLD'S FRESH SURFACE WATER, WITH OUTFLOWS OF ONLY 1% PER YEAR - WATER SUPPLY FOR 1/3 OF CANADIANS
- o CENTRE FOR ABOUT 1/2 THE \$150 BILLION CAN.-U.S. TRADE
- o LARGE CONCENTRATIONS OF INDUSTRY, ABOUT 25% CDN. AGRIC.
- o 37 MILLION PEOPLE - 84% IN URBAN CENTRES - 2 MILLION MORE TO COME TO GTA IN NEXT 30 YEARS
- o 1/3 OF MP<sub>s</sub> IN G.L. BASIN - NEW U.S. GOVERNMENT -
- o 20-YEAR HISTORY, EMPHASIS MOVING FROM:
  - LOCAL TO REGIONAL
  - PHOSPHORUS TO P.T.S.
  - END-OF-PIPE TO ECOSYSTEM
  - CONTROL TO PREVENTION
  - PROBLEM IDENTIFICATION TO RESULTS

# GREAT LAKES STRATEGIC FRAMEWORK (1994-1999)



# IMPLEMENTATION

- o ENSURE RESOURCES IN PLACE FOR FEDERAL ACTION (GLAP 2)
  - Use framework to show all actions matched with funding sources
- o ENCOURAGE AND TRACK CONTRIBUTIONS OF OTHER LEVELS OF GOVERNMENT (COA)
- o ENCOURAGE AND TRACK CONTRIBUTIONS OF INDUSTRY AND CITIZENS
- o REPORT OUT ON RESULTS
- o SEEK PUBLIC INPUT



# EVALUATION

- o REVIEW IMPACT OF ACTIONS
- o ASSESS 3RD PARTY REVIEW OF PROGRESS  
(IJC - AUDITOR-GENERAL)
- o PROVIDE MID-COURSE CORRECTIONS

canine

# le Development

Water Pipelines and Sustainable Development  
Technical Secretariat  
Ontario Water Services Secretariat  
Toronto

James MacLaren

## Introduction

The need to construct water pipelines from areas of major supply, such as the Great Lakes, to regions of significant water demand must have strong justification to warrant detailed study.

Pipeline supplies are only warranted where the land-use management decisions have determined the appropriate regional limits to growth and where the development proposed within such limits cannot be served adequately by local sources of water supply, including groundwater. A major new supply by pipeline must be considered as supply management of the water regime because its availability tends to release users from a conservation-oriented attitude to water use.

Pipelines are normally competitive in the provision of water supply provided the population of the region to be served represents at least 250,000 people located in a 250 km<sup>2</sup> (100 sq mi) development area and the distance of transmission does not exceed 120 km (75 mi).

The routing of the pipeline to serve the most significant target area, however, can vary significantly depending on the intention and need of serving development *en route*.

## Importance of Planning

To avoid land speculation and irregularities in planning, the pipeline sizing and routing studies must be under full provincial control with participation of the various stakeholders such as municipalities, regions, large customers, and representatives of the public to be served.

These studies must be conducted so as to clearly meet the terms of the *Environmental Assessment Act*, for even if the pipeline supply alternative appears technically justified, it will not gain regulatory approval until the proponent agency of the province has submitted a complete environmental assessment to the Minister of the Environment. The purpose, rationale, and description of the project, and a justification for it being more beneficial than any other alternative must be clearly obvious.

It is quite probable that for a pipeline project the Minister may require a hearing of the Environmental Assessment Board, or more probably of a Consolidated Hearings Board, before determining to give his approval to the project, with or without conditions, or indeed to reject the project.

Throughout the development process it is only reasonable that the proponent be a ministry or provincial corporation. It is not to be expected that no local private or public interest can bias the proposal. This does not mean that private interests cannot be considered in the design, building, operation, and financing of the project. Franchises to private-sector groups could be one of the viable alternatives considered by the proponent agency of the province, but that agency would be the ultimate owner and would be the manager of the sale of water to municipalities and regions *en route*, and at the terminal of the pipeline.

In releasing the areas to be served from the constraints of local water-supply capacity, the proponent agency and all to be served by the pipeline should recognize that water from this supply will become waste water which must be treated to a no-discharge condition before it is released to augment the flow of local waterways. Probably of even greater consequence is that the development spawned by the new pipeline supply will generate storm runoff from rainfall and thaw that could materially exceed the safe-flow capacities of local waterways, unless state-of-the-art urban drainage management plans are introduced and strictly enforced.

### **Conservation and Supply**

Pipeline supplies of water can be provided to a customer, region, or municipality at \$2 to \$3 per 1,000 gallons or 45 to 65 cents per 1,000 litres. These costs do not represent a large increase over current supply costs, so it behoves all parties to ensure that a customer pricing and metering structure is adopted that properly reflects full user-pay so that a conservation-minded consuming public is served and that abnormal amounts of waste water are not generated through wasteful water-use practices.

Continuing the conservation theme, some municipal customers may promote supplementing current water-supply systems with pipeline water, rather than abandoning local supplies for the pipeline supply.

Mixing the two systems can create potential problems in mixing the quality of two supplies. On the whole, studies of western Ontario experience in mixing Great Lake pipeline supply with local river or ground water have revealed no problems of consequence.

However, trying to live with two systems can be very expensive, especially if both systems have a high energy requirement. Normally it will prove more beneficial to switch to the pipeline supply and abandon the local supply, or to isolate it to the supply of a particular geographical area or a major industrial customer.

### **Plan Requirements**

In a broader sense, the development of water conservation plans for regions of urban concentration and potential development would serve to better identify new supply needs, including the need for water transfer to supplement local supply sources.

Such a plan would include the following major elements:

- (1) A co-ordination of current land-use development, redevelopment, and future development, with due reference to official plans, so as to direct the water management study to follow land-use requirements.

- (2) An estimate of present, current, and projected water use and waste-water generation responding to land use and, therefore, segregated according to land use.
- (3) An estimate of current urban runoff conditions and future impacts according to current and projected land use.
- (4) Identification of the current conditions of water resources within the planning region, and the various uses and impacts relating to different land use and consumer types.
- (5) An inventory of water conservation measures currently practised by municipal water and waste-water utilities, direct industrial users, and urban authorities to control water use, point and non-point water pollution discharges and groundwater pollution. (Automatically this would cover water pricing and customer metering.)
- (6) The water management programs necessary to meet the *Safe Drinking Water Act*, MISA Effluent Regulations, Provincial Water Quality Objectives and Provincial Urban Drainage Requirements for the water resources of the planning area, while satisfying land-management objectives.
- (7) The relative environmental and economic impacts of these programs and their relation to the Six Guiding Principles of the Ontario Round Table on the Environment and the Economy, and sustainable development.
- (8) A schedule of implementation for the proposed programs and the related financing plan.
- (9) An outline of the public education and involvement program that would be undertaken prior to submitting the plan for provincial approval.
- (10) A commitment to a regular five-year review of the Plan.

We have indeed, in the words of the Round Table's Challenge Paper, reached the need for "new ways of thinking, new decision-making processes and new ways of doing things. New partnerships among all stakeholders - individuals and organizations - will have to be developed to seek common ground and workable solutions."

So the need to build a pipeline to transfer water for new development can only be justified if such a solution best suits a regional water conservation plan.

# Water Quality Considerations

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In considering the question of the quality of water piped to a municipality from one of the Great Lakes, it is necessary to look at the quality of alternative sources, groundwater and local surface water.

## Groundwater Quality

As a former resident of Waterloo, I am well aware of some of the advantages and disadvantages of groundwater as a municipal supply. I recall a conversation with my Waterloo dentist many years ago. He said that his practice would be much larger if it were not for the existence of an almost optimal concentration of naturally occurring fluorides in the groundwater we were drinking. Groundwater usually is free from sediments and bacteria so that it requires little, if any, treatment.

A major disadvantage is known as the "three-tap" syndrome - hot, cold, and hard. Waterloo tap water is great to drink, but don't try to wash in it. A water softener is almost mandatory.

In some areas of southwestern Ontario the groundwater has objectional taste and odour characteristics. In many localities there are no available aquifers of sufficient capacity, so the alternative of groundwater supply does not exist.

## Local Surface Water Quality

Many municipalities have developed their water supply from a local river. In most parts of the world this is the only alternative to groundwater. In addition to the problems of highly variable flow, what about quality considerations?

In many instances, the same river must serve several municipalities along its route to the Great Lakes. In reality, the sewage treatment plant discharge of an upstream city becomes a significant portion of the river flow used as a water supply for a downstream city. Fortunately, good water treatment processes can convert this "raw" water into a potable municipal supply.

Sediment-laden (muddy) water may seem polluted but, in actual fact, this sediment is easily removed and may assist in the removal of more serious toxics. There are added costs for sediment removal, and the frequency of filter back-flushing can become a serious problem.

## ***Withdrawals from the Great Lakes***

Many municipalities in the Great Lakes basin have an alternative water supply which is unique to this region. Withdrawals from the lakes has always been the preferred option. The quality of lake water varies considerably from lake to lake. In all cases, however, there are some clear advantages in using lake rather than local water supplies.

All Great Lakes water is relatively soft, although the water of Lake Ontario is quite a bit harder than that of Lake Huron and Lake Superior. Other quality considerations are less clear-cut. Suspended sediment usually is lower than in riverine sources, but periodic algal blooms can have a serious impact on filter operation and sometimes cause taste and odour problems.

The big question with Great Lakes water is toxic substances. Lake Ontario, in particular, has been much maligned in some quarters. In actual fact, the jury is still out. Toxicologists are still trying to determine the significance of the extremely low concentrations of many toxic substances that have been found in the water and biota. Also, all chemicals for which there are drinking water guidelines (for example, nitrates and PCBs) do not exceed these guidelines.

Public reaction to previously unquantifiable concentrations of some specific toxics has led to the emergence of the "bottled water" industry. Tests have shown that some of this bottled water is worse than the water coming out of the tap. This is not to say there is no toxics problem in the Great Lakes or in surface water. The true significance and public health threat are still under investigation. The concentrations of DDT and PCB in lake water are lower now than they were 20 years ago.

## ***Impact on the Lakes and Rivers***

What might be the impact of municipal pipelines on the rivers and lakes? This is the other side of the issue. The quality of water usually has little, if any, impact on the hydraulic characteristics of the system. The converse is not true. The hydraulic characteristics of the system can have profound impacts on the quality of the water.

The ability of a stream to biodegrade pollutants or to simply dilute them is dependent on the hydraulic characteristics such as flow velocity, depth, and re-aeration. Significant changes in lake levels can produce a wide variety of water quality and fish habitat impacts.

Introducing a piped supply of lake water into a community will not increase the amount of waste being generated, but it might increase the amount of water used. This puts an increased hydraulic load on the sewage treatment plant which might reduce plant efficiency resulting in an increase in pollutant load to the stream.

On the other hand, the increase in plant discharge will increase the total flow in the stream. This might increase the stream's capacity to biodegrade the residual waste.

Will direct withdrawal of water from the Great Lakes significantly impact the lakes themselves? The quantities required for municipal water supply are so small compared to the natural flow in the system that the impacts would be almost indistinguishable. Thus, no significant water quality impacts are anticipated.

If megadiversions out of the basin are considered, there would be very large environmental impacts. My comments address only pipelines to service municipalities within the basin.

## **Summary**

The quality of water delivered by pipeline from the Great Lakes must be compared with the quality of local sources. Groundwater has advantages such as clarity and desirable minerals. It also has some disadvantages such as hardness, and sometimes undesirable taste and odour.

Local surface water requires considerable treatment before use, especially if there are municipal waste treatment plant discharges upstream.

The quality of Great Lakes water used as a municipal supply is generally very good. The significance of very small concentrations of toxic substances is unknown and the situation is getting better rather than worse.

The impact on Great Lakes water quality of a conversion from local to piped-in municipal water supplies is insignificant.

Georgian Bay  
Pipeline

Sarah

June 10/93

# 'Governments just ignore problems' Canada years behind U.S. in protecting groundwater, prof says

By Bob Burt  
Record staff

Canada needs a national environmental group to force governments to show more interest in groundwater protection, says John Cherry, a professor at the Centre for Groundwater Research at the University of Waterloo.



Groundwater problems will get worse instead of better, Cherry predicted in a public lecture Wednesday night at East Collegiate in Cambridge.

He said the federal and provincial governments are years behind the United States and Europe in developing standards and setting regulations. And at the same time more of the major environmental groups has

taken up groundwater as a major issue.

The lecture was organized by Groundwater Alert, a fledgling environmental group formed because of concern about groundwater contamination in Cambridge. About 100 people attended.

Cherry estimated that about 30 per cent of all Canadians rely on well water, compared with about 50 per cent in the United States and about 60 per cent in Switzerland.

Unlike Canada, all legislation affecting groundwater is carefully scrutinized by environmental groups before it becomes law in the United States.

"The (Canadian) federal government seems to think that the best way to deal with it is to ignore the problem," Cherry said.

"The (Ontario) Ministry of the Environment is a problem. They have hired hydrogeologists on staff now when they did a few years ago, and I wonder why anyone would work there. There are fewer of them, but

more problems to deal with all of the time."

Cherry said Waterloo Region and the City of Region are two municipalities in Canada making serious efforts to understand and protect groundwater resources.

Cherry praised Waterloo Region for "deciding to move out of the dark ages in 1991" after being socked by the Elmhurst water crisis.

"This region is at the forefront of groundwater protection in Canada. It is good to be at the forefront," he said, but added that in this case "it is like being a star player on a team that never makes it to the playoffs."

The region still has a long way to go to make up for lost time, Cherry said.

Citing the experience in the United States, Cherry said it is impossible to completely clean some contaminant sites. And in some instances millions of dollars are wasted trying. The Stratford PCB site in the Niagara Peninsula is a classic example of wasting millions of dollars trying

to return water to a pristine state. Much of the work there will do nothing to improve water quality, he said.

Cherry said the challenge for governments is to pick the spots and the sites which areas can be cleaned and at which problems should simply be contained to prevent contamination from spreading.

The real solution, though, is preventing the problem in the first place, Cherry said. He said it makes no sense for governments to say they have no money for prevention and then spend millions on cleanup attempts which are bound to fail.

One million dollars in protection can save tens of millions of dollars in cleanup costs, he said.

Informed citizen and environmental groups can play fundamental roles in forcing governments to take the appropriate action, Cherry said, but he added that in some instances well-meaning groups have contributed to inappropriate decisions.



# JobsOntario Capital Grants

## NEW WATER AND SEWAGE PROJECTS STARTING IN 1993-94

AS AT February 1, 1993

MUNICIPALITY	DESCRIPTION	GROSS COST	TOTAL GRANT
<b>CENTRAL REGION</b>			
Anson, Hindon & Minden Townships (Minden)	Water Supply Upgrading	0.392	0.319
Barrie C	Upgrading of Existing Sewage Digestion Facility	9.894	1.484
Bicroft Township	Construction of Pumping Station, Sewers, Treatment Works and Outfall	1.903	1.618
Clifford V	Sanitary Sewers and Treatment Plant	7.030	5.976
Coldwater V	Upgrading of Water Supply Works	1.284	1.085
Collingwood T	Provision of Zebra Mussel Control System	0.148	0.049
Durham RM (Whitby)	Construction of Trunk Sanitary Sewer to Service Brooklin Area	5.450	0.818
Durham RM (Whitby)	Construction of Local Sanitary Collection System for Brooklin Core Area	10.500	5.942
Dysart et al Township (Haliburton)	Construction of an Expansion to the Sewage Treatment Plant	2.990	2.420
Emily Township (Birch Point)	Water Works Improvement	0.350	0.191
Grand Valley V	Municipal Water Supply and Distribution System	4.632	3.862
Haldimand Township (Grafton)	Ground Water Supply, Pumping Station, Filtration Plant, Storage and Distribution	6.99	5.439
Halton RM (Bridgeview)	Extension of Communal Sewage System to the Bridgeview Community	2.691	1.614
Halton RM (Georgetown)	Watermain Extension into the Hamlet of Glen Williams	1.747	1.035
Hamilton Township (Creighton Heights)	Communal Water System	4.300	3.655
Innisfil T (Alcona Beach)	Water Supply for the Lake Simcoe Shoreline Area	20.800	10.142
Mariposa Township (Canadiana Shore Subdivision)	Water Filtration Plant, Storage Reservoir Pumping Unit and Distribution System	1.633	1.388
Midland T	Modification and Upgrading of Sewage Pumping Station No. 1	0.483	0.072
Midland T	Replacement of Sewage Pumping Station No. 2	0.617	0.093
Muskoka DM (Bracebridge)	Water Treatment Plant, Storage Facility and Watermains Improvements	12.850	7.710
Muskoka DM (McTier)	Water Treatment Plant, Storage Facility and Distribution Mains	3.678	2.207
Orillia C	Waste Water Treatment Centre - Secondary Treatment Upgrade/Expansion	0.400	0.109
Orillia C	Water Filtration Plant Upgrade	0.979	0.147
Penetanguishene T	Fox Street Sewage Treatment Plant - Provision of Tertiary System	0.819	0.365
Penetanguishene T	Expansion of Main Street Water Pollution Control Plant including Tertiary Treatment.	5.040	2.247
Thorold C (Beaverdams)	Sanitary Sewer System for Village of Beaverdams	0.732	0.439
Waterloo RM (Wellesley)	Wellesley Water Supply System - Treatment Works	1.629	0.244
Wellesley Township	Wellesley Water Distribution System	2.762	1.657
York RM (Keswick)	Zebra Mussel Control at Water Filtration Plant	0.164	0.055
<b>TOTAL CENTRAL REGION (29 Projects)</b>		<b>112.296</b>	<b>62.382</b>

## SOUTHEAST REGION

Almonte T	Improvements to Sewage Works Conts. 11, 12 & STP Upgrade	3.160	1.921
Arnprior T	Sewage Treatment Plant Expansion	13.176	6.044
Arnprior T	Elevated Water Storage Tank	1.350	0.597
Brockville C	Upgrade of Existing Water Poll Plant & Main PS - Phase II	3.840	1.125
Brockville C (PUC)	Water Treatment Plant Zebra Mussel Control System	0.153	0.051
Cambridge Township (St. Albert)	Communal Sewage Collection and Disposal System	3.808	3.237
Cobden V	Water System Improvements	0.265	0.225
Cornwall Township (Long Sault)	Upgrading of Sewage Treatment Plant	5.565	4.571
Ernestown Township	Amherstview Zebra Mussel Control Measures	0.113	0.038
Finch Township (Crysler)	Communal Sewage Works	6.538	5.557
Finch Township (Crysler)	Communal Water Works	5.700	4.845
Gananoque (PUC)	Provision of Submersible Pumps & Wet Well Modifications	-0.257	0.137
L'Orignal V	Well Station & Connection of Well No. 4 to Distribution System	0.082	-0.064
Madoc V	1993 sewage Works Project Contract No. 5	0.425	0.354
Madoc V	1993 Water Works Project Contract No. 5	1.250	1.043
Osnaburck Township (Ingleside)	Sewage System Upgrade	7.478	6.081
Ottawa-Carlton RM (Carp)	Sewage Pumping Station and Forcemain	9.505	5.703
Ottawa-Carlton RM (Carp)	Local Sewer System	4.050	2.430
Ottawa-Carlton RM (Vars)	Communal Water System	7.120	4.272
Ottawa-Carlton RM (Carp)	Communal Water System	7.860	4.716
Perth PUC	Zebra Mussel Control Facilities at Water Filtration Plant	0.135	0.067
Picton T	Zebra Mussel Control Facilities for Water Plant Intake	0.065	0.040
Roxborough Township (Moose Creek)	Sewerage Works and Treatment Lagoon for Moose Creek	3.901	3.316
Roxborough Township (Moose Creek)	Moose Creek Water Supply System	3.082	2.620
Russell Township (Marionville & Embrun)	Iron and Manganese Removal at Water Treatment Plant	5.260	3.303
Sidney Township (Glen Miller)	Glen Miller Water Supply	1.750	1.488
Stirling (PUC)	Well No. 4	0.504	0.396
St. Isidore V	Water Supply, Treatment and Distribution System	6.149	5.228
Vankleek Hill T	Sewage Works Expansion	5.850	4.624
Westport V	Expansion & Upgrading of Sewage Works	4.255	3.591
Winchester V	Construction of 2 Well Pumping Stations and Water Supply Line	3.035	2.324
<b>TOTAL SOUTHEAST REGION (31 Projects)</b>		<b>115.681</b>	<b>80.008</b>

## SOUTHWEST REGION

Arkona V	Sanitary Collection System, Pumping Station, and Sewage Treatment Facilities	4.634	3.939
Aylmer T	Reconstruction of the Fath Avenue Sanitary Sewage Pumping Station	0.350	0.158
Blandford-Blenheim Township (Plattsville)	Continuous Chemical Feed Facility at Existing Sewage Lagoons	0.161	0.136
Bothwell T	Water Supply and Distribution System	3.380	2.873
Bruce Township (Scott's Point)	Water Works Project	0.425	0.341
Chatham Township	County Road 33 Rural Water System - Phase II	0.299	0.100
Colchester South Township	Rural Watermain along King's Highway 18, Ridge Rd & McCormick Rd	0.418	0.139
Dover Township (Mitchell's Bay)	Water Storage Facility	0.750	0.638
Dover Township (Paincourt)	Chatham Waterline Extension and Storage Facility	3.000	2.550
Dunwich Township	Trunk Watermain, Distribution System & Standpipe	2.709	2.303
Enniskillen Township (Oil Springs/Oil City)	Extension of Petrolia Water Supply System - Joint Project	1.600	1.360
Flesherton V	Sewage Works Project	3.999	3.399
Glencoe V	Continuous Chemical Feed Facility at Existing Sewage Lagoon	0.161	0.125

Gosfield South Township (Lakeshore West)	Sanitary Sewage Works System	11.825	8.285
Leamington	Modification and Upgrading of Pollution Control Centre	4.500	0.940
London Township (Ilderton)	Sewage Collection and Treatment to replace Existing Failed Septic System	3.773	3.207
Malden Township	Rural Watermain Extension on County Road 50, Elm Street, and County Road 41	0.275	0.092
Markdale V	Standby Power for Sewage Facilities	0.140	0.116
Mildmay V	Expansion of Sludge Treatment and Storage Facilities	0.485	0.410
Moore Township (Bridgen)	Continuous Chemical Feed Facility at Existing Sewage Lagoon	0.161	0.137
Moore Township (Corunna/Mooretown)	Sewer Extension to St. Clair Parkway - lots 42 to 48 & 8th Line	1.072	0.453
Neustadt V	Continuous Chemical Feed Facility at Existing Sewage Lagoons	0.161	0.137
Neustadt V	Water Supply, Storage and Distribution System	4.429	3.765
Oil Springs V	See Enniskillen Township		
Oxford County (Drumbo)	Communal Water System	1.918	1.630
Plympton Township (Lakeshore Area)	Sewage Collection System & Treatment Plant	17.502	11.564
Raleigh Township	Highway 3 Water System - Dealtown to Lot 154 T.R.C.	0.573	0.191
Rodney V	Trunk Watermain and Standpipe	1.932	1.640
Romney Township	Rural Watermain Extensions, Lots 210 - 215, Concession 2	0.538	0.179
Sarawak Township (East Linton)	East Linton & Area WaterWorks	3.048	2.591
Sombra Township (Port Lambton)	Continuous Chemical Feed Facility at Existing Sewage Lagoon	0.161	0.137
Sombra Township (Sombra)	Continuous Chemical Feed Facility at Existing Sewage Lagoon	0.161	0.137
Sombra Township	8th Concession - Gravity Sewer, Pumping Station, Forcemain and Related Works	0.820	0.499
Sombra Township	13th & 14th Concession - Gravity Sewers, Forcemains & Related Works	1.360	0.827
Sombra Township	9th & 10th Concession - Gravity Sewers, Pumping Stations, Forcemains & Related Works	1.310	0.797
South Dumfries Township (St. George)	Upgrading of Water Supply, Storage Facility and Distribution System	3.169	2.643
West Lorne V	Sewage Works Expansion	4.844	3.982
Windsor C	Turkey Creek Watershed Sanitary Sewer Program	7.300	3.650
<b>TOTAL SOUTHWEST REGION (38 Projects)</b>		<b>93.343</b>	<b>66.070</b>

#### NORTHERN REGION

Atikokan Township	Water Treatment Plant Upgrade	1.500	0.938
Caramat LSB	Upgrading of Water Treatment Facilities	0.337	0.286
Carnavron Township (Mindemoya)	Communal Sewage Collection System & Sewage Treatment Facility	7.005	5.954
Carnavron Township (Mindemoya)	Communal Water Distribution System & Treatment Facility Using Mindemoya Lake	7.043	5.987
Chapleau	Trunk Sewer Replacement on Beech St., Lisgar & Railway Crossing	1.150	0.863
Cochrane T (PUC)	Design & Construction of a New Water Treatment Plant	10.000	5.804
Dryden T	Construction of Water Treatment Plant and Water Treatment Facilities	0.896	0.388
Espanola T	Pollution Control Plant Expansion and Upgrade	7.025	3.522
Espanola T	Water Treatment Plant and Elevated Storage Reservoir	9.502	4.764
Haileybury T (North Cobalt)	North Cobalt Lagoon Expansion	5.000	4.250
Kapuskasing T	Sanitary Sewer Works - Gurney Rd. Hwy 11- 950m Easterly, Mill St.	2.730	2.321
Kirkland Lake T	Water Filtration Plant	10.000	2.910
Lac Ste. Therese	Upgrading of 20 Individual Private Sewage Disposal Systems	0.190	0.162
Latchford T	Sullivan Avenue Watermain Extension	0.138	0.117

Mattice - Val Cote	Construction of Low Pressure Sewage Collection and Lagoon	1.420	1.207
Nairn Township	Design and Construction of Water Treatment Plant and Distribution System	3.851	3.273
Shedden Township	Well Pumping Station, Water Storage and Distribution Mains	1.428	1.214
Sioux Lookout T	New Sewage System Facilities - Extension of Forcemain and Sewers	1.400	0.966
Sudbury RM	South Shore Lake Ramsey Sewermains Phase 2 & 3	2.817	1.253
Sudbury RM	South Shore Lake Ramsey Watermains Phase 2 & 3	0.785	0.348
Sudbury RM	Sudbury Reservoir	7.500	2.500
Thornloe V	Communal Sewage System	1.028	0.874
TOTAL NORTHERN REGION (22 Projects)		-82.745	49.901

# The Conservation Council of Ontario

Suite 506, 489 College Street  
 Toronto, Ontario M6G 1A5  
 Tel: (416) 969-9637  
 Fax: (416) 960-8053

A provincial association of major  
 organizations committed to the  
 conservation of our environment.

Registered charitable organization  
 No. 0221218-52

June 2, 1993



Hon. Howard Hampton  
 Minister  
 Ontario Ministry of Natural Resources  
 5th Floor, Room 6301  
 Whitney Block  
 99 Wellesley Street West  
 Toronto, Ontario  
 M7A 1W3

**Re: Watershed and Subwatershed Guidelines**

Sir:

For the past two or three years, the Conservation Council has cooperated in a variety of initiatives working towards better ecosystem protection and planning in developing areas. As these relate to water resource planning, we have consistently indicated the need for a more proactive approach to planning for the enhancement of aquatic ecosystems. The Watershed and Subwatershed Guidelines were generally considered to be the best method of developing site specific ecosystem-based requirements which could be applied to changes in land use.

We have agreed with all parties involved in their development that they now must be tested in order to monitor their effectiveness. This will allow us to better understand any requirements for legislative or policy changes necessary to assure their effective use and the ecosystem protection results we all desire.

Unfortunately, although it was agreed that these would be released for voluntary use and monitoring by all parties, this has not yet happened.

As a result, the many developers, consultants and municipalities trying to institute better natural resource management do not have the benefit of these documents and the Council is faced continually with intervening, on a case-by-case basis, in processes which have not been consistently

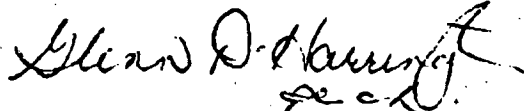
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planned. Monitoring efforts in the future will, of course, suffer from a lack of consistent approaches.

I urge you to expedite the release of these guidelines for voluntary implementation and to begin the monitoring process which will develop these guidelines into a workable tool for natural resource planning in developing areas.

Sincerely,

CONSERVATION COUNCIL OF ONTARIO



GLENN D. HARRINGTON, OALA, FCSLA  
CHAIR, WATER TASK FORCE

GDH/ch

c.c. Executive Director, Conservation Council of Ontario

/over



# ACTION UPDATE

February 15, 1993

## GREAT LAKES-ST. LAWRENCE RIVER ECOSYSTEM UNDER ATTACK...AGAIN!

The Levels Reference Study Board of the International Joint Commission has voted not to recommend major new construction of works in the Great Lakes and St. Lawrence River Basin to control water levels. The recommendation is one of several major recommendations contained in the Study Board's Draft Final Report to the Commission.

HEARINGS ON THE DRAFT FINAL REPORT WILL BE HELD FEBRUARY 22nd IN SAULT STE. MARIE, ONTARIO; FEBRUARY 23rd IN CHICAGO, ILLINOIS; FEBRUARY 24th IN BUFFALO, NEW YORK; AND FEBRUARY 25th IN DORVAL, QUEBEC.

A small, but determined, coalition of waterfront property owners will attempt to reverse that recommendation and lobby the governments of the United States and Canada to spend billions of dollars to protect their property from natural Great Lakes and St. Lawrence River water level fluctuations. The three-lake regulation plan supported by the property owners would significantly dampen the amplitude of natural lake level fluctuations and alleviate some flooding and erosion in the middle lakes (Michigan, Huron and Ontario) during high water periods. The measure would require additional regulation of Lake Superior, the construction of a dam at Buffalo-Ft. Erie, dredging of the Niagara River downstream from the new dam, and more aggressive regulation of Lake Ontario and the St. Lawrence River. Expensive mitigation works (up to \$4 billion) would have to be installed on the St. Lawrence River to protect against damage from increased levels and flows. Regardless of the control measures taken, erosion damage in the middle lakes will still occur as it is primarily the result of storm events, not high lake levels.

What would be at stake if the three-lake riparian plan were adopted would be the survival of thousands of hectares of wetlands, wildlife habitat, fisheries habitat, and flood plain forests. Wetlands depend upon natural lake level fluctuations in order to remain healthy. During high water periods, woody vegetation and shrubs that encroach on wetlands would be forced out. During low water periods, wetlands would regenerate as a result of the germination and growth of seeds and plants that lay dormant in the wetland soils during high water periods. A diverse, healthy wetland provides habitat for numerous wildlife species, some of which are declining precipitously in the Great Lakes--St. Lawrence

River Basin Ecosystem. Site specific studies show that 30% of some wetlands would be lost if the three-lake plan were adopted.

The attached **UPDATE** provides a brief summary of the Draft Final Report that just released and includes findings and recommendations that go beyond consideration of structural water level controls. Other Board recommendations include:

- o Adoption of principles to guide the management of future issues related to water levels and flows within the Great Lakes--St. Lawrence River System.
- o Re-evaluation of existing control regulations on Lakes Superior and Lake Ontario to better meet the needs of users.
- o Adoption of land use and shoreline management measures that would prevent future damages due to flooding and erosion, including: purchase of at risk lands, setback requirements, shoreline alteration requirements, real estate disclosures, and flood hazard insurance that discourages development at the shore.
- o Adoption of an Emergency Preparedness Operations Plan that would allow slight adjustments in lake levels in crisis situations.
- o Establishment of a Great Lakes--St. Lawrence River System Advisory Board to advise the International Joint Commission on water level and shoreline management issues.
- o Establishment of a binational Communications Clearinghouse to provide timely information on water levels.
- o Continued improvement in hydrologic and hydraulic models, mapping of hazard zones, mapping of wetlands, and refinement of Global Climate Models.

On January 17, 1993, the Board of Directors of Great Lakes United adopted a resolution reaffirming GLU's opposition to the construction of major additional structural works and support for land use management measures as the most acceptable and efficient methods to alleviate adverse impacts from fluctuating water levels.

Great Lakes United encourages its coalition members to speak out on the recommendations of the Levels Reference Study Board contained in the **DRAFT FINAL REPORT** at each of the public hearings. If your organization cannot attend one of the hearings, please be sure to submit written comments to the Study Board Secretariat listed in the attached **UPDATE** by February 25th.

If you have any questions about the lake level issue or about the position taken by Great Lakes United, please call GLU Executive Director Terry Yonker at (716)886-0142.



### Study Board Seeks Your Views On Its Draft Recommendations

#### Public Forums Will Present The Details

The Levels Reference Study Board has drafted more than 30 recommendations that deal with the issues of lake level regulation, land use and management, guiding principles for governments, communications initiatives, changes in the institutions that manage water levels issues, and potential improvements to existing information bases.

This UPDATE summarizes these recommendations for your review. A complete draft of the Final Report will be available for mailing the second week of February from either of the offices listed on the back page. Please request your copy as soon as possible. Copies will be mailed as soon as they are available. Please note that, due to the need to condense the recommendations for UPDATE, the wording of the recommendations in the draft report may differ somewhat from that presented here.

A review of the draft recommendations will be held during four public forums, scheduled for February 22 to February 25. See the map on page 2 for the location nearest you. Details about times and locations are given below.

"These recommendations are the result of careful consideration of the views expressed by hundreds of citizens throughout the Great Lakes-St. Lawrence River Basin over the course of the Study, and of our numerous scientific and technical studies," explains Tony Wagner, Canadian Co-chair of the Study Board.

U.S. Co-chair John D'Aniello adds, "We hope citizens will continue to participate in the Study right through to its completion."

Following the public forums, the draft report will be finalized and presented to the International Joint Commission on March 31.

The Study Board was pleased with the response to the first set of public forums, held from November 30 to December 3. Citizens at Thunder Bay, Ontario; Milwaukee, Wisconsin; Sarnia, Ontario, and Watertown, New York contributed to useful discussion about how the technical studies were conducted, and they were able to express their views on how particular actions might affect them.

Study members heard from approximately 230 riparians, recreational boaters, environmentalists, shipping interests, farmers and other interested people.

The upcoming public forums will be the last major opportunity for citizens to contribute to the Study's final report before it is sent to the International Joint Commission, which will then make its own report to the Governments of Canada and the United States, as requested in the Reference of 1986. □

### BE SURE TO ATTEND THE PUBLIC FORUMS

#### Sault Ste. Marie, Ontario

Monday, February 22

Holiday Inn,

208 St. Mary's River Drive

Tel. (705) 949-0611

Registration 6:30 p.m.

#### Chicago, Illinois

Tuesday, February 23

Chicago Hilton and Towers

Lake Erie Room - 8th Floor

720 S. Michigan, Downtown

Tel. (312) 922-4400

Registration 6:30 p.m.

#### Buffalo, New York

Wednesday, February 24

Buffalo Hilton

120 Church Street

Tel. (716) 845-5100

Registration 6:30 p.m.

#### Dorval, Quebec

Thursday, February 25

Sarto Desnoyers Community Centre

1335 Lakeshore Road

Registration 6:30 p.m.

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## Guiding Principles Can Assist In Making Foresighted Decisions

With almost 20% of the world's supply of fresh surface water, a drainage basin that embraces the industrial heartland of the North American continent, and a surrounding population of more than 40 million people, the significance of Great Lakes and St. Lawrence River is considerable.

Many people benefit in many ways from this vast water resource, which has a value that extends well beyond the boundaries of its drainage basin. Millions rely on the lakes for their drinking water, for transportation of goods, community sanitation, their industrial jobs, electricity in their homes and at work, and for their leisure time enjoyment. The traditional ways of life in many Native North American communities are tied to the Great Lakes and St. Lawrence River. Hundreds of plant and animal species rely on the lake system as well, from common backyard species to the Carolinian forests and the bald eagle which are examples of the many rare, threatened and endangered life forms that depend on this resource.

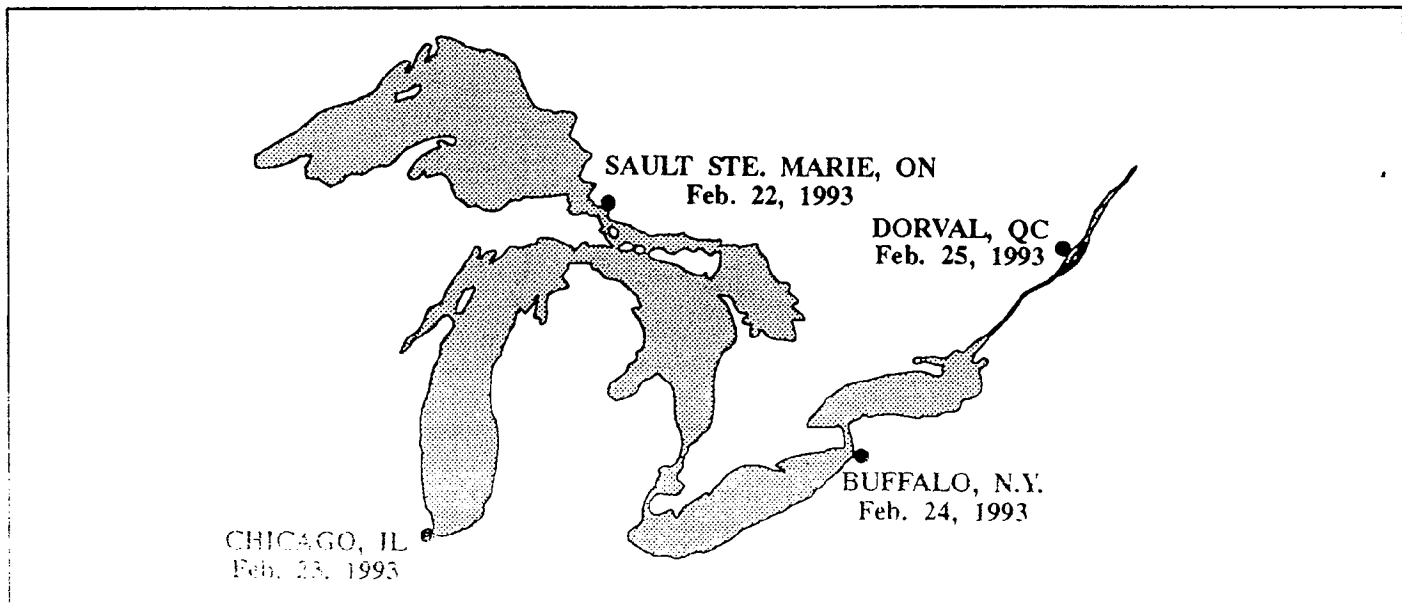
The region's relative prosperity can be expected to continue well into the foreseeable future, but it cannot continue without due consideration for the complex ecosystem that supports the diversity of economic and social development that has burgeoned here almost since the first European settlers arrived.

The replenishable supply to the Great Lakes and St. Lawrence River comes primarily from precipitation and runoff from the drainage basin. This often overlooked fact underlines the need for wise planning today of a finite water resource that must serve the generations to come at least as well as it has served to the present day.

The following principles are broad guidelines and enhance coordinated, system-wide management in future water levels and flows issues. These principles are recommended for

dealing with issues related the water levels and flows of the Great Lakes-St. Lawrence River System.

- Existing and future beneficial uses will be considered and the fundamental character of the Great Lakes-St. Lawrence River System will not be adversely affected.
- Actions approved or taken will be environmentally sustainable and respect the integrity of the Great Lakes-St. Lawrence River System ecosystem.
- Actions approved or taken will be beneficial to the Great Lakes-St. Lawrence River System and not result in undue hardship to any particular group.
- Coordinated management of the System needs to respect and accommodate the dynamic nature of the entire Great Lakes-St. Lawrence River Basin. Reduction of damages to existing development from fluctuating water levels in the Great Lakes- St. Lawrence River System will be based on a combination of non-structural and structural measures.
- Prevention of damages to future development from fluctuating water levels in the Great Lakes- St. Lawrence River System will include the implementation of land use measures that will discourage construction in areas subject to damage from fluctuating water levels and storms.
- Management of the Great Lakes-St. Lawrence River System will be done in full awareness of the potential for reduced water supply as a result of climate change.
- Decision-making with respect to management of the Great Lakes-St. Lawrence River System will be open, respecting the full range of interests affected by any decisions, and facilitating their participation in the policy process.



- Management of the Great Lakes-St. Lawrence River System will be based on coordination of actions relating to levels and flows.
- Management of the Great Lakes-St. Lawrence River System will be based on continued improvement in the collection of data and the understanding of the processes and impacts of fluctuating water levels and flows.
- Management of the Great Lakes-St. Lawrence River System requires ongoing communications and public awareness. □

**Recommendation**  
 that the federal, state and provincial governments adopt the guiding principles listed above, and that these principles be used as guidelines for the management of issues related to water levels and flows within the Great Lakes-St. Lawrence River System.

## Recommended Measures Will Be Preventive and Remedial

### Focus on Coordinated Planning of Land Use and Shoreline Management

A large portion of this Study's effort was directed toward developing practical measures (or actions) that Governments could take to alleviate the problems associated with fluctuating water levels. Three possible approaches could be used: Preventive, remedial, or combinations of preventive and remedial.

**Lake Level Regulation.** The question of whether to further regulate the levels and flows of the Great Lakes and St. Lawrence River System is central to this Study. These types of measures are classified as remedial because they would reduce or eliminate future damages to property and structures that already exist.

Currently Lakes Superior and Ontario are the only two of the five Great Lakes that have structures at their outlets to regulate their outflows. A large portion of this Study's effort was devoted to determining whether similar structures could achieve beneficial water level ranges for some or all of the other lakes in the System. Among measures examined were possible regulation of all five Great Lakes, possible regulation of three of the lakes (Superior, Erie and Ontario), and possible modification of existing regulation to make it more closely coordinated and more responsive to interests' requirements.

**Land Use and Shoreline Management.** Measures such as shoreline zoning restrictions and real estate disclosure are considered preventive, because they keep development from occurring in areas that are vulnerable to flooding or erosion. However, some land use and shoreline management measures -- such as land acquisition or hazard insurance -- could be considered either preventive or remedial, depending upon whether they keep future development from occurring, or

whether they help correct for damage that has already occurred.

This Study has found that no one measure will be the answer to all water level-related problems; nor can measures be applied to specific instances without regard for measures taken in other areas, or without regard for the varied interests affected. This Study has also concluded that, regardless of whether additional lake regulation measures are instituted, flooding and erosion caused by wind, wave and storm action will continue to occur along the shorelines of the Great Lakes and St. Lawrence River.

Many land use and shoreline management measures were found to be feasible, partly due to their ability to be tailored to specific areas, local budgets, the interests of local citizens and environmental requirements.

This Study found that, although it would be engineeringly feasible to regulate all five of the Great lakes, such an undertaking would be neither economically efficient nor environmentally acceptable. It was also found that existing lake level regulation has adversely affected the health of wetlands of Lake Ontario.

A number of possible plans for regulating three of the Great Lakes (Superior, Erie and Ontario) were examined. One of these plans was strongly supported by riparians of the middle lakes. Through dredging and installation of a structure in the Niagara River, this plan would have provided benefits to riparians on Lakes Michigan, Huron and Erie by reducing the range and frequency of water level fluctuations. Water level and flow ranges on Lakes Superior and Ontario and in the St. Lawrence River would increase. Mitigation works in the St. Lawrence River would be required. This plan would adversely affect the wetlands of the middle three lakes by reducing the range of water level fluctuations.

This plan had the highest economic efficiency of any plan that significantly reduced flooding and erosion damages on the middle three lakes, with reductions in annual property damages estimated at approximately \$12.5 million. Damages would increase on Lake Ontario and the St. Lawrence River. If the avoided costs of installing and maintaining shore protection by implementing this plan are used as an indication of economic benefits for the middle three lakes, this plan would reduce average annual flood and erosion damages by approximately \$42.5 million.

It would cost approximately \$50 million annually to dredge, construct, operate and maintain the control works on the Niagara River that are called for in this plan. This amount would increase by as much as \$327 million annually, as a result of works in the St. Lawrence River to mitigate the impacts of increased outflows from Lakes Erie and Ontario. Further costs of approximately \$3 million annually to the U.S. commercial shipping industry, and \$13 million annually to hydropower production would be incurred as a result of this plan. The Study Board concluded that, although this plan is engineeringly feasible and could reduce flooding and erosion damage on the middle three lakes, the potential economic and environmental costs are too high to justify such a project. □

## Recommendations

- That no further consideration be given to five-lake regulation.
- That no additional consideration be given to three-lake regulation.
- That Lake Superior regulation be reviewed for responsiveness to its current users, that the Lake Superior Board of Control be authorized to use its discretion in regulating outflows, similar to St. Lawrence River Board of Control, and that Lake Ontario regulation be revised to better reflect the needs of current users. In particular, this plan should be modified to minimize the occurrence of low water levels on Lake Ontario and St. Lawrence River downstream to Trois Rivières during the recreational boating season, and to take into account the environmental interest on Lake Ontario and St. Lawrence River downstream to Trois Rivières. The modifications to the regulation plans should be based on potential modifications developed in this study.
- That any comprehensive approach to management of the adverse impacts of fluctuating water levels and flows should be multi-objective in focus and coordinated in application.
- That consideration be given to establishing a multi-level government funding of \$10 to \$20 million per year for planning and implementing land use and shoreline management measures. It is suggested that areas requiring land use and shoreline management measures be prioritized through a comprehensive shoreline management program in developed and undeveloped areas.
- That consideration be given by federal, state, provincial and local governments to implementing the following remedial measures, as appropriate to local conditions: Relocation of dwellings; flood proofing of existing structures; non-structural shore protection, and structural shore protection. Decisions on implementation should be made in a regional multi-objective planning process, and decisions on implementation should be consistent with federal, state and provincial guidelines, taking into account local concerns.
- That the following preventive measures be implemented and applied consistently and uniformly:

Erosion Setback Requirements, which include minimum 30-year erosion zones for movable structures and 60 to 100 year erosion zone for permanent structures, plus adequate distance to assure a stable slope. Variances should be allowed in areas where the slope has been stabilized by a well-engineered structure.

Flood Protection Requirements, which include requirements for setbacks and elevations for flooding, with minimum requirements of a one percent risk line, plus an allowance for wave uprush and freeboard.

Shoreline Alteration Requirements in the context of a comprehensive plan that considers the environmental and hydraulic impacts, as well as those updrift and downdrift of the alterations.

Real Estate Disclosure Requirements that require the seller to disclose to prospective buyers when the property is in a known or mapped flood or erosion hazard area, and require the buyer to acknowledge being informed of the risk.

That the following combination remedial and preventive measures be considered:

Acquisition of undeveloped land, developed land and habitat areas is recommended as a priority measure, as it has high potential for preventing future shoreline damage. Local governments and other agencies should embark on long-term, or phased-in, acquisition programs, with the support and cooperation of regional and other levels of government.

Hazard Insurance, either existing or newly instituted, should include the following elements: use of historic shoreline change methods coupled with recession rate studies to identify long term erosion hazards on Flood Insurance Rate Maps; encouragement of community-based erosion management through setback requirements for new construction; denial of subsidized flood insurance for new or substantially improved construction in the hazard zone, denial of subsidized insurance for repeat claimants, and reconstruction of storm damaged structures landward of the hazard zone; eligibility for mitigation assistance when damage claims exceed 50% of fair market value of the insured property, and mitigation assistance for structures imminently threatened by erosion with an emphasis on relocation rather than demolition.

## Planning Will Be The Key To Emergency Preparedness

A variety of short-term actions that could be quickly taken to lessen the effects of high or low water crises, and quickly reversed once the crises were over, were reviewed for possible incorporation into an Emergency Operations Plan.

These actions included hydraulic measures, which would alter the levels and flows of the lakes and St. Lawrence River, and land-side measures, which would provide protection from extreme levels.

A set of hydraulic measures was selected that, when grouped together, represents the maximum possible effect on

water levels that could be achieved in a crisis situation. These measures include adjusting flows from Lakes Superior and Ontario; manipulation of the Long Lac-Ogoki, Chicago and Welland Canal diversions; placement of an ice boom at the head of the St. Clair River; and, increasing Niagara River flows through the Black Rock Lock.

Land-side measures include emergency preparedness plans at the state, provincial and local levels; storm and water level forecasting and warning networks; emergency sandbagging; shore protection alternatives; temporary land and water use restrictions, and others.

This Study finds that preparation and implementation of an Emergency Operations Plan before the next water level crisis is essential. However, manipulation of the Long Lac-Ogoki and Chicago Diversions, are controversial and would have impacts outside the Basin. In addition, the potential side effects of hydraulic measures would have to be considered. Preparation of such a plan would require cooperation by the two federal governments, the provincial, state and local governments, in consultation with other affected parties. □

### Recommendation

That the two federal governments, in cooperation with the provincial and state governments, begin as soon as possible preparation of a joint and cooperative Emergency Operations Plan for the Great Lakes and St. Lawrence River. Some of the elements that could be quickly implemented include provisions for adjustments to the following in crisis situations: Existing lake level regulation plans, flow through the Black Rock and Welland Canal, and addition of an ice boom in the St. Clair River. This plan should also include post-crisis evaluation of its effectiveness.

## Changes Are Recommended For Basin Institutions

This Study reviewed the range of jurisdictions involved in activities related to water levels and flows, and it examined the ways in which the institutions involved fulfill their responsibilities. These investigations have led to a proposal for changes to the institutional structure that would improve coordination and effectiveness of the decision-making process. □

### Recommendation

• That a Great Lakes-St. Lawrence River System Advisory Board be established with a membership as follows: Representatives from the Lake Superior, Niagara River and St. Lawrence River Control Boards, officials from the states and provinces, and interest groups. This board should oversee, and advise the Commission on, Great Lakes-St. Lawrence River water level issues, including lake level regulation and land use and shoreline management activities. It should also review and monitor the activities of a proposed Water Level Communication Clearinghouse.

- That membership of the Lake Superior Board of Control be expanded to include representation from the states and provinces and citizen members.

## Communications Clearinghouse Would Improve Information Flow

Regardless of the measures implemented as a result of this Study, the foundation for their success will be laid only through an effective process of two-way communication between Governments and the users of the Great Lakes-St. Lawrence River System.

This Study considered several options for establishing a Communications Clearinghouse that would act as the central coordinating point for all government information efforts regarding Great Lakes-St. Lawrence water levels. □

### Recommendation

• That a Communications Clearinghouse be established as a binational effort by Environment Canada and the United States Army Corps of Engineers, that it have direct access to the expertise that rests with these agencies, and that it establish a communications network.

## Management And Operational Improvements

In the course of the Levels Reference Study, a number of areas were identified in which improvements could be made to improve knowledge of the Great Lakes-St. Lawrence River System, and to improve communication of water level and flow information. □

### Recommendations

- That action be taken to update hydrologic and hydraulic models, improve data collection, improve forecasting and statistical methodologies and improve communication of specific water level and flow information
- That identification and mapping of all flood and erosion hazards in the Great Lakes-St. Lawrence River Basin continue, that mapping methods be standardized, and that maps be made available for general use.
- That long-term monitoring of shoreline erosion be undertaken and that future erosion damage assessments consider, or be based upon, information gathered in this Study.
- That a potential damage survey be undertaken in the future to improve flood damage estimates.
- That an inventory of Great Lakes-St. Lawrence River wetlands be completed, and that long-term assessments

be continued of the effects on wetlands of variations in levels and flows.

- That Global Climate Models be continually refined to improve their predictive capabilities. It is further recommended that a committee be established to develop a bi-national assessment of the potential impacts of climate change on the Great Lakes-St. Lawrence River Basin, and to coordinate responses to expected changes in climate.

- That data gathered in this Study and others be housed in a Geographic Information System (GIS) database to provide optimal use of the data. It is further recommended that the United States and Canada continue to share data and coordinate data gathering efforts.

## Full Draft Of Report Available For Review

If you would like to read the complete draft of the Final Report, please request it as soon as possible from the offices listed below. If you would like to comment on the contents of the report, or on the recommendations summarized in UPDATE, please feel free to send your comments no later than February 25 to either of the contact points below. □

## Practical Recommendations Are The Study's Goal

### Grouped into six categories

A major goal of this Study is to present recommendations for practical steps that Governments in the U.S. and Canada can take to alleviate problems associated with fluctuating water levels - - in other words, to make recommendations that will be acted upon. "We want to make sure that our report doesn't end up gathering dust on someone's bookshelf," says John D'Aniello, the United States Co-chair of the Study Board. "We are designing our recommendations so that they can be readily put into effect by the responsible agencies."

"Our entire process for evaluating the actions that we will be recommending was oriented toward making sure, not only that they are technically possible, but that they make economic, environmental and social sense," adds Tony Wagner, the Canadian Co-chair.

The Study Board's report will present recommendations for action in six areas:

1. Guiding Principles that the Governments of the United States and Canada can use for management of water levels and flows;
2. Measures (specific projects or programs) to alleviate the adverse consequences of fluctuating Great Lakes-St. Lawrence River water levels;
3. Emergency Preparedness Planning for high or low water level crises;

4. Institutional arrangements to assist in implementing other recommendations;
5. Improvements in communications with the general public on water level issues; and,
6. Management and operational improvements to deal with future water levels issues. □

*Direct your comments and enquiries to:*

### In Canada:

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L7R 4A6  
(416) 336-4581/4629

### In the United States:

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U.S. Army Corps of Engineers  
Casey Building  
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22060-5586  
(703) 355-2336

Levels Reference Study Board UPDATE is published periodically by the Public Participation and Information Working Committee (Working Committee 1) of the Levels Reference Study.

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