

# **Resource Improvement Standard: Analysis and Prospective Application**

## **Briefing Paper**

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## PREFACE

This briefing paper was prepared for the Great Lakes Commission as a component of an ongoing project, *Development of a Water Resources Management Decision Support System for the Great Lakes/St. Lawrence System*. The project is sponsored by the Great Lakes Protection Fund. This document is a product of Project Element Four, which addresses the compilation of an inventory of information on ecological impacts of current and prospective water use.

**The material presented and discussed in this document is intended to provide background information to decision-makers. The authors do not recommend particular approaches for how the improvement standard should be implemented, and this document is not a policy statement.**

## EXECUTIVE SUMMARY

Directive #3 of Annex 2001 to the Great Lakes Charter of 1985 (Annex 2001) describes a new decision making standard that will be based on four principles, including one describing “an improvement to the Waters and Water-Dependent Natural Resources of the Great Lakes Basin.” This briefing paper was prepared to inform and assist the Annex 2001 implementation process by exploring issues and options in the definition and application of the resource improvement standard principle. It is a product of Project Element Four of the ongoing project led by the Great Lakes Commission titled: *Development of a Water Resources Decision Support System for the Great Lakes/St. Lawrence System*. The project is directed at developing the framework for a decision support system that will provide the data, information and process required to ensure timely and well-informed public policy decisions concerning the use and management of ground and surface water in the Great Lakes Basin. The Great Lakes Protection Fund is supporting this effort.

The scope and emphasis of this paper were defined during a Focus Group conference call in early March. During the conference call, there was some consensus, and some diverse viewpoints were expressed. There was general consensus that the issues paper should define the improvement concept through illustrative case study examples; focus on improvements to ecological health, not human users; and explore the relationship between use and improvement. Diverse viewpoints were expressed related to whether mitigation should be a component of Annex 2001, and the authors were asked to distinguish between mitigation and improvement in the case study reviews.

This briefing paper presents the definition of improvement as defined in Annex 2001, and discusses the goals of resource improvement, and how these goals have changed over time. Nine case study applications in different settings and for different purposes from within and outside the Great Lakes are presented and discussed. For each case study, the following information is provided: a case study overview; the definition and application of a resource improvement concept in context of the example; associated issues; and potential applicability to Annex 2001 implementation. The following case study examples are presented and discussed:

- Recent Precedent
- Natural Resource Damage Assessments: Compensatory Improvements
- Environmental Trading Programs
  - Water Quality Trading Programs
  - Clean Air Act: New Source Review Program
  - Wetland Mitigation Banking
- Endangered Species Act: Habitat Conservation Plans
- Wetlands Reserve Program
- Canadian Fisheries Act: Habitat Provisions
- Resource Improvement Trust Funds

These case studies do not constitute a comprehensive collection of all relevant examples in the universe of programs that may illustrate the resource improvement standard concept. Rather, they were selected to provide a sampling and a range of examples to stimulate discussion on how the improvement standard may be applied to implementation of the Great Lakes Charter Annex.

The background material provided in this paper will serve as a departure point for discussions as efforts to interpret and apply the improvement standard move forward. The final section of this report provides four questions that are the types of questions that might be considered. They are associated with the definition, interpretation, and application of the resource improvement standard.

## 1. INTRODUCTION AND BACKGROUND

Directive #3 of Annex 2001 to the Great Lakes Charter of 1985 (Annex 2001) describes a new decision making standard that will be based on four principles, including one describing “an improvement to the Waters and Water-Dependent Natural Resources of the Great Lakes Basin.” The objective of this briefing paper is to inform and assist the Annex 2001 implementation process by exploring issues and options in the definition and application of the resource improvement standard principle. The material presented and discussed in this document is intended to provide background information to decision-makers. The authors do not recommend particular approaches for how the improvement standard should be implemented, and this document is not a policy statement.

### 1.1. BACKGROUND

Directive #3 of the June 18, 2001 Great Lakes Charter Annex reads as follows:

*“Establish a new decision making standard.*

*The new set of binding agreement(s) will establish a decision making standard that the States and Provinces will utilize to review new proposals to withdraw water from the Great Lakes Basin as well as proposals to increase existing water withdrawals or existing water withdrawal capacity.*

*The new standard shall be based upon the following principles:*

- *Preventing or minimizing Basin water loss through return flow and implementation of environmentally sound and economically feasible water conservation measures; and*
- *No significant adverse individual or cumulative impacts to the quantity or quality of the Waters and Water-Dependent Natural Resources of the Great Lakes Basin; and*
- *An Improvement to the Waters and Water-Dependent Natural Resources of the Great Lakes Basin; and*
- *Compliance with the applicable state, provincial, federal, and international laws and treaties.”*

The full text of the Great Lakes Charter Annex is found in Appendix A, and also at the web address: <http://www.cglg.org/projects/water/GreatLakesCharterAnnex.pdf>

This paper explores the resource improvement standard concept; its various definitions; applications in different settings and for different purposes; and issues and opportunities in interpreting and applying it to support implementation of Annex 2001 to the Great Lakes Charter of 1985. This briefing paper was prepared for the Great Lakes Commission as a component of an ongoing project, *Development of a Water Resources Management Decision Support System (WRMDSS) for the Great Lakes/St. Lawrence System*. An overview of the project is included as Appendix B to this report, and more information is found at the web address:

<http://www.glc.org/waterquantity/wrmdss/>

## 1.2. PROJECT OBJECTIVES

In early March, the study team conducted a Focus Group conference call to define the focus and scope of this effort. Focus group participants included members of the Governors' Charter Annex Working Group, some members of the Project Management Team and the Stakeholders Advisory Council for the WRMDSS project, and representatives of the Great Lakes Protection Fund. Focus Group participants discussed a background paper that was distributed prior to the call, and addressed two primary objectives: 1) To clarify definitions of key terms used in Directive #3's statements of the principles upon which a new decision making standard is to be based; and 2) to obtain direction on the way that the new standard would be interpreted and applied.

During the conference call, there was some consensus, and some diverse viewpoints were expressed. There was general consensus that the issues paper should:

- Define the improvement concept, and case study examples are best;
- Focus on improvements to ecological health, not human users; and
- Explore the relationship between use and improvement.

Diverse viewpoints were expressed related to whether mitigation should be a component of Annex 2001, and the authors were asked to distinguish between mitigation and improvement in this briefing paper.

The Focus Group discussion provided direction for the structure of this paper, and focused our research. Both the background memo discussed during the call and a summary of the Focus Group call are included in Appendix C. The material in this briefing paper will serve as a departure point for discussions as efforts to interpret and apply the improvement standard move forward.

## 1.3. REPORT ORGANIZATION

The remaining sections of this report are structured as follows:

**Section 2.0** discusses the goals of resource improvement, the resource improvement standard concept as defined in Annex 2001, the concept of mitigation, and specific frameworks in other settings.

**Section 3.0** describes several case study improvement standard applications in different settings and for different purposes from within and outside the Great Lakes.

**Section 4.0** presents some key questions related to applying the resource improvement standard to implementation.

## 2. RESOURCE IMPROVEMENT STANDARD CONCEPT

The term “Improvement to the Waters and Water Dependent Resources of the Great Lakes” is defined in the Annex as meaning:

*“additional beneficial, restorative effects to the physical, chemical, and biological integrity of the Waters and Water-Dependent Natural Resources of the Basin, resulting from associated conservation measures, enhancement or restoration measures which include, but are not limited to, such practices as mitigating adverse effects of existing water withdrawals, restoring environmentally sensitive areas or implementing conservation measures in areas or facilities that are not part of the specific proposal undertaken by or on behalf of the withdrawer.”*

The research for this paper focused in particular on the following terms on the Annex 2001 definition: *conservation, enhancement, restoration, and mitigating adverse effects.*

This section discusses the goals of resource improvement and how these goals have changed over time. The concept of mitigating adverse effects and the relationship of mitigation to improvement is also discussed.

### 2.1. GOALS OF RESOURCE IMPROVEMENT

The concept of resource improvement is subjective, and depends on the valuation framework that the observer applies to the natural world (Tietenberg, 1996). Time perspective and the importance assigned to human uses of natural resources are two key dimensions of the framework by which we value resources.

One polar case is to value resources only on the basis of the current services they provide to human populations. This valuation framework aims to maximize current human welfare. However, such a static and wholly anthropogenic view of resource valuation can threaten the viability of natural systems, sacrificing future environmental health to achieve short-term gain.

Conservationists, including those in industry, reject this static view of resource valuation in favor of a longer-term perspective, favoring measures that enhance both current and future resources. In their view, for example, forestry management should be forward-looking, valuing the future health of the forest along with its current health.

If so, then what weight is to be given to the future services to be provided by natural resources, relative to current services? One answer is to assign dollar values to future services and discount them using an interest rate, as we would do to evaluate the future economic payoff from a capital investment. This puts investments in natural resources on the same footing as other investments, in terms of comparing their costs and benefits. The decision to maintain the forest would depend on the value of future yields, relative to payoffs from other investments.

Some would argue, however, that this mode of resource planning assigns too little value to the environment that will be inherited by future generations, because they cannot participate in today’s decision process, and that we must do more to advocate for unborn generations.

The concept of sustainability provides a way to do so, dictating that every generation should inherit an environment whose resources are maintained and not degraded.

Even within the umbrella of sustainability, there are alternatives depending on the importance assigned to human use services. What exactly is to be sustained? One view is that the services provided to human populations should be sustained at current levels. In this view, a forest might be managed so that its yield of lumber does not decline with time.

An alternative view of sustainability is ecosystem-oriented, advocating not just for unborn human generations, but also for all living things, present and future: that the environment should be managed in such a way that native populations of plants and animals remain healthy and viable, regardless of the services that they may or may not provide to human populations.

Over the course of the past 150 years, popular views of resource management have evolved to take an increasingly long-term perspective, and are increasingly ecosystem oriented. The Annex 2001 definition of improvement appears to reflect this evolution, focusing on the “physical, chemical, and biological integrity of ... resources”, rather than the services that resources may provide to human populations. Based on Focus Group discussions, we understand this to be the prevailing view of the Governors’ Annex Working Group. It should be recognized, however, that the definition may be open to differences in interpretation (e.g. some might argue that an increase in current commercial fishing yields due to the construction of a new dock might be described as “a beneficial effect ... resulting from enhancement measures”), and that the public’s view of resource valuation will very likely continue to evolve over time. The implementation of Annex 2001 should be consistent with current societal values and needs, but also flexible enough to incorporate future changes in overall environmental goals.

## **2.2. MITIGATION VERSUS IMPROVEMENT**

The definition of improvement in Annex 2001 includes “such practices as mitigating adverse effects of existing water withdrawals.” Some participants in the Focus Group cited this language and emphasized that, with the exception of mitigating the adverse effects of existing water withdrawals, mitigation is not a component of the Annex because a principle of Directive #3 is no significant adverse impacts.

The President’s Council on Environmental Quality (40 CFR Part 1508 Section 20) defines mitigation as including:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

- (e) Compensating for the impact by replacing or providing substitute resources or environments.

Many of the resource improvement programs that exist today in the regulatory arena address this definition of mitigation, and are designed to compensate for past damages or future unavoidable impacts. Some also require measures that go beyond mitigation and are directed at resource improvements. A common feature of the examples provided in Section 3 is that they try to match activities that have negative effects with offsetting positive actions, and there is an effort to scale the positives and the negatives through some type of trading ratios. The challenge in applying these types of programs to implementation of Annex 2001 is how to scale improvements when there are no negative impacts allowed, and therefore available for use in scaling required positive actions. Programs do exist that undertake resource improvements without matching them to specific proposed actions, such as programs run by conservation groups like the Nature Conservancy. Because the resource improvements are not tied to actions such as water withdrawals, these types of programs were not reviewed for this briefing paper, although they may have features that are applicable to the Annex 2001 improvement standard.

In the case studies discussed in Section 3, the role of mitigation in the program is highlighted and discussed, as appropriate.

### **2.3. EXISTING FRAMEWORKS FOR RESOURCE IMPROVEMENT**

Few existing regulatory programs currently specifically mandate resource improvement. The programs that have an element of resource improvement generally use different terms to describe it, or the improvement is implicit to the program rather than being explicitly stated in the regulations. An example is compensatory restoration as part of Natural Resource Damage Assessments. These compensatory measures are directed at overall improvements to the ecosystem to compensate for past damages, yet there is no specific language in the authorizing Acts that describes a “resource improvement standard.” For this reason, the concept is discussed in the context of illustrative case studies in Section 3, and relevant language from regulations or guidelines is cited as appropriate.

Proposed approaches also exist: for example, a consortium of nongovernmental organizations submitted suggestions to the Council of Great Lakes Governments in May of 2002 (Miller et al., 2002). These included requirements that improvements function in perpetuity; that they be tied to restoration plans; that they be matched to withdrawals by subbasin where possible; that they be measured in terms of ecological rather than economic value; and that the withdrawals and improvements be scaled according to size, type, and potential for unknown harm. Other approaches and diverse views exist on each of these aspects of improvement.

The importance of considering cumulative impacts in implementation of Annex 2001 was highlighted during the Focus Group discussion. During the review of case study examples, the examples were examined to determine if cumulative impacts of multiple stressors (including multiple water withdrawals) are addressed through the program. Some programs implicitly account for cumulative impacts by nature of the program design. For example, water quality trading programs take a whole watershed approach, and focus on

improvements as an outcome of trading between multiple dischargers that may have a cumulative impact. Canada manages fisheries habitat under a “net gain” policy that is designed to achieve an improvement in habitat while allowing for multiple uses with potentially cumulative impacts. Other programs focus only on the particular project under review and do not address cumulative impacts. An example of this type of program is compensatory improvements as part of Natural Resource Damage Assessments.

### 3. CASE STUDY IMPROVEMENT STANDARD APPLICATIONS

In this section, specific applications in different settings and for different purposes from within and outside the Great Lakes are discussed. For each case study, the following information is provided:

1. **Case study overview** provides a general description of the project or program. For each example, the “environmental currency” in which required future resource improvements are measured is described;
2. **Definition and application of resource improvement concept** describes why this example was selected as illustrative of an improvement concept;
3. **Associated issues** highlights relevant issues, including whether the case study is an example of mitigation; and
4. **Potential applicability to Annex 2001 implementation** discusses how a similar framework might be applied to implementation of Annex 2001.

These case studies do not constitute a comprehensive collection of all relevant examples in the universe of programs that may illustrate the resource improvement standard concept. Rather, they were selected to provide a sampling and a range of examples to stimulate discussion on how the improvement standard may be applied in implementation of the Great Lakes Charter Annex. Each of these case studies illustrates certain features that could be applicable to resource improvement, rather than approaches that are consistent with Annex 2001 in every respect.

Several additional program examples were brought to the authors’ attention shortly before this chapter went to press. These include the Electric Consumer Protection Act of 1986 (U.S. Congress, 1986), which provides for “mitigation of damage to ... enhancement of ... and preservation of ... environmental quality “ as a licensing consideration. Another suggested case study was the Federal Regulatory Energy Commission's accepted Settlement Agreement for the licensing of the Ludington Pump Storage Hydroelectric Project on Lake Michigan. The agreement addresses mitigation of impacts (past, present, and future) for water withdrawals from Lake Michigan. At one point the State of Michigan proposed several offsite mitigation projects that were within the basin, but nothing in Lake Michigan proper. This was not considered acceptable, and through an arduous negotiation process, a combination of "on site" and off site mitigation proposals were agreed to, including establishment of the Great Lakes Fishery Trust.

#### 3.1. RECENT PRECEDENT

It has been only 12 months since the signing of the Great Lakes Charter Annex and the Annex has not yet been implemented, so precedents are few. However, one case study in Michigan was found that may assist in the resource improvement work called for in Annex 2001.

### 3.1.1. CASE STUDY OVERVIEW

The Perrier Group of American recently began operations at a water bottling facility in the Muskegon River watershed, which is located in west-central Michigan. At peak production, the plant will withdraw approximately 720,000 gallons per day of groundwater for purification, sterilization, bottling and distribution to consumers under the brand name Ice Mountain.

After conducting an extensive review and public hearing, the Michigan Department of Environmental Quality (MDEQ) issued a permit in August 2001 for the plant to construct and operate two wells. Hydrogeologic tests and analyses reported that there would be no significant adverse impact on adjacent private wells or on nearby surface waters and wetlands. In addition, studies performed by MDEQ to assess the potential effect of water withdrawals on fish and other wildlife reportedly showed no significant impacts.

There has been a great deal of interest and concern related to this project. Lawsuits from environmental groups and Native Indian tribes concerned about the impacts to groundwater levels and nearby surface water are currently pending. Another issue has been whether the sale of bottled water outside of the Great Lakes basin constitutes a diversion that would require application of the Water Resources Development Act (WRDA). The MDEQ concluded that it does not constitute a diversion based on the customary exemption of water that is used for food products, beverages or bottled water and the traditional definition of diversions as being bulk exports out of the Great Lakes basin (MDEQ press release, August 15, 2001). The issue of how much of the water will remain within the basin and how much will be shipped to other states or countries is an ongoing topic of debate.

In anticipation of the implementation of Annex 2001, the Perrier Group incorporated several environmental restoration and protection features into its final project. These actions were not required by MDEQ and were voluntarily initiated. The environmental protection and restoration features include:

- The endowment of a \$500,000 environmental stewardship fund to finance educational and environmental restoration projects throughout the Muskegon River watershed;
- The acquisition of development rights for over 1,100 acres of land surrounding the wells to protect the groundwater recharge area; and
- The installation of over 60 monitoring wells to develop a long-term monitoring network, and data sharing.

The environmental currency in this case is water quantity and quality. Perrier is offering water quality protections in exchange for water quantity reductions.

### 3.1.2. DEFINITION AND APPLICATION OF RESOURCE IMPROVEMENT STANDARD

The intent of the environmental protection and restoration environmental measures is to provide in many ways for an overall improvement in the Muskegon River watershed. In addition to demonstrating that the operations will have no significant adverse impacts, the applicants will also implement several measures to improve the quality of the watershed and advance the state of knowledge of water resources in the area.

The environmental stewardship fund was established to support efforts and programs that protect and enhance the natural resources. An outside consultant will manage the fund, and board members will include stakeholders within the community as well as a representative from the Perrier Group. The board will then oversee project grants and reach out to potential beneficiaries. This represents an improvement in the watershed by facilitating projects that improve water quality, restore natural wildlife habitat and restore and preserve critical wetlands, stream, and waterbodies.

The undeveloped land surrounding the bottling facility is primarily pervious and allows rainwater to infiltrate and replenish the groundwater. Acquiring the land surrounding the wells will prohibit the development of this area, minimizing surface runoff. By preserving the 1000 acres surrounding the wells, the groundwater is also protected from future sources of contamination.

The installation of the monitoring network serves as an early warning system if the pumping activities have any adverse impacts so that changes can be made before larger problems occur. Also, the information collected from these wells, such as water levels and concentrations of various constituents, will be shared with regulators, universities and the surrounding communities, allowing the groundwater behavior in the area to be better understood.

### **3.1.3. ASSOCIATED ISSUES**

The studies that were conducted prior to permitting indicated that there would be no significant adverse impacts due to the pumping. Therefore, the voluntary improvement measures defined above are not intended to mitigate adverse impacts. Rather, the watershed improvements are part of the project design. The measures are also an example of improvements tied directly to the use, a possible approach to the improvement standard, in that they relate to protections and restoration of the watershed that provides the water for the facility.

### **3.1.4. POTENTIAL APPLICABILITY TO ANNEX 2001 IMPLEMENTATION**

The environmental protection and restoration measures in the final project plans may provide a precedent for future projects. To the authors' knowledge, the Perrier Group was the first party that intentionally developed a plan to incorporate the principles of Directive #3.

One comment expressed during the Focus Group was that improvement measures should be developed within the context of regional water management/ecosystem restoration plans. This case study is an example of a project that is in keeping with that vision.

The following web sites provide additional information about this project:

Michigan Department of Environmental Quality:

[http://www.michigan.gov/deq/1,1607,7-135-3313\\_3675\\_3692-20939--CI,00.html](http://www.michigan.gov/deq/1,1607,7-135-3313_3675_3692-20939--CI,00.html)

Ice Mountain Plant:

<http://www.michigan4icemountain.com/>

Local Environmental Groups:

<http://www.mlui.org/projects/enviropolicy/perrierpermit.asp>

<http://www.savemiwater.org>

### **3.2. NATURAL RESOURCE DAMAGE ASSESSMENTS: COMPENSATORY IMPROVEMENTS**

The objective of natural resource damage assessments (NRDAs) is to restore and improve injured resources in compensation for past and expected future damages. Damages are quantified in terms of dollar values, and this provides the currency in which required future resource improvements are measured.

#### **3.2.1. CASE STUDY OVERVIEW**

NRDAs are based in the legal doctrine of public trust, under which title to natural resources is held by the state in trust for the people. The purpose of the trust is to preserve resources in a manner that makes them available to the public. The state may convey to private owners the right to use land and natural resources, but private interest is subservient to preserving the public's right to use and enjoy those resources. The following web sites, maintained by Albany and New York University Law Schools, provide background on the public trust doctrine:

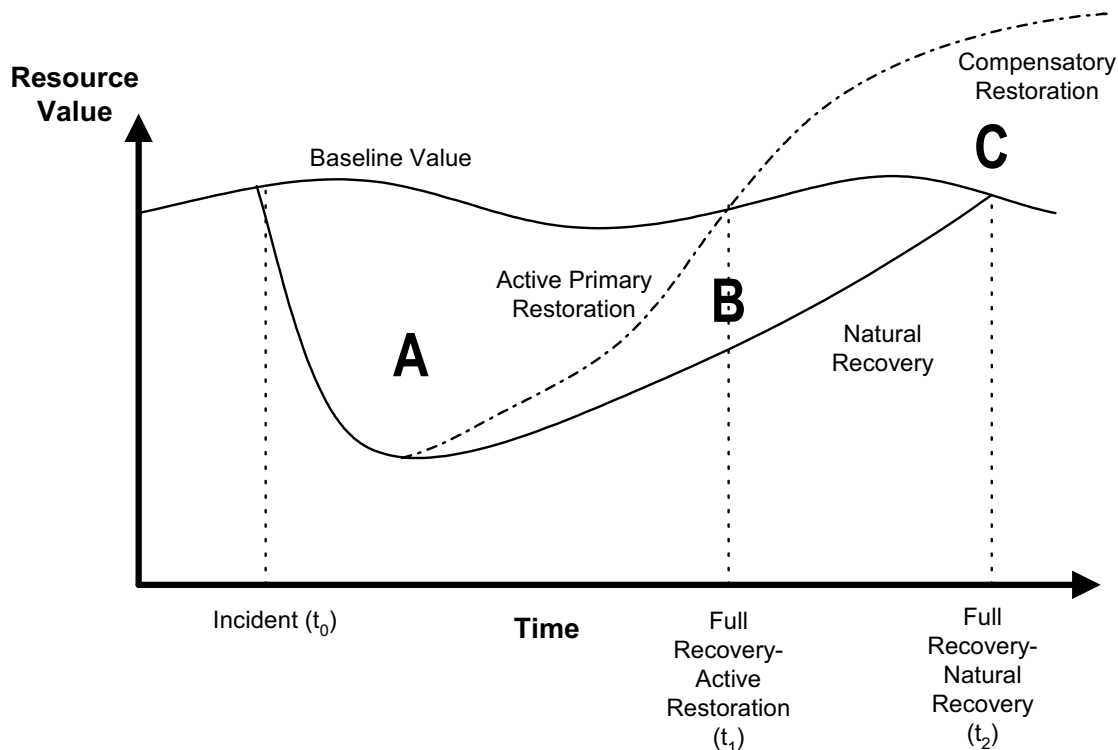
<http://www.als.edu/glc/ptd-home.html>

<http://www.nyu.edu/pages/elj/issueArchive/vol4/2/4nyuelj418.html>

NRDA provisions were included in US legislation authorizing CERCLA, OPA, the National Marine Sanctuaries Act, and the Park System Act in order to establish specific public agencies as trustees for natural resources, and give them the right to recover damages on behalf of the public. Because trustees have a responsibility to make the public whole in cases of injury to resources, damage assessments take into account the cost to restore the resource, rather than just any diminution in the value of the resource, and the trustees are required to apply any damages collected toward "restoring, rehabilitating, replacing, or acquiring the equivalent of the injured resource." NRDA activities constitute mitigation of injuries, in that they identify and quantify damage that has been done and require an equivalent resource improvement, in terms of dollar value of services, with the goal of making the public whole.

Figure 1 (Jones, 2000) illustrates the NRDA concept. In the example shown, because of a historical release at time  $t_0$ , there is a loss of services provided by natural resources. An example might be a reduction in fishing recreation. In Figure 1, the economic valuation of those total losses is represented by areas A + B, under a natural recovery scenario. Under active restoration, the resource recovers faster and future losses are reduced: in the figure, losses are equal to only area A, because the portion of future losses represented by B is prevented. NRDA procedures provide for compensatory resource improvements, requiring provision of additional services with a value of C, in addition to the restoration of baseline services. Compensation is sufficient and complete when the present discounted value of

losses A and of compensatory restoration C are equal and offsetting. Thus, NRDA requires active restoration to reduce losses, if possible, and also provide restoration to fully compensate for interim losses.



**Figure 1. Relationship between Compensatory Restoration and Interim Lost Value**

### 3.2.2. DEFINITION AND APPLICATION OF RESOURCE IMPROVEMENT STANDARD

The baseline for NRDA, according to the definition in US Department of Interior (USDOI) regulations, is “the condition or conditions that would have existed at the assessment area had the discharge of oil or release of hazardous substance not occurred.” Thus, the damage to resources is not measured relative to pristine conditions: rather, it is measured relative to a hypothetical state in which this discharge did not occur but all other ongoing impacts did occur. Thus, the historical discharger must compensate the public for the effects of the discharge, but not for any other concurrent environmental degradation.

Damages are determined by identifying injured resources, quantifying services lost due to the injuries, and then determining the dollar values of those lost services. *Injury* is defined by USDOI regulations (43CFR Subtitle A) as “a measurable adverse change ... in the chemical or physical quality or viability of a natural resource resulting either directly or indirectly from exposure to a discharge of oil or release of a hazardous substance...”. *Services* are defined as “the physical and biological functions performed by the resource including the human uses of those functions”. *Compensable value* is “the amount of money required to compensate the public for the loss in services provided by the injured resources

between the time of the discharges and the time the resources and the services those resources provided are fully returned to baseline conditions.”

A current example of NRDA procedures as applied in the Great Lakes Basin is the Restoration and Compensation Determination Plan developed by US Fish and Wildlife Service (USFWS, 2000) as lead trustee for the resources of the Lower Fox River and Green Bay, Wisconsin. In this case, the historical discharge of hazardous substances was the release of PCBs to the Lower Fox River in the course of carbonless copy paper production and waste-paper recycling, primarily in the 1960's and early 1970's. The Lower Fox River flows into Green Bay, and sediment PCB impacts have been documented in both the river and the bay. Although the Wisconsin Department of Natural Resources has released a Preliminary Remedial Action Plan in 2001 to reduce PCB contamination at the site, this document recognizes that impacts cannot be completely eliminated in the short term. For this reason, USFWS estimates both current and expected future damages.

USFWS and the other trustees have chosen to base past damages on estimated recreational fishing service losses, due to fish consumption advisories. Estimates are based on a combination of data on anglers' actual choices of fishing activities and locations, and their stated willingness to pay for improved conditions. Compensation for future losses, which also include impacts of PCBs on wildlife, is to be provided through projects such as habitat restoration or preservation; nonpoint source runoff control; and direct resource restoration projects. USFWS established equivalence between future losses due to PCB contamination and gains from these proposed projects by conducting a survey of citizen preferences for PCB removal versus other proposed resource improvements.

### **3.2.3. ASSOCIATED ISSUES**

It should be emphasized that the human use of natural resources is the basis of NRDA. Damage is assessed only to the extent that resources provide services that are of measurable value to human populations. This includes both use (for example the benefits of recreation) and nonuse (also called passive or existence) values (for example, valuing the knowledge that resources exist and are uninjured). Resources have no intrinsic value in NRDA, other than their value in providing these human services.

A controversial issue in NRDA is the estimation of nonuse values of resources. Although there is little doubt that people place value on the existence of natural resources from which they do not personally obtain any tangible services, there is much less agreement whether specific dollar estimates of those values are real and meaningful. Because active uses require users to make economic choices, indirect but objective estimates of these values can often be made. For example, the incremental travel cost to go fishing at pristine Lake A instead of contaminated Lake B provides an objective estimate of the differences in services the angler expects from the two experiences. In contrast, nonuse values are estimated through questionnaire methods, asking people what they would be willing to pay to effect a specific resource improvement. For example, respondents could be asked how much they would be hypothetically willing to pay if this payment would result in a specific increase in the population of an endangered species. Because it is not practical to put respondents to a real test of their true willingness to pay for nonuse services, their answers are not verifiable. Nevertheless, because there is general agreement that nonuse values do exist, and they are explicitly recognized in US federal NRDA rules, and the state of the art is to refine methods

to minimize known pitfalls of questionnaire construction, to produce the best estimates possible.

Although dollars are the standard currency of resource improvement in NRDA, services have been employed as an alternative currency in some cases. Most commonly this has been done through “habitat equivalency”: habitat improvement is required as compensation for past habitat degradation, and full compensation requires that resource services gained by the improvement are sufficient to offset services previously lost due to the release. For example, services might be measured in terms of ability to support endangered migratory bird populations.

As employed in US programs, NRDA valuations are retrospective. Typically many years after a discharge or other triggering event, past and expected future damages are identified, associated lost services are enumerated, and total lost value is estimated. Expected natural resource damages are not undertaken to compensate for damages due to proposed or planned actions.

#### **3.2.4. POTENTIAL APPLICABILITY TO ANNEX 2001 IMPLEMENTATION**

One possible distinction between the NRDA approach and Annex 2001 is NRDA’s human use valuation of resources. Members of the resource standard Focus Group conducted for this report expressed a strong preference for ecosystem sustainability as a basis for resource improvement, rather than human use values.

Another important difference between NRDA procedures and the contemplated resource improvement standard under Annex 2001 is that NRDA is retrospective, whereas Annex 2001 is prospective. The Annex 2001 resource improvement standard would not be applied as compensation for effects of past withdrawals from the Great Lakes Basin.

Nevertheless, the methods used in NRDA to value resources are available provisions to be considered for use under Annex 2001, with some history to illustrate their pros and cons. If such a framework were employed, any expected impact from Great Lakes water withdrawals would be evaluated in terms of reductions in resource services, and their associated use and nonuse values. The applicant would be required to provide compensation, in an equal amount or including a premium to account for uncertainty of estimation methods, either in cash or through in-kind resource improvement projects. A resource improvement standard would direct either form of compensation toward improvements providing sufficient services to offset the impact of the proposed water withdrawal. In practice, it would be desirable for the Great Lakes states and provinces to estimate the service losses associated with generic withdrawals in each Great Lakes subbasin, and develop and maintain a list of desired improvements and their estimated service values. This would facilitate matches between water withdrawal applicants and compensating resource improvements.

Another potentially applicable concept is habitat equivalency. Expected potential natural resource service losses (e.g. decline in wildlife populations or diversity) due to proposed water withdrawals would be estimated for the various Great Lakes subbasins. Candidate habitat improvements would also be catalogued, along with estimates of associated service improvements. Proposed new water withdrawals would then be matched with required habitat improvements to protect resources from net degradation. Annex 2001 would require that this be accomplished in such a way as to prevent adverse impacts to the resource.

### **3.3. ENVIRONMENTAL TRADING PROGRAMS**

Three types of environmental trading programs are reviewed and discussed in this section:

- Water Quality Trading Programs
- New Source Review program under the Clean Air Act; and
- Wetland Mitigation and In-Stream Flow Banking.

#### **3.3.1. WATER QUALITY TRADING**

Water quality trading provides an instructive resource improvement standard case study, because trading programs require that every trade accomplish an improvement in water quality. The basic currency of water quality trading programs is pollutant loading rates, so that resource improvements are measured in terms of reduced total loads.

##### **3.3.1.a. Case study overview**

The primary objective of water-quality trading is to reduce the cost of achieving water-quality goals, by providing dischargers with market-based flexibility. There can be numerous available means of reducing total pollutant loads to a target level, and trading programs allow dischargers to negotiate among themselves, selecting the most cost-effective method(s) and sharing the costs of implementation. A second objective is water-quality improvement: where agencies have allowed water-quality trading, they have also required resource improvements in the form of overall load reductions, relative to preexisting water-quality-based targets.

In practice, the most important avenue for trading is between point-source and nonpoint-source dischargers. In the recent decades the water-quality threat posed by nonpoint sources, such as agricultural runoff and urban stormwater, has become increasingly clear. It is also often apparent that reductions in nonpoint-source loads can be achieved at lower cost than additional point-source load reductions, because point-source loads have been more aggressively controlled by past environmental policies. Water-quality trading allows a point-source discharger to earn credit toward its permit limits by financing a load reduction program for a nonpoint-source discharger, effectively purchasing credits for load reduction. In this way, dischargers as a group can reduce or eliminate sources in order of their cost-effectiveness.

The so-called trading ratio is the key to effecting resource improvement under environmental trading programs. This is the discount applied to any credits purchased, before they may be applied to meet the purchaser's permit requirements. For example, a 2:1 trading ratio requires one credit to be retired toward water-quality improvement for each credit used to meet permit requirements. In this case, a point source discharger requiring a 1000 kg reduction to meet its permit requirements would need to finance a 2000 kg reduction in nonpoint-source loads to satisfy its permit through trading. Trading ratios may vary on a case-by-case basis, but are set above 1:1 to facilitate improvements.

##### **3.3.1.b. Definition and application of resource improvement standard**

USEPA (2002) has recently released a proposed trading policy, for trading involving nutrients and sediments. According to USEPA's proposed policy, pollutant reduction credits may be expressed in rates or mass per unit of time. For example, if flow and

concentration limits in a discharge permit effectively limit a discharger's phosphorus load in units of kilograms per month, then credits are expressed in the same units. The improvement of the resource brought about by a trading ratio greater than 1:1 would then likewise be measurable in units of kg/month.

The proposed USEPA policy also supports for the creation of credits "in ways that achieve ancillary environmental benefits beyond reductions in specific pollutant loads, such as the creation and restoration of wetlands, floodplains and wildlife and/or waterfowl habitat." Credits for these activities may be used to supplement pollutant load reductions made at a 1:1 point/nonpoint-source trading ratio, to bring about a net environmental benefit.

A recent example in the Great Lakes Basin is the Kalamazoo River (Michigan) Water Quality Demonstration Project. The objective of this demonstration project was to reduce phosphorus loads to Lake Allegan, an impoundment of the Kalamazoo River, thereby lessening nuisance algae growth. It was anticipated that improvements in agricultural practices could result in cost-effective improvements in water quality. Reductions in loads achieved by upgrading to generally accepted agricultural practices were subject to a 2:1 trading ratio, and any further improvements earned credits at a 1:1 ratio. Point-source dischargers were allowed to apply these credits to help meet their water-quality-based effluent limits.

#### **3.3.1.c. Associated issues**

USEPA's proposed trading policy contains numerous safeguards against trading that would degrade water quality in one location while improving it in another, a possibility that arises when trading partners are in different locations. Key provisions, intended to ensure consistency with the Clean Water Act, include:

- *Watershed basis:* all trading should be within a watershed, so that the total pollutant load within the watershed is reduced.
- *No localized impairment:* any trades that would cause localized impairments of existing or designated uses are unacceptable.
- *Baselines for trades:* parties earn credits only when they improve upon levels derived from and consistent with water-quality standards. Where Total Maximum Daily Loads (TMDLs) have been established, the associated load allocations for dischargers constitute the baseline.
- *Trading ratios:* trades should require the retirement of a portion of credits earned, to achieve water-quality improvements and provide a margin of safety of load shifts between point and nonpoint sources.

#### **3.3.1.d. Potential Applicability to Annex 2001 Implementation**

Trading offers the potential to allocate existing Great Lakes water withdrawals to their most beneficial uses, while also improving Great Lakes resources. A trading framework for implementation of Annex 2001, analogous to water quality trading, would establish a baseline of Great Lakes water withdrawals, possibly at current levels, and would allow the flexibility for prospective users and existing users to trade in withdrawal credits. The most

fundamental issue that arises in applying trading principles is whether Great Lakes water withdrawal rights can be established, at current or at any other levels.

To effect resource improvements in any trading program, trading ratios need to be greater than 1:1. In this instance, a portion of the allowed withdrawal could be retired upon purchase of withdrawal rights, or else the purchaser would finance some additional resource improvement. The latter option would be analogous the option in the USEPA proposed water-quality-trading policy for the creation of credits “in ways that achieve ancillary environmental benefits beyond reductions in specific pollutant loads.” The creation and restoration of wetlands, floodplains and habitat are currently high priorities in the Great Lakes Basin, relative to reductions in water withdrawals below current levels. For this reason, requiring these ancillary activities would likely be a more beneficial way to achieve resource improvements than to retire water withdrawal rights.

As with water quality trading, it might also be beneficial to restrict trades to parties within common hydrological regions, in order to minimize adverse local effects.

Finally, the baseline established for trading programs sets the target to be met by trading. If current rates of water withdrawal are satisfactory, then these could be used to set the baseline. If significantly lower withdrawal rates are desired, then this could be taken into account by setting a lower baseline.

The following websites provide additional information on EPA proposed policy:

Federal Register notice announcing the availability of EPA's Proposed Water Quality Trading Policy for public comment published on May 15, 2002:  
<http://www.epa.gov/fedrgstr/EPA-WATER/2002/May/Day-15/w12148.htm>

Fact Sheet on Proposed Trading Policy:  
<http://www.epa.gov/owow/watershed/trading/policyfs.html>

Information on Michigan's proposed program, the Great Lakes Trading Network, and the Kalamazoo Project can be found at:  
[http://www.michigan.gov/deq/1,1607,7-135-3313\\_3682\\_3719---,00.html](http://www.michigan.gov/deq/1,1607,7-135-3313_3682_3719---,00.html)

### **3.3.2. NEW SOURCE REVIEW PROGRAM; CLEAN WATER ACT**

Congress enacted the New Source Review (NSR) program in 1977 under the Clean Air Act. This section describes the program and highlights some components that illustrate an improvement standard. The environmental currency in this program is tons of air pollutant emitted per year, based on discussion below.

#### **3.3.2.a. Case study overview**

The goal of the New Source Review program is to minimize air pollution from large new and modified stationary sources. If new construction or major modification will increase emissions by an amount large enough to trigger NSR requirements (typically 100 tons or more per year), then the source must obtain a permit before construction can begin. This

permit will require that the best available control technology be used to control the source. In nonattainment areas, the control technology requirement is more stringent than in attainment areas.

States have the primary responsibility for enforcing the NSR program. They have the authority through the State's Implementation Plan (SIP) to define attainment and nonattainment areas for each criteria air pollutant (ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead). The nonattainment areas are further classified based on the severity of the pollution into five classes which range from marginal to extreme. This classification system is used to tailor clean-up requirements to the severity of the pollution and set realistic deadlines for meeting national air quality standards. Not only must each state meet these goals, but they must also show that they are making reasonable further progress toward improving air quality. The permit system allows the states to ensure that sources such as power plants and factories meet their individual clean-up goals.

In order for nonattainment areas to move toward attainment, overall emissions must decrease. To allow for economic development while still improving overall air quality, the NSR program allows sources to provide or purchase offsets when they want to increase emissions. An offset is defined as a reduction in the mass emitted of a criteria air pollutant by an amount somewhat greater than the planned increase. For example, if an owner or operator of a power plant wants to increase energy production, more generators must be purchased that would cause emissions to increase. To comply with the Clean Air Act, an offset must be obtained to ensure that the area moves toward attainment. This can either be a reduction in emissions in another part of the plant, or offsets can be purchased from another company.

### **3.3.2.b. Definition and application of resource improvement standard**

In nonattainment areas, the goal is to meet national air quality standards for criteria air pollutants. In order for this to occur, overall emissions must decrease. Sources in these areas must provide or purchase offsets to compensate for the increases from new sources or modifications. The actual ratio of the required offset to the proposed emissions is determined by the states and is typically 1.1 – 1.4. This number depends upon the location of the facility and the severity of the air pollution in the vicinity. Offsets can be obtained by making reductions at a different stack in the same plant, or may be purchased from other companies having extra emission offsets. These can be obtained when old equipment is retired and replaced with newer, more efficient and cleaner equipment without increasing emissions in another area of the plant.

An example of how this is applied can be illustrated with a hypothetical steel mill in a non-attainment area. The plant would like to expand by purchasing two additional coke ovens. This increase would put them over the 100 ton annual threshold for carbon monoxide and therefore trigger the NSR program. A solution would be to replace some of their older coke ovens, which are dirty, leaky and produce a large amount of emissions annually with newer, cleaner and more efficient ovens. This would demonstrate a net air quality benefit because although they increased capacity, the overall emissions were decreased.

### **3.3.2.c. Associated issues**

Part of the goal of the NSR program is to retire older inefficient equipment. Some would argue that by allowing companies to obtain emissions offsets for this type of activity, companies can get credit for something they would likely do without the program.

When trading partners are in different locations, it is possible that trading emissions could cause significant air pollution in one location while improving it in another. Currently, the guidance states that the offsets are generally acceptable if obtained from within the same air quality control region. Because these regions can be quite large, concern has been expressed that “hot spots” can occur within the region when pollutant trading occurs between distant sources. For example, if an older plant wants to expand, it may be more cost effective to purchase offsets from a cleaner, newer plant in another location than to upgrade their own equipment. If many of these older plants are located in relatively close proximity, air quality could be degraded in this localized area.

### **3.3.2.d. Potential Applicability to Annex 2001 Implementation**

The concept of applying offsets to water withdrawals could potentially allow water to be withdrawn for a variety of uses while providing for economic development. To allow for improvement, the ratio of the current use to the amount offset would be somewhat greater than one. Actions that could constitute an appropriate offset include ancillary benefits, such as habitat restoration or educational programs, or decreases in the quantity of water withdrawn from the watershed. Water users could either implement measures within their own jurisdiction or buy credits from other users within the watershed.

As an example of how this concept may be applied to water withdrawals within the Great Lakes basin, a municipality wants to increase its water withdrawal from a river to supply a growing community. In order to withdraw this additional water, they must demonstrate an overall improvement to the waterbody. Because many cities have older distribution systems that are in need of rehabilitation, fixing the leaking pipes could potentially offset this increase. Alternatively, the municipality could finance educational programs that encourage household and industrial water conservation. If these measures resulted in less consumption overall, there would be a net improvement in terms of water quantity. While this type of program may be considered in keeping with the intent of the resource improvement language, conservation is already a separate principle under Directive #3 (“Preventing or minimizing Basin water loss through return flow and implementation of environmentally sound and economically feasible water conservation measures”). However, the scheme described above would provide a way to finance it.

The following websites provide additional information about the New Source Review program:

EPA, Office of Air Quality Planning and Standards website: The Plain English Guide to the Clean Air Act:

[http://www.epa.gov/oar/oaqps/peg\\_caa/pegcaain.html](http://www.epa.gov/oar/oaqps/peg_caa/pegcaain.html)

New Source Review, Technology Transfer Network website:

<http://www.epa.gov/ttn/nsr/>

### **3.3.3. WETLAND MITIGATION BANKING**

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Permit applicants must provide justification for impacting wetlands and must avoid and minimize impacts to wetlands before a compensation (mitigation) proposal can be entertained. Applicants must compensate for all unavoidable wetland impacts by replacing the lost wetlands. Mitigation ratios result in a net gain of wetland acreage and range from 1.5: 1 to 3:1. This section focuses on wetland banking as a mitigation strategy.

#### **3.3.3.a. Case study overview**

A wetlands mitigation bank is a wetland area that has been restored, created, enhanced, or (in exceptional circumstances) preserved, which is then set aside to compensate for future conversions of wetlands for development activities. The following description of mitigation banking is excerpted from a 1997 Congressional Research Service Report (Zinns, 1997):

Mitigation banking is relatively new, and federal mitigation banking policies continue to evolve... Five federal agencies published final guidance in the Federal Register in November 1995 providing a framework to support a functioning banking system. In addition, many states have initiated or are considering banking programs.

Banking can occur only after three steps are taken in the federal process for protecting wetlands. First, wetland development must be avoided if possible; second, when this is unavoidable, impacts must be minimized; and third, impacts that can not be minimized to an acceptable level must be mitigated. Mitigation banking is an option only when mitigation on-site is not possible. Bank sponsors create wetland "credits" at a bank site that can be acquired by those who fall within the purview of these two programs and are required to offset wetland losses, or "debits," at other sites.

Congressional interest is building because mitigation banking appears to be a promising approach for offsetting wetland degradation and implementing an overall policy goal of "no net loss." While the recent growth in the number of mitigation banks suggests expanded interest and support for this approach, several years or more may elapse before success (or failure) at individual sites can be determined.

Mitigation banking has many definitions, but most center on the restoration, creation, enhancement, or, in exceptional circumstances, the preservation of wetlands which will compensate for unavoidable wetland losses at another site. Banking is designed to coordinate mitigation at one location for habitat losses allowed under federal programs at other sites. Mitigation banking is used primarily when on-site mitigation can not be achieved or is not as environmentally beneficial. Mitigation banking involves a process in which a client may be required to obtain wetland units with similar functions and values at a nearby site to satisfy federal permit or program requirements.

Bank operations vary widely, but all follow the same general principles. These principles use the terminology of financial institutions: transactions are described in terms of credits and debits to wetland resources. A bank sponsor creates credits as it

restores, enhances, or creates wetlands at the bank site. These credits are either debited (money is not involved) or purchased by clients (a financial transaction) who are being required to compensate for wetland losses. When clients obtain these credits, they are withdrawn from the bank and become unavailable for future transactions. Clients are usually required to make these withdrawals prior to or concurrently with their proposed activity that will result in wetland losses. Banks may be allowed to transfer some credits, usually to fund their operations, before the site is fully established.

U.S. EPA (<http://www.epa.gov/owow/wetlands/facts/fact16.html>) lists the following benefits of wetland mitigation banking:

- Banking can provide more cost effective mitigation and reduce uncertainty and delays for qualified projects, especially when the project is associated with a comprehensive planning effort.
- Successful mitigation can be ensured since the wetlands can be functional in advance of project impacts.
- Banking eliminates the temporal losses of wetland values that typically occur when mitigation is initiated during or after the development impacts occur.
- Consolidation of numerous small, isolated or fragmented mitigation projects into a single large parcel may have greater ecological benefit.
- A mitigation bank can bring scientific and planning expertise and financial resources together, thereby increasing the likelihood of success in a way not practical for individual mitigation efforts.

US EPA supports mitigation banking and is currently developing interagency guidance for the establishment and use of mitigation banks. Approximately 100 mitigation banks are in operation or are proposed for construction in 34 States across the country, including the first private entrepreneurial banks.

The environmental currency in which future resource improvements are measured is acreage of wetland.

### **3.3.3.b. Definition and application of resource improvement standard**

Mitigation ratios used in mitigation banking result in a net gain of wetland acreage and range from 1.5: 1 to 3:1. In terms of wetland acreage, this represents an improvement. However, some critics argue that even though mitigation banking involves obtaining wetland units with similar functions and values at a nearby site, wetlands can not be replaced because wetlands can not be created with the same functions and values, and they should not be destroyed under any conditions. According to USFWS, the rate of wetlands loss in the U.S. has slowed by 80% from 1986 to 1997 compared to the preceding decade. However, forested wetlands and freshwater emergent wetlands show the most losses, while open water pond acreage has been increasing, reflecting substitution between these different wetland types.

### **3.3.3.c. Associated issues**

Mitigation banking is controversial. Supporters claim that mitigation banking, when compared with mitigation on-site, provides better-organized planning, an improved regulatory climate, greater commitment to long-term wetland protection, and more consolidation of habitat. Opponents are concerned that banking is a loophole and facilitates additional wetland destruction, that some types of wetlands are difficult to create or restore as thriving ecosystems, and that wetland losses are sometimes allowed before the bank is fully functional. More generally, supporters view policy flexibility as critical to success, especially for commercial banks, while critics worry that flexibility will lead to unacceptable losses of wetland functions and values (Zinns, 1997).

The success of wetland mitigation programs in general is currently a topic of much debate. A recent self-assessment of New Jersey's wetland program (Brouwer, 2002) revealed that New Jersey has lost 22 percent of its wetland acreage over a recent four-year period. This contrasts sharply with the state's goal of creating 2 acres of wetland for every acre lost. The study focused primarily on wetlands created from scratch, and the low success rate with these types of mitigation measures was cited in part for the poor results.

### **3.3.3.d. Potential Applicability to Annex 2001 Implementation**

One of the benefits of wetland mitigation banking listed by USEPA is that it consolidates numerous small, isolated or fragmented mitigation projects into a single large parcel, resulting in greater ecological benefit. USEPA also mentions that banking brings scientific and planning expertise and financial resources together, thereby increasing the likelihood of success in a way not practical for individual mitigation efforts. These characteristics are consistent with opinions expressed during the Focus Group that improvement measures need to be within the context of regional water management/ecosystem restoration plans. Such measures would provide greater ecological benefit than many isolated measures throughout the basin.

An example of a similar application in the Great Lakes might be the development of "restoration banks" that may involve stream enhancement projects, projects that target exotic species invasions, nutrient reduction, or other restoration or enhancement projects. A bank sponsor would create credits as it carries out these projects at the bank site, and these credits would then be either debited or purchased by clients who are being required to provide a resource improvement in connection with a proposed water withdrawal. The water withdrawals may or may not be tied to the bank projects. An obvious difference between wetlands banking and Annex 2001 implementation is that wetlands banking requires a compensation for resources lost, and a key principle of Directive #3 is "No significant adverse individual or cumulative impacts to the quantity or quality of the Waters and Water-Dependent Natural Resources of the Great Lakes Basin." If there is no adverse impact, then it is not obvious how to scale the resource improvement to be required for a given proposed water withdrawal. One possibility would be to base resource improvements on mitigation of potential cumulative harm, and to scale individual resource improvement projects according to their contribution to that potential cumulative harm (if mitigation of potential harm is permitted).

The following websites provide additional information on wetland mitigation banking:

US EPA's fact sheet on mitigation banking is found at:  
<http://www.epa.gov/owow/wetlands/facts/fact16.html>

The 1997 Congressional Research Service report is found at:  
<http://cnie.org/NLE/CRSreports/Wetlands/wet-8.cfm>

### **3.4. ENDANGERED SPECIES ACT: HABITAT CONSERVATION PLANS**

Habitat Conservation Plans (HCPs) are a conservation tool under Section 10(a)(2)(A) of the Endangered Species Act (ESA) to recover endangered and threatened species on non-federal lands. More than 300 HCPs have been approved, and more than 300 are pending.

#### **3.4.1. CASE STUDY OVERVIEW**

The goal of a Habitat Conservation Plan is to improve the survival and recovery of listed species. When a "taking" of a listed species may occur as a result of a proposed project or action, an incidental take permit is required, and a Habitat Conservation Plan must accompany the permit application. The ESA defines "take" as any activity that harms a threatened or endangered species, and "harm" can include habitat modification that injures species.

An HCP protects listed species, protects unlisted species, and actively manages habitat. It includes measures to monitor, minimize, and mitigate the impact on the listed species. It can apply to an individual landowner or multiple landowners, and create improvements of entire regions. An HCP is made up of 5 components:

1. Biological Goals and Objectives: Guiding principles that reflect the best scientific information available;
2. Adaptive Management: Method to address uncertainty and significant data gaps;
3. Monitoring: Ensures compliance and gauges effectiveness of HCPs and informs choices under adaptive management;
4. Permit Duration: Varying lengths but up to 50 years; and
5. Public Participation: 30 to 60 days for public comment.

The environmental currency in which required future resource improvements are measured is habitat equivalency.

Some examples of Habitat Conservation Plans follow.

#### **3.4.1.a. Cedar River Watershed Habitat Conservation Plan**

Seattle Public Utilities operates water supply facilities in the 90,500 acre Cedar River Watershed for 1.3 million people in King County. The watershed is home to old-growth forests, and species in the watershed are listed, proposed for listing, and at risk for listing. Currently, the city uses about 100 million gallons a day from the river, but access to as much as 50 million more gallons a day was requested to accommodate growth, and this potentially threatens endangered species because of the potential reductions in flow.

In order to meet federal requirements for species protection, the city, in conjunction with five state and federal agencies, prepared an \$84 million, 50-year Habitat Conservation Plan. The HCP includes commitments to forest, fish, and flow. The forest commitments include eliminating commercial harvest; removing forest roads; restoring ecological functions; maintaining habitats; restoring degraded fish and wildlife habitats; improving water quality; and conducting research and monitoring studies. The fish commitments include protecting and restoring habitats and populations of ESA listed fish which are currently blocked by the dam. The flow commitments include guaranteeing river flows including base flow and supplemental flows to provide better habitat, limiting the rates of decrease in river levels, protecting and restoring habitats and populations directly affected by water supply operations, evaluating “dead storage” in reservoir to improve stream flows, and providing for research, monitoring, and adaptive management.

#### **3.4.1.b. Tacoma Water Habitat Conservation Plan**

Tacoma Water prepared an HCP as part of its application to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for a 50-year incidental take permit for its water supply operations on the Green River. The permit will ensure that the utility operates in full compliance with the requirements of the Endangered Species Act and will allow the utility to continue to withdraw water from the Green River for public health and safety, homes and businesses.

The potential for water withdrawal impacts to stream flow is the most significant issue. The HCP allows the utility to continue to withdraw water while assuring compliance with ESA. The plan provides for next 50 plus years and includes 64 habitat conservation measures. The benefits of the plan include:

- Upstream and downstream ESA listed passage past dams;
- Reintroduction of large woody structures and spawning gravels;
- Restoration of fish habitat including juvenile rearing;
- Wildlife habitat conservation; and
- Provide for minimum instream flows, water storage of fish releases, increased fisheries protection.

#### **3.4.2. DEFINITION AND APPLICATION OF RESOURCE IMPROVEMENT CONCEPT**

These Habitat Conservation Plans were selected as examples of an application of the resource improvement standard concept because they relate to water withdrawals, and their intent is to restore listed species, including improvements to degraded habitat and nonlisted species. HCPs allow operational activities to occur while applying conservation and recovery measures to degraded habitat. The plans lay out measures to preserve, restore, protect, and improve listed species, and non-listed species.

#### **3.4.3. ASSOCIATED ISSUES**

Habitat Conservation Plans describe plans to minimize and mitigate for any “take” that may result from a project. In the examples provided, HCPs provide a mechanism for water

withdrawals to continue and increase in the future, and for some harm in the form of a taking of listed species to occur in any cases where takings are a possible result. However, while these plans do involve mitigation measures to offset the harm, they go beyond individual species mitigation to include ecosystem restoration and improvement measures.

With respect to the implementation of Annex 2001, some in the Focus Group argued that mitigation is not a component of Annex 2001, while others suggested that it could be. Some pointed out that one principle under Directive #3 is that there shall be “no significant adverse individual or cumulative impacts to the quantity or quality....” Some argued that the term “mitigation” in the definition applies only to adverse impacts of existing water withdrawals.

While some of the measures outlined in the HCP examples presented above are tied to directly to the use (water withdrawals from the river), other measures benefit listed species in a number of ways, and provide benefits to nonlisted species and the watershed as a whole. For example, the Cedar River Watershed HCP includes forest commitments that eliminate commercial harvest and remove forest roads.

#### **3.4.4. POTENTIAL APPLICABILITY TO ANNEX 2001 IMPLEMENTATION**

Habitat Conservation Plans may provide a model to allow for increased water withdrawals in the Great Lakes Basin while improving water dependent natural resources, degraded habitat, and water quality. HCP goals are similar to Annex 2001 objectives to protect, conserve, restore, improve and manage use of waters. The plan is implemented and monitored to assure that the goals are met. HCPs also provide a mechanism to bring together diverse stakeholders over a broad area or region(s) into a voluntary long-term agreement.

One issue with employing a similar approach in the Great Lakes is how to scale the resource improvement to be required for a given proposed water withdrawal. One possibility would be to base resource improvements on mitigation of cumulative harm, and to scale individual resource improvement projects according to their contribution to the cumulative harm. Habitat equivalency based on cumulative impacts could be used for this purpose.

The following website provides additional information about Habitat Conservation Plans:

<http://www.nwf.org/smartgrowth/hcpbenefits.html>

The following web address provides additional information about the Cedar River Watershed HCP:

<http://www.cityofseattle.net/util/CedarRiverHCP/>

The following web address provides additional information about the Tacoma Water HCP:

[http://www.ci.tacoma.wa.us/water/system/m\\_system\\_habitat-cons.htm](http://www.ci.tacoma.wa.us/water/system/m_system_habitat-cons.htm)

#### **3.5. WETLANDS RESERVE PROGRAM (WRP)**

The Wetlands Reserve Program (WRP) was mandated by Section 1237 of the Food Security Act of 1985 (PL 99-198), as amended by the Food, Agriculture, Conservation and Trade Act of 1990 (PL-101-624) and the Federal Agriculture Improvement and Reform Act of 1996 (PL-104-127), to assist landowners in restoring and protecting wetlands. The WRP was reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill).

### 3.5.1. CASE STUDY OVERVIEW

The Wetlands Reserve Program is a voluntary program that provides technical and financial assistance to eligible landowners to restore, enhance and protect wetlands. The USDA-Natural Resources Conservation Service administers the program. Funding for WRP comes from the Commodity Credit Corporation. The program offers three enrollment options:

*Permanent Easement.* This is a conservation easement in perpetuity. Easement payments for this option equal the lowest of three amounts: the agricultural value of the land, an established payment cap, or an amount offered by the landowner. In addition to paying for the easement, USDA pays 100 percent of the costs of restoring the wetland.

*30-Year Easement.* Easement payments through this option are 75 percent of what would be paid for a permanent easement. USDA also pays 75 percent of restoration costs.

For both permanent and 30-year easements, USDA pays all costs associated with recording the easement in the local land records office, including recording fees, charges for abstracts, survey and appraisal fees, and title insurance.

*Restoration Cost-Share Agreement.* This is an agreement (generally for a minimum of 10 years) to re-establish degraded or lost wetland habitat. USDA pays 75 percent of the cost of the restoration activity. This enrollment option does not place an easement on the property.

### 3.5.2. DEFINITION AND APPLICATION OF RESOURCE IMPROVEMENT CONCEPT

The program provides an opportunity for landowners to receive financial incentives to enhance and restore wetlands in exchange for retiring marginal land from agriculture. The program benefits the Great Lakes Basin by restoring and protecting wetland functions and values, and by developing fish and wildlife habitat. Wetlands also benefit the Great Lakes by improving water quality by filtering sediments and chemicals, reducing flooding, and protecting biological diversity. As of November 2001, there have been 1,074,245 acres enrolled in WRP in the entire United States.

To be eligible for WRP, land must be restorable and be suitable for wildlife benefits. Examples of eligible lands include: farmed or prior converted wetlands; pasture or production forage land where the hydrology has been significantly degraded and can be restored; riparian areas linked to protected wetlands; and lands adjacent to protected wetlands that contribute significantly to wetland functions and values. Ineligible lands include wetlands converted after December 23, 1985, lands with timber stands established under the Conservation Reserve Program, Federal lands, and lands where conditions make restoration impossible. Thus any wetlands in this program represent land that has been reclaimed from prior conversion to agricultural land or which support protected wetlands, resulting in a net gain in wetlands in the Great Lakes Basin. Use of these wetlands in mitigation efforts is prohibited by statute.

### 3.5.3. ASSOCIATED ISSUES

On acreage subject to a WRP easement, participants control access to the land and may lease the land for hunting, fishing, and other undeveloped recreational activities. The purchase of a conservation easement by the US Government does not constitute an outright purchase of lands. At any time, a participant may request that additional activities be evaluated to

determine if they are compatible uses for the site. This request may include such items as permission to cut hay, graze livestock or harvest wood products. Compatible uses are allowed only if they are fully consistent with the protection and enhancement of the wetland.

Implementation of WRP has illustrated the need for funding for technical assistance to landowners, not just financial assistance. NRCS and its partners, including conservation districts, provide a great deal of assistance to landowners as part of restoration activities. These include the design of wetland restoration practices and overseeing restoration activities. Easement acquisition is also an important part of the program, which guarantees that wetlands will be properly maintained, but which involves a great deal of time and effort to accomplish. NRCS and its partners also continue to provide assistance to landowners after completion of restoration activities. This assistance may be in the form of reviewing restoration measures, clarifying technical and administrative aspects of the easement and project management needs, and providing basic biological and engineering advice on how to achieve optimum results for wetland dependent species.

The case studies given to this point all have funding mechanisms that place the costs of restoration on the end user. The theory is that the end user can then pass restoration costs on to the consumer, as part of the price of doing business. The agricultural producer is unable to pass on these costs, however, since the marketplace typically fixes commodity prices. Therefore a public benefit such as wetland restoration will require public investment in the form of cost-share payments, technical assistance, and purchase of conservation easements.

#### **3.5.4. POTENTIAL APPLICABILITY TO ANNEX 2001 IMPLEMENTATION**

A key principle of Directive #3 is "No significant adverse individual or cumulative impacts to the quantity or quality of the Waters and Water-Dependent Natural Resources of the Great Lakes Basin." A similar program to WRP in the Great Lakes Basin would directly address the goals of this directive. Key issues related to this type of program that would need to be addressed include:

- Whether the Great Lakes government entity has the legal authority to acquire and hold easements;
- The financial costs of both the easement purchase and cost-share for wetlands restoration; and
- Technical ability of the government entity to design and implement wetland restoration.

Partnership agreements between Great Lakes government entities and NRCS, conservation districts, and environmental groups such as Ducks Unlimited could address the second and third issues. Also, there are other funding mechanisms besides direct appropriation of funds to a program, such as the sale of bonds by state or local governments.

#### **3.6. FISH HABITAT PROVISIONS: CANADIAN FISHERIES ACT**

Section 35 of the Canadian Fisheries Act instructs that "no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat." It further states that the Minister is the only person who can authorize, under certain conditions, the alteration, disruption or destruction of fish habitat (HADD). This section

discusses the policy and guidelines related to Section 35, and focuses on the policy objective of “net gain” in the productive capacity of fish habitats.

### 3.6.1. CASE STUDY OVERVIEW

Fisheries and Oceans Canada (DFO) has decision-making authority for the conservation and protection of fish and fish habitat. DFO’s “Policy for the Management of Fish Habitat” (1986) provides direction for interpreting the broad powers mandated in the Act in a way that is consistent with the concept of sustainable development. A key policy objective is the *Net Gain of Habitat for Canada’s Fisheries Resources*, described as an “increase the natural productive capacity of habitats for the nation's fisheries resources, to benefit present and future generations of Canadians.”

The DFO’s Habitat Conservation and Protection Guidelines describe how the Net Gain Policy Objective goes beyond the principle of no net loss:

“The long-term policy objective of the Department is to achieve an overall Net Gain in the productive capacity of fish habitats. A fundamental strategy for achieving this is to prevent further erosion of the productive capacity of existing habitat by applying the No Net Loss Guiding Principle to habitat management decisions related to the review of proposed works and undertaking.”

Progress toward the objective of increasing productive capacity is achieved through three policy goals: conservation of the current productive capacity of habitats; restoration of damaged fish habitats; and development of new habitats.

These goals are described by DFO as follows:

“The conservation and protection of existing habitat through preferred location, design and mitigation is fundamental to conserving the current productive capacity of habitats. The conservation goal is implemented using the No Net Loss Guiding Principle. Under this principle, DFO works with Proponents and other government agencies so that projects are designed in a way that maintains the productive capacity of fish habitat. Proponents must pursue location and design options which will avoid impacts to fish habitat before DFO will consider authorizing works which would require habitat compensation to achieve a no net loss of fish habitat. The hierarchy of management options is presented below from most to least preferred.

- Relocation (most preferred)
- Redesign
- Mitigation
- Habitat Compensation (least preferred)

All project plans should meet the No Net Loss Guiding Principle of fish habitat. In cases where losses of fish habitat can not be avoided, habitat replacement or enhancement, on a case-by-case basis may compensate the unavoidable losses.”

During the permit review process, if the Department believes that the impact of a project on fish habitats may be reduced by certain measures, it will advise on ways to avoid or minimize damage. These measures might include relocating or redesigning the project - or

steps to mitigate the harmful impacts on habitat. There will also be cases in which a habitat is so critical or sensitive that authorizations will not be granted. The stated objective is not to block all development activity but to protect fish habitat effectively and reasonably. Negotiations of habitat remediation agreements in instances where an activity may have, or has had, an impact on fish habitat are conducted to meet the policy of a "net gain" in fish habitat.

The currency in which future environmental improvements are measured is productive capacity of fish habitat .

### **3.6.2. DEFINITION AND APPLICATION OF RESOURCE IMPROVEMENT CONCEPT**

The net gain policy is directed at achieving an increase in the productive capacity of fish habitats. In this way, it designed to result in resource improvements over the long term. This is accomplished through measures that ensure no net loss of habitat, as well as measures that increase productive capacity. Examples of compensatory options (when residual impacts of projects on habitat productive capacity are deemed harmful after relocation, redesign or mitigation options have been implemented) include creating similar habitat, and increasing the productive capacity of an existing habitat.

### **3.6.3. ASSOCIATED ISSUES**

This example illustrates a program designed to mitigate harmful alteration, disruption or destruction of fish habitat. Applicants must pursue location and design options which will avoid impacts to fish habitats before DFO will consider authorizing works which would require habitat compensation to achieve a no net loss of fish habitat. When a project results in a HADD, and where the impacts are judged acceptable, compensatory restoration may be required. In some cases those measures are at or near the development site within the same unit (most preferred) and in other cases that are in different ecological units (less preferred). Like the wetland mitigation program described earlier, the policy of net gain in fish habitat is directed at an overall improvement that goes beyond no net loss in habitat.

### **3.6.4. POTENTIAL APPLICABILITY TO ANNEX 2001 IMPLEMENTATION**

The net gain policy for fisheries habitat is similar to the principle of a net resource improvement in Annex 2001. Also similar is the Annex principle on "no adverse impacts" and the no net loss of habitat policy in the Act. Some would argue, however, that the actions that are implemented under the Policy for the Management of Fish Habitat are mitigative in nature, and that mitigation is not a component of Annex 2001.

DFO's Policy for the Management of Fish Habitat can be found at:

[http://www.dfo-mpo.gc.ca/habitat/Policy/english/Index\\_e.htm](http://www.dfo-mpo.gc.ca/habitat/Policy/english/Index_e.htm)

An overview of the Project Review process can be found at:

<http://www-heb.pac.dfo-mpo.gc.ca/english/publications/pdf/LwrFraserProjRevProcess.pdf>

### 3.7. RESOURCE IMPROVEMENT TRUST FUND

Several programs exist across the country in which a fee or tax is paid for a service or product, and the revenues are collected in a trust fund. The money in this fund is then used to fund a variety of programs including habitat and wetland conservation and environmental restoration and clean-up efforts.

#### 3.7.1. CASE STUDY OVERVIEW

There are many examples of resource improvement trust funds. Several are provided below, to illustrate the range of these types of programs.

- Michigan Waterfowl Hunting License: A percentage of the fees collected are used to acquire wetlands and other lands to be managed for the benefit of waterfowl.
- Minnesota Fishing License: The revenues collected from fishing licenses go to the general fund for the Division of Fisheries and support activities such as stream surveys, fishery management, lake rehabilitation and spawning habitat improvement.
- New Mexico Habitat Stamp Program (HSP): Funds collected from the HSP program through stamps purchased by hunters, anglers and trappers are dedicated to habitat conservation and rehabilitation projects. These projects benefit both game and non-game species through wetlands enhancements, riparian plantings, bank stabilization, vegetative management, and habitat protection.
- Michigan Natural Resources Trust Fund (MNRTF): The fund was established in 1976 to purchase lands for outdoor recreation and/or the protection of natural resources and open space. It also is used to assist in the appropriate development of land for public outdoor education. The MNRTF is supported by annual revenues from the extraction of non-renewable resources from state-owned lands, primarily oil and gas.
- Bottle Bills: When a soft drink container is purchased with a deposit and the bottle is discarded without redeeming the deposit, this money typically returns to the beverage distributor who initiated the deposit. However, Massachusetts, Michigan and California collect unredeemed deposits and direct all or a percentage of the funds to an environmental fund. Examples of funded projects include hazardous waste cleanups, municipal recycling programs, and brownfields redevelopment.
- Federal Gasoline Excise Tax: The gasoline tax is imposed on the manufacturer (the producer, refiner or importer) and is generally passed on to the consumer. Revenues collected from this tax primarily support the Highway Trust Fund, although 0.1 cent of the money collected supports the Leaking Underground Storage Tank Trust Fund to help fund clean-up efforts of leaking gasoline storage tanks.

The currency in which required future resource improvements are measured is dollars.

### 3.7.2. DEFINITION AND APPLICATION OF RESOURCE IMPROVEMENT STANDARD

Each of the funds described above is dedicated to environmental improvement, with projects that range from remediation of contaminated sites to protection and enhancement of wildlife habitats. The amount of the fee or tax and the uses of the revenues can vary, but the common theme is that a benefit is created, either by those that use the resource (hunting and fishing licenses) or those who purchase certain products (bottle deposits and gasoline taxes).

### 3.7.3. ASSOCIATED ISSUES

Issues can arise relate to management of these types of funds. There can be questions about who pays into it, what will the fees be, what projects get funded, where they are located, and who makes the project funding decisions. Historically, some of these types of funds have been redirected into general funds and have not been used for the original intended purpose. Alternatively, authorities may cut back on general fund-based activities, effectively using these fees to augment the general fund.

### 3.7.4. POTENTIAL APPLICABILITY TO ANNEX 2001 IMPLEMENTATION

These types of resource improvement trust funds may offer a model for a “Great Lakes Ecological Restoration Fund.” This fund could be used to finance restoration measures such as wetlands conservation, habitat restoration, or streambank erosion measures that have been identified in watershed restoration plans. Application of the trust fund payment procedure may simplify the implementation of the improvement standard. By creating a uniform payment structure based on the characteristics of the water withdrawal, the fund could be administered to provide for local and/or regional improvements. The prioritization of projects and management of the fund may present challenges. While there would be interest in addressing local issues and concerns, there would also be interest in improvement projects that are consistent with broader regional water management and ecosystem restoration plans. Some states and provinces already have well-developed watershed management processes, while others including Ontario and Quebec are currently developing new systems of water resource regulation. A key issue related to this type of a program is whether Great Lakes governments have legal authority to charge a fee for water withdrawals.

The following websites provide more information about these types of trust funds:

Summary of all of the bottle bills within the United States:

<http://www.bottlebill.org>

[http://www.bottlebill.org/USA/states-all\\_deposit\\_systems\\_11-00.htm](http://www.bottlebill.org/USA/states-all_deposit_systems_11-00.htm)

<http://www.deq.state.or.us/wmc/solwaste/unredmupdate.html>

Hunting/Fishing Licenses:

- New Mexico Habitat Stamp Program  
[http://www.gmfsh.state.nm.us/PageMill\\_TExt/Hunting/hstamp.html](http://www.gmfsh.state.nm.us/PageMill_TExt/Hunting/hstamp.html)
- Michigan Waterfowl Hunting License  
<http://www.michiganlegislature.org/documents/mcl/pdf/mcl-324-43525.pdf>
- Michigan Natural Resources Trust Fund  
[http://www.michigan.gov/dnr/1,1607,7-153-10366\\_11864-36732--,00.html](http://www.michigan.gov/dnr/1,1607,7-153-10366_11864-36732--,00.html)

Gasoline Excise Tax:

<http://cnie.org/NLE/CRSreports/Transportation/trans-24.cfm>

#### 4. APPLYING THE RESOURCE IMPROVEMENT STANDARD TO IMPLEMENTATION: KEY QUESTIONS

The background material provided in previous sections of this issues paper will serve as a departure point for discussions as efforts to interpret and apply the improvement standard move forward. Following are the types of questions that might be considered. They are associated with the definition, interpretation, and application of the resource improvement standard.

1. At what scale is the resource improvement standard appropriately applied?
  - a. At what *spatial* scale is the resource improvement standard appropriately applied (e.g., site specific, lake-wide, basin-wide)?
  - b. At what *time* scale is the resource improvement standard appropriately applied (e.g., 10 years, 50 years, etc.)?
2. What options are available for measuring improvement under the application of the resource improvement standard?
3. To what extent, if any, should mitigation be a consideration in the application of the resource improvement standard?
4. How should cumulative impacts be considered in the application of the resource improvement standard?

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**APPENDIX A**

**THE GREAT LAKES CHARTER ANNEX**

**A SUPPLEMENTARY AGREEMENT TO THE GREAT LAKES  
CHARTER**

**JUNE 18, 2001**

# **THE GREAT LAKES CHARTER ANNEX**

## **A SUPPLEMENTARY AGREEMENT TO THE GREAT LAKES CHARTER**

**June 18, 2001**

### **FINDINGS**

The Great Lakes are a bi-national public treasure and are held in trust by the Great Lakes States and Provinces. For the last sixteen years, the Great Lakes Governors and Premiers have followed a set of principles to guide them in developing, maintaining, and strengthening the regional management regime for the Great Lakes ecosystem. Protecting, conserving, restoring, and improving the Great Lakes is the foundation for the legal standard upon which decisions concerning water resource management should be based.

There has been significant progress in restoring and improving the health of the ecosystem of the Great Lakes Basin. However, the Waters and Water-Dependent Natural Resources of the Basin remain at risk of damage from pollution, environmental disruptions, and unsustainable water resource management practices which may individually and cumulatively alter the hydrology of the Great Lakes ecosystem.

### **PURPOSE**

In agreeing to this Annex, the Great Lakes Governors and Premiers reaffirm their commitment to the five broad principles set forth in the Great Lakes Charter, and further reaffirm that the provisions of the Charter will continue in full force and effect. The Governors and Premiers commit to further implementing the principles of the Charter by developing an enhanced water management system that is simple, durable, efficient, retains and respects authority within the Basin, and, most importantly, protects, conserves, restores, and improves the Waters and Water-Dependent Natural Resources of the Great Lakes Basin.

State and Provincial authorities should be permanent, enforceable, and consistent with their respective applicable state, provincial, federal, and international laws and treaties. To that end, and in order to adequately protect the water resources of the Great Lakes and the Great Lakes ecosystem, the Governors and Premiers commit to develop and implement a new common, resource-based conservation standard and apply it to new water withdrawal proposals from the Waters of the Great Lakes Basin. The standard will also address proposed increases to existing water withdrawals and existing water withdrawal capacity from the Waters of the Great Lakes Basin.

## **DIRECTIVES**

The Governors and Premiers put forward the following DIRECTIVES to further the principles of the Charter.

### **DIRECTIVE #1**

#### ***Develop a new set of binding agreement(s).***

The Governors and Premiers agree to immediately prepare a Basin-wide binding agreement(s), such as an interstate compact and such other agreements, protocols or other arrangements between the States and Provinces as may be necessary to create the binding agreement(s) within three years of the effective date of the Annex. The purpose of the agreement(s) will be to further the Governors' and Premiers' objective to protect, conserve, restore, improve, and manage use of the Waters and Water-Dependent Natural Resources of the Great Lakes Basin. The agreement(s) will retain authority over the management of the Waters of the Great Lakes Basin and enhance and build upon the existing structure and collective management efforts of the various governmental organizations within the Great Lakes Basin.

### **DIRECTIVE #2**

#### ***Develop a broad-based public participation program.***

The Governors and Premiers commit to continue a process that ensures ongoing public input in the preparation and implementation of the binding agreement(s) called for in this Annex. Included in this process will be periodic progress reports to the public.

### **DIRECTIVE #3**

#### ***Establish a new decision making standard.***

The new set of binding agreement(s) will establish a decision making standard that the States and Provinces will utilize to review new proposals to withdraw water from the Great Lakes Basin as well as proposals to increase existing water withdrawals or existing water withdrawal capacity.

The new standard shall be based upon the following principles:

- Preventing or minimizing Basin water loss through return flow and implementation of environmentally sound and economically feasible water conservation measures; and
- No significant adverse individual or cumulative impacts to the quantity or quality of the Waters and Water-Dependent Natural Resources of the Great Lakes Basin; and
- An Improvement to the Waters and Water-Dependent Natural Resources of the Great Lakes Basin; and
- Compliance with the applicable state, provincial, federal, and international laws and treaties.

### **DIRECTIVE #4**

#### ***Project review under the Water Resources Development Act of 1986, §1109, 42 U.S.C. §1962d-20 (1986) (amended 2000).***

Pending finalization of the agreement(s) as outlined in Directive #1, the Governors of the Great Lakes States will notify and consult with the Premiers of Ontario and Quebec on all proposals subject to the U.S. Water Resources Development Act of 1986, §1109, 42 U.S.C. §1962d-20 (1986) (amended 2000) (WRDA), utilizing the prior notice and consultation process established in the Charter. In doing so, the Governors and

Premiers recognize that the Canadian Provinces are not subject to, or bound by, the WRDA, nor are the Governors statutorily bound by comments from the Premiers on projects subject to the WRDA.

## **DIRECTIVE #5**

***Develop a decision support system that ensures the best available information.***

The Governors and Premiers call for the design of an information gathering system to be developed by the States and Provinces, with support from appropriate federal government agencies, to implement the Charter, this Annex, and any new agreement(s). This design will include an assessment of available information and existing systems, a complete update of data on existing water uses, an identification of needs, provisions for a better understanding of the role of groundwater, and a plan to implement the ongoing support system.

## **DIRECTIVE #6**

***Further commitments.***

The Governors and Premiers of the Great Lakes States and Provinces further commit to coordinate the implementation and monitoring of the Charter and this Annex; seek and implement, where necessary, legislation establishing programs to manage and regulate new or increased withdrawals of Waters of the Great Lakes Basin; conduct a planning process for protecting, conserving, restoring, and improving the Waters and Water-Dependent Natural Resources of the Great Lakes Basin; and identify and implement effective mechanisms for decision making and dispute resolution. The Governors and Premiers also commit to develop guidelines regarding the implementation of mutually agreed upon measures to promote the efficient use and conservation of the Waters of the Great Lakes Basin within their jurisdictions and develop a mechanism by which individual and cumulative impacts of water withdrawals will be assessed. Further, the Governors and Premiers commit to improve the sources and applications of scientific information regarding the Waters of the Great Lakes Basin and the impacts of the withdrawals from various locations and water sources on the ecosystem, and better understand the role of groundwater in the Great Lakes Basin by coordinating their data gathering and analysis efforts. Finally, the Governors and Premiers commit to develop in the new binding agreement(s) the water withdrawal rates at which regional evaluations are conducted and criteria to assist in further defining acceptable measures of Improvement to the Waters and Water-Dependent Natural Resources of the Great Lakes Basin.

## **FINAL PROVISIONS**

This Annex shall come into force on the day that all signatures are executed. The Parties have signed the present agreement in duplicate, in English and French, both texts being equally authentic.

## **DEFINITIONS**

**Waters of the Great Lakes Basin** (also termed in the Great Lakes Charter as “Water Resources of the Great Lakes Basin”) means the Great Lakes and all streams, rivers, lakes, connecting channels, and other bodies of water, including tributary groundwater, within the Great Lakes Basin.

**Water-Dependent Natural Resources** means the interacting components of land, water, and living organisms affected by the Waters of the Great Lakes Basin.

**Improvement to the Waters and Water-Dependent Natural Resources of the Great Lakes Basin** means additional beneficial, restorative effects to the physical, chemical, and biological integrity of the Waters

and Water-Dependent Natural Resources of the Basin, resulting from associated conservation measures, enhancement or restoration measures which include, but are not limited to, such practices as mitigating adverse effects of existing water withdrawals, restoring environmentally sensitive areas or implementing conservation measures in areas or facilities that are not part of the specific proposal undertaken by or on behalf of the withdrawer.

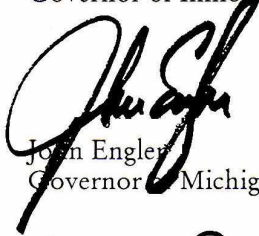
*Signed and entered into the 18<sup>th</sup> day of June 2001.*



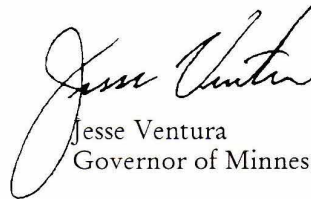
George H. Ryan  
Governor of Illinois



Frank O'Bannon  
Governor of Indiana



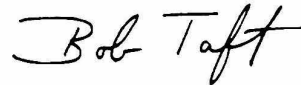
John Engler  
Governor of Michigan



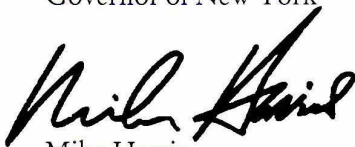
Jesse Ventura  
Governor of Minnesota



George E. Pataki  
Governor of New York



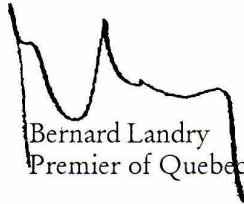
Bob Taft  
Governor of Ohio



Mike Harris  
Premier of Ontario



Tom Ridge  
Governor of Pennsylvania



Bernard Landry  
Premier of Quebec



Scott McCallum  
Governor of Wisconsin

## **APPENDIX B**

### **SUMMARY SHEET: DEVELOPING A WATER RESOURCES MANAGEMENT DECISION SUPPORT SYSTEM FOR THE GREAT LAKES**

## **PROJECT UPDATE** **TOWARD A DECISION SUPPORT SYSTEM FOR THE GREAT LAKES**

The Great Lakes Commission is leading a large scale collaborative effort to provide the region, in unprecedented detail, with a status assessment of Great Lakes water resources, an inventory of the sources and use of Great Lakes water, and enhanced understanding of the ecological consequences of such use. The initiative is supported by the Great Lakes Protection Fund, and responds to priorities established by the Great lakes governors and premiers acting through the Council of Great Lakes Governors.

A multi-agency, multi-disciplinary collaborative has been formed to accomplish this task and brings the expertise and resources of the Great Lakes Commission, its ten member states and provinces, multiple U.S. and Canadian federal agencies, regional organizations, and academic institutes to bear on the issue. The Great Lakes Commission and its team of collaborators are laying the framework for a state-of-the-art decision support system that will provide the data, information and process required to ensure timely and well-informed public policy decisions concerning the use and management of surface and groundwater in the Great Lakes system. The products will strengthen water quantity decisionmaking and management processes in the Great Lakes-St. Lawrence region.

The project work plan is founded upon seven premises that are guiding project methodology and outcomes:

- ▶ All project activities and outcomes will be **state and province driven**; representatives of these jurisdictions will have a role in all project elements and in shaping all project deliverables.
- ▶ The project is ensuring that **Great Lakes Protection Fund support is leveraged** to the greatest extent possible, through significant direct and in-kind contributions from project partners.
- ▶ Access to and use of **existing and planned initiatives** by project partners and other collaborators is being maximized.
- ▶ A number of **interim products with immediate applicability** to the water resources management needs of the states and provinces have recently been completed.
- ▶ The **assembly and synthesis of existing data and information is a priority**, and will be complemented by the identification of gaps, unmet needs and means to address them.
- ▶ Project outcomes will be practical, pragmatic and additive, providing a **strong foundation for necessary follow-up work** yielding the structural and operational characteristics of a water resources decision support system.
- ▶ All project activities and outcomes will be directed at **ensuring the sustainability** of data and information gathering, analysis, and application well beyond the conclusion of project funding.

A Project Management Team was established early in the project and provides overall leadership and direction in the design and conduct of all project elements. It is comprised of representatives from all ten Great Lakes states and provinces (10); the Council of Great Lakes Governors; one representative each from the several U.S. and Canadian federal agencies with major roles in primary project elements (i.e., U.S. Geological Survey; National Oceanic and Atmospheric Administration; U.S. Army Corps of Engineers; Environment Canada); and several Great Lakes Commission staff members who are providing secretariat support. All have a working familiarity with, and responsibility for, all aspects of water use monitoring, data analysis, management and policy in their jurisdiction. The eighteen member body, is chaired by Richard S. Bartz, Assistant Chief, Division of Water, Ohio Department of Natural Resources, has been meeting quarterly to provide leadership and direction, guide project element implementation, advise the Project Secretariat and, generally, ensuring that project commitments are met fully and in a timely manner. Project Management Team members are also involved in ongoing regional discussions concerning water resources management policy and ensure that project activities and products are consistent with/contribute to these discussions.

A Stakeholders Advisory Committee (SAC) has also been formed to provide advice and guidance to the PMT, and the technical subcommittees (TSCs) working on the substantive project elements. The SAC includes representatives from an array of agencies, organizations and user groups responsible for the acquisition, analysis, dissemination and/or application of water resources-related data and information. The SAC has met twice since project inception in August 2000 will meet formally one to two additional times during the upcoming year.

Commission staff and the project management team (PMT) have been working closely with the Council of Great Lakes Governors (CGLG) on the implementation of the Great Lakes Charter Annex signed by the Governors at their annual meeting in June. The PMT has established a sub-committee structure to work on the varied and complex issues of this project and to help better incorporate work products into the framework of an overall decision support system. The three technical sub-committees (TSCs) are involved with: Status Assessment of Water Resources (TSC2); Water Withdrawal and Use (TSC3); and Ecological Impacts (TSC4). In addition to their prescribed work as outlined in detailed project element work plans, the PMT and the TSCs are working to define, scope, and answer questions associated with three priority issues identified by the Great Lakes Charter Annex; water conservation, resource improvement, and developing better consumptive use data to support a water resources management decision support system.

The TSCs have been working consistently to accomplish the following variety of project tasks:

- ▶ TSC2, working on the status assessment, has produced a draft Water Balance Report for PMT and Stakeholder Advisory Committee (SAC) review and comment at their September meetings. Work has begun on a white paper addressing the scope and impact errors may have on existing Great Lakes water quantity calculations. A compilation and listing of all sources and locations of water resources data for the Great Lakes and St. Lawrence River have been initiated. The project web site continues to be updated and will begin being developed along the lines of the decision support system framework as addition project products are completed.
- ▶ TSC3, involved with water withdrawal and use information, has completed a draft 1998 water use report, a draft summary of state and provincial water use data collection and reporting programs and a draft summary of the analysis of three water withdrawal, diversion and consumptive use scenarios and resulting recommendations for water use data needs. All of these drafts were submitted to the PMT and SAC for their review and comment prior to the September 20-21 meetings.
- ▶ TSC4, working on ecological impacts, has completed a draft and revised draft of the literature search and analysis which was reviewed by the PMT and SAC. A descriptive inventory of computer models was prepared by the USACE and augmented by a project consultant Limno-Tech, Inc. An Ecological Impacts Experts' Workshop is scheduled for November 13 - 14 to identify specific needs and to develop descriptive questions to help frame the eventual decision support system. At this time, more than 40 experts in a dozen different disciplines have been identified as prospective participants. A proceedings document will be prepared on the outcomes reached at the workshop.

Since the Commission's May Semiannual Meeting, the PMT has met twice in Romulus, Michigan on June 27 and September 20, 2001. The SAC has met once on September 21, 2001, also in Romulus. Each Project Element TSC has met either in person or via conference call on numerous occasions. Upcoming meetings include the Experts' Workshop in Ann Arbor, Michigan on November 13-14, 2001. The next PMT meeting is tentatively scheduled for January 23, 2002 in Romulus, Michigan; meetings of the three TSCs, both in-person and via conference call, will be scheduled as needed.

## **APPENDIX C**

### **MARCH 6 FOCUS GROUP CONFERENCE CALL**

- Focus Group Background Memo**
- Focus Group Summary Memo**



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## Memorandum

**DATE:** March 1, 2002  
**PROJECT:** GLCWW3 2

**TO:** Mike Donahue  
Great Lakes Commission

**FROM:** John Wolfe  
Wendy Larson  
Joe DePinto

**SUBJECT:** Interpretation of Principles for New Decision Making Standard  
Directive #3; Annex 2001

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This memo provides the objectives, background information, and key questions for the Focus Group conference call scheduled for March 6 at 2:00 PM (EST).

### Objectives for the call:

- To receive input on the definitions of key terms used in Directive #3 statements upon which a new decision making standard is to be based.
- To secure advice on how to structure a discussion paper exploring the definition and application of the new decision making standard.

### Background:

Directive #3 of the June 18, 2001 Supplementary Agreement to the Great Lakes Charter reads as follows (with italics added to identify key terms for discussion):

“Establish a new decision making standard.

The new set of binding agreement(s) will establish a decision making standard that the States and Provinces will utilize to review new proposals to withdraw water from the Great Lakes Basin as well as proposals to increase existing water withdrawals or existing water withdrawal capacity.

The new standard shall be based upon the following principles:

- Preventing or minimizing Basin water loss through return flow and implementation of environmentally sound and economically feasible water conservation measures; and
- *No significant adverse individual or cumulative impacts* to the quantity or quality of the Waters and Water-Dependent Natural Resources of the Great Lakes Basin; and
- *An Improvement to the Waters and Water-Dependent Natural Resources* of the Great Lakes Basin; and
- Compliance with the applicable state, provincial, federal, and international laws and treaties.”

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*Improvement to the Waters and Water Dependent Resources of the Great Lakes* is defined in the Annex as meaning “additional *beneficial, restorative effects* to the physical, chemical, and biological integrity of the Waters and Water-Dependent Natural Resources of the Basin, resulting from associated conservation measures, enhancement or restoration measures which include, but are not limited to, such practices as *mitigating* adverse effects of existing water withdrawals, *restoring* environmentally sensitive areas or *implementing conservation* measures in areas or facilities that are not part of the specific proposal undertaken by or on behalf of the withdrawer.”

**Following are some key issues related to interpretation and application of Directive #3. Some relate to the clarification of terms that can be subjective. These will be helpful in thinking about answers to Discussion Questions # 1 and #2 below, which will be the focus of our call:**

- How is an *adverse* impact defined?
- How are *mitigation, restoration, and conservation* measures defined, as practices that would be acceptable ways to bring about improvements?
- Are acceptable *improvements* to natural resources to be limited in any way with respect to water body or the manner in which the resource is improved?
- What is the threshold for a *significant* adverse impact to quantity or quality of waters? Is it based on the number of beneficial use impairments, the magnitude of a single impairment, or both?
- Is there *significant adverse impact* if it is *mitigated* by a net improvement to the same resource?
- How are *individual and cumulative impacts* defined?

#### **Discussion Questions for the Call:**

The discussion and questions posed below will form the agenda of our focus group conference call.

One way to define adverse impacts and improvements in water bodies is with respect to beneficial uses, such as healthy fish and wildlife populations, fish consumption, aesthetic value, safe drinking water sources. These are among the beneficial uses recognized in the Great Lakes Water Quality Agreement (GLWQA), forming the basis for the 14 beneficial use impairments listed in Annex 2, Section 1 of the GLWQA.

This discussion is structured in two parts, to address the two critical questions: 1) What types of water withdrawal scenarios will likely be addressed under the Annex? and 2) How is the term "improvement" to be defined and applied with regard to the new decision making standard?

**Question #1: What types of water withdrawal scenarios will likely be addressed under the Annex?**

- Does the Annex apply to all users, or are some exempt (e.g., small farms, individual households)?
- Is there a minimum flow threshold, below which the Annex would not apply?
- In terms of adverse impacts, what level of impacts will be permitted? To facilitate this discussion, we present a matrix of possibilities:

Scenario	Adverse?	Significant? (Gross, Not Net With Improvement)	
		Individually	Cumulatively
<b>a. Do No Harm</b>			
<b>b. Do No Significant Harm</b>	X		
<b>c. Last Straw</b>	X		X
<b>d. OKIMBY</b>	X	X	
<b>e. No Holds Barred</b>	X	X	X

These scenarios are defined as follows:

- a. Do No Harm:** No adverse impact identified, but still need an improvement somewhere.
- b. Do No Significant Harm:** Adverse impact identified, but it is not significant.
- c. Last Straw:** Adverse impact identified that is significant cumulatively, but not individually (e.g., multiple water withdrawals from a river that cumulatively lead to increased total dissolved solids).
- d. OKIMBY (OK In My Back Yard):** Adverse impact identified that is significant individually, but has no significant cumulative impact (e.g., dissolved oxygen impact in a stream).
- e. No Holds Barred:** Adverse impact identified that is significant individually *and* significant cumulatively.

**We would like the focus group to identify which withdrawal scenarios are “on the table” and which are “off the table.” This will help determine which scenarios will be explored in the future issues paper and follow up discussions.**

**Question #2: How is the term "improvement" to be defined and applied with regard to the new decision making standard?**

Suppose that a beneficial use of a water body in the Great Lakes Basin would be potentially impaired by a proposed withdrawal. The decision-making standard could require an improvement with respect to the same beneficial use or allow consideration of other beneficial uses. Likewise, the standard could require an improvement to the same water body or allow consideration of other water bodies, the question of "proximity." This presents a matrix of possibilities:

	Same water body	Different water body
Same beneficial use	a	c
Different beneficial use	b	d

For example, withdrawal of groundwater for commercial sale might threaten to reduce the availability of water for agriculture in a locality. Possible required improvements could be:

- To prevent a drop in the water table through conservation or recharge, maintaining the water supply for local agriculture (a);
- To provide wellhead protection for that aquifer, to keep the water safe for drinking (b);
- To increase the availability of water for agriculture from another aquifer or surface water body, through conservation or recharge (c);
- To provide an improvement in another water body with respect to some other beneficial use, such as providing improved fish habitat in another location (d)

Equity considerations (compensating those who would be harmed by a use impairment) may suggest compensation (a) to be the most preferred outcome, and (d) to be least preferred.

**We would like the focus group to identify which improvement options (a, b, c, and/or d) are "on the table" and which are "off the table." Is the answer to this question affected by the extent of harm permitted? For example, if the only withdrawals allowed are those that do no significant harm, are your preferences for options a, b, c, and d any different (i.e., are proximity of improvement and compensation of users important considerations)?**



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## Memorandum

**DATE:** April 19, 2002  
**PROJECT:** GLCWW2/03

**TO:** Michael J. Donahue  
Great Lakes Commission

**FROM:** John Wolfe  
Wendy Larson  
Joseph DePinto

**SUBJECT:** Summary of March 6, 2002 Conference Call Focus Group; Resource Improvement Standard and Draft Issues Paper Outline

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This memo provides a summary of the Focus Group conference call on March 6 related to the Resource Improvement Standard concept, and a draft outline for the issues paper on this topic, to be prepared by LTI. A memorandum dated March 1 was distributed to participants before the call, and served as a discussion piece for the call.

The objectives for the focus group, as stated in the memorandum, were:

- To clarify definitions of key terms used in Directive #3's statements of the principles upon which a new decision making standard is to be based.
- To obtain direction on the way that the new standard would be interpreted and applied.

The main points from a follow up call with Dick Bartz are also outlined in this memo.

### CONFERENCE CALL PARTICIPANTS

#### Great Lakes Commission

Michael Donahue

#### Annex Working Group

Dennis Shornack, Michigan  
Steve Taglang, Pennsylvania  
Bill Gast, Pennsylvania  
Jim Hebenstreit, Indiana  
Gerry Mikol, New York  
Leslie Maebly, New York  
Paula Thompson, Ontario  
Donald De Launay, Ontario  
Lucie Bouchard, Quebec

#### Stakeholders Advisory Council

Reg Gilbert, Great Lakes United  
Marc Hudon, Strategies Saint-Laurent  
Jon Bartholic, Michigan State University  
George Kuper, Council of Great Lakes Industries  
Sarah Miller, Canadian Environmental Law Association  
Terese McClenahan, Canadian Environmental Law Association

#### Project Management Team

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Wendy Leger, Environment Canada  
James Nicholas, U.S. Geological Survey  
Roger Gauthier, U.S. Corps of Engineers  
Peter Johnson, Council of Great Lakes Governors  
David Naftzger, Council of Great Lakes Governors

#### Limno-Tech, Inc. (LTI)

John Wolfe  
Joseph DePinto  
Wendy Larson

#### Observers

Scudder Mackey, Great Lakes Protection Fund  
David Rankin, Great Lakes Protection Fund

## **INTRODUCTION**

Mike Donahue first described the purpose of the call and the background memo that was distributed to participants. He emphasized that the purpose was to get direction on how the issues paper should be structured and focused, so that the paper will provide the most focused and useful information for the Working Group. He also emphasized that LTI was asked to do some “creative thinking” to stimulate discussion, and that the background memo prepared for the conference call is not a policy statement, and it does not make recommendations. This applies to the issues paper that will be prepared as well.

John Wolfe of LTI then provided a brief overview, and requested that discussion focus on answering the two discussion questions provided in the background memo, to assist LTI in planning the issues paper.

## **SUMMARY OF DISCUSSION**

Mike Donahue indicated that the objective of the call was to identify diverse viewpoints. While there was some consensus on the call, there were also some diverse viewpoints expressed. In instances where consensus exists, we will incorporate that viewpoint in the issues paper. Where differences exist, we will accommodate the range of viewpoints.

Comments generally fell into six general categories: 1) what the focus of the issues paper should be; 2) ways to measure improvements; 3) mitigation vs. improvement; 4) the need for specific examples; 5) the scope and scale of the effort; 6) the need for the standard to be applied in the context of an ecosystem plan; and 7) general observations. The main points in each category are summarized below:

### **1. Focus of Issues Paper**

The main points are summarized as follows:

- The primary focus of the issues paper should be on defining the Improvement Standard concept, and specific case study examples are a good way to do this. A discussion of what constitutes improvements in a practical sense is what is needed.
- A secondary focus should be placed on assembling the current knowledge on regulatory definitions of adverse impacts.
  - There is not currently a consensus on what is an adverse impact.
  - Most states have some form of adverse impacts definition in their regulations.
- The issues paper should focus on improvements to the ecological health of the resources, as opposed to economics, farming, etc.

- Beneficial uses focus on how people use the water. Many have an economic context. Should focus on ecosystem, not human users.
- Review all options and possibilities.
- Explore relationship between use and improvement. Improvements should not necessarily be tied to any use.

## **2. Ways to Measure Improvement**

- Improvement can be viewed as the flip side of harm. You can use the same yardstick.

## **3. Mitigation vs. Improvement**

- Conference call participants expressed a difference of opinion on this topic. Some argued that mitigation is not a component of Annex 2001. Others suggested that it could be.
- The issues paper will address this divergence of opinion by exploring the definition of mitigation as in Annex 2001, and by reviewing the literature to distinguish between mitigation and improvement.

## **4. Need for Specific Examples of Applications of Improvement Standard**

- Look at regional examples as well as the rest of country.
- Look at what states are doing with respect to antidegradation. May provide useful information.
- Look at TMDL program: 305(b) evaluations identify ways states are/are not meeting their water quality goals. Whatever is getting in the way of them meeting their goals defines the improvement that is needed. Could define improvement as the opposite of harm (to habitat or water quality). Look at habitat in tributaries that feed the Great Lakes, riparian corridors.
- Possible specific examples (these have been incorporated in the outline):
  - Ontario: Trend in shifting from groundwater withdrawal to direct withdrawal from the lakes – improves local water table, supports baseflow and habitat associated with streams. No consequences in switching to Great Lake.
  - Ohio: Akron, Ohio: not enough water past the dam. Required to maintain a minimum flow. No net harm by maintaining flow – would not have been done without the project. River is in better shape after.
  - Perrier case: look into what Michigan required them to do. Hydrogeological modeling and monitoring for watershed group?

- Case studies don't all have to be science-based – it is also important to understand peoples' perceptions.

### **5. Questions of Scope and Scale**

- Conference call participants expressed a diversity of opinions regarding scope and scale. Some thought the focus should be on the Great Lakes proper, while others considered it important to look at groundwater and Great Lakes tributaries (i.e., entire basin impacts).
- Some participants emphasized that cumulative impacts (positive and negative) must be considered.
- The issues paper will address this divergence of opinion by taking a basin-wide look at impacts and improvements.

### **6. Improvement Standard needs to be in the context of a regional water management/ecosystem restoration plan.**

- Need to put in context of ecosystem plans such as Lakewide Management Plans.
- Need to put in context of localized plans in the same area as the withdrawal, e.g., watershed plans, which are the building blocks for the larger plans. Have to look at watersheds to make improvements to the Great Lakes.
- Have to decide what you are improving and how to measure it.

### **7. General Comments**

- Strategic goal in incorporating the improvement standard concept in the Annex is to secure authority to manage waters of the Great Lakes. Other options were examined (just say “no”, require some percent return, etc.) but this is the only path to getting to “yes.”
- A question was raised about the origin of, and support for the threshold numbers identified in the Great Lakes Charter.
- With regard to Annex 2001 implementation, need to define which agencies would be involved, and their responsibilities. When do other states and provinces get brought into the process?
- In scoping out the issues paper, the authors shouldn't be constrained by Annex 2001 discussions to date. It is too soon to tell what is on or off the table.
- Need to strive for certainty in assessing “harm” and “improvement.” Actual numbers would be good.

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**Resource Improvement Standard: Analysis and Prospective Application**  
**Project Element 4: Ecological Impacts**  
**Draft Outline for Issues Paper**

**i. Acknowledgments** (*Estimated length: 0.5 pg.*)

**ii. Table of Contents** (*Estimated length: 1.0 pg.*)

**iii. Preface** (*Estimated length: 0.5 pg.*)

**Executive Summary** (*Estimated length: 2 pgs.*)

**I. Introduction and Background** (*Estimated length: 2 pgs.*)

- A. Project objectives: to inform and assist Annex 2001 implementation process by exploring issues and options in the definition and application of the resource improvement standard concept.
- B. Background: describe impetus for issues paper:
  - 1. Initiative related to commitments of Great Lakes Charter Annex, Directive #3
  - 2. Relationship to Project Element (PE) 4, Ecological Impacts of Decision Support System project
- C. Study approach
  - 1. Focus group conference call (attach summary)
  - 2. Issues paper
  - 3. Workshop and Proceedings

**II. Resource Improvement Standard Concept** (*Estimated length: 4-6 pgs.*)

- A. Resource improvement standard concept as defined in Annex 2001
- B. “Traditional” view of resource improvement concept in other settings
- C. Explanation of specific frameworks for resource improvement standard, as found in:
  - Annex 2001-related documents
  - Legal definitions
  - State and federal statutes
  - Other

**III. Case Study Improvement Standard Applications** (*Estimated length: 3 pages on average per case study, 20-30 pages total*)

The authors will identify specific applications in different settings and for different purposes from within and outside the Great Lakes. The search will focus on examples where the resource improvement standard has been explicitly applied. The list below is meant to be illustrative of the types of studies that will be examined. The list is subject to change based upon initial assessment of the relevance and availability of information. Other candidate case studies will also be assessed.

*Potential examples include:*

- Ohio's improvement standard for wetlands banking and stream channel flow as it relates to mitigation
- Restoration activities to improve salmon fishery as it relates to impacts due to Columbia River, Oregon channel deepening project
- NRDA settlements under the Department of the Interior may provide examples of compensatory improvements.
- Great Lakes Fisheries Trust Fund as it relates to impacts due to Ludington, Michigan Pump storage facility withdrawals
- Michigan hydropower impact mitigation (fisheries habitat improvements as they relate to impacts due to hydropower operations)
- Applications with respect to wetlands restoration
- Applications of standard in managing irrigation schedules (Canada)
- Canadian Federal Fisheries Act (habitat replacement/ enhancements).
- Ontario: Trend in shifting from groundwater withdrawal to direct withdrawal from the lakes – improves local water table, supports baseflow and habitat associated with streams. No consequences in switching to Great Lake.
- Akron, Ohio: not enough water past the dam. Required to maintain a minimum flow. No net harm by maintaining flow – would not have been done without the project. River is in better shape after.
- Perrier case: look into what Michigan required Perrier to do. Hydrogeological modeling and monitoring for watershed group?

A standard level of detail will be provided for each case study. For each example, the authors will address the following:

- Case study overview
- Definition and application of resource improvement standard
- Associated issues, including whether the example is mitigation or improvement
- Lessons learned with relevance to Annex 2001 implementation

#### **IV. Applying the Resource Improvement Standard to Implementation: Key Questions** (*Estimated length: 1-2 pgs*)

This section will articulate the key questions that will be discussed during the upcoming resource improvement standard workshop. The background material provided in previous sections of this issues paper will serve as a departure point for discussions of these questions during the workshop. They are associated with the definition, interpretation, and application of the resource improvement standard:

1. What are the various definitions and interpretations of the resource improvement standard?
2. How has the standard been applied in different settings?
3. At what spatial scale is the resource improvement standard appropriately applied (e.g., site specific, lake-wide, basin-wide)?
4. At what time scale is the resource improvement standard appropriately applied (e.g., 10 years, 50 years, etc.)?
5. How can we ensure the consistent application of the resource improvement standard across all basin jurisdictions?
6. What options are available for measuring improvement under the application of the resource improvement standard?

7. Is mitigation typically a consideration in the application of the resource improvement standard?
8. How are cumulative impacts considered in the application of the resource improvement standard?

This list may be refined based on comments on this outline, and as the issues paper is developed.

**Appendices**

- A. Great Lakes Charter and Annex 2001
- B. Summary Sheet: Developing a Water Resources Management Decision Support System for the Great Lakes
- C. Memorandum prepared for focus group conference call, and summary of conference call
- D. Cited documents, if appropriate