INTERNATIONAL UPPER GREAT LAKES STUDY BOARD

ORGANIZATIONAL AND OPERATIONAL GUIDELINES FOR THE ECOSYSTEM TECHNICAL WORKING GROUP

GENERAL GUIDELINES AND INFORMATION

The Technical Working Groups (TWGs) are formed by the Board in consultation with the IJC. The TWGs are organized under specific tasks which fulfill the mandate of the IJC to undertake the studies required to provide the Commission with the information it needs to evaluate options for regulating levels and flows in the Upper Great Lakes system in order to benefit affected interests and the system as a whole in a manner that conforms to the requirements of the Treaty, and the Board shall be guided by this mandate in pursuing its studies. These studies include:

1. Examining physical processes and possible ongoing Lake Huron outflow and St. Clair River changes and their impacts on levels of Lake Michigan and Huron. Additionally, depending on the nature and extent of these changes and impacts, recommending and evaluating potential remedial options;
2. Reviewing the operation of structures controlling Lake Superior outflow in relation to impacts of such operations on water levels and flows, and consequently affected interests;
3. Assessing whether changes to the Order or regulation plan are warranted to meet contemporary and emerging needs, interests and preferences for managing the system in a sustainable manner; and
4. Evaluating any options identified to improve the operating rules and criteria governing the system.

Specific Tasks Teams (TTs) are the Lake Huron Outflow/ St. Clair River Task Team and Lake Superior Regulation Task Team (See attached "IUGLS Organization – Task Team Framework"). The following TWGs are established under the two Task Teams to provide the expert and technical support to deliver the Study:

I. Lake Huron Outflow/ St. Clair River Task Team:

1. Data Verification, Reconciliation, Collection and Monitoring;
2. Hydraulic Modeling; and
3. Sediment Studies.

II. Lake Superior Regulation Task Team:

1. Municipal, Domestic and Industrial Water Uses;

2. Commercial Navigation;

3. Eco-System;

4. Coastal Zone;

5. Hydropower; and

6. Recreational Boating and Tourism

III. Other TWGs which serve one or both TTs:

1. Basin Hydrology: to address net basin supply (NBS), net total supplies (NTS) and climate change issues for both Task Teams;

2. Plan Evaluation: directly linked to the Lake Superior Regulation Task Team, but could peripherally be connected to the Lake Huron Outflow/ St. Clair River Conveyance Task Team;

3. Mitigation Issues: directly linked to the Lake Huron Outflow/ St. Clair River Task Team, but could peripherally be connected to the Lake Superior Regulation Task Team.

The individuals appointed to the TWGs provide the Study Team and the International Joint Commission their expertise and support in their personal and professional capacity and not as representatives of their agencies or employers. The Board provides guidance to the TWGs directly and through the Study Co-Managers. Each TWG should, whenever possible, be composed of equal numbers of members from the U.S. and Canada, and there shall in all cases be at least one member from each country. Each TWG will have two co-Leads, one from each country. All reports of TWGs shall include any dissenting or different views within the group.

Study Board and PIAG members will be apprised of the activities of the TWG by the Task Team Co-Chairs and specifically by TWG co-Leads for those in which they have an expertise in the subject being evaluated by that TWG.

TWG members are committed to work with their specific group as a team in advising on the issues and delivering the work with which the group is tasked.

The co-Leads of each TWG, working in close liaison with the Study Managers and the TWG members are expected to provide leadership and guidance in planning and delivering the work of their TWG as defined by the Study Board Work Plan. The co-Leads will organize meetings and conference calls; draft work plans; draft terms of reference and provide cost estimates for

required work; identify suppliers and sources; draft documentation for contracts; prepare written reports on completed work; and coordinate with other TWGs.

The co-Leads are responsible for ensuring that all deliverables are provided on time and within the approved budget. Meta-data will be required for all deliverables and activities will not be considered complete until this obligation is fulfilled with funding retained accordingly. (As a rule of thumb, twenty percent [20%] of funding will be retained until meta-data is provided).

Each TWG is expected to confirm its annual Work Plans and deliverables with the Board and Study Managers. Funding for the activities of each TWG, in accordance with its approved Work Plan, will be provided by the appropriate section of the Commission, in accordance with applicable government procedures and requirements.

Work that may be undertaken by other government agencies will be on the basis of well-identified products and deliverables, with timelines and itemized costs associated with the tasks. Such work may be according to a formal agreement, contract or memorandum of understanding as the case may justify. Such agreements will be concluded by the appropriate section of the Commission, in accordance with applicable government procedures and requirements.

Each TWG will submit a semi-annual activity report listing activities completed and products created during the reporting period in time to provide input to the Board's semi-annual Progress Report. The TWG will also submit a semi-annual report on expected deliverables that will be generated during the next period.

Each TWG should also keep abreast of the activities of the Board, TTs and other TWGs to ensure consistency in Board general procedures and guidelines, and to ensure best integration of the results of these groups towards the ultimate objectives of the Board and IJC.

SPECIFIC INFORMATION AND TASKS

A number of scoping papers addressing various aspects of the mandate of this TWG were commissioned by the Study Team. These will be made available to the TWG as resource material to further fine tune the scope of work.

The ecosystem resource area covers a broad spectrum of valuable individual resources on the upper Great Lakes from Lake Superior through Lake Erie that could potentially be affected by changes in regulation of Lake Superior outflows. Ecosystem is defined for purposes of this document as a community or assemblage of living things, together with their environment. The community of living things that will be addressed under the ecosystem evaluation area will include wildlife, fish, and supporting habitats and food web organisms. Ecosystems of particular interest are coastal habitats including wetlands, where water levels changes on the order of centimetres (inches) could shift or alter them significantly.

Variation in water levels over cycles of hours, days, seasons, years, decades, and beyond is a feature of the Great Lakes that sets them apart from other aquatic systems in North America. Existing ecosystems have evolved under conditions of water level variation since Holocene glaciation. Natural variation in annual levels of the Great Lakes is caused by climate-driven precipitation and evaporation patterns in the watershed and over the lakes. Glacial isostatic adjustment, causing some parts of the basin to slowly sink and others to slowly rise, also affects natural variation in lake levels over decades.
In the 20th Century, water levels of Lakes Superior and Ontario were affected by human structures that regulate outflows for purposes of hydroelectric power generation, flood control, and commercial navigation. The effect has been to reduce long-term variation especially in these lakes, but has also influenced lake levels for all of the Great Lakes.

Differences in shoreline topography, geomorphology, and geology among the upper lakes affect the manner in which the physical environment and biological communities respond to water level variations. For example, much of the Lake Superior Canadian shoreline is composed of a rugged bedrock shoreline, with beaches and wetlands occurring within some embayments, near river mouths, and in areas of lower topography. In other areas of the basin, the coastal zones may be comprised of active beaches or bluffs of less consolidated material. In these areas, erosional and depositional processes vary with storm events, water levels and flows.

Owing to the great variability of the upper Great Lakes shorelines, there is a complex array of response mechanisms of both the physical and biological environment to water levels changes. This response would be expected to differ in relation to the vertical range of variability (i.e., depth), the spatial extent of the area affected, and the duration of flooding or exposure (e.g., daily versus seasonal versus long term).

Shallow habitats of the nearshore and coast are disproportionately more influenced by lake levels than are deep waters. Small (centimetre) shifts in lake levels can alter the extent, structure, and functions of coastal habitats, and alter the extent of interaction between coastal and nearshore habitats. Most habitats and fish and wildlife populations occur in nearshore and coastal sites, and these zones are high in biodiversity. Human uses of natural habitats are highest in coastal and nearshore areas. Coastal habitats are maintained in states of arrested succession owing to annual and greater cycles of variation in Great Lakes water levels.

Daily flow variations due to hydropower peaking operations and releases from control structures have the potential for affecting local ecosystems. For example, in the St. Marys River, changes in flows may affect spawning fish, fish substrate, and other aquatic organisms. Monthly flow variations due to regulation plan gate changes can also impact fishery resources. Dispersing the effects of discharge changes in the Rapids over a longer period of time may be more beneficial. These resources should be evaluated. The Ecosystems Group will conduct any necessary studies to determine impact associated with hydropower peaking and ponding and participate with the Hydropower, Commercial

Navigation and Plan Evaluation TWGs to determine system-wide benefits and dis-benefits.

Seasonal water-level variation is caused by watershed drainage of snowmelt and precipitation minus evaporation, which influences the growing season processes of habitats and fish and wildlife populations. Aquatic and wetland habitats, such as submerged vegetation, coastal marsh, beaches, mud bottoms and flats, and forested wetlands, form complexes and arrays supported by lake-level variation. Such ecosystem complexes serve many functions that are important to humans, such as reducing erosion; filtering nutrients, contaminants, and sediment; supporting populations of fish, wildlife and other aquatic biota, and commercial products such as wild rice and marsh hay; maintaining native biodiversity; and providing aesthetic and inspiring sites for tourism.

Ongoing studies of the wetlands in Georgian Bay will provide valuable information on the identification and assessment of these wetlands. Specifically, determinations are being made as to which wetlands will be able to migrate towards or away from the shore in response to persistently high or low water levels.

A large scale study was recently completed by The Nature Conservancy and Nature Conservancy of Canada to identify lands and waters critical to the biodiversity in the Great Lakes region. The “Bi-national Conservation Blueprint for the Great Lakes” scientifically and systematically identifies native species, natural communities and ecological system characteristics and determines where they need to be protected to ensure their long-term survival. These studies will be valuable to the Upper Great Lakes Study.

Part of an assessment for the ecosystem needs to include the examination of issues related to future basin land use changes. Demographic and land use changes and shifts will likely continue to occur in the basin, along with corresponding water needs. Increased population can result in construction of new highways near the lakeshore or across floodplains. Where these highways cross riverine wetlands adjacent to the lake, flow restrictions under bridges or though culverts also disrupt sediment transport processes and can result in excessive siltation in wetlands or alter hydrological processes. Encroachment can result in direct loss of nearshore environment and chemical contamination of that environment.

The Ecosystem TWG should address the issues of climate change/variability and how the ecosystem may need to adapt in the future to respond to more extreme conditions than have been experienced in the past.

Fundamental to understanding the relationship between management of Lake Superior outflows and the coastal ecosystems of Lakes Superior, Michigan, Huron, St. Clair, and Erie is development of various shoreline mapping and modeling tools. Decision support tools allow us to synthesize information about relationships and to simulate conditions based on alternative regulation scenarios. In the International Lake Ontario –St.

Lawrence River Study an “Integrated Ecological Response Model” (Limno-Tech, 2005) was developed to simulate the interactions of various ecosystem performance indicators and their response to various water level regimes.

Resource-specific analyses are needed to relate the landscape-scale patterns to ecosystem functions and biological populations and communities. Endpoints for analysis include resources such as species at risk, key fisheries, wildlife, wetlands, and other shoreline habitats important to ecosystem sustainability. Resource-specific analyses can fill important gaps in decision-support tools to aid us in understanding and predicting responses of ecosystems to changes in Lake Superior outflow regulation vs. natural variation and climate.

Ecosystem study aspects would include, but are not limited to the following tasks:

- Assess impacts of water level variations, such as from peaking and ponding, on the St. Marys River ecosystem, in particular, habitat for fish species, and provide input on guidelines governing flow variations in the St. Marys River at Sault Ste. Marie.
- If a structural solution having dynamic capability is proposed as an option to remediate conditions resulting from modifications to the St. Clair River, a similar analysis needs to be undertaken.
- Acquire and synthesize, for purposes of analysis of lake level scenarios, existing data and expert opinion on the following ecosystem functions of coastal and nearshore habitats: wetlands and other coastal habitats for fish and wildlife, species at risk, fisheries, colonial nesting birds, amphibians and reptiles, submerged aquatic vegetation, exotic/invasive species, wild rice, toxic contaminants, and eutrophying nutrients.
- Develop decision-support models to link water levels and flows with ecosystem information to have predictive capabilities to assess effects of various alternative regulation plans on ecosystems. Methods for model validation should be included. Incorporate existing bathymetry and topography for coastal ecosystems where data are available, and make decision-support tools available to stakeholders.
- Enhance platforms for status and trend reporting and ways to incorporate status and trend information into decision support tools.
- Evaluate effects of alternative regulation scenarios on the ecosystem.
- Develop a risk assessment framework for use in evaluation of lake level responses by key features of ecosystems, as the scope of effects emerges.
- While water quantity does have an impact on water quality, it is not within the mandate of this study to investigate water quality in detail. Qualitative discussions will be included where appropriate. It is noted that water quality is being addressed by other avenues such as the Great Lakes Water Quality Agreement and portions of the Great Lakes Regional Collaboration.