Coastal Processes

"The coastal areas of Lake Ontario and the St. Lawrence River are expected to exhibit varying reactions to different water level and flow regimes."

How do water levels in Lake Ontario and the St. Lawrence River affect Coastal Zone interests?

1. High water levels can combine with other factors, such as storm waves or ship wakes, to cause serious flood and erosion damage.
2. Low water levels increase the shore area, but can also impact water intake structures, ramp and docking facilities, water quality, and can lead to the undercutting of shore protective works.

Why was the Coastal Processes Technical Working Group (TWG) created?

The primary purpose of the Coastal Processes TWG is to develop and implement methods to measure the physical impact of water level regulation on coastal and riverine shorelines within the study area.

What are the Coastal Processes Technical Working Group (TWG) goals for the Study?

1. Determine the possible response of both Lake Ontario and St. Lawrence River shoreline types to changes in water levels and flows that may occur as a result of changes to the operation of the existing control structures on Lake Ontario at Cornwall.
2. Based on the above responses, determine the various impacts that may result to the riparian interest group along these shorelines, including possible flooding or low water level scenarios.
3. Using the above evaluations, provide recommendations of new regulation criteria that best considers the needs of the riparian interest group.

How will the Coastal Processes Technical Working Group achieve these goals?

a. Determine and assess existing physical processes and physical settings. This includes developing a knowledge of both lake coastal processes and riverine processes, understanding the range of shore types and near shore environments that exist, collecting and assessing historic recession rate and other shoreline change information.
b. Determine and assess existing "landside" or human settings and issues. This includes understanding and mapping land uses, the type and quality of shore protection that has been constructed along the shoreline, the numbers and types of structures located along the shoreline, land and structure property values.
c. Develop a common and consistent coastal zone database of the above information so that this data can be used in any modeling and impact assessment activities that are undertaken.
d. Assess, determine and apply appropriate state-of-the-art coastal or riverine modeling applications to evaluate lake and river shoreline response to changes in water levels or flows.
e. In applying the model(s), determine the spatial limitations of model application (i.e., full extent of shoreline, or site specific, representative sites) and conduct modeling analysis as appropriate.
f. Use modeling results to determine and assess potential flooding, erosion and low water impacts to the riparian interest group. Provide modeling results as appropriate to other TWGs (e.g., environmental, recreational boating), who may find the results useful in conducting their specific impact assessments;
g. Develop a set of potential regulation criteria (water level ranges) that will minimize negative (or maximize positive) impacts for the riparian interest group;

What are the Group's Scheduled Year Two and Three Activities?

The Coastal Processes Technical Work Group is overseeing a large number of data collection, processing and evaluation activities during Year Two and Three of the Study. These activities are split between two primary geographic study areas being Lake Ontario/Upper St. Lawrence River and the Lower St. Lawrence River. This was done due to the differing geomorphic and physical processes that are unique to the study area and to most effectively utilize the subject matter technical expertise that exists.

Year One of the study focused on selection of study contractors and consultants, determination and assessment of existing data, collection of new data, initiation of coastal zone data bases and determination of appropriate modeling strategies.

Year Two and Year Three of the study involve intensive and extensive efforts of data collection, processing, evaluation, shoreline process modeling and economic evaluations. Since it is cost prohibitive to perform detailed modeling of the entire study shoreline the focus is on thorough investigation and modeling of select study sites that are representative of the study area. Approximately forty detailed study sites are currently being evaluated on the Lake and River that will later be used as a basis for a complete lake-wide and river-wide assessment of shoreline and flooding impacts due to various lake level regulation scenarios. Large databases are being assembled and will continue to be assembled including shoreline and nearshore characteristics, recession rates, shoreline protection structures and property parcel information. This information is being integrated with wind, wave and water level information in various shoreline process numerical models that predict future erosion and flooding events. Year Three of the study will focus on economic evaluations based on the

outcome of the flooding and erosion modeling. Preliminary flooding and erosion performance indicators have been established which will later be converted to impact functions, operational criteria and ultimately economic damages/ benefits. This information in conjunction with the other study technical work group input will be the basis for developing recommendations for Lake Ontario and St. Lawrence River regulation plans through the Shared Vision Model.