

MANAGING THE LAKE ONTARIO-ST. LAWRENCE RIVER SYSTEM FOR ENVIRONMENTAL BENEFITS

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Abstract: A 5-year study to revise the criteria by which the Lake Ontario-St. Lawrence River System is managed was begun in 2000 and recently completed. The study was conducted under the auspices of the International Joint Commission (IJC), the institution established by the Boundary Waters Treaty of 1909 to prevent and resolve disputes relating to the use and quality of Canadian and American boundary waters. The original criteria were specified in the Orders of Approval granted by the IJC for the development of the St. Lawrence Seaway and Power Project. The criteria were formulated considering the framework of the Treaty, the physical design of the project, and past observed hydrology (1860-1954). A regulation plan, referred to as Plan 1958-D, was developed and refined between 1955 and 1963 that was deemed to meet the criteria. Original interests considered in formulating the criteria and regulation plan were domestic and sanitary uses, navigation, hydropower, and riparians upstream and downstream of the project. The new study to revise the criteria was prompted by lack of robustness of the regulation plan under supplies more extreme than those historically observed and to consider the additional interests of environmental and recreational boating.

The study's Plan Formulation and Evaluation Group was tasked with developing and evaluating new criteria and regulation plans. Plan options were provided to the IJC in late 2005 for their consideration and recommendation to governments after public review. One of the new regulation plans is designed to return the Lake Ontario-St. Lawrence River System to a more natural flow regime such that net environmental benefits are maximized while balancing impacts to all interests. The plan is based on a sliding rule curve that adjusts the pre-project discharge relationship based on a forecast of annual net total water supplies. Short-term forecasts (4 week horizon) of weekly supplies and local river inflows are used to anticipate project design flow limits and to smooth week-to-week flow changes. The regulation plan is evaluated with 9 hydrologic time-series: one historical series (1900-2001), 4 stochastically generated series, and 4 climate change series. Impacts on interests are evaluated by performance indicators developed by Technical Working Groups during the study. Hydrologic and performance indicator results are presented for this plan in comparison to two reference or base plans: Plan 1958-D with operational deviations, and Pre-project with channel ice formation constraints. Mitigation requirements, tradeoffs, and other findings related to this plan are presented.