



Lake Ontario-St. Lawrence River Plan 2014: Summary of Benefits and Impacts

December 2016 - The International Joint Commission (IJC) has approved Plan 2014, a new plan for managing water levels and flows in Lake Ontario and the St. Lawrence River. Before the IJC took this action, the Governments of Canada and the United States concurred on amendments to the IJC's Order of Approval, which specifies conditions and criteria for setting the flow through the Moses-Saunders Dam, located between Cornwall, Ontario and Massena, New York. This Fact Sheet summarizes the benefits and impacts of Plan 2014.

A Careful Balancing of Diverse Interests

Water levels on Lake Ontario and the St. Lawrence River are primarily determined by rain, snow, wind and other natural factors. The Moses-Saunders Dam, approved by the International Joint Commission (IJC) in the 1950s, also provides some control over water levels and flows. Regulating levels and flows has provided benefits to various uses and interests by allowing for hydropower production; improving conditions for commercial navigation, recreational boating and water intakes; and reducing the flooding and erosion of shoreline communities. Unfortunately, however, the regulation plan that has been in place for more than a half century, Plan 1958D with deviations (Plan 1958DD), has unnaturally compressed water levels and harmed coastal ecosystems on Lake Ontario and the upper St. Lawrence River. These impacts were not understood when the project was approved, but it is now widely recognized that ecosystem needs must be considered along with other interests. The IJC has reviewed an extensive range of alternative regulation plans through 16 years of scientific study, public engagement, dialogue with basin governments and careful consideration of all water

uses and affected interests in Canada and the United States. IJC Commissioners have concluded that Plan 2014 allows more natural water levels while minimizing impacts to other interests. For example, compared to 1958DD, the increase in the maximum Lake Ontario level under Plan 2014 is six centimeters (2.4 inches).

Affected Interests

Ecosystem

Plan 2014 helps restore plant diversity and habitat for fish and wildlife by allowing more natural variability in water levels while continuing to moderate extreme high and low levels. Plan 1958DD has reduced the natural variability in water levels and degraded the health of the remaining 26,000 hectares (64,000 acres) of coastal wetlands on Lake Ontario and the upper St. Lawrence River. Fish and wildlife have been adversely impacted because the diverse plant community has been overrun by a monoculture of cattail thickets.

The scientific evidence for the harm caused by Plan 1958DD is clear and too strong to ignore.

Coastal development

Both Plan 2014 and Plan 1958DD protect coastal development from the damage that would occur on Lake Ontario without regulation. Studies show that average annual coastal damages on Lake Ontario would be approximately \$46 million under natural conditions, approximately \$18 million under Plan 1958DD and approximately \$20 million under Plan 2014. These data include impacts to shore protection structures, unprotected shorelines, and buildings on the U.S. and Canadian shoreline of Lake Ontario. While the IJC understands that these impacts are larger in some years than others, the studies provide a sound basis for comparing regulation plans.

Approximately 85 percent of the costs to coastal development under either plan result from investment needed to maintain shore protection structures, typically barriers made from large rocks placed along the shore. Some of these structures are tall, well-made and unlikely to fail. But other structures will be overtopped and destroyed under either plan.

While this is likely to happen under with Plan 1958DD, it is likely to happen a little sooner under Plan 2014, because to restore fish and wildlife habitat, Plan 2014 needs to allow for more variability in levels. Plan 2014 and Plan 1958DD are both effective at flood reduction and their performance is similar when water supplies are extremely high. A small portion of the expected coastal damage under either plan (about one percent) is due to flooding. The remaining economic impact is from erosion, which increases by a small amount under Plan 2014.

There is more variability in water levels on the lower St. Lawrence River than on Lake Ontario, in part because of the influence of Ottawa River inflows. The variability and flooding impacts on the lower St. Lawrence River would not change under Plan 2014.

Recreational boating

On Lake Ontario and the upper St. Lawrence River, Plan 2014 would result in higher autumn levels in two years out of three and lower summer water levels in some years. The net effect is a small negative impact, largely because there are more boaters in the summer than in the fall. Plan 2014 makes a small improvement for recreational boating in the lower St. Lawrence River.

Municipal and industrial water use

Plan 2014 would continue to protect against extreme high water levels that flood facilities and extreme low water levels that impact water intakes. The result would be no change in economic benefits to municipal and industrial water and wastewater use. Facilities that experience problems under the present regulation plan would continue to experience problems under Plan 2014.

Commercial navigation

Overall, Plan 2014 would maintain the same economic benefits to commercial navigation. The frequency of low levels at the Port of Montreal would be about the same. In rare low water years, which have been experienced a couple of times in the last century, some ships traversing Lake Ontario would have to light load. However, in typical years navigation would enjoy small increases in available depths, allowing some ships to carry larger loads more frequently.

Hydropower

More natural fluctuations under Plan 2014 would slightly increase energy production at the Ontario Power Generation, New York Power Authority and Hydro-Quebec power plants. The value of the increase is approximately 0.2 percent of the value of hydropower produced at these plants.

MORE INFORMATION

See the Plan 2014 website online at www.ijc.org/en/Plan2014.

Environmental Performance Indicators Ratio to 1958DD Using historical water supplies	Regulation Plans					
	Natural	1958DD	B+	Bv7	Bv7 2-95	Plan 2014 (Bv7 2-90)
Lake Ontario						
Meadow Marsh	1.56	1.00	1.44	1.46	1.41	1.40
Spawning habitat supply (Low Veg 18C)	0.88	1.00	0.95	0.96	0.96	0.95
Spawning habitat supply (High Veg 24C)	1.08	1.00	1.00	0.98	0.99	1.00
Spawning habitat supply (Low Veg 24C)	1.11	1.00	1.02	1.05	1.04	1.03
Northern Pike YoY recruitment	1.03	1.00	1.00	0.98	0.99	1.00
Largemouth Bass YoY recruitment	0.96	1.00	0.98	0.98	0.98	0.98
Least Bittern reproductive index	1.13	1.00	1.04	1.12	1.11	1.09
Virginia Rail reproductive index	1.15	1.00	1.11	1.16	1.15	1.09
Black Tern reproductive index	1.16	1.00	1.12	1.19	1.16	1.11
Yellow Rail preferred breeding habitat	1.01	1.00	1.01	1.04	1.02	1.02
King Rail preferred breeding habitat	1.27	1.00	1.10	1.19	1.16	1.14
Upper River						
Spawning habitat (Low Veg 18C)	1.04	1.00	1.01	1.02	1.01	1.01
Spawning habitat (High Veg 24C)	1.02	1.00	1.01	1.00	1.01	1.00
Spawning habitat (Low Veg 24C)	1.04	1.00	1.01	1.02	1.01	1.01
Northern Pike YoY recruitment	1.06	1.00	1.03	1.03	1.03	1.03
Largemouth Bass YoY recruitment	1.00	1.00	1.00	1.00	1.00	1.00
Northern Pike YoY net productivity	2.07	1.00	1.46	1.39	1.39	1.39
Virginia Rail (RALI) reproductive index	1.33	1.00	1.27	1.17	1.17	1.19
Muskrat house density, drowned river mouth wetlands	14.29	1.00	2.99	2.59	2.56	2.60
Lower River						
Golden Shiner - suitable feeding habitat area	1.01	1.00	1.00	See Note	1.00	1.00
Wetlands fish - abundance index	0.97	1.00	0.90		1.00	1.00
Migratory wildfowl - habitat area	0.94	1.00	0.97		0.98	0.99
Least Bittern reproductive index	1.06	1.00	1.03		1.02	1.02
Virginia Rail reproductive index	1.04	1.00	1.05		1.03	1.02
Migratory wildfowl productivity	1.02	1.00	1.01		1.01	1.01
Black Tern reproductive index	1.01	1.00	0.97		1.01	1.00
Northern Pike reproductive area	1.01	1.00	1.03		1.01	1.01
Eastern Sand Darter reproductive area	1.00	1.00	0.99		1.00	1.00
Spiny Softshell Turtle reproductive habitat area	1.01	1.00	1.01		0.99	0.99
Bridle Shiner reproductive habitat area	0.97	1.00	0.92		0.95	0.94
Muskrat surviving houses	1.05	1.00	0.99		0.96	0.96
Shading indicates species at risk						

Note: Scores above 1.1 and below 0.9 are considered significantly different from Plan 1958DD results. Lower river results for Bv7 are not available; scores for a similar plan ranged from 0.94 (Muskrat) to 1.03 (Virginia Rail and Wetland fish abundance index).

Economic Benefits (in \$US Million 2005) Net Average Annual Using stochastic water supplies	Regulation Plans					
	Natural	1958DD	B+	Bv7	Bv7 2-95	Plan 2014 (Bv7 2-90)
Total	-\$20.80	\$0.00	\$1.31	\$1.61	\$3.12	\$3.85
Municipal and industrial water use	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
St. Lawrence River one-time infrastructure costs	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Lake St. Louis water quality investments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Commercial Navigation	-\$0.05	\$0.00	-\$1.24	-\$0.02	\$0.00	\$0.00
Ontario	-\$0.02	\$0.00	-\$0.01	-\$0.01	-\$0.01	\$0.00
Seaway	-\$0.02	\$0.00	-\$1.19	-\$0.01	\$0.00	\$0.00
Montreal	-\$0.01	\$0.00	-\$0.04	\$0.00	\$0.01	\$0.01
Hydropower	\$12.59	\$0.00	\$6.08	\$5.40	\$5.26	\$5.26
NYPA-OPG	\$8.77	\$0.00	\$3.85	\$3.45	\$3.41	\$3.54
Hydro-Quebec	\$3.82	\$0.00	\$2.22	\$1.95	\$1.85	\$1.76
Coastal	-\$29.88	\$0.00	-\$2.78	-\$3.17	-\$2.23	-\$2.24
Lake Ontario total	-\$27.38	\$0.00	-\$2.53	-\$3.11	-\$2.22	-\$2.23
Shore protection maintenance	-\$19.85	\$0.00	-\$2.16	-2.62	-\$1.94	-\$1.95
Erosion to unprotected developed parcels	-\$0.58	\$0.00	-\$0.17	-0.17	-\$0.16	-\$0.18
Flooding	-\$6.94	\$0.00	-\$0.20	-\$0.32	-\$0.11	-\$0.11
Upper St. Lawrence River flooding	-\$2.00	\$0.00	-\$0.04	-\$0.07	-\$0.01	-\$0.01
Lower St. Lawrence River flooding	-\$0.49	\$0.00	-\$0.22	\$0.00	\$0.00	\$0.00
Recreational Boating	-\$3.46	\$0.00	-\$0.74	-\$0.60	\$0.10	\$0.79
Above the dam	-\$5.31	\$0.00	-\$1.42	-\$1.33	-\$0.68	-\$0.10
Lake Ontario	-\$4.93	\$0.00	-\$1.18	-\$1.11	-\$0.57	-\$0.15
Alexandria Bay	-\$0.36	\$0.00	-\$0.29	-\$0.25	-\$0.14	\$0.00
Ogdensburg	-\$0.07	\$0.00	\$0.00	-\$0.02	-\$0.01	\$0.00
Lake St. Lawrence	\$0.05	\$0.00	\$0.05	\$0.04	\$0.05	\$0.05
Below the dam	\$1.85	\$0.00	\$0.68	\$0.72	\$0.78	\$0.90
Lake St. Louis	\$1.03	\$0.00	\$0.49	\$0.45	\$0.48	\$0.54
Montreal	\$0.64	\$0.00	\$0.19	\$0.20	\$0.22	\$0.26
Lake St. Pierre	\$0.18	\$0.00	\$0.00	\$0.07	\$0.08	\$0.10