

Performance Indicator: Migratory waterfowl – floodplain habitat surface area (Lake St. Louis to Trois-Rivières) [E23]

Technical Workgroup: Environment TWG

Research by: Lehoux, Dauphin, Champoux & Morin.

Modeled by: Jean Morin



Performance Indicator Metric: Use of the non-managed flood plains of the Lake St. Pierre area by waterfowl (in terms of abundance of birds during the spring migration) according to different water levels. Water levels are those measured at the Sorel gage.

Ecological Importance/Niche: During spring, the Lake St. Pierre flood plains represent the most important migratory stopover of the whole St. Lawrence River for waterfowl. An economic spin-off is related to aquatic bird observation in the sector. The reproductive success of the birds could be reduced significantly if inappropriate conditions are encountered on staging areas.

Temporal validity: Valid between April 10th and May 7th.

Spatial validity: Lake St. Pierre flood plains

Hydrology Link: The use of the lake St. Pierre flood plains (the non-managed sector) reaches an optimum when the water levels at the Sorel gage is maintained between the elevation 6.0 and 6.88 m (19.69 and 22.57 ft). The area is *almost* completely deserted at the elevation 5.0 m (16.4 ft). Adequate water levels provide the following benefits:

- ensure optimal aquatic birds distribution in the Lake St. Pierre flood plains;
- prevent a too small flood plain acreage forcing birds to concentrate mainly in managed marshes where available food could be a limiting factor and increase inter an intra-specific stress;
- prevent birds from being in poor physiological health due to poor nutrition which could potentially reduce their reproductive success significantly;
- ensure that most important flood plain of the fresh water portion of the St. Lawrence is sustained;
- maintain the economic spin-off related to aquatic bird observation, a very important activity in the Lake St. Pierre sector.

Algorithm: The algorithm relies on the mean water level at Sorel from QM14 to QM17. The model is based on historical data and on a field study conducted in 2000. Historical data provided 7 years of bird surveys between 1983 and 1995, for a total of 20 surveys during the spring migration in the lake St. Pierre flooded plains. Flooded plains of lake St. Pierre become attractive to migrating waterfowl when water levels registered at the Sorel gage are higher than 5.4 m (17.72 ft). Under the elevation 5.0 m (16.4 ft) the non-managed portions of the flooded plains are almost completely deserted. The abundance of

migrating waterfowl can be determined with the following correlation: $Y = 8124,3X - 40714$

Calibration Data: No data available

Validation Data: The model is based on survey data

Documentation and References:

Dombrowski, P., D. Dolan et D. Lehoux, 2000. Étude sur les fluctuations des niveaux d'eau du fleuve Saint-Laurent : niveaux printaniers favorisant la sauvagine au lac Saint-Pierre. Rapport présenté au Service canadien de la faune, Environnement Canada, 78p. + annexes.

Lehoux, D. et D. Dauphin, 2004. Impact des fluctuations des niveaux d'eau sur les canards barboteurs en reproduction dans le tronçon lac Saint-Louis/lac Saint-Pierre (seuils critiques) et évaluation finale des indicateurs de performance. Environnement Canada, Service canadien de la faune, 55p.

Risk and uncertainty Assessment: This performance indicator shows an important correlation between water levels and bird abundance in the non-managed portion of the Lake St. Pierre flood plains (demonstrated by survey data; $r^2 = 0.53$). Detailed impacts of non appropriate water levels within the flood plains during the spring migration on the physiological condition of birds remain however difficult to assess with accuracy. This performance indicator should however be considered as a significant indicator to assess impacts of the different plans mainly because the flooded plains of the lake St. Pierre represent the most important staging area for aquatic birds within the southern portion of the Province of Quebec. More than 500 000 waterfowl stop over during April and May.

Indicator evolution for 1958DD and PreProject plans:

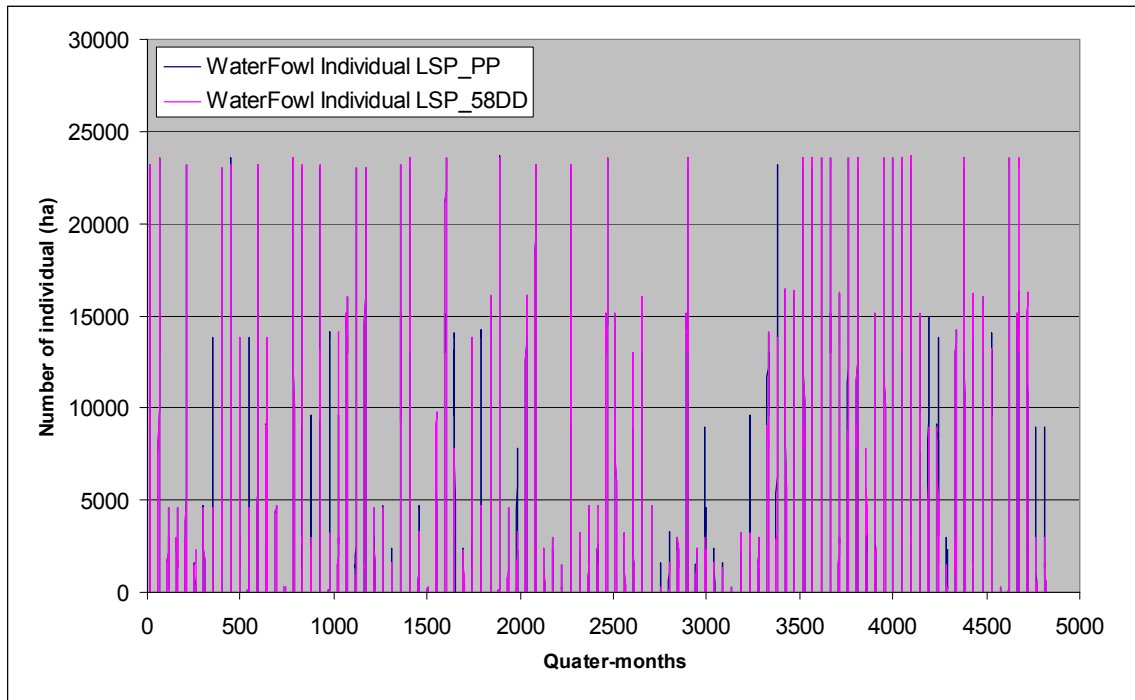


Figure: Comparison of the Performance indicator for the 100 years discharge series: Plan 1958DD and PreProject.

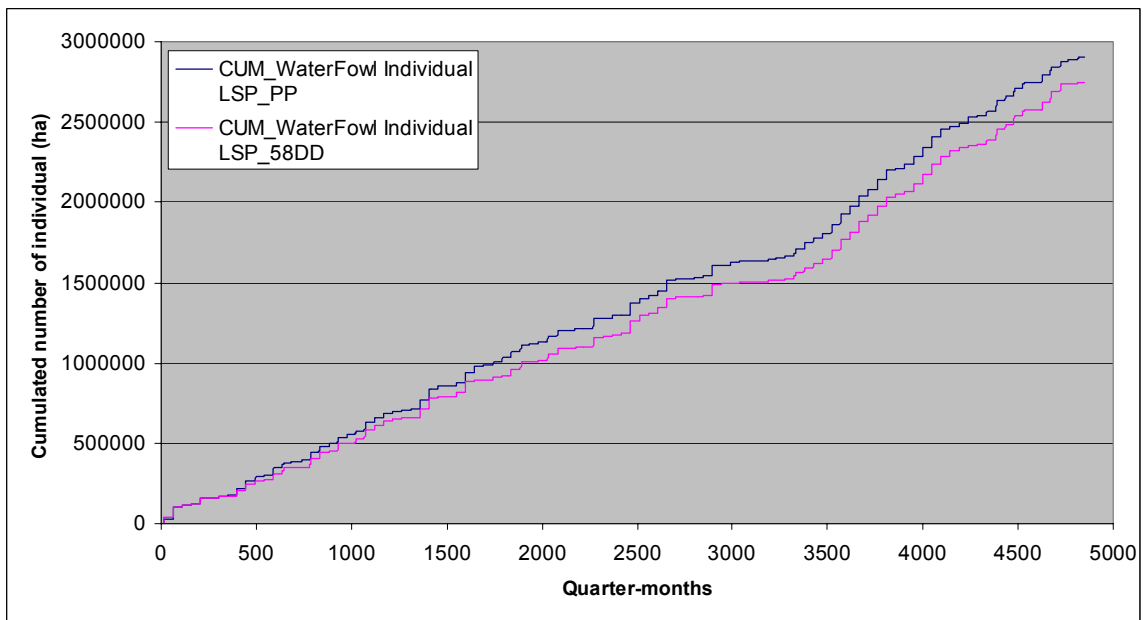


Figure: Comparison of the temporally cumulated Performance Indicator for the 100 years discharge series: Plan 1958DD and PreProject.