EXECUTIVE SUMMARY – Recovery Strategy for the American Eel (*Anguilla rostrata*) in Ontario

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The American Eel (*Anguilla rostrata*) is the only member of the genus *Anguilla* found in North America. In Ontario, it is near the northern extremity of its range, which spans fresh and coastal Atlantic Ocean waters of North, Central (Mexico) and northern South America. Aboriginal traditional knowledge, anecdotal (local knowledge from the public), archaeological information, historical documents and old fisheries records tell us that the American Eel was once extremely abundant throughout all tributaries to Lake Ontario and the St. Lawrence River. Declining abundance in most watersheds appears to have been underway by the turn of the twentieth century. More recently, the American Eel has been apparently extirpated from many parts of its Ontario range and is in serious decline where it still exists, leading to its listing as endangered under Ontario’s *Endangered Species Act, 2007* (ESA).

Present science considers the American Eel to consist of a single breeding population in which all individuals travel to the Sargasso Sea in the Atlantic Ocean to spawn. From there, young eels drift with ocean currents and most eventually migrate inland into streams, rivers and lakes. Ontario’s eels, being virtually all female and the most fecund within the species’ range, are an important segment of the global population.

In Ontario, the American Eel is a highly valued fish for Aboriginal peoples, and was also highly valued by European settlers. It thus forms a strong component of Ontario’s cultural and natural heritage. It is clear that the species has been in decline in Ontario due to anthropogenic effects for a century; the American Eel has been completely extirpated from extensive areas of many Ontario watersheds and is in steep decline in the remainder of the province’s waterbodies.

The cumulative effects of eel mortality during downstream migration due to hydro-electric turbines, reduced access to habitat imposed by man-made barriers to upstream migration, commercial harvesting in jurisdictions other than Ontario, contaminants, and habitat destruction, alteration and disruption are among the most significant threats to the survival and recovery of the American Eel in Ontario. Thiamine deficiency in Lake Ontario eels may pose additional stress to Lake Ontario eels, but research is required to confirm the potential effects.

Recovery of the American Eel in Ontario is a long-term prospect, likely to take many eel generation times to complete in its fullest sense (one generation = approximately 20 years). The recovery goal for the American Eel is to re-establish the species in a wide variety of waters throughout its historical range in Ontario by the year 2150, at abundance levels that: (1) restore cultural relationships and natural heritage values, (2) are consistent with ecosystems of high integrity and function, (3) strengthen the biodiversity of the province’s watersheds, and (4) provide valued ecological services.
Achievement of the goal will provide the best opportunity for long-term persistence of the species in Ontario while enabling Ontarians to regain some of the benefits they once derived from the species. Given the extensive time frame (equivalent to seven eel generations) of the recovery goal, the range of presently available mitigation approaches and the potential for development of new approaches over this period, it is the opinion of the American Eel Recovery Team that the goal is reasonable and achievable. Although full recovery of historical abundance may not be feasible, recovery to beneficial levels should be possible in most areas of the historical range. Much progress can be made within one eel generation time. Now that anthropogenic mortality due to fishing in Ontario has been addressed, it is recommended that eel recovery actions emphasize strategic provision of enhanced, adequate and safe upstream and downstream passage. The recovery goal will be achieved through the following recovery objectives.

1. Strategically restore access to habitat within the historical range of the American Eel.
   - By 2150, restore resilience of the American Eel to anthropogenic stress in Ontario by diversifying habitats available to the American Eel across its historical range in Ontario. This should be accomplished by protecting and strategically restoring access to and use of, both the upper St. Lawrence River/Lake Ontario and the inland watersheds formerly used by the American Eel in Ontario.
   - By 2050, increase production and enhance resilience of the American Eel by strategically restoring access to all immediate tributaries of the Ottawa River, Lake Ontario and the upper St. Lawrence River (generally proceeding downstream to upstream). Improvements to downstream passage should be made within 10 years of restoring access to areas where it was formerly prevented.
   - Beginning immediately and using the habitat range in 2000 as the baseline, increase American Eel access to habitat by 10 percent every five years, consistent with the draft National Management Plan for the American Eel (Canadian Eel Working Group [CEWG] 2009).

   It is recommended that the watershed areas in which to restore access should be strategically determined through the development and implementation of Watershed-based Implementation Plans (WIPs), with full public and Aboriginal consultation.

2. Increase escapement and recruitment.
   a) Increase escapement of silver and large yellow eels from watersheds in their historical range within Ontario.
      - By 2050, reduce cumulative mortality rates by 50 percent at the watershed level (the benchmark against which this is to be measured is the 1997-2002 average; CEWG 2009). The intent is to increase the escapement of large, mature female eels from provincial waters to levels targeted in
implementation plans for a given watershed. This objective is intended to support increased recruitment of eels. As there is no eel fishing in Ontario, the focus will need to be on cumulative mortalities due to turbines.

- By 2070, increase the number of American Eels annually migrating from Ontario to the ocean to levels consistent with those observed in the early 1980s. Continue to undertake negotiations with power operators to develop options to reduce mortality, increase escapement and enhance recruitment of the American Eel in Ontario. Consult with Aboriginal communities, the public and other stakeholders on the options.

b) Enhance recruitment.

- Measured at the Moses-Saunders ladders (Saunders and New York Power Authority ladders combined), achieve recruitment of eels ascending the ladders consistent with the returns observed during the late 1970s and early 1980s at the Saunders ladder (as this was the only ladder in existence during the early 1980s).

3. Reduce anthropogenic mortality of eels in boundary waters managed jointly with other jurisdictions.
4. Locate, protect, restore and enhance habitats upon which eels depend.
5. Reduce other sources of stress on the American Eel (e.g., contaminants, disease, harmful destruction, alteration or disruption of habitat).
6. Use an appropriately coordinated and strategic watershed-based approach to eel recovery across its historical range in Ontario.
7. Strengthen the engagement of Aboriginal peoples, stakeholders and other partners in the development and implementation of recovery actions for the American Eel.
8. Maintain strong Ontario participation and leadership in the development and implementation of coordinated inter-jurisdictional protection, management and recovery of the American Eel and its habitats at national and bi-national levels.
10. Evaluate potential short-term methods of supporting eel abundance through such means as translocations and eel ladders in key watersheds.
11. Address knowledge gaps to enable and enhance protection, conservation and recovery efforts.

The American Eel recovery should occur through coordination and integration of science, management and conservation across the numerous jurisdictions and among the agencies and organizations responsible for eel management in North America. It is important that Ontario continue its strong efforts to encourage the participation of others to reverse the American Eel declines. It also should include a commitment to integrate
western science with Aboriginal Traditional Knowledge and community knowledge in the implementation of the recovery strategy.

All migratory corridors (historical and current) for the American Eel should be contained in the habitat regulation. This would include all waters that are tributaries to Ontario’s portions of Lake Ontario, the St. Lawrence River and the Ottawa River.

It is recommended that the habitat regulation should protect the primary habitat in both lentic (still) and lotic (moving) waters, including all waters extending from the high-water mark down to a depth of 10 m for all reaches currently or formerly occupied or used as migratory corridors by the American Eel. This includes all rivers, streams and rivulets, both permanent and ephemeral. It should be noted that potential habitat can be much broader depending on the water body and can extend from the high water mark to any depth. Local knowledge should be used to determine if refinements in particular water courses or reaches are necessary. Otherwise, protecting the primary habitat to a depth of 10 m should be sufficient.

Finally, as the recovery of many aquatic fish species at risk will be prevented by the same anthropogenic impacts, an ecosystem approach should be adopted during the development and implementation of the WIPs wherein other species at risk are given due consideration at the same time.