

## Method used to develop the Great Lakes Surveillance Framework Watch List

An inventory of candidate “Watch List” species was compiled from a variety of sources (**Table 1**). More than 400 candidate species were identified. A number of species were excluded from the candidate list before any additional assessment, including: viruses and bacteria, species already established in all five Great Lakes’ basins (based on USGS NAS occurrence records; <https://nas.er.usgs.gov/>), species with no known history of invasion or impacts (based on impacts described in USGS NAS fact sheets for each species), species resolved to be marine/estuarine and/or subtropical/tropical (based on various sources including <http://www.fishbase.org/> and/or peer-reviewed literature), and riparian and/or facultative and facultative upland plant species (based on the National Wetland Plant List; [http://wetland-plants.usace.army.mil/nwpl\\_static/index.html](http://wetland-plants.usace.army.mil/nwpl_static/index.html)).

The Great Lakes Aquatic Non-indigenous Species Risk Assessment (GLANSRA) framework developed by Davidson et al. (2017) was used to evaluate the potential for negative ecological or socio/cultural impacts and to assign a pathway (or pathways) of introduction for every species on the candidate watch list. The GLANSRA method provides semi-quantitative information on socio-economic and ecological impacts, as well as individual introduction risk measures for each of the major invasion pathways. In total, 236 species were assessed using GLANSRA.

The Surveillance Framework “Watch List” is the subset of 147 species that met the following criteria per the GLANSRA framework: a) predicted high or medium socio-economic and/or environmental impact, b) present in or capable of entering a probable pathway of introduction, *and* c) able to survive transport to the Great Lakes.

### Reference

Davidson AD, Fusaro AJ, Sturtevant RA, & Kashian DR (2017). Development of a risk assessment framework to predict invasive species establishment for multiple taxonomic groups and vectors of introduction. *Management of Biological Invasions*, 8(1), 25-36.

**Table 1.** Sources used to compile a candidate inventory of “Watch List” species.

Name	Source(s)	Description
Prohibited species in the Great Lakes region	Compiled by The Nature Conservancy	A comprehensive list of all prohibited, regulated, and/or restricted species across the ten Great Lakes’ jurisdictions
Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) Watchlist	<a href="https://nas.er.usgs.gov/queries/greatlakes/SpeciesList.aspx?Group=&amp;HUCNumber=&amp;Genus=&amp;Species=&amp;ComName=&amp;Sortby=1&amp;SpeciesCategory=4">https://nas.er.usgs.gov/queries/greatlakes/SpeciesList.aspx?Group=&amp;HUCNumber=&amp;Genus=&amp;Species=&amp;ComName=&amp;Sortby=1&amp;SpeciesCategory=4</a>	A list of aquatic species not yet established in the Great Lakes but assessed as likely to become so and living in a known Great Lakes’ donor region or in an area with climate conditions matching the Great Lakes
Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) “Nonindigenous and Range Expander” list	<a href="https://nas.er.usgs.gov/queries/greatlakes/SpeciesList.aspx?Group=&amp;HUCNumber=DGreatLakes&amp;Genus=&amp;Species=&amp;ComName=&amp;status=0&amp;pathway=0&amp;Sortby=1&amp;SpeciesCategory=3">https://nas.er.usgs.gov/queries/greatlakes/SpeciesList.aspx?Group=&amp;HUCNumber=DGreatLakes&amp;Genus=&amp;Species=&amp;ComName=&amp;status=0&amp;pathway=0&amp;Sortby=1&amp;SpeciesCategory=3</a>	A list of established aquatic species considered nonindigenous to the Great Lakes basin or a portion of the basin to the ordinary high water mark
US Fish and Wildlife Service Ecological Risk Screening Summaries	<a href="https://www.fws.gov/fisheries/ans/species_erss_reports.html">https://www.fws.gov/fisheries/ans/species_erss_reports.html</a>	Potentially invasive imported, non-native fish, crustaceans, and/or mollusks based on a peer-reviewed risk screening model that accounts for a species’ history of invasiveness and climate match to the contiguous US.
Fisheries and Oceans Canada Screening Level Risk Assessments (SLRA) for fish, mollusks, and plants	Mandrak, N.E., Gantz, C., Jones, L.A., Marson, D., and Cudmore, B. 2014. Evaluation of Five Freshwater Fish Screening-Level Risk Assessment Protocols and Application to Non-Indigenous Organisms in Trade in Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/122. v + 125 p.	Aquatic non-indigenous species in live trade in Canada, but not yet present in Canadian waters, and that pose a potential risk to Canada’s aquatic ecosystems based on a SLRA methodology developed by DFO’s Centre of Expertise for Aquatic Risk Assessment.

	<p>Schroeder, B., Mandrak, N.E., and Cudmore, B.C. 2014. Application of a Freshwater Mollusc Risk Assessment to Non-indigenous Organisms in Trade in Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/060. v + 26 p</p> <p>Gantz, C., Mandrak, N.E., and Keller, R.P. 2014. Application of an Aquatic Plant Risk Assessment to Non-Indigenous Freshwater Plants in Trade in Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/096 v + 31 p.</p>	
Annex 6	Compiled by the Great Lakes Water Quality Agreement AIS Annex 6 Species Risk Assessment Task Team	A draft list of species: 1) NOT currently established in the Great Lakes Basin, 2) NOT in trade in U.S. or Canadian markets, 3) that have a history of invasion outside the basin and 4) that have a climate match to the Great Lakes.
Erie Canal Assessment	Compiled by The Nature Conservancy	<p>Aquatic vertebrates, vascular plants, crustaceans and/or mollusks present in the Great Lakes, Hudson River and/or Lake Champlain basins, that could enter and spread through the Erie Canal to connected basin(s) and that have a history of invasiveness and a climate match to any of the unoccupied basins.</p> <p>Occurrence record(s) in each basin were compiled from U.S.Geological Survey's (USGS) Nonindigenous Aquatic Species (NAS) information resource, GLANSIS, USDA PLANTS database, and peer-reviewed inventories of exotic species in Lake</p>

		<p>Champlain and the Hudson River. Species were considered “invasive” if listed on any of the following: USDA PLANTS database (federal noxious weed designation), Lacey Act (“injurious wildlife” designation), IUCN Global Invasive Species Database, or Appendix B-1 of U.S. Environmental Protection Agency publication EPA/600/R-08/066F. Climate match to unoccupied basins was assessed using the USDA Plant Hardiness Zone rating (for plants) or the Australian Government Department of Agriculture and Water Resources' climate matching tool (Climatch) (for animals)</p>
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