**AIS Early Detection and Rapid Response Initiative Achievements and Activities to date, December 2015**

| Annex 6 Aquatic Invasive Species 2012 GLWQA Commitment | Achievements and Activities |
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| 3. within two years of entry into force of this Agreement, develop and implement an early detection and rapid response initiative that: |  |
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| (a) develops species watch lists; | A “watch list” for species at risk of invading the Great Lakes was developed.  The highest priority species on the species watch list *in both countries* include:   * Asian carp (Bighead, Silver, Black, and Grass carps).   The highest priority species on the species watch list *in the U.S.* include:   * Fishes including Northern Snakehead, Tench, Rudd, Oriental Weatherfish, Ruffe, and Red Shiner. * Benthic organisms includingAmphipods (e.g., Killer Shrimp, Demon Shrimp), Crayfishes (e.g., Red Swamp Crayfish, Rusty Crayfish, Marmorkrebs), Mollusks (e.g., Faucet Snail, Asian Clam, Golden Mussel, New Zealand Mudsnail).   These species were determined to be of the highest priority for the potential of new introductions into the Great Lakes based on: risk assessments undertaken by the U.S. Fish and Wildlife Service and Fisheries and Oceans Canada, and on prohibited species lists by one or more Great Lakes jurisdictions. All of the species listed in this list are either: established in the Mississippi River system, but not the Great Lakes; or established in the Great Lakes basin and/or St. Lawrence system but not widespread there; or not known to be established in natural ecosystems in North America, but within a pathway connected with the Great Lakes. This watch list will be updated as additional information on species and pathway risk assessment results become available. |
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| (b) identifies priority locations for surveillance; | The following priority locations *in the U.S.* to undertake surveillance for the potential introduction of the species on the watch list have been identified (these locations sampled were developed in partnership with states and tribes):   * Hotspots of historical invasions resulting from ballast water discharge (based on [Grigorovich et al. 2003. Ballast-mediated animal introductions in the Laurentian Great Lakes: retrospective and prospective analyses. Canadian Journal of Fisheries and Aquatic Sciences 60(6): 740-756](http://www.nrcresearchpress.com/doi/pdf/10.1139/f03-053)). * Connections with the Mississippi River system (<http://glmris.anl.gov/>). * Locations near major cities, where live bait, live food, aquaculture, aquarium pet, water garden, biological supply, and water-related recreation are concentrated.   *In Canada*, where the focus of early detection is Asian carp species, the priority locations for surveillance are based on the results of modelling of habitat suitability used in risk assessments for these species.  These priority surveillance locations have been identified based on history of invasions in the Great Lakes, risk assessments that describe potential points of invasion and suitable habitat in the Great Lakes, and cities where human-mediated invasional pathways are most concentrated. Those pathways include the live bait, live food, aquaculture, aquarium pet, water garden, biological supply, and water-related recreation. Locations sampled for Asian carps were developed based on associations with projected spawning habitats, and where a combination of depth, temperature, and food would most support their biological needs. |
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| (c) develops monitoring protocols for surveillance; | *In the U.S.*, monitoring and surveillance protocols were developed in partnership with states and tribes. A detailed summary of non-eDNA sampling methods is contained in Schloesser and Quinlan (2015), Fish community monitoring for early detection of invasive fishes  in Lake Superior: St. Louis River, Upper St. Marys River, Thunder Bay, and Chequamegon Bay assessments, 2014. U.S. Fish and Wildlife Service, Ashland Fish and Wildlife Conservation Office,  Technical Report No. 07. Ashland, WI. Detailed summaries of eDNA methods and results related to U.S. sampling are available at <http://www.fws.gov/midwest/fisheries/eDNA.html>.  *In Canada*, where early detection is focussed on the Asian carp species, monitoring protocols were developed following U.S. experience sampling those species, those techniques are described at <http://asiancarp.ca/MONITORING-PREVENTION-AND-RESPONSE/Prevention-Techniques>. Detailed description and results of Asian carp early detection efforts during 2014 can be found in [Canadian Manuscript Report of Fisheries and Aquatic Sciences 3103](http://publications.gc.ca/site/archivee-archived.html?url=http://publications.gc.ca/collections/collection_2016/mpo-dfo/Fs97-4-3103-eng.pdf). Sampling of eDNA is carried out by the Ontario Ministry of Natural Resources and Forestry and is described at <http://asiancarp.ca/MONITORING-PREVENTION-AND-RESPONSE/Great-Lakes-eDNA-Monitoring-Program>. |
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| (d) establishes protocols for sharing information; | *In the U.S.*, protocols for sharing information were developed, which includes information being shared among the Fish and Wildlife Service and each state. *In Canada,* detailed protocols for sharing information have been established between Fisheries and Oceans Canada and the Ontario Ministry of Natural Resources. *Binationally*,  Information sharing protocols have been established with the Asian Carp Regional Coordinating Committee and also under the aegis of the Great Lakes Fishery Commission’s Lake and Technical Committees. |
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| (e) identifies new AIS; and | To date, no new AIS have been identified as established in the Great Lakes since the entry into force of the 2012 GLWQA. It is noteworthy that some specimens of Grass Carp have been collected in the Lake Erie system, but fishery scientists do not consider the population as established and self-sustaining. Similarly, Grass Carp specimens have been discovered in Lake Ontario, but there is no evidence of establishment. |
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| (f) coordinates effective and timely domestic and, when necessary, binational response actions to prevent the establishment of newly detected AIS. | Although no new AIS have been identified as established, Canada and the U.S. continue to undertake activities such as, the coordination of plans and preparations for any response actions necessary to prevent the establishment of newly detected AIS and to be prepared in the event of the identification of newly detected AIS in the Great Lakes. All of the activities listed below are enhancing the ability of agencies to respond to newly detected AIS in the Great Lakes:   * State and Ontario/Canada Asian Carp Response Plans are in place in Ohio and Michigan. All states have AIS management plans in place, and all of those plans include AIS response plans that can be implemented for Asian carps and other AIS. * [Governors’ and Premiers’ Mutual Aid Agreement (MAA; http://www.cglslgp.org/media/1564/ais-mutual-aid-agreement-3-26-15.pdf)](http://www.cglslgp.org/media/1591/ais-harmonization-resolution-6-13-15.pdf) is in place to prevent the introduction and spread of AIS in the Great Lakes, foster mutual aid among the Great Lakes states and provinces to respond to serious threats to the Great Lakes Basin from AIS; and encourage further cooperative actions by the parties to combat AIS. One of the projects recently initiated under the MAA is an innovative pilot program between Michigan, Ohio and Ontario to harmonize approaches to address AIS risk, and further cooperation among those three jurisdictions (<http://www.cglslgp.org/media/1591/ais-harmonization-resolution-6-13-15.pdf>). * Table-top Exercises have been conducted within and among jurisdictions to enhance preparedness for a possible detection of additional AIS in the Great Lakes. Those exercises evaluate plans and procedures, clarify roles and responsibilities, develop effective agency relationships, assess resources and capabilities, and identify needs and solutions. * One such exercise was convened under a partnership of the AIS Annex Subcommittee, Michigan, Ohio, Ontario, the International Joint Commission, and others. The After Action Report, which summarizes the exercise and lessons learned, is being finalized. * Another such exercise was convened under the newly created Great Lakes Interstate Management Plan. Individual states continue to conduct exercises that include cross-agency and cross-program staff. * Field Exercises are similar to Table-top exercises, except that field exercises conduct additional activities to evaluate operational plans and procedures implemented in Great Lakes ecosystems. Just as with Table-top exercises, field exercises also result in clarifying roles and responsibilities, developing effective agency relationships, assessing resources and capabilities, and identifying needs and solutions. * Under the Council of Great Lakes Governors and Premiers MAA: * Illinois and Indiana convened a Ruffe Detection Exercise in 2015. Other Great Lakes states were invited to participate. * Michigan and Ohio convened a Grass Carp Detection exercise in Lake Erie. That exercise was convened as the result of Grass Carp detections in the Lake Erie system. * Incident Command System training has been delivered in various venues, including the Table-top exercise convened by the AIS Annex Subcommittee and their partners. * Detection and response activities undertaken: * U.S. Fish and Wildlife Service undertook Bighead Carps eDNA sampling in 2015. From the 5,028 water samples collected, none were eDNA positive. * Ontario Ministry of Natural Resources and Forestry undertook eDNA sampling in 2015. From the 848 water samples collected, two positive samples were found however no fish were found. eDNA sampling from Bay of Quinte and Toronto area were added after discoveries of Grass Carp (see bullet below). * U.S. Fish and Wildlife Service collected, in 2015: * 348 invertebrate samples in Lakes Superior, Michigan, and Erie * 248 samples of newly hatched fishes in Lakes Superior, Michigan, and Erie, and * 1193 samples of adult and juvenile fishes in Lakes Superior, Michigan, and Erie. * Fisheries and Oceans Canada undertook Traditional Gear Sampling (boat electrofishing, fyke nets, gill nets, trammel nets, 3' and 6’ hoop nets, bag seines, and 4' and 6’ trap nets) in 2015. From the 35 Early Detection locations sampled across Lakes Huron, Erie, Superior and Ontario (~800 field sampling sites) * Grass Carp specimens were discovered in Lake Ontario and Lake Erie during July to September, 2015. A full Incident Command Response was coordinated by Fisheries and Oceans Canada and Ontario Ministry of Natural Resources and Forestry, along with partners, to complete intensive surveys. Full laboratory analysis was undertaken on the samples, including fertility, origin, and age testing, which was coordinated with U.S. Geological Survey experts. The analysis indicated that all Grass Carps found were large adults and 2 were sterile and 6 were fertile but all of which were from pond origin. |