

Great Lakes Panel on Aquatic Nuisance Species Meeting

November 7-8, 2018

Ann Arbor, Michigan

Draft Meeting Summary: February 13, 2019

Additional meeting information including a final agenda and presentations are available on the Great Lakes Panel website (<https://www.glc.org/work/glpans/meetings>)

Wednesday, November 7, 2018

Call to Order

Sarah LeSage, Great Lakes Panel (GLP) Chair, Michigan Dept. of Environmental Quality (DEQ)

- Sarah LeSage called the meeting to order
- GLP members and observers introduced themselves and a quorum was confirmed
- LeSage reviewed the agenda and there were no changes

GLP Business

Sarah LeSage, GLP Chair

Erika Jensen, GLP Coordinator

- The June 2018 meeting summary was approved without revisions
- The June 2018 action items were reviewed for the full panel and ad hoc committees, both complete and in progress

Update on 2018-2020 GLP Work Plan Development and GLP Project(s)

- The GLP Risk Assessment: Populating risk assessment clearinghouse project was selected as the highest ranked project across all GLP member input
 - A detailed implementation plan will be determined at the risk assessment ad hoc meeting the next day
- Any funding that remains after this project has been implemented may be used to fund one of the lower ranked projects
- Projects that were not selected to move forward under this funding opportunity may still be considered for future GLP work; the GLP may also publicize the project ideas to encourage other groups to pursue funding opportunities (including GLRI Focus Area 2 funding) to implement the projects
- A summary of GLP member feedback on project ideas will be developed and made available for GLP member review

Plans for spring 2019 meeting

- Ohio and Ontario are both being considered as host locations for the spring GLP meeting
- Recognizing that there may be some barriers to international travel from the U.S. into Canada, GLP staff will create a poll to assess the extent of these issues
- Feedback from the poll will be used to inform a decision on location by the GLP Executive Committee

ANS Task Force Report

Susan Pasko, Executive Secretary, ANS Task Force (ANSTF), U.S. Fish and Wildlife Service (FWS)

- Susan Pasko provided a reminder of ANSTF membership and mission, noting that the ANSTF is the only U.S. federal task force dedicated to managing aquatic nuisance species, with the support of the six regional ANS panels (including the GLP)

- The ANSTF held their first meeting since the conclusion of the U.S. Department of the Interior’s “strategic pause” in June 2018, where updates were provided on the USGS-NAS database, national invasive carp management efforts, U.S. Coast Guard ballast water management, and Habitattitude™
- The meeting also included drafting sessions for the next five-year ANSTF strategic plan
- The draft outline of the strategic plan was presented via teleconference a few weeks ago, and revisions were made based on feedback
 - The revised outline was distributed on Oct. 24 and is available on the ANSTF website
 - Any comments from GLP members can be submitted to the GLP Coordinator, Erika Jensen, who will then compile and provide them to Susan prior to the upcoming ANSTF meeting (Dec. 12-14)
- The ANSTF is also working on a set of bylaws, which do not currently exist
- The ANSTF typically meets twice a year, in the spring and fall
 - The next meeting will be in May 2019, hosted by the Western Regional ANS Panel (exact dates and venue are still being finalized)

Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) Update

Rochelle Sturtevant, GLANSIS Program Manager, Michigan Sea Grant Extension

- Ten cross-taxa species were selected to build two pilot projects: a query-able database of habitat requirements/tolerances and life history information, and an enhanced management/control database
- Two risk assessment explorers have been built
 - The methodology explorer is available and includes a side-by-side comparison option for up to two different methodologies: <https://www.glerl.noaa.gov/glansis/raExplorer.html>
 - The species-level explorer for risk assessment results is in beta testing and includes a side-by-side comparison option to compare two results or methodologies for one species: <https://www.glerl.noaa.gov/glansis/raT2Explorer.html>
- GLANSIS is also collaborating with the U.S. EPA to develop Great Lakes Waterlife, a product designed to provide photos and eDNA information for all species present in the Great Lakes region
 - U.S. EPA is building profiles for native species and GLANSIS is working on non-native species
 - Each species profile will include a photo, common name, distribution of the species, taxonomy information and links to where the taxonomy has been verified, links to eDNA information and marker series from the Barcode of Life, and references/bibliography for all information

Regional Initiatives: AIS Goals and Role for the Great Lakes Panel

Great Lakes Water Quality Agreement (GLWQA) Annex 6

Gavin Christie, Fisheries and Oceans Canada (DFO)

Mike Weimer, U.S. FWS

- The bulk of work to support Annex 6 goals is conducted at the agency level, with support from the Annex
- Early detection and response efforts are reported on in a basin-wide context and the Progress Report of the Parties highlights response efforts
- Science and action priorities are identified to advance the Annex
- An example of GLP involvement with the Annex is the work of the risk assessment ad hoc committee, which supports the action priority to “Advance a clearinghouse or inventory for AIS species and pathway risk assessments to support actions in all jurisdictions”
- The Annex is developing its 2020-2023 science and action priorities and the group anticipates that the science priorities will remain similar to the 2016-2019 priorities, while the updated action priorities will focus on early detection and response activities
- It was also noted that there had been and would be many useful discussions through the GLP in identifying AIS priorities around the region and how the Annex can contribute to those shared priorities

Great Lakes Restoration Initiative (GLRI) Action Plan III

Kevin O'Donnell, U.S. Environmental Protection Agency (EPA)

- GLRI Action Plan III is not publicly available yet
- Public engagement meetings for Action Plan III were held across the region seeking input on how the GLRI program is working/not working, and what should be changed
 - Written comments were solicited at meetings, and an email address was provided for attendees to submit electronic comments
- The overwhelming impression from these public engagement meetings is that the public needs to better understand basic information about specific issues in the Great Lakes region
- EPA also has dedicated opportunities for state agency and tribal input on the Action Plan, including a webinar for states to provide specific information on commitments, objectives, and specific measures
- The general approach for AIS is to support specific control efforts
- There are no inherent funding limits to grants
- The typical duration of non-competitive agreements begins with an initial grant period of 2-3 years with some flexibility for extensions depending on project
 - Phased grants have been implemented where the planned length of project is 5 years, but funding is phased in over the years rather than all upfront

Lakewide Action and Management Plans (LAMPs)

Beth Hinchey and Liz LaPlante, U.S. EPA

- LAMPs are developed on a five-year cycle through lake partnerships with federal, provincial, state, tribal, and local governments; the process is co-chaired by Environment and Climate Change Canada and EPA
 - Lake Superior and Lake Huron LAMPs were updated within the past two years
 - Lake Ontario LAMP update is in progress and nearly complete
 - Lake Michigan and Lake Erie LAMP updates are in progress
- Each LAMP sets forward science priorities for the lake across a variety of parameters designed to maintain and improve the chemical, physical, and biological integrity of the lakes
- The Lake Superior LAMP was developed based on eco-regions of the lakes and threats to each
 - AIS priority actions and projects, due to be completed by the end of 2019, include early detection sampling; outreach and education; sea lamprey control; and *Phragmites* control
- The Lake Huron LAMP identifies six AIS priority project areas: ballast water; early detection and rapid response; canals and waterways (specifically to prevent establishment and spread of bighead and silver carp); sea lamprey control, including developing more specific traps; studying interactions between round goby, cladophore growth, and botulism outbreaks; and *Phragmites* management
- Developing LAMP updates for Lakes Michigan, Erie, and Superior in close coordination with GLP members would greatly increase the quality of the plans; GLP members would bring welcome expertise to the drafting teams
- After priority actions are identified in the LAMPs, volunteers must step forward and offer to facilitate implementation
 - It can be difficult for partners to make formal commitments to LAMP projects due to time, resources, and other constraints and uncertainties
 - Local partners can be particularly difficult to engage on formal LAMP priorities (e.g., invasive carp in Illinois); however, even though local partners may not be able to commit to large projects does not mean that they are not encouraged and welcomed to assist in them
- GLRI funds for the implementation of AIS state management plans are distributed through FWS; coordination between projects funded for state management plans and LAMPs could increase access to non-competitive grants that serve a purpose for both plans

Great Lakes St. Lawrence Governors and Premiers: Regional Collaboration in the Great Lakes-St. Lawrence Basin

Kevin Irons, Illinois Dept. of Natural Resources (DNR)

Mike Piskur, Great Lakes St. Lawrence Governors and Premiers (GSGP)

- The AIS Least Wanted List was first developed in 2013 in conjunction with AIS experts and was designed to expedite the process for listing injurious species in each Great Lakes jurisdiction and promoting consistency in regulations
 - The list has since been updated with new species to stay current with the major AIS threats to the region; access to up-to-date risk assessments are a major component of these updates
- A mutual aid agreement for AIS response efforts was also developed and implemented successfully for grass carp activities in Lake Erie
- Future AIS priorities include a renewed focus on enforcement coordination and communication across jurisdictional boundaries
 - These activities will be convened in coordination with the Great Lakes Fishery Commission Law Enforcement Committee
- There are several available successful case studies in AIS law enforcement from Illinois, because of the conservation officers dedicated to law enforcement on AIS issues
 - GLP can help to highlight those success stories to encourage/inform other jurisdictions about successful activities
- A priority for both the least wanted list and any law enforcement coordination should be to consider commensurate regulations to species listed as injurious under the Lacey Act, given that FWS can no longer regulate interstate commerce of those species unless there are applicable state laws in place
- The GLP can assist in promoting and achieving AIS priorities of the GSGP by engaging in dialogue on the AIS needs of the day and contributing to workplan discussions
 - The GLP's role is important in understanding where gaps exist in regulations and maintaining communication throughout all levels of AIS management

Council of Great Lakes Fishery Agencies (CGLFA) Invasive Fish Committee

John Dettmers, Great Lakes Fishery Commission

- Preventing invasive species from establishing is a central shared priority of the Great Lakes region
- A voluntary, non-binding joint strategic plan for the management of Great Lakes fisheries allows jurisdictions around the region to work together to manage these resources via lake committee meetings
 - The GLFC is not a signatory to the agreement, but facilitates the process
- The Invasive Fish Committee is developing a basin-wide invasive fishes communication protocol
 - The protocol is designed to standardize the information that is distributed in the event of an invasive fish discovery and recommends key talking points so all involved parties are communicating consistently
 - The protocol outline is based on ACRCC and eDNA communications plans, and will serve to coordinate inter-agency communication of new findings as well
- The Lake Erie grass carp plan is designed to implement effective control strategies and prevent breeding populations of grass carp in Lake Erie
- The most pressing AIS need identified by this group is to harmonize AIS regulations, including resolving Lacey Act issues
- The development process has not yet been finalized for a list of invasive fish in the Great Lakes region, but the contents of the list should overlap with GLANSIS and other interstate invasive species lists
 - This committee likely won't deal with fishes that are already well-established (e.g. sea lamprey)

Cross-walk of regional initiatives AIS goals and priorities and plan for Day 2 discussion

Sarah LeSage, GLP Chair

Ceci Weibert, Great Lakes Commission

Erika Jensen, GLP Coordinator

- The regional priorities of the GLP standing committees and ten regional initiatives were collated and organized around common themes. Of those themes, the GLP Executive Committee selected four themes for discussion by breakout groups
- The regional priorities document is available at <https://www.glc.org/wp-content/uploads/GLP-AIS-Priority-Crosswalk-10.23.18.pdf>

Thursday, November 8, 2018

All times Eastern

GLP Breakout Discussion: Identifying Opportunities to Coordinate and Advance AIS Prevention and Control: Aquaculture and Bait; Organisms in Trade; Recreational Activities; and Control

- Meeting participants broke into discussion groups to discuss the four common regional priority themes selected by the GLP Executive Committee and identify recommended activities to advance priorities for AIS prevention and control that support regional initiatives, including recommendations for implementation
- During these discussions, meeting attendees participated in two group discussions on two different common themes to:
 - Review commonalities across regional initiatives' goals & objectives, and existing GLP priorities
 - Define the specific, "SMART" activities/projects needed to accomplish regional goals and objectives
 - Identify parties that are or could implement the specific activities/projects
 - Define the role of the GLP in advancing progress on regional goals and objectives

Review outcomes from discussion and identify next steps

- Breakout group notes will be included as an appendix to the meeting summary
- The GLP Executive Committee will use these notes to develop next steps and identify priorities and actions to share with the full GLP membership

Response Case Studies and Regional Needs

New York Response to Hydrilla

Cathy McGlynn, New York Dept. of Environmental Conservation

- There were six new hydrilla populations identified in New York in 2018
- Several management options are in place, including:
 - No management (ponds that are private with no connectivity or only outlets are to marine areas)
 - Benthic mats (areas that are under an acre or long areas near boat launches)
 - Triploid grass carp in conjunction with benthic mats
 - Chemical treatment, i.e., endothall, fluoridone, and copper
- Highest priority areas for monitoring and treatment are waterways that link the Great Lakes to inland New York
- Areas with extensive recreation usage are also targeted for education and outreach to users in addition to sampling for hydrilla
- Three knowledge gaps have been identified as significant barriers to effective hydrilla management:
 - The best method(s) for monitoring areas of treatment with shrinking populations
 - A few missed plants in a season could become a larger patch in the future
 - Are waterfowl a serious vector, and how long can fragments/tubers/turions remain viable outside of water

- The locations of source and sink populations in New York, and implications for recreation across state lines
- Future work will continue to focus on prevention, early detection and response to build a baseline of data
 - High priority monitoring areas are identified based on suitability for establishment
- The average cost for hydrilla control is about \$1.5 million per year including staff time for state and U.S. Army Corps of Engineers (ACE) employees, contractors, and applications
- U.S. ACE is finalizing a risk assessment on monoecious hydrilla, including population and distribution information as well as habitat suitability modeling for the Great Lakes

Ontario Response to Water Soldier

Holly Simpson and Francine MacDonald, Ontario Ministry of Natural Resources and Forestry (OMNRF)

Sophie Monfette, Ontario Federation of Anglers and Hunters (OFAH)

- Water soldier was first identified in Ontario in the Trent Severn Waterway (In Lake Seymour) in 2008. At that time, it was unclear between provincial and federal agencies who was responsible for addressing aquatic invasive plants
- There is no record or history of control of water soldier in North America, thus, there is very little information about its biology of, how it will react to treatment methods, best timing for application, etc.
 - There is limited access to herbicides for use on open waters in Canada
- Other agencies challenged proposed management because they didn't believe that water soldier was a problem/priority and instead advocated for no management
- A collaboration between the Canadian interagency working group, the University of Florida (UF), and U.S. ACE yielded information regarding the life history of water soldier and the efficacy of the herbicide diquat for management
 - This partnership enabled OMNRF to expand the usage label for commercially available herbicide (diquat) to include water soldier, and led to an integrated management plan for water soldier with full scale management beginning in 2014
 - The GLP was instrumental in forming this partnership as the forum by which OMNRF and UF/U.S. ACE employees were introduced
- The interagency working group has been key to addressing questions about interjurisdictional (federal vs. provincial) authority and to clarify roles and responsibilities
 - This approach allows decisions to be made based on what agency/organization has the resources to accomplish which tasks, rather than identifying whose responsibility each action should be
- Treatment in Lake Seymour has been highly effective over the past year with a 78% population reduction from 2017-18
 - Herbicide has been the best management approach for this location given the size and scale of the treatment area
 - Land owners in the treatment area were approached by door to door agency employees who spoke one-on-one with each citizen about the herbicide use
- Treatments occur in early October because at this point water soldier is still growing and there is minimal concern about impacts to wild rice
- There have been no reports of sightings at new wild locations, but it has been identified in private ponds

ProcellaCOR: Novel herbicide use in Michigan

Sarah LeSage, Michigan DEQ

- ProcellaCOR is federally approved for use as of Feb. 2018 and approved for use in Michigan as of July 2018
- Michigan undertook two treatments with the new herbicide; one for an infestation of yellow floating heart and one for an infestation of parrot feather
- Yellow floating heart treatment:
 - There is minimal experience in Michigan using herbicide to treat yellow floating heart
 - There is uncertainty around the pathway for movement beyond intentional planting

- When yellow floating heart was identified at an isolated private pond, DEQ sought extensive external consultation to understand potential treatment methods before selecting ProcellaCOR
- DEQ found that seeds remain viable post-treatment, and there are still more questions regarding the overall seed bank's density, viability, and length of viability post-treatment
- Parrot feather treatment:
 - There is previous experience with herbicide treatment of parrot feather in Michigan, but the site characteristics at this specific location (i.e., an aquaculture flow-through system with a short retention time) are unsuitable for most herbicides
 - Triclopyr was used for treatment prior to 2018, but was only successful in reducing above-water biomass
 - DEQ decided to switch to ProcellaCOR in 2018 because there is previous evidence of the efficacy of ProcellaCOR for milfoil species and the short contact time required is well-suited to a system with significant flow
- Partners' expertise was critical when considering novel treatment methods
- Application rate for ProcellaCOR is described as a Prescription Dose Unit, which is slightly less than 2 ppb

Michigan Response to Red Swamp Crayfish

Sara Thomas, Michigan DNR

- A red swamp crayfish response plan was developed based on reports of infestations in several locations in southeastern Michigan
- Small waterbodies in urban areas (primarily retention ponds) of southeast Michigan make up the majority of infested areas
 - Crayfish are possibly using underground tunnels to travel between water bodies as they have not yet been found in streams
 - Monitoring continues in larger water bodies in the infested watershed (e.g., River Rouge)
- Dog food is used to bait sampling traps and is both cheap and effective
- Concerns remain about false negatives and positives with eDNA as an early detection device
- Trapping likely not effective for eradication
 - Catch per effort continues to increase despite cold winters and relatively shallow waters, and there have been issues with trap theft
 - Gravid females or juveniles have not been captured in traps, although gravid females have been dug out of burrows
- Experimental control method treatments are continuing:
 - Carbon dioxide (CO₂) and cypermethrin are being considered
 - CO₂ data is being provided by USGS
 - Working through permitting process for approval of cypermethrin use in water
- In lab and pond studies, CO₂ drove crayfish from water, making them easier to capture
 - Field trials lasted three days during which dissolved oxygen levels never dropped below the minimum required by permit
 - Crayfish did not replicate the fleeing behavior observed in the studies and primarily stayed near the air/water interface
 - The highest catch rate occurred after dark
- The suitability of CO₂ as a treatment method depends on the size of the site, but could possibly be used as a push/pull method to drive crayfish towards an oxygen-rich portion of a lake set with traps
- Michigan State University's agriculture department is studying sound frequencies that attract crayfish for future use as a push/pull method
- Automated trapping systems could improve efficiency by continually removing trapped specimen and preventing overcrowding
- Management techniques need to be very adaptive, particularly in urban areas

Responding to Connecting Waterways in Ohio

John Navarro, Ohio DNR

- The Great Lakes and Mississippi River Interbasin Study identified four connecting waterways between the Mississippi River basin and the Great Lakes basin, two of which are in the top three most likely locations of AIS transfer: the Ohio Erie Canal and Little Killbuck Creek
- Ohio Erie Canal:
 - Flooding of the tow path could create a direct water connection between Muskingum River (Ohio River watershed), circumnavigating a dam through a water diversion structure into the canal and through to Lake Erie
 - The height of the tow path was increased using sheetpile and other materials to prevent flooding
 - Culverts and fencing are also planned in overflow weirs and under the highway to prevent movement in high flow events
 - Improved grating will be installed at flood gates and a canal feeder gate which will prevent jumping carp from transferring when water levels are at equilibrium during high flow events
 - U.S. ACE selected a contractor to begin construction on Phase 1
 - Ohio DNR is responsible for consulting with the State Historic Preservation Office on work and operations and maintenance
- Little Killbuck Creek:
 - High water events can connect Little Killbuck Creek (Ohio River watershed) to Black River (Lake Erie watershed)
 - Berms, similar to those used at Eagle Marsh, are proposed to close this connection
 - The landowner prefers a longer southern route for the proposed berms to avoid building through fields
 - Mastodon bones were uncovered in this area, so the State Historic Preservation Office is involved in the planning in case anything is discovered during construction
- To account for changes in water height due to climate change, elevations are built to the anticipated 100-year high water mark, plus an additional two feet
- Bighead and silver carp are present in the Ohio River, but eDNA surveys over the past three years have all been negative in the Muskingum River

Grass Carp SDM: Informing the Grass Carp Response in Michigan and Ohio

Kelly Robinson, Michigan State University (MSU)

John Navarro, Ohio DNR

- Five regional structured decision making (SDM) meetings were held to develop a regional grass carp strategy
- The possible actions identified through the SDM meetings were reduced to three different categories, with a mix of actions in use and not tried yet
- A population model was developed for three different regions of grass carp populations in Lake Erie over a year and across two habitats (nearshore and spawning)
 - The model was used to develop “what if” scenarios for trialing/modeling the effects of four control scenarios and provide insight on what combination of actions could be implemented to meet the target population size
 - Data gaps for catchability and effort prevents the development of a fully informed model
- The adaptive management strategy is driving a new project between USGS, FWS, MSU, and Michigan DNR to determine where and when to sample, effectiveness of different gear types, catchability, and optimized gear structure; initial results will be available as early as fall 2019
- Information gathered from grass carp telemetry receivers has been invaluable
 - A high-water event occurred during a planned grass carp response action this year, and a receiver installed in Sandusky River provided real-time information to inform the response action and increase efficiency

- One or two more receivers will be installed in Sandusky River, one more receiver will be installed in Maumee River, and the state of Michigan will install more receivers in their infested tributaries
- Ohio DNR and the University of Toledo will be partnering to create a dedicated grass carp removal team for western Lake Erie
 - A crew leader will be hired from Toledo and seasonal crew through Ohio DNR
 - FWS and Michigan DNR will be assisting as well
- Additional modeling will build on the SDM population modeling to better inform how to efficiently sample in large bodies of water with a low density of fish
- A barrier assessment for Sandusky River and Maumee River will assess the feasibility of constructing a seasonal barrier that can be in place during grass carp spawning events without impeding native wildlife
- Handheld receivers connected to telemetry receivers in water are not yet in use during response actions
- There is interest in installing real-time receivers in the Thames River or other Canadian tributaries
- There is uncertainty about how many captured individuals will be tagged and released moving forward

Public Comment

- The floor was opened for public comments; none were received.

Announcements

- The 2018 Upper Midwest Invasive Species Conference occurred in October with 715 attendees
- The International Association of Great Lakes Researchers 2019 Conference will be held in Brockport, New York in June
 - The call for sessions is open, interested GLP members should coordinate with Rochelle Sturtevant on an AIS-focused session
- The International Conference on AIS will be held in Montreal, Quebec in October 2019
- The Invasive Species Centre will host a webinar in November 2018 on binational collaboration to address invasive carp and is seeking ideas for additional webinar presenters/topics for their invasive carp series
- Researchers at the University of Maryland Center for Environmental Science, in cooperation with NOAA's National Centers for Coastal Ocean Science (NCCOS) is conducting a survey on critical needs in coastal ecosystem-based management and GLP members are encouraged to provide input; Felix Martinez will distribute to the announcement to the GLP member email list
- The Minnesota Aquatic Invasive Species Research Center RFP is open
- GLP members are encouraged to use the GLP listserv to share information, and may do so by sending an email directly to the listserv address (glp-member@great-lakes.net and glp-observer@great-lakes.net)
- GLWQA Annex 6 will be working on AIS indicators for the State of the Lakes report; feedback on the report will be accepted through the end of November 2018

Appendix: GLP Breakout Discussion Summary

GLP Breakout Discussion: Identifying Opportunities to Coordinate and Advance AIS Prevention and Control: Aquaculture and Bait; Organisms in Trade; Recreational Activities; and Control

Desired Outcome: Set of recommended activities to advance priorities for AIS prevention and control that support regional initiatives, including recommendations for implementation

Meeting participants were divided into four groups to discuss the draft strategy goals and objectives and brainstorm next steps for implementation. Participants had the opportunity to participate in two of the four breakout groups and signed up for groups in advance. During the breakout groups, participants worked to:

- Review commonalities across regional initiatives' goals & objectives, and existing GLP priorities,
- Define specific, "SMART," activities/projects needed to accomplish regional goals and objectives,
- Identify parties that are or could implement the specific activities/projects, and
- Define the role of the GLP in advancing progress on regional goals and objectives

Organisms in Trade Breakout Session Summary

Facilitator: Greg Hitzroth, Illinois-Indiana Sea Grant

Regulations

- Public may not fully understand regulations, and it would be beneficial to work with state regulators to develop language that is more easily digestible.
 - Some of this work was done with MI and IL a few years ago through GLRI, and garnered positive feedback from industry regarding the layman's terms for regulations
- While a species may not be able to survive in every part of the region, consistent species regulations protects the entire region and helps to prevent movement and spread
- Prohibited lists should be expanded based on risk assessments
- State regulators should consider shifting from a black list to a white list
 - Responsibility shifts from proving that species **are** injurious to proving that they **are not** injurious
 - Stay ahead of the curve of new species
- Most jurisdictions are no longer adding species to regulated lists as a reactionary measure, but as a protective one
 - This was the rationale behind the Great Lakes and St. Lawrence Governors and Premiers' Least Wanted List
 - It is much more labor intensive to implement a white list for trade compared to implementing a white list for aquaculture, as there tend to be significantly less species raised for aquaculture compared to pet trade
- A top down approach to adding a species to the regulated species list is the most efficient method
- Priority actions:
 1. Harmonize regulated species lists
 2. Recommend more species for the GSGP Least Wanted list
 3. Update the Take AIM database more frequently to accurately reflect a nationwide view of AIS policy and regulations
 4. Identify which, if any, species that have been assessed as high risk are allowed in trade for each jurisdiction

Outreach

- The Habitattitude campaign fosters strong partnerships with industry and public
 - Illinois' Be A Hero Release Zero and Michigan's RIPPLE programs also address the OIT pathways while having the flexibility of addressing individual state priorities
- Illinois-Indiana Sea Grant conducted a behavior assessment to assess recognition of the Habitattitude campaign and compliance with the campaign's recommended behaviors for organism purchase and disposal. The team found that hobbyists who care more about the environment are driven by that connection to dispose of unwanted organisms properly
- There is an economic rationale for the proper disposal of unwanted organisms (e.g., costs to infrastructure or communities for treatment) which should be further developed as a messaging point to encourage a behavior shift in end users
- There can be a disconnect between bait use and release – how can we combat emotional attachment? Organisms that are used for bait are killed, but any excess organisms that aren't used for bait may be released due to angler compassion
- The Mississippi River Basin ANS Panel is conducting work on cultural release that the GLP may be interested in learning from
 - How can outreach to first generation immigrants move beyond conservation attitude education about laws and into behavior change?

Organisms in Trade Breakout Session Summary

- What is the current level of public awareness around the dangers of releasing organisms? Who is the audience that is unaware and/or is not reached by outreach messaging? How do we bridge this gap?
 - One step New York DEC is taking is to continue development of multilingual signage for “dumping hot spots” in New York
- Priority actions:
 1. Outreach (e.g. grass carp letter?) from a higher level than a single individual to wholesalers
 - a. What content goes into this letter? Should it emphasize the GSGP least wanted list? A targeted message is necessary
 - b. Drafting such a letter should also be a last step after all other efforts to include and educate industry have been exhausted
 2. GLP host an OIT-focused symposium/meeting to invite industry to participate in the Panel and learn more about regional work
 3. Develop a clearinghouse for BMPs, HACCP training program links, links to other OIT resources
 4. Distribute the model for takeback events presented by Tim Campbell and Doug Jensen at the GL BIOTIC II Symposium
 5. Research end user motivations for aquarium dumping¹
 6. Commission a social science study to better understand motivations and behaviors around cultural release
 7. Contact religious leaders, and people who are doing cultural releases
 - a. Execute both a top-down and bottom-up approach

Industry

- There are many unknowns about what organisms are in trade, where they originate, and, for many species, what their environmental tolerances are²
- What are some voluntary best practices that industry can take?
 - There are various levels at which BMPs can be focused (e.g. wholesalers, shop owners, etc.)
 - Inspecting shipments and standardizing labeling
 - Industry should be consulted and engaged in determining what those BMPs are
 - ANSTF has developed BMPs for water gardeners and classroom pets, but there aren't currently any for aquarium owners³
- NYSDEC messaging to industry has so far taken the tone of “please work with us to protect state waters, here are some steps you can take” rather than focusing on regulations
- Big box stores, how can Panel connect with PetCo, PetsMart, etc.
- PIJAC needs to be promoting Habitattitude, new website is a resource but not a campaign
- An option other than kill or release: give/buy backs
 - Return pets and re-home or have someone else humanely kill them
 - Has industry been involved in this? Can Panel bring them in

¹ An unpublished 2004 Habitattitude survey included a question asking why respondents “choose NOT to dispose of the unwanted fish, plants or invertebrates by releasing it alive into a pond, lake or river”

² The level of knowledge about species in trade often varies at different levels of management, and it can be difficult to effectively disseminate information about the many species in trade (e.g. origin of species may be known to some, but may be a knowledge gap for other managers)

³ While ANSTF does not have formal BMPs for aquarium owners, Habitattitude developed BMPs that are available on its website at: <http://www.habitattitude.net/prevention/adopt.php>

Organisms in Trade Breakout Session Summary

- The demonstrated success of takeback programs in Wisconsin, Minnesota, and Illinois and public engagement with the programs should be highlighted to promote the model to industry as well as other communities and states
- Priority actions:
 1. Engaging industry to secure their buy-in to prevent injurious species from moving through trade
 - a. Wholesalers and stock providers may be the most efficient place to start⁴
 2. Engage directly with commercial suppliers to understand what type of alternative species or solutions work for them in order to maintain economic feasibility but promote responsible sales of species
 3. Develop voluntary best practices with industry for industry
 4. Developing a pet shop “certification” program or models to ensure that only low risk or native species that are sold, targeted specifically to shop owners
 - a. Crosswalk these efforts across the various regions covered by other Panels to identify what programs are in place and how effective they are, and elevate/support successful programs to move them forward elsewhere
 - b. Similar to “dolphin safe” tuna and sustainable aquaculture, this approach provides a customer base niche/economic benefit to shops who obtain that certification
 5. Incorporating an OIT-specific industry representative on the Panel
 - a. Possibly include as an ex-officio member? Engaging early in conversation to be part of the solution
 - b. Bob Likins, Scott Harden – PIJAC
 - c. Plant trade/nursery industry representatives may also be considered
 6. Try to work with corporations like REI or Patagonia to spread awareness to their customer base (e.g. information in catalogues)
 - a. Outdoor outfitting stores that have a stake in conservation/preservation (e.g. Cabela’s, Bass Pro Shops) would also make good partners for this work
 7. Define what species are moving through trade
 8. Develop an expert network or other support for stores to assist in accurate species identification
 - a. DFO is currently working to compile a similar expert species identification list

Risk

- Pathway risk assessments can help identify choke points where targeted management may be most effective
 - DFO has started a pathway risk assessment for OIT, with a goal completion date in 2019/2020
 - The drafting team will review the OIT priorities crosswalk to understand if/ which priorities will be addressed and where
- Completing risk assessments for a species prior to making it available in trade can prevent a scenario where it may be difficult to remove a problematic species after it is already in trade
- Priority actions:
 1. Conduct more risk assessments
 2. Increase communication/awareness about low risk species available in trade, including tropical species
 3. Obtain data from industry to know species are in trade and then assess the risk of those species

⁴ The OIT industry is huge with many segments that need to be addressed individually, and outreach/partnerships should ideally take place across the entire chain of commerce

Organisms in Trade Breakout Session Summary

Enforcement/compliance

- International trade and lack of Lacey Act enforcement for interstate movement continues to be of concern
 - USFWS has begun the process to secure funding to add species to the Lacey Act
- Michigan conservation law enforcement officers (CLO) have a good relationship with fish biologists and can rely on them to respond timely to identification questions, but identification is generally restricted by working hours of biologists, but these relationships are variable in the basin
 - A Memorandum of Understanding for hours from experts for emergency response identification could be considered
- Priority actions:
 1. Identify choke points in the pathway(s) for concentrated effort and attention from CLO
 2. Develop identification tools for CLO and conduct regional trainings to connect officers and informing them about species identification issues that may encounter on a day-to-day basis
 - a. What local officers should be looking for and how to identify those species
 - b. OMNRF and ISC have been working together on a training course for species identification
 - i. Get available ID training resources from David Nisbet, Minnesota, and Wisconsin
 3. Support developing a list of on-call ID experts across various taxa
 - a. Within states and/or across the Great Lakes region
 4. Develop more clear and defined procedures and protocols for disposal of seized species when a fish biologist or state staff aren't available to provide direction
 5. Other tools may be valuable for CLO outside of working hours that are particularly important when seizing large and/or valuable shipments. A specific meeting/workshop to identify these gaps would be beneficial
 6. Educate prosecutors to inform them about why it is important to take AIS violation cases to court
 - a. Messaging points could be the monetary value/cost of AIS, information about impacts, etc.

Other

- Michigan Sea Grant is working on their next RFP regarding economic impact of invasive species, which may be refined and further targeted to specific pathways but is broad at this point (not OIT specific)
- University of Minnesota, Minnesota Aquatic Invasive Species Research Center conducted a survey of research needs and subsequently put out an RFP to address those needs, including some OIT-specific
- New York can provide case studies about the economic cost of treating species that are likely aquarium releases (e.g. hydrilla)
- Genetic work to identify the specific methods of movement/origin of a species may be a lower priority research topic, but developing a genetic database of source populations could be helpful to assist in tracking movement
- Priority actions:
 1. Collate case study information about the cost of managing species introduced through/attributed to the OIT pathway
 2. Redevelop and push the GLP priority documents in general

Organisms in Trade Breakout Session Summary

- a. Add ideas generated from these breakout groups to refine research priorities and push them to guide GLRI project selection, state grant programs, etc.
3. Personal outreach to researchers/groups for targeted attention to research needs
 - a. NYS invasive species research group
4. Provide letters of support for projects addressing GLP priorities

Recreational Activities Breakout Session Summary

Facilitator: Doug Jensen, Minnesota Sea Grant

Commonalities across regional initiatives' goals and objectives

- Address needs for existing and potential pathways
- Need for consistency across priorities and strategies
- Research to drive policy and further research
- Development of tools for managers

Status of current programs and initiatives

- **Western states** are leading the way in addressing the seaplane pathway⁵
- **Ontario**
 - Produced a database of outreach materials
 - Evaluated how users react to varying degrees of engagement/enforcement on-site; how do you determine WHY users take preventative actions?
 - A pathway analysis is underway in Ontario; conducting preliminary review of legislation in neighboring provinces and states
- **Stop Aquatic Hitchhikers**
 - U.S. FWS has funding to create a portal where partners can download materials from around the country; what are the model projects and campaigns to be featured on the website; who is evaluating these resources?
- **Starry Stonewort Collaborative in the Finger Lakes** is looking at developing a similar platform (digital library); media, webinars, BMPs, factsheets, etc.
- **Minnesota**
 - There are roughly 1,200 watercraft inspectors in MN; 27 decontamination stations; ambassador programs among smaller lakes to cover gaps in inspection
 - MN Sea Grant conducted a comparison of Zebra Mussel Spread Across MN, WI and MI; the goal is to provide evidence that prevention is working by tracking infestations over 50 years
 - Surcharge on boat registration used to produce revenue for AIS prevention and control initiatives and funds the watercraft inspection program; more expensive for non-residents
- Regulations are pretty consistent among MI, MN, and WI; NY is not far behind; OH and PA are lagging

Priority needs for progress

Policy and regulation

1. Interstate consistency across regulations
2. Institutionalize mandatory inspections on-site
3. Harmonize regulations and risk assessments

Information and education

1. Identify recreational user groups that have not been targeted; e.g. sailboat and seaplane operators
 - a. How do you prioritize funding to address these groups?
2. Establish a searchable and contact-based index of outreach/educational/messaging materials for use by jurisdictions and other groups to provide consistency across materials
 - a. Pre-approved materials to use and modify

⁵ Protocols for decontamination of seaplanes are commonly in place in Western states

Recreational Activities Breakout Session Summary

- b. Tailored messaging for specialty vessels, e.g. wakeboard boats
3. Identify and prioritize locations for establishing outreach and inspections
4. Identify the information/advocacy gap between the panel and the states
5. Create a BMPs document/guide for states at varying levels of investment by jurisdictions
6. Produce training materials for law enforcement on a region-wide basis

Research

1. Cost/benefit analysis for inspection/decontamination stations
2. Methods for modeling boat movement
3. Evaluate effectiveness of messaging, outreach, and educational material

Aquaculture and Bait Breakout Session Summary

Facilitator: Tory Gabriel, Ohio Sea Grant

Aquaculture and bait goal priorities

- The priorities are both short in the way they are currently written
- Education and informational opportunities exist but very few specifically stated in the goal priorities

AIS-HACCP

- Tracking HACCP plans:
 - HACCP is a voluntary program that isn't being widely implemented⁶. More of a priority for information/learning but not with implementation. Would like to see it as a regulatory model
 - HACCP certification process with retailers would be really beneficial and powerful in the bait industry
 - The HACCP trainings that exist are fairly well known and some of the breakout group participants have even attended and led the trainings
 - HACCP is being implemented at part of larger AIS prevention programs but lack the requirements necessary to be fully useful – more of a good starting point that must be built upon
 - HACCP plans are in place in the bait industry purposes primarily to ensure those who utilize the plans aren't breaking the law. The existence and usage of these plans are not advertised to consumers
 - A plan is required by the individual/organization but after the creation of the plan, there is no additional reporting. But there should be some reporting (maybe every 6 months). HACCP is more of an education/outreach tool (uses the honor system)
 - A third-party verifier would be useful and even necessary to HACCP if it became regulatory
 - Encourage producers to implement the HACCP plan and then have a third party verifier confirm that they are actually doing it. If they do everything right (producers), then they will be given the certification
 - Questions that need to be answered include:
 - Do we want regulators in each state to be training in HACCP? Who are the leads in each state? Should we consider changing the culture instead of making HACCP regulatory – if so, how?
 - HACCP is currently missing the incentive since there isn't a third party verification program
- Evaluating the effectiveness of HACCP:
 - Need to determine way to assess the different HACCP plans that are being implemented by industry
 - Although no one is currently implementing this, we can review the documents and see species are pulled out and reporting in their forms. This approach is not fool proof

⁶ Lack of follow up verification of implemented programs prevents managers from understanding the extent to which HACCP programs are truly implemented and adhered to

Aquaculture and Bait Breakout Session Summary

because only works if the records are correctly maintained and in general, record keeping at this point isn't great

- There may already be plan in place to verify those certified are correctly implementing HACCP; needs looking into
- For the US Fisheries and Wildlife Service, HACCP is more about showing that the employees are aware of the processes involved in the program
 - The HACCP reports should be reviewed at least annually
 - Reviewing could help add some level of accountability that may be lacking
- Record keeping
 - Encourage high quality record keeping and make it easier to accomplish by the development of a built-in record keeping system
 - All record keeping forms are currently available online with examples of how to fill the forms in and other resources
- Current efforts that would/ are benefitting from HACCP programs:
 - Producer wanted to bring a nonnative fish species (barramundi) into aquaculture in Illinois. They conducted a risk assessment using expert opinion from across the country, asking questions such as: What happened if the fish escaped? How are other states introducing this species (was HACCP being used)?
 - Species specific screening with collaboration and communication between states
 - Natural fish facilities use HACCP in their hatcheries
 - Food industry in ON includes HACCP and considers cage aquiculture in the Great Lakes
 - COs are doing bait checks possibly based off HACCP plans
 - Aquaculture introductions (or for research or by an agency), HACCP is required as part of that evaluation for bringing a new species
 - The bait producers in Michigan are interested but not totally willing to create HACCP plans
- More information is need:
 - What are aquaculture regulations for states in the basin?
 - The North Central Regional Aquaculture Center (NCRAC) would be a good resource on aquaculture in general, specifically fish health and AIS (Chris Weeks was running it). NCRAC covers the eastern half of the basin less formally
 - NCRAC doesn't have plans to update in the near term
 - Great Lakes Fish Health Committee has a good structure that is followed when new fishes are brought into the basin
- **PRIORITY** – Change wording of bullet number one to include more than “fish”
 - The first bullet talks about the escape of fish however strongly encourage to look beyond at disease and other organisms that are transferred through the same pathways
- **PRIORITY** – Standardization of HACCP utilization across the basin
 - Standardize the implementation and tracking of HACCP across the Great Lakes basin by: knowing who is utilizing it (who is the responsible agency), improving record keeping and information sharing, and implementing a verification program (decide who will grunt the cost of the verification implementation)
 - To achieve this, there needs to be a clearer direction of where HACCP is going; an overarching goal that can be accepted across states
- **PRIORITY** – Incentivize HACCP (Main priority)
 - Incentivizing HACCP would make it more of an unfunded regulation

Aquaculture and Bait Breakout Session Summary

- Could do something like what is being done already in the smoke fish industry. The regulatory mechanisms are in place in similar other industries (i.e. the food safety industry). However, cost is a barrier
- This is a good place for the Great Lakes ANS Panel to be involved. However, the responsibility would likely fall more on the states
- **Sub-PRIORITY** - Identify specific impediments to HACCP implementation and methods to overcome those barriers
 - Industry are missing from this conversation and they are a key stakeholder that need to be brought into the conversation
- **PRIORITY** - Determine the best way to implement HACCP or show the value to interested parties by standardizing BMPs across the basin
 - This priority is over lessor importance at the time being. Not something that we need to solve it now
 - Develop training workshops to ensure high quality implementation
- **PRIORITY** – Begin a HACCP certification program for participants
 - A nonregulatory way to encourage participants (industry specifically) to get involved and create high quality HACCP plans
 - Creating a symbol that participants in the certification program can use for marketing purposes or to place on products (e.g., food certification, “dolphin safe tuna”) can make participating companies more appealing to ecologically- or conservation-minded consumers
 - Need to develop a list of standards to achieve the certification level
 - Still some remaining questions that need to be addressed: Who will regulate this? How will the public understand the change at their bait dealers?

Bait Program

- Existing programs in place:
 - Ohio has does some evaluation of bait shops. Involved putting a GoPro into tanks and documenting what is in them. The Conservation Officers have been trained in identification and it has proven to be a quick way to evaluate
 - In MN, regulators are looking at the suppliers who supply bait across the state. When they detect undesirable bait in shops, they ask for their supplier and go straight to the source
 - 95% of bait shops in MN are evaluated each year. Still value in interacting with the bait shops. Can also confirm their list of suppliers if the retailers are all visited
 - Extensive bait review currently happening in Ontario
 - Restricts the movement of bait by breaking down the province into 4 geographic zones where bait can only be moved bait south, NEVER north
 - Quebec has prohibited the use of bait all together
 - The Great Lakes Fishery Commission’s Law Enforcement Committee has conducted analysis on bait regulations and enforcement in the region
- From an outreach prospective, a lot of that work is done through bait shops. Should the outreach go to the consumers or retailers? They end up targeting consumers (anglers) and encouraging them to not dump their bait
 - Need the consumers to be able to identify potential AIS species could be in their bait.

Aquaculture and Bait Breakout Session Summary

- Hard to know how much taxonomy information needs to be included or is a simpler message of “don’t dump” better?
- **PRIORITY** – Standardizing risk assessment for new aquaculture (bait) species for in the basin.
 - Standardizing use of language, procedure, etc.
 - Set a minimum standard of methods/ procedures in risk assessment of new species
 - For aquaculture specifically, the species assessed are not looked at for specific pathway and purposefully don’t assess risk of introduction – focus on establishment, risk, and harm
 - Resource: Helen Roy (EU) developed minimum standards on what should be included in each the risk assessment
 - Need to determine what risk assessment frameworks are currently being used; where should we go with the clearinghouse; where are the weaknesses?
 - Building the clearinghouse can be helpful for making these risk assessment decisions. Are there less obviously invasive organisms that may be brought in?
- Need to consider industrial use of bait vs. private use of bait
 - Many individuals will purchase bait and transport that bait for fishing trips.
 - How do we reach the individuals purchasing bait? What outreach activities can we do that will be impactful?
 - Not allowing the transfer of bait outside of waterbodies but allowing capture and transfer within the waterbody could be a good way to prevent spread and deals with private capture
- **PRIORITY** – Education for private individuals capturing bait across the basin and gaining a better understanding how knowledge translates to action
 - Promote education and educational materials such as factsheets
 - There is nothing under research on the crosswalk document – do we need more research on how to reach people?
 - Could implement a survey on bait usage for anglers across the basin although this may have already been done⁷
 - May need to do more social science research on what knowledge leads to action
 - Identifying AIS species is a huge lack of skills for the public
 - Need to be targeted in the education efforts; area specific
 - Getting in the classroom and educating the next generation
 - Sea Grant is currently has trunks, packs, and curriculum for teachers

⁷ Sea Grant conducted an unpublished study in 1999 on this topic that may be available from Pat Charlebois or Doug Jensen

Control Breakout Session Summary

Facilitator: Sara Stahlman, Pennsylvania Sea Grant

Group One

Existing projects/programs related to control:

- Great Lakes Phragmites Collaborative
 - This group evolved organically and used Collective Impact to establish structure and help advance common objectives
- Hydrilla Collaborative
- Invasive Mussel Collaborative
- Sea lamprey control program
- Starry stonewort collaborative (starting soon)
- Invasive species research institute in NY – creating documents on water milfoil

Discussion: What could be the panel's role to address issues related to AIS control?

- The panel should identify existing projects and control strategies, determine which species need to be controlled in the Great Lakes, and evaluate effectiveness of current efforts
- The panel should identify gaps and consider how to support emerging collaborative initiatives
- There are several single-species collaboratives but this approach isn't needed for all species
- The panel should consider the feasibility of addressing individual species and act strategically
- Information-sharing is needed for starry stonewort and Eurasian water milfoil – how can we synthesize and collate information into BMPs that can be widely shared?
- The panel needs a research-based approach to help facilitate decision-making
- Research results need to be honed into BMPs that can be used on the ground
- Collaboratives could take the lead in translating research for the layperson audience as well as in consolidating and ensuring accuracy of BMPs
- The panel could begin with a species list and evaluate control options by considering probabilities of success and lessons learned from long-term programs like lamprey
- There's already a lot of information on risk assessment. Instead we should:
 - Identify gaps
 - Address multiple vectors for individual species
 - Identify control methods that can be useful for managing multiple species
- The panel needs a clear understanding of what the benefits of management would be as part of an evaluation of the feasibility of management actions
- The panel shouldn't focus on species that are already being addressed by other initiatives (e.g. sea lamprey)
- Approach:
 - Identify species
 - Identify pathways and gaps in addressing each species
 - Identify BMPs for each species

Discussion of Priority Actions:

1. Identify priority species

- We need to prioritize species that can be the focus of efforts
- A research committee should identify the next high profile invasive or identify established species that can be the focus of work
- The committee should determine the status of individual species as part of the prioritization process, by: conducting a risk assessment; seeking recommendations; and identifying who can do this work
- The panel needs to consider and clearly identify the role of GLANSIS in this process
- The panel needs to connect research priorities with control priorities
- Action: develop a process for the panel to identify priority species for control

Control Breakout Session Summary

2. **Conduct gap analysis**

- This can be conducted by research committee
- The analysis should include identification of pathways
- The panel can lean on collaboratives for support and information
- The research committee could develop recommendations as part of prioritization process
- The research committee could also develop rapid response plans
- Action: A research subcommittee should conduct a gap analysis which includes pathways and recommendations for new control strategies

3. **Translate information**

- BMPs and guidance documents should be developed that connect science to applied management
- The panel should identify the need for BMPs but should not write them
 - If collaboratives are conducting research and testing management actions they should create BMPs; the role of the panel could be to distribute/communicate facilitate uptake and assist in review/assessment as needed
- Rapid response plans should be included as part of BMP development
- If we don't establish single-species collaboratives, the work to compile research and develop BMPs should be conducted by:
 - Other organizations like the GLC who can step in to fill gaps if there is funding
 - In the past, a subset of panel members has convened to discuss and then allocated appropriate tasks to other organizations
- Existing BMPs need to be organized and consolidated, and incorporate adaptive management approach where possible to track long-term effectiveness and identify what does not work
- Within the BMPs we should provide basic guidelines on permitting and monitoring, and promote long-term planning (lake management plans are an example of this at a broader scale)
- BMPs are useful at the fine scale, but large-scale effectiveness is more complex and can't be achieved with a simple BMP
- Support generated from this panel can help to ensure consistent funding for collaboratives that are effective, particularly if they are expected to provide these services
- The panel needs to inform policy-makers and governments, and communicate how control actions tie into broader work on invasive species including policy
- Action: Develop a process through which we can determine who can do the BMP work if there isn't an existing collaborative, and create a subcommittee if needed

4. **Developing and implementing new control strategies**

- New control strategies and tools have potential for success but also may present risks
- Regulatory, outreach, and policy support is needed to help guide processes in the development and approval of new chemical tools
- Can the panel help to guide how these new tools are implemented and where they are implemented? There is a need to communicate to the public why these tools are necessary and create support
- Potentially controversial components of control work should be identified ahead of time
- Alternatively, the panel could stick to a solely informational role, focusing on risk communication, public outreach, and other social science considerations
- What are other panels doing in this realm?
- First step: reach out to other panels and learn how they are acting to assist in the development and/or implementation of new control strategies

Summary of Actions:

1. Action: develop a process for the panel to identify priority species for control

Control Breakout Session Summary

2. Action: a research subcommittee will conduct a gap analysis which will include pathways and recommendations for new control strategies
3. Action: the panel will develop a process through which we can determine who can do the BMP work if there isn't an existing collaborative and create a subcommittee if needed
4. First step: reach out to other panels and learn what they are doing to address challenges around developing new technologies for control

Control Breakout Session Summary

Group Two

Existing projects/programs related to control:

- There is a program led by Ohio DNR, Michigan DNR, and USGS to tag grass carp and release them back into the system to improve understanding of grass carp life history and improve the understanding of where the fish go outside of high flow events. This approach has been controversial, but it has yielded important data. Public outreach has been important to communicate why this work is necessary
- Nature Conservancy have developed fish spawning reefs for invasive crayfish and goby control. Through this project they have learned a lot but need more information. Basic understanding of the life history of the target species is critical for effective control and is a requirement for funding applications (it's not possible to apply for funding for control work without fully understanding effective control strategies)
- There is ongoing research on Starry Stonewort, but knowledge gaps remain
- There is also ongoing research on a digestive fish pesticide, but more funds are needed to navigate the federal approval process

Discussion: What could be the panel's role to address issues related to AIS control?

- Private businesses need support and buy-in from federal agencies to support development of new technologies
- The panel could have a role in facilitating public-private partnerships
- The panel could identify potential benefits from managing certain species and use this information to identify strategic actions
- A gap analysis is needed to identify knowledge gaps in life history and other challenges
- Commercial harvest for carp isn't an effective control strategy
- The panel should continue to ensure that the latest science is being translated effectively and accurately to inform BMPs
- The panel should continue to facilitate informed decision-making and ensure that the benefits of control work can be realized before action is taken (e.g. GLERL is doing an ecosystem-level assessment of gaps and how they can be effective)
- The panel should continue to help improve communication among collaboratives and facilitate sharing of effective tools and strategies
- Each collaborative has developed their own lessons learned, goals, objectives, and are working on similar issues (e.g. advancing new control technologies)
- The panel should identify common issues that existing collaboratives are facing, collate these lessons learned, and share widely

Considerations for a gap analysis:

- Gap analysis components should include: life history, monitoring to determine location, feasibility of management, and control options
- Habitat requirements and the potential geographic range for a species should be understood and categorized before any control actions are taken
- There are multiple layers of bureaucracy, so inter-agency collaboration is needed to work through processes without funding for all steps
- Specific government agencies should be identified to address gaps relevant to their expertise
- Consider conducting a collaboration analysis (e.g. Who is doing what, and what do we know?), and consider requesting funding to do this as a precursor to the gap analysis
- Many organizations have been established and many plans and policies have already been created; we need to coordinate more effectively between and among them, but staff time limits mixing between these groups
- A centralized database of ecological niche modeling is being developed by GLANSIS, and this resource will assist with information sharing and inter-agency collaboration
- The panel could hold a technical exchange that reviews new control technology with a focus on regional agencies that have a role in reviewing and approving these technologies

Control Breakout Session Summary

- Collaborative organizations could help businesses navigate approval processes and identify funding
- Public access sites – how to keep species out of water around public access sites – BMP? Establish biosecurity zones; encourage specific inspection practices; e.g. Aquatic Ecosystem Restoration Foundation is an industry-funded org has a BMP guide for BMPs; more public agencies could be involved in this org
- The panel could consider partnering indirectly in research grant programs which provide funding for research projects
- DOI should have a small business research funding program to encourage private sector investment in control technologies

Priority Actions:

1. Improve communication – list all control options on website, act as a clearinghouse of existing control methodologies
 - Collaborative exchange – gap analysis
 - Invasive mussel collaborative asked people to self-report; difficult to keep current
 - Work with existing collaboratives to compile control strategies and keep up to date
2. Where collaboratives have not yet been developed; identify people who could be good contacts to collaborate and share knowledge
 - Identify an official contact person from each collaborative to report out to the panel on work and share information; report on work once per year
 - Include as a regular part of panel meetings; panel members can ask questions and identify ways to assist
3. Conduct risk analysis and gap analysis – first step would be to refine list of criteria including permitting and limitations that are imposed through permitting process; evaluate the benefits of action, create criteria for orgs to work through determining potential control strategies, benefits, gaps in info, life history