

2016

FLATHEAD BASIN Aquatic Invasive Species Strategic Prevention Plan



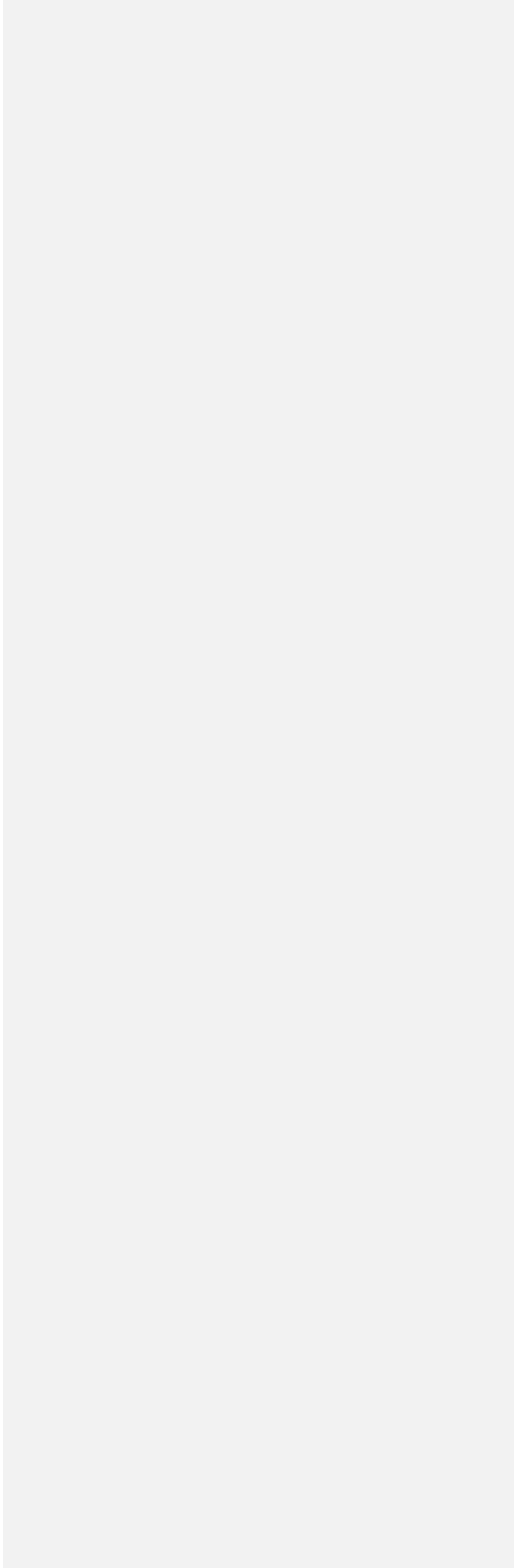
The mission of the Flathead Basin AIS work group is to work locally to help prevent the introduction of aquatic invasive in to the Flathead Basin, and to help contain, control and, where possible, eradicate the aquatic invasive species present in the Flathead Basin.

Table of Contents

Executive Summary	3
Introduction.....	4
About the Flathead Basin AIS Work Group and the Prevention Strategy	5
Area of Concern.....	9
Section 1: Prevention	10
Section 2: Monitoring	13
Section 3: Rapid Response.....	15
Section 4: Containment & Mitigation.....	16
Section 5: Education and Outreach.....	18
Section 6: Research.....	20
Section 7: Innovation for the Future	21
Appendix A: Action Items for 2016	22
Appendix B: Action Items for 2017 to 2020	24
Appendix C: Budget Needs	25
APPENDIX D: AIS threats to the Flathead River Basin.....	26
Appendix E: Summary of Curlyleaf Pondweed Management in Flathead Lake and River, Montana	32

Executive Summary

To be completed after body is finalized.



Introduction

Introductions of Aquatic Invasive Species (AIS) have caused the decline and extinction of many plant and animal species, and are cited as a cause of endangerment for 48% of the species listed under the Endangered Species Act (ESA). In 2005, AIS cost the US economy over \$120 billion. Their occurrence and distribution are increasing rapidly. For all of these reasons, there is an immediate need to develop local, regional, and national strategies for prevention and management of AIS.

AIS are nonindigenous invasive species that can harm aquatic ecosystems and their capacity to benefit people. AIS influence nearly every aquatic ecosystem in the United States, posing risks to native species within those ecosystems, as well as human and wildlife health. AIS can be plants, such as Eurasian watermilfoil; animals, such as zebra mussels or nonnative fishes; pathogens; and other microorganisms, such as the parasite that causes whirling disease. Once introduced into new habitats these organisms disturb native species through competition, predation, displacement, hybridization, spread of disease and parasites, and can ultimately cause extinction of many valued organisms. AIS can also affect humans by causing adverse impacts to commercial, agricultural, aqua-cultural, and recreational activities that depend on water resources for their viability.



Figure 1 Zebra mussels. Photo courtesy of Michigan Sea Grant.

AIS are introduced to new habitats through both natural and human-caused mechanisms. In many waters, fisheries management programs have intentionally transplanted nonnative sport fish to provide recreational opportunities. Other aquatic organisms have been transported via ballast water in ships, aquarium releases, and illegal translocations. Regardless of the cause of species introductions, the establishment and proliferation of AIS often results in the decline of native organisms and the modification of aquatic communities. Over the past 50 years the rate of AIS introduction has dramatically increased. Once introduced, populations often grow quickly and spread rapidly due to lack of natural controls. Once established, AIS can displace native species, clog waterways, impact municipal and industrial irrigation and power systems, degrade ecosystems, reduce or threaten recreational and commercial fishing opportunities, and can cause wildlife and public health problems.

Aquatic Invasive Species are a serious problem in Montana. There are currently over 70 nonindigenous aquatic species reported in Montana and many more could be accidentally introduced. Current state activities and mandates have addressed AIS, their prevention, and control. However, there is a need to combat AIS at the local watershed levels to assist with these efforts. To address the need, the Flathead AIS Work Group established a Flathead Basin Aquatic Invasive Species Management Plan, tiered to the

federally approved State Aquatic Nuisance Species Management Plan. The 2010 Plan was the initial step in establishing a cooperative program in the Flathead Basin to help address AIS threats. The Flathead Basin AIS Work Group used the Plan to establish a great deal in the next five years; however, a revised plan is needed to outline next steps to be taken for continued success in preventing, monitoring, responding to new infestations, mitigating AIS, education and outreach, and research.

About the Flathead Basin AIS Work Group and the Prevention Strategy

The Flathead Basin Commission convened the Flathead Basin Aquatic Invasive Species Work Group in 2009 in response to the discovery of Eurasian watermilfoil in Noxon and Cabinet Gorge Reservoirs, the first known infestations in the State, and the spread of Dreissenid mussels to Lake Mead, the first infestation west of the Mississippi River. In 2010, the Work Group completed and implemented the Flathead Basin Aquatic Invasive Species Prevention Strategy. The Flathead AIS Work Group makes the Basin AIS program both possible and successful.

Originally, the Work Group consisted of 15 stakeholders. Currently, 27 active members participate, and our partnerships continue to grow. The following is a current list of work group participants and stakeholders.

• Alberta, Province of*	• Glacier National Park
• Blackfeet Tribe*	• Great Northern Landscape Conservation Cooperative*
• City of Polson*	• Lake County
• City of Whitefish*	• Lake County Weed District*
• Clark Fork Coalition*	• Lolo National Forest*
• Clearwater Resource Council*	• Missoula County Weed District
• Confederated Salish and Kootenai Tribes	• Montana Department of Agriculture
• Crown Managers Partnership*	• Montana Dept. of Fish, Wildlife & Parks
• Flathead Basin Commission	• Montana Dept. of Natural Resources
• Flathead Conservation District	• Sanders County
• Flathead Chapter of Trout Unlimited*	• Swan Lakers*
• Flathead Lake Biological Station	• U.S. Bureau of Reclamation
• Flathead Lakers	• U.S. Geological Survey
• Flathead National Forest	• U.S. Fish and Wildlife Service*
• Flathead Lake Protection Association	• Whitefish Lake Institute
•	• Whitefish Water and Sewer*

* Denotes Work Group members who have joined since 2010

The Flathead Basin Work Group accomplished a great deal since the original Prevention Strategy in 2010, including two successful pilot programs. In an effort to continue to foster innovation, a new section to the plan, called “Flathead Pilot Projects,” was added to the 2015 AIS Strategy. Since the Work Group embraces the concept of adaptive management, and often responds by “thinking outside of the box,” many Pilot Projects have resulted and led to programs unique to the Flathead Basin. The two most notable Pilot Programs are an “AIS Detection Dog” program through a partnership with the Province of Alberta and launching an Aquatic Invasive Prevention Program in partnership with the Blackfeet Nation, which featured regulations far more robust as compared to the State of Montana. Starting in 2015, all watercraft launching on the Blackfeet Reservation must be inspected prior to launching in Blackfeet waters. These pilots provide data and impetus for improvements in AIS prevention at the landscape scale.

In addition to the pilot projects noted above, the Flathead AIS Work Group completed many goals set out in the 2010 – 2014 Strategy. A full list can be seen in Appendix XXX; however, some of the most significant ones are highlighted below:

- Raised \$XXXXCARYN GET FINAL NUMBERS to ensure that watercraft entering the Flathead basin were inspected. Funds went to watercraft inspection stations at Clearwater, Coram and Browning.
- Responded to two new invasive plant introductions: Eurasian watermilfoil in Beaver Lake and curlyleaf pondweed in Flathead Lake and River.
 - Eurasian watermilfoil was discovered in Beaver Lake in 2011. Partners worked quickly to restrict boater movement, install bottom barriers over the primary plant bed and dredge individual plants that had spread around the perimeter of the lake. In 2011, XXX lbs. of plant material was removed from Beaver Lake. By 2015, the number was reduced to XXX lbs. of EWM removed. It is estimated that full eradication will occur within less than five years.
 - Curlyleaf pondweed was discovered in Flathead Lake....ERIK WRITE quick success blurb
- Created outreach materials for a wide variety of audiences. Work Group partners created three AIS brochures, one of which is used throughout the state; an AIS video called “Boat Launch Trivia,” that can be watched at XXX; a 13-lesson high school AIS curriculum, an AIS kiosk for display at events; and an AIS Speakers Trunk, which includes brochures, monitoring information and a narrated PowerPoint presentation.
- In 2010, when the Flathead AIS prevention plan was originally adopted, baseline AIS data was completely lacking. Today, AIS monitoring is an integral part of the AIS prevention program in the Flathead Basin. We now have baseline data, including calcium levels, for all lakes (other than some backcountry lakes) in the basin. Moreover, a monitoring plan has been developed which directs frequency intervals based on a basin-wide risk analysis, and includes monitoring

for both invasive plants and mussels. This effort will assist in targeted, rapid response in the event that a new invasive species is detected in the Flathead Basin.

- The Flathead has worked to broaden its partnerships regionally to enhance AIS prevention efforts. The Flathead now works with the Crown Managers Partnership (CMP)¹ and the Great Northern Conservation Cooperative (GNLCC)² to ensure that AIS prevention efforts are coordinated at a landscape scale.
- The Flathead has worked with Montana legislators to improve statutory AIS protection efforts. Since 2009, the Flathead stakeholders have worked each biennium³ to craft statutory amendments, including but not limited to the additional of an AIS trust fund; empowerment of all peace officers to enforce the AIS statute; provisions allowing local governments to operate Watercraft Inspection Stations, etc.
- In 2010, Eurasian Watermilfoil (EWM) was detected in Beaver Lake. The containment plan developed for Beaver Lake has been a great success, and we project that by 2017 EWM will be fully eradicated from this water body – though monitoring will continue for up to another 5 years.
- The Flathead stakeholders funded environmental DNA (edna) research for zebra and quagga mussels undertaken by the Flathead Lake Biological Station. The lab protocol that was successfully developed has enhanced our AIS monitoring efforts, and has provided us with another methodology that can now be used for early detection efforts.

The tasks listed above could not have been accomplished without fiscal and in-kind support. The Flathead Basin AIS Work Group would like to especially thank Avista Corp, Blackfeet Tribe, City of Whitefish, Confederated Salish and Kootenai Tribes, Flathead County Conservation District, Flathead Lakers, Flathead Protection Association, Glacier National Park, Glacier National Park Conservancy, Great Northern Landscape Conservation Cooperative, Crown Managers Partnership, Lake County, Lake County Conservation District, Lake County Weed District, Montana Department of Agriculture, Montana Department of Fish, Wildlife and Parks, Montana Department of Natural Resources and Conservation, Swan Lakers, Trout Unlimited Flathead Chapter, U.S. Bureau of Reclamation - Hungry Horse, U.S. Bureau of Reclamation – Washington D.C., U.S. Forest Service – Flathead National Forest, U.S. Forest Service – Lolo National Forest, U.S. Fish and Wildlife Service, Whitefish Lake Institute, and Whitefish Water and Sewer District for their contributions to the basin-wide AIS effort.

¹ The CMP is a group of natural resources managers from Montana, Alberta and British Columbia that voluntarily partner to improve and enhance natural resource management across jurisdictional borders.

² The GNLCC is a federal initiative designed to enhance cooperative resource management from a large landscape, regional perspective.

³ The Flathead stakeholders assisted with successful legislative efforts in 2009, 2011, 2013 and 2015.

Much work still needs to be done to ensure success. This Plan outlines a new set of goals and tasks to be completed from 2016 – 2020 to make sure we continue to keep aquatic invasive species out of the Flathead watershed, contain existing populations, and responsibly and effectively react to new infestations. The plan is broken down into the following sections:

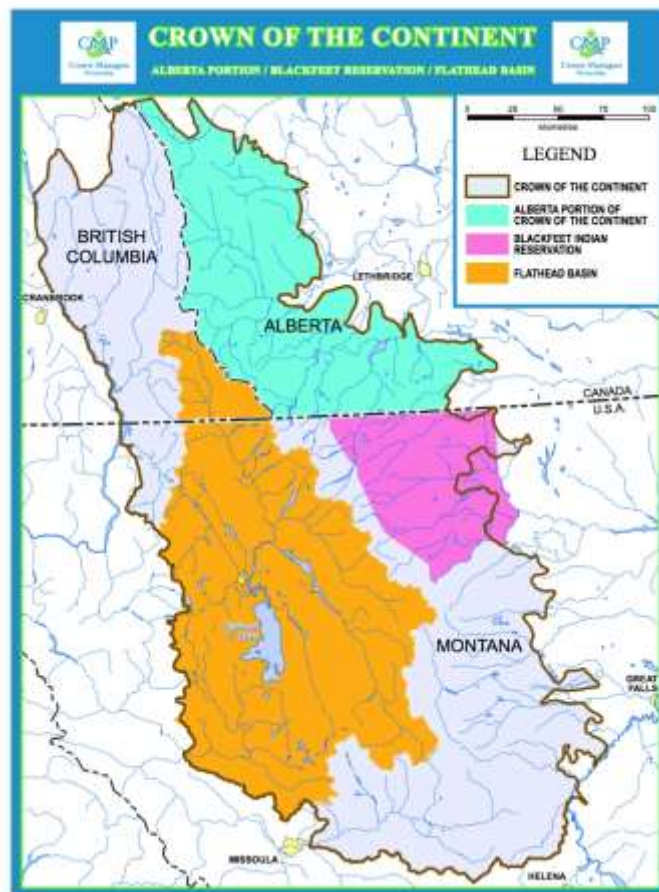
- Prevention
- Monitoring
- Rapid Response
- Mitigation
- Education and Outreach
- Research
- Innovation for the Future

Each section will have a corresponding committee that will meet in conjunction with the AIS work group meetings and track the progress of the tasks outlined in this strategy and outline needs for upcoming strategy activities.

Area of Concern

The area of concern includes all aquatic and riparian environments in the Flathead Basin. Due to strong partnerships with groups adjacent to the Basin, Alberta and the Blackfeet Indian Reservation are included (Figure XXX). The Flathead Basin encompasses 8,587 square miles (approximately six million acres) in Northwest Montana and Southeast British Columbia, including Flathead Lake, rivers, tributaries, lakes, ponds and wetlands. The basin drains the western and southern slopes of Glacier National Park, as well as portions of the Bob Marshall Wilderness Complex. The Flathead River is the largest tributary to the Clark Fork River, which flows into Lake Pend Oreille, Idaho, and the Flathead Basin serves as the headwaters for the Columbia River system.

The Flathead Basin is arguably the most intact native aquatic ecosystem in the United States (outside of Alaska). For example, this Basin supports some of the last best habitat for native cold-water aquatic species in Montana, including bull and westslope cutthroat trout. Within the Flathead Basin, AIS have the potential to significantly impact the fragile ecological balance between physical habitat and the native plants and animals that depend on it (see Appendices C & D for a summary of AIS species currently posing the greatest threats to the Flathead Basin). Since the Flathead Basin is located in the headwaters of the Columbia River Basin and sustains numerous native fish populations, any infestation of AIS here could result in serious adverse impacts to native fish and aquatic health within the Basin as well as downstream.



Section 1: Prevention

The adage “an ounce of prevention is worth a pound of cure” is a dramatic truism with aquatic invasive species. It is far less costly to prevent an introduction of AIS than to pay for control or eradication once an unwanted species becomes established (assuming control or eradication is even possible). If prevention is unsuccessful and an invasion occurs, managers must act immediately to detect, contain or eradicate the invasive species, otherwise the community will likely face expensive, long-term efforts to manage a well-established species with the potential to spread to other water bodies. In most instances a quick and powerful response is needed if there is to be any hope of eradication, containment, or cost control. Responding to an invasion becomes less feasible as the organism becomes more widespread – as the size and cost of treatment increases, and the chance for successful control diminishes.

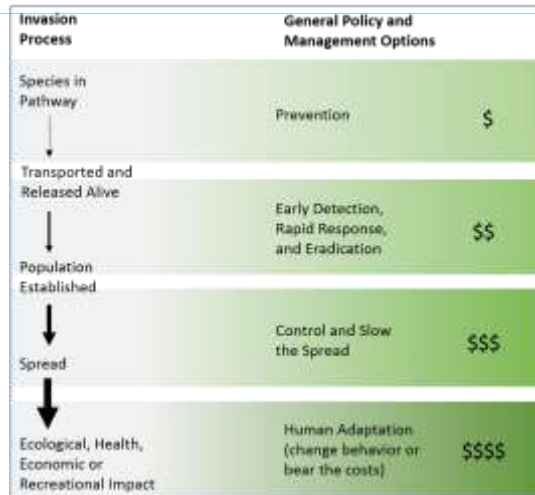
Focusing efforts on introduction pathways, and risk/vulnerability criteria and procedures will be critical to prevent additional AIS from invading and spreading within the Flathead Basin. Some AIS species are already established and spreading in the Flathead system, including whirling disease, flowering rush, and several fish species. Others we’ve been able to diminish like curlyleaf pondweed in Flathead Lake and Eurasian watermilfoil in Beaver Lake. To prevent any new AIS invasions, we must engage organizations and agencies in collaborative planning and action. We must also understand the pathways of introduction so that we can better direct our prevention efforts.

Ultimately, we need to have sufficient resources, criteria, and procedures in place to implement each of the plan components.

The specific prevention strategies and action items are described below.

STRATEGY 1A: Work with partners to ensure that the Flathead Basin region/Crown of the Continent possesses a fully functional perimeter defense plan. Recognizing that keeping AIS out of Flathead will be more successful when there are no AIS in neighboring waters, it is in the best interest of the Plan to keep AIS out of the entire Crown of the Continent Region. We support all AIS prevention efforts by neighboring watersheds, and the following actions will be taken in the Basin to defend against any new AIS introductions:

Figure1: Model of Increasing Costs Based on Invasion Process and Management Response. Source: CDFG (2008)



Commented [d1]: Insert a footnote citing two of three cost estimates – ie. ACE, NWPPC, etc.

- Ensure that all major roadways into the Flathead Basin have mandatory watercraft inspection stations.

- Hwy 93
- Clearwater
- Hwy 2

- In addition to Work Group members, Montana partners may include MDOT...
- Coordinate, through the CMP with Canadian partners to facilitate perimeter defense for the Crown of the Continent ecosystem.
- Encourage longer hours of operation, earlier season and two-way inspection stations, as appropriate.
- Identify areas where the use of AIS detection dogs may be efficient and effective
- Enhanced enforcement to increase compliance rates/reduce drive-bys (see strategy 1D below)



STRATEGY 1B: Operate volunteer watercraft inspection stations at boat launches in the Flathead Basin. The Flathead region started a volunteer watercraft inspections in 2011, and volunteers from multiple organizations have inspected over **XXXHeidi get numbers** boats. The following steps will ensure continued success of the volunteer inspection program:

- Provide WIT 1 training to volunteers
- Maintain inspection programs on existing lakes
- Expand volunteer base to incorporate new lakes into the program
- Create incentives for groups to participate in the program
- Ensure that all data collected is uploaded to FBC website and made available to the public

STRATEGY 1C: Create and support legislation, regulations and/or ordinances that prevent the introduction of AIS to the Flathead Basin and Montana.

- Federal legislation
- State legislation
- Local Ordinances

STRATEGY 1D: Partner with local Law Enforcement agencies to ensure existing AIS laws are enforced in the Flathead Basin. Legislation passed in 2015 allows any law enforcement agency to respond to AIS violations, and there was success on the Blackfeet in drive-by reduction and regulation compliance when law enforcement, including city police and game wardens, worked with the watercraft inspectors. Basin-wide efforts need to be made to support AIS laws in the Flathead. Specifically, we need to:

- Identify jurisdictions
- Familiarize appropriate law enforcement agencies with the issue and applicable laws.

STRATEGY 1E: Evaluate the value and potential structure of an effective “Flathead First Alert” system to ensure boats with AIS heading to the Flathead or the Blackfeet Reservation are intercepted and decontaminated.

- Create an on-call schedule so an AIS person can always be reached
- Establish a basin-wide phone tree to notify stakeholders in the Basin
- Make sure that decontamination equipment is available at key Basin areas.

STRATEGY 1F: **Identify less common AIS vectors and ensure they are AIS free.** While boats are the most common means of the introduction and spread of AIS, there are other vectors that require outreach and best management practices. Those vectors include:

- Pet and nursery trade
- Firefighting equipment
- Sea planes
- Equipment/construction

Section 2: Monitoring

Without clear knowledge of the location of existing populations of AIS within the Flathead Basin, our fight against AIS is like boxing in the dark. This portion of the implementation plan addresses the need for continuing AIS monitoring the Basin-wide and reporting to confidently keep an eye out for new AIS infestations and the movement/growth of existing populations.

Water bodies in the Flathead Basin were prioritized by risk of introduction in 2013 **Erik – confirm** and a monitoring plan was completed as a result. A list of lakes ranked from highest to lowest risk of AIS introductions is in **Appendix XXXX**; the Basin-wide AIS monitoring Plan is **in Appendix XXXX**.

This section also provides an approach to sharing data and producing reports to analyze trends over time. Work is currently being done to establish a basin-wide GIS database of existing AIS populations. Reporting new infestations has been challenging in the last five years; there is a need to create an easier way to communicate new populations within the basin. Associated monitoring benefits include clear knowledge of existing conditions to facilitate effective monitoring, and a cooperative database for information sharing and communication.

STRATEGY 2A: Continue to implement the AIS Monitoring Plan in the Basin. An AIS Monitoring Plan was completed in **XXX-ask Erik** that identified water bodies that were at the highest risk of AIS introductions and surveys the lakes every 1 to 3 years depending on the risk.

- Meet with partners at the beginning of the field season to:
 - Identify/modify protocols to be utilized
 - Ensure that all monitoring entities are familiar with the protocols;
 - reduce duplication of efforts:
 - confirm water bodies to be monitored and frequency rate;
 - ensure any pertinent data gaps are filled;
 - modify the plan when necessary
- Obtain funding for AIS monitoring in the Basin
- Conduct AIS annual monitoring
- Prepare Annual Report and distribute results
- Incorporate results into appropriate spatial databases
- Conduct fall monitoring group meeting to discuss the previous season's activities and results

STRATEGY 2B: Use, develop, or modify existing universal/consistent survey methodologies for basin-wide use.

- Use Montana Aquatic Invasive Aquatic Plant Survey, Monitoring and Plant Sample Collection Protocol for plant monitoring. **(Appendix XXX or summarize?)**
- Use Montana **FWP?** monitoring for microscopy. (Appendix or summarize?)
- Use **FLBS?** monitoring for eDNA testing (Appendix or summarize?)
- Work with partners to make protocols available on websites with contact information to direct questions.
- Meet once a year to review protocols and suggest changes.

STRATEGY 2C: Use existing databases/maps as templates to incorporate new survey data when available. Develop a basin-wide AIS database/map if needed.

- Use existing GIS databases of existing plant populations when available, create new GIS databases as necessary.
- Create GIS layer documenting spread of AIS within the Flathead Basin
- Develop an online reporting tool to facilitate the reporting of newly discovered or suspected AIS

STRATEGY 2D: Continue support for other monitoring efforts in the Flathead Basin Region

- Continue to support and obtain funding for professional AIS monitoring services and rapid assessments;
- Provide monitoring training and continue to support volunteer monitoring efforts including but not limited to: Clearwater Resource Council, Whitefish Lake Institute and Swan Lakers;
- Recruit new organizations to start monitoring programs;
- Start an annual "Mussel Walk" on Flathead Lake; and
- Offer mussel substrates to groups to enhance public participation.

Section 3: Rapid Response

Without a rapid response plan, we lack the ability to respond to newly detected AIS in a timely fashion. This inability to respond can lead to many unwanted outcomes, including spread to unaffected water bodies, and increased costs to mitigate as AIS populations grow unabated. Therefore, Basin-wide rapid response protocols are needed to effectively address newly discovered AIS populations.

In cases where Tribal, State, federal and local resource agencies have rapid response plans, such plans should be coordinated. However, if plans are lacking or inadequate, which is often the case, an integrated rapid response plans needs to be developed.

STRATEGY 3A: Undertake comparative analysis of Rapid Response Plans, including those of the Western Regional Panel, provinces and nearby states, to assist in crafting a Flathead Basin Rapid Response Plan.

STRATEGY 3B: Write and adopt a Flathead Rapid Response Plan for AIS.

- Establish a sub-committee within the Work Group to create the Basin-wide Response Plan. The plan should:
 - Develop an improved notification structure within the Flathead Basin.
 - Define authorities and responsibilities in a rapid response scenario that includes plants, animals and pathogens.
- Create easy-to-follow rapid response protocols for plants, animals and pathogens. Coordinate a table top exercise to test the rapid response plan
- Annually review and update as needed, Aquatic Invasive Plant Plan (see [Appendix x](#))

STRATEGY 3C: Ensure framework is established to enact Rapid Response when needed.

- Boat ramp closed signage and associated materials
- Emergency funding identified
- Public outreach/media
- ???



Section 4: Containment & Mitigation

Containment of established populations is the next step after monitoring/early detection and rapid response. Timing for the containment of AIS should coincide with the rapid response plan and a smooth transition from an immediate response to a long-term containment effort is critical.

Integrated control strategies include physical, chemical and biological mechanisms to eradicate or reduce AIS populations. Selection of one or more control strategies can be influenced by agency policies, as well as conditions on-the-ground, so that different controls may be employed for the same AIS depending on the jurisdiction, and the conditions dictating preferred methodologies. Optimally, state, federal and tribal land management agencies with functional AIS containment programs should coordinate mitigation efforts to obtain the best outcomes at the landscape level. Other factors to consider when developing long-term mitigation plans include:

- Size of infestation;
- Demonstrated history of control and/or eradication elsewhere;
- Knowledge of species life history;
- Potential environmental, economic, recreational and human impacts of mitigation techniques, including impacts on threatened and endangered species;
- Financial support for initial and follow-up management;
- Likelihood of reintroduction; and
- Public comment.

An initial containment and mitigation plan was established by the Flathead AIS Work Group to address curlyleaf pondweed (CLP) in 2012, when the plant was discovered. The plan has been successful to date. In 2012, Dr. John Madsen, working for DNRC, detected 7 locations in Flathead River with CLP. Today, CLP remains in only 2 locations Flathead Lake. However, the CLP in the River has proven to be more challenging. To better address the infestation in Flathead River, the Flathead AIS Work Group adopted a plan in 2015 which calls for more aggressive control efforts, focusing primarily on the use of diver dredge and benthic barriers, see [Appendix XXX](#). The control measures in use or being investigated for use in the Flathead River are not necessarily aimed at eradication, but at a minimum the effort will control the spread of this noxious invasive plant; however, extirpation of localized open-water AIS plant populations appears to be possible, as does eradication in Flathead Lake⁴.

Abating the impacts of AIS is time consuming, costly, and sometimes ineffective. However, not attempting any control of AIS is inviting further spread within the Flathead Basin and will likely lead to contamination of unaffected areas external to the Basin. Moreover, in many situations much can be done to contain the AIS, especially if they are detected early. In addition to standard mitigation techniques, containment measures may also be needed that involve mandatory watercraft inspections or even seasonal closures or quarantines (see Prevention, page [xx](#)).

⁴ Though the CLP population in the lake can be controlled and perhaps even eradicated, annual monitoring and dredging will continue well into the future if the CLP population in the River is not eradicated.

STRATEGY 4A: Complete a Programmatic Environmental Impact Statement for the Flathead Basin for the use of different control measures, including herbicides.

STRATEGY 4B: Identify jurisdictional responsibilities for infestation in question.

STRATEGY 4C: **Develop general Standard Operating Procedures (SOPs) for long term containment for newly discovered AIS infestations.** Specific containment actions will likely be site-specific. See Rapid Response on page xx for a discussion of short term containment efforts.

- Plants
- Mussels
- Fish
- Pathogens

STRATEGY 4D: Develop mitigation plans for existing and newly discovered AIS infestations.

- EWM in Beaver Lake
- CLP in Flathead Lake and River
- other

STRATEGY 4E: Establish and maintain funding sources to support mitigation that minimize impacts of AIS, initially focusing on EWM effort in Beaver Lake and CLP effort in Flathead Lake and River.

STRATEGY 4F: Facilitate discussion amongst responsible management agencies to better coordinate and fund mitigation efforts.

Section 5: Education and Outreach

The success of this AIS Program depends upon public and local business support. Focusing efforts on education and outreach has been critical in preventing additional AIS from invading the Flathead Basin as well as containing AIS already present. There is a need to foster understanding of the AIS threat and provide direction and information about ways to prevent or control local infestations. There is a need to encourage people to inspect, clean, drain and dry boats, trailers, waders, and any other gear used in more than one water body. There is a need to develop and implement consistent education and outreach plans addressing AIS throughout the Flathead Basin, and to develop an AIS-free certification program.

Given that humans are a primary vector for transporting AIS, the success of our strategic plan rests on our outreach activities to inform the public of AIS threats in a way that encourages active participation in prevention efforts. Previous outreach campaigns have been successful in raising awareness in the Basin (Appendix XXX). **Do we have anything tangible to use as a reference for how much awareness has increased? Sanders County...**

This portion of the implementation plan defines how we will continue to increase public awareness and initiate basin-wide participation in AIS prevention activities. Since successful programs to educate the public about the threats, impacts, and prevention of AIS have been undertaken by the Flathead AIS Work Group, the need is shifting to a call to action for AIS preventing behaviors. This can be done only by institutionalizing behaviors and procedures that reduce the potential for AIS spread, regardless of survey knowledge, defining and incorporating Best Management Practices into management actions.

STRATEGY 5A: Inform the public, policy makers, natural resource workers, private industry and other stakeholders about actions they should be taking in order to develop a community that actively contributes to AIS prevention in the Basin. By now, most locals have basic knowledge of AIS. Next steps need to be taken to turn that knowledge into active AIS prevention – the following action items by the work group will promote an active community:

- Establish relationships with visitor centers, chambers of commerce and other “marketing focal points,” such as websites.
- Use the data collected from Section 6: Research to develop an AIS Campaign/Marketing Plan to create public action against the introduction and spread of AIS.

STRATEGY 5B: Promote 1-on-1 contact with water users. Studies have shown that one-on-one communication is the most effective way promote behavior change. **(find sources).** Below are existing methods that promote one-on-one interactions as well as new ideas to increase contacts.

- Survey water users on AIS knowledge and activities. Consider hiring an AIS Outreach Coordinator to survey boaters on the Flathead.
- Use existing Fish, Wildlife & Parks watercraft inspection data on boater behaviors in the Flathead
- Utilize volunteer inspection stations as information vectors

STRATEGY 5C: Create and operate AIS Certification Programs.

- Pet stores/aquaculture
- Self-certification for watercraft

STRATEGY 5D: Define and incorporate Best Management Practices into water user activities.

- Assess current AIS BMPs used by agencies and Work Group partners and determine a generalized AIS BMP Protocol
- Research protocols/BMPs that have been most successful in other regions

STRATEGY 5E: Implement School Outreach Programs.

- Encourage AIS Work Group members to use high school trunk
- Bring the trunk to Trunk Workshops and PIR Days
- OTHER k-12 programs that I should include?

STRATEGY 5F: **Promote a consistent and effective education and outreach campaign.** Focus group testing was completed in 2015 to look at different messaging campaigns and how they promoted AIS Best Management Practices. Data from further outreach research will be used to ensure:

- All watercraft inspectors are delivering the same message.
- Outreach materials all have the same message

STRATEGY 5F: Host educational workshops in the Basin. **How effective was this from 2010-2015? Keep?**

- Focus on “How-To” workshops to keep AIS out and less “Informative” workshops. By now, most Basin residents, even temporary residents, know what AIS are.
- Create a database of attendees for a contact/ mailing list to invite to regional events
- Continue to integrate AIS outreach at community programs/events
- Partner with rafting companies and/or utilize float trips to promote prevention

STRATEGY 5G: Integrate AIS outreach into the plans and actions of partner and other relevant agencies and organizations.

- Promote use of AIS Speakers Trunk to Work Group partners.
- Meet with public information personnel to determine routes for outreach in organizations and agencies. **(Keep?)**
- Stock offices and front desk areas of all Flathead Basin AIS Plan partner organizations and agencies and others with basic informational materials on AIS.

Section 6: Research

To ensure that we are equipped with the most up-to-date tools and methods to abate ecologic, economic, and public health and safety impacts from AIS introductions, we need to be familiar with current AIS research nationally and within the Flathead Basin. Current knowledge will allow us to identify further needs and encourage additional research. Information will be used to more comprehensively inform policy and program decisions that potentially influence how AIS prevention, containment, outreach and eradication will occur in the Flathead Basin. Since its inception, the Flathead AIS Work Group was successful in researching and addressing multiple pathways of introduction and spread within the Basin.

STRATEGY 6A: Research AIS characteristics, mitigation methods and introduction pathways. The science of how to effectively contain, control, and eradicate AIS populations continues to develop. It is important to stay current with the latest methods and techniques and to encourage the development of new methods when necessary. The Flathead Basin AIS work group supports collaborative scientific research among State, Tribal, Provincial, and federal and state agencies and academic institutions that investigate potential control strategies and associated environmental impacts. Identification of the AIS research needs within the Flathead Basin will be an ongoing process as infestations occur and new threats are detected. Possible topics for current scientific research needs include:

- inventories, vectors, high priority waters, high probability waters, most probable invaders, rates of spread, effectiveness of existing prevention, control and abatement techniques and ecological impacts.
- Mitigation methods for AIS already present in the Flathead Basin.
- AIS adaptability to changing environments, especially climate change, and interaction with native species

STRATEGY 6B: Research impacts of AIS, including social, ecological and economic systems

- Find and compile most up-to-date impacts to the economy, ecology, recreation, human health and other industries potentially affected by AIS.
- Research economic impacts of AIS introductions to the Montana agriculture industry.

STRATEGY 6C: Develop an effective outreach campaign through marketing research. Campaign needs to emphasize action as well as awareness.

- Conduct local focus group testing for effective AIS messaging
- Use results from focus group testing to create an AIS outreach plan/call to action.

STRATEGY 6D: Inventory completed and on-going AIS research in the Basin, state, and nation.

- Peer reviewed AIS articles database. Participate in a technology transfer program to be used in distributing research findings.
- Ongoing research (opt-in) can prevent redundancy

Section 7: Innovation for the Future

A successful AIS Prevention Strategy is greatly enhanced by the ability to adapt to changing policies, recreational activities, and new research findings. During the 2010-2015 timeframe, the Flathead AIS workgroup identified opportunities to “think outside of the box while staying in the lines,” enabling them to:

- Partner with Alberta to run a pilot “AIS Detection Dog” program;
- Defend the Highway 2 corridor and the Flathead Basin against AIS through a partnership with the Blackfeet Nation; and
- Support Environmental DNA research at the Flathead Lake Biological Station
- MORE??

New threats will be detected, and the work group will strive to continue develop innovative solutions to adapt to changing conditions. The following is a short list of newly identified threats to the basin:

- 1) Addressing the threat of ballast tanks
- 2) Regulating the use of mechanical harvesters
- 3) Adoption of hold-order regulations at either the local, state and/or Tribal level
- 4) Advocating for legislation requiring inspections for all watercraft entering the state
- 5) Creating an ongoing funding source for AIS activities in the Basin

Many unforeseen opportunities and challenges will be presented in the next five years. Therefore, the work group must be prepared to address the issues as they arise to ensure ongoing success, and to protect that the natural resources which make the Flathead such a special and unique landscape.

Appendix A: Action Items for 2016

Prevention:

- Ensure that all major roadways into the Flathead Basin have mandatory watercraft inspection stations.
- In addition to Work Group members, Montana partners may include MDOT...
- Coordinate, through the Crown Managers Partnership with Canadian partners to facilitate perimeter defense for the Crown of the Continent ecosystem.
- Encourage longer hours of operation, earlier season and two-way stopping at watercraft inspection stations.
- Enhanced enforcement to increase compliance rates/reduce drive-bys
- Operate volunteer watercraft inspection stations at boat launches in the Flathead Basin.
- Create and support legislation, regulations and/or ordinances that prevent the introduction of AIS to the Flathead Basin and Montana
- Partner with local Law Enforcement agencies to ensure existing AIS laws are upheld in the Flathead Basin.
- Create an effective "Flathead First Alert" system to ensure boats with AIS heading to the Flathead or the Blackfeet Reservation are intercepted and decontaminated.

Monitoring:

- Continue to implement the AIS Monitoring Plan in the Basin. Meet with partners at the beginning of the field season to:
 - Ensure that all monitoring entities are familiar with the protocols;
 - reduce duplication of efforts;
 - confirm water bodies to be monitored and frequency rate;
 - ensure any pertinent data gaps are filled;
 - modify the plan when necessary
- Use, develop, or modify existing universal/consistent survey methodologies for basin-wide use.
- Continue to support and obtain funding for professional AIS monitoring services and rapid assessments;
- Continue to support volunteer monitoring efforts including but not limited to: CRC, WLI and Swan Lakers;
- Recruit new organizations to start monitoring programs;
- Start an annual "Mussel Walk" on Flathead Lake

Rapid Response:

- Undertake comparative analysis of Rapid Response Plans, including those of the Western Regional Panel, provinces and nearby states, to assist in crafting a Flathead Basin Rapid Response Plan.
- Ensure framework is established to enact Rapid Response when needed. (Includes boat ramp closure signs, emergency funding, and public outreach).

Containment and Mitigation:

- Annually review and update as needed, Aquatic Invasive Plant Plan
- Develop mitigation plans for existing and newly discovered AIS infestations.
- Facilitate discussion amongst responsible management agencies to better coordinate and fund mitigation efforts.

Education and Outreach:

- Establish relationships with visitor centers, chambers of commerce and other “marketing focal points,” such as websites
- Promote 1-on-1 contact with water users
- Implement School Outreach Programs
- Integrate AIS outreach into the plans and actions of partner and other relevant agencies and organizations

Research:

- Research AIS characteristics, mitigation methods and introduction pathways
- Research impacts of AIS, including social, ecological and economic systems
- Conduct local focus group testing for AIS messaging

Innovation for the Future:

- Create a strategy for effectively identifying, assessing and managing boats with ballast tanks.

Appendix B: Action Items for 2017 to 2020

Prevention:

- Use of AIS detection dogs
- Create and support legislation, regulations and/or ordinances that prevent the introduction of AIS to the Flathead Basin and Montana
- Identify less common AIS vectors and ensure they are AIS free

Monitoring:

- Use existing databases/maps as templates to incorporate new survey data when available. Develop a basin-wide AIS database/map if needed.
- Offer mussel substraights to groups to enhance public participation.

Rapid Response:

- Establish a sub-committee within the Work Group to create the Basin-wide Response Plan.
- Implement an early detection and rapid response system.
- Develop an improved notification structure within the Flathead Basin.
- Define authorities and responsibilities in a rapid response scenario that includes plants, animals and pathogens.
- Create easy-to-follow rapid response protocols for plants, animals and pathogens.
- Coordinate a Table Top exercise for the Flathead Basin Work group and modify the Rapid Response Plan as necessary.

Containment and Mitigation:

- Complete a Programmatic Environmental Impact Statement for the Flathead Basin for the use of different control measures, including herbicides.
- Develop Standard Operating Procedures (SOPs) for long term containment for newly discovered AIS infestations (plants, mussels, other...)

Education and Outreach:

- Use the data collected from Section 6: Research to develop a AIS Campaign/Marketing Plan
- Create and implement an AIS Certification Program
- Define and incorporate Best Management Practices into water user activities
- Promote a consistent and effective education and outreach campaign.

Research:





- Use results from focus group testing to create effective AIS messaging and an outreach plan/call to action.
- Inventory completed and on-going AIS research in the Basin, state, and nation.

Appendix C: Budget Needs

Prevention	\$215,000
	WIS Clearwater -- 3/1-Memorial Day \$45,000
	WIS Hwy 93 -- 3/1 to 9/30 \$45,000
	Hwy 2 -- 3/1 to Memorial Day \$85,000
	AIS Consultant fund \$30,000
	Volunteer WIS Program \$10,000
Education and Outreach	\$20,000
Monitoring/Surveys	\$20,000
Rapid Response	\$25,000
	Programmatic EIS \$10,000
	Table Top Exercises \$5,000
	Decon Unit (north) \$5000
	Decon \$5,000
Mitigation	\$200,000 annually
	CLP Flathead Lake/River \$195,00
	EWM Beaver Lake \$5000
Pilots	\$20,000 (est.)
Research	TBD
Legislation/Regulations	in-kind







Total: \$500,000

APPENDIX D: AIS threats to the Flathead River Basin







Species	ANS Priority Class ⁵	Legal status ⁶	Photo
Fish			
Asian carp species (bighead, grass, silver, and black)	1	Prohibited	 A photograph of a silver Asian carp species, likely a grass carp, with a red and white striped collar around its neck.
Black bullhead	4	Unclassified	 A photograph of a black bullhead fish in clear water. <i>Photo: NPS</i>
Eurasian ruffe	1	Prohibited	 A photograph of an Eurasian ruffe fish resting on a gravelly riverbed. <i>Photo: Find Copyright</i>
Lake trout	4	Unclassified	 A photograph of a lake trout fish against a white background. <i>Photo: Joseph Tomelleri</i>




⁵ Priority classes were adapted from the Statewide ANS Management Plan.

⁶ Classification in Exotic Wildlife Administrative Rules ARM 12.6.2220.

Northern snakehead	1	Prohibited	 <i>Photo: USGS</i>
Brook trout	4	Unclassified	 <i>Photo: Montana Fish, Wildlife & Parks</i>
Rainbow trout ⁷	4	Unclassified	 <i>Photo: USGS</i>
Brown trout	4	Unclassified	 <i>Photo: greatbasin.wr.usgs.gov</i>
Largemouth Bass	4	Unclassified	 <i>Photo: Duane Raver USFWS</i>
Walleye	4	Unclassified	 <i>Photo: Duane Raver USFWS</i>

⁷ Lake trout and rainbow trout do pose significant impacts to native fish within the Flathead River Basin. Management strategies are utilized in some locations to control their populations. Continued management is encouraged and prevention of spread to new areas is essential to limit further impacts to native species.

Northern pike	4	Unclassified	 <p><i>Photo: USGS</i></p>
Pumpkinseed	4	Unclassified	 <p><i>Photo: Duane Raver USFWS</i></p>
Lake Whitefish	4	Unclassified	 <p><i>Photo: NOAA</i></p>
Round goby	1	Prohibited	 <p><i>Photo: Eric Engbretson, USFWS</i></p>
Tench	1	Unclassified	 <p><i>Photo: Steffen Zienert</i></p>
Walking catfish	1	Prohibited	 <p><i>Photo: Ian G Baird</i></p>

Yellow perch	4	Unclassified	 <p><i>Photo: USFWS</i></p>
White perch	1	Prohibited	 <p><i>Photo: USGS</i></p>
Zander	1	Prohibited	 <p><i>Photo: USGS</i></p>
Amphibians			
African clawed frog		Prohibited	
North American bullfrog		Prohibited	
Mollusks			
New Zealand mud snail	1	Prohibited	
Quagga mussel	1	Prohibited	
Zebra mussel	1	Prohibited	
Asian Clam			
Crustaceans			

Rusty crayfish	1	Prohibited	
Plants			
Eurasian watermilfoil	3		
Curlyleaf pondweed	4		
Fragrant water lily			
Flowering rush	4		
Yellow flag iris	4		
Parsites and Pathogens			
VHS virus	1		
Whirling disease	2		
Mammals			
Nutria	1	Prohibited	

Priority Class 1

These species are not known to be present within the Flathead Basin, but have a high potential to invade. Limited or no known management strategies for these species exist. Appropriate action for this class includes prevention of introductions and eradication of pioneering populations.

Priority Class 2

These species are present and established within the Flathead Basin and have the potential to spread further. Limited or no known management strategies for these species exist. These species can be managed through actions that involve mitigation of impact, control of population size, and prevention of dispersal to other waterbodies.

Priority Class 3

These species are not known to be established in the Flathead Basin and have a high potential for invasion. Appropriate management techniques are available and include prevention of introductions and eradication of pioneering populations.

Priority Class 4

These species are present and have the potential to spread within the Basin, but management strategies exist for these species and include mitigation of impact, control of population size, and prevention of dispersal to other waterbodies.

Appendix E: Summary of Curlyleaf Pondweed Management in Flathead Lake and River, Montana

The submersed aquatic noxious weed, curlyleaf pondweed (*Potamogeton crispus*), has been reported in the lower Flathead Basin since 1974. Although this aquatic plant is present both east and west of the continental divide, the majority of water bodies in the Flathead Basin are not currently infested with curlyleaf pondweed. Information in this document was developed for the Flathead Basin AIS Work Group, Flathead Lakers and other partners to help identify and secure long term funding sources for curlyleaf pondweed management within the upper Flathead Basin.

The primary objective of this document is to explore management options and associated costs for controlling curlyleaf pondweed in Flathead Lake and Flathead River (from Flathead Lake upstream 12 miles). Key components of this document include an assessment of the problem, current work that has been conducted, and science-based options and cost for containing, controlling and where feasible eradicating curlyleaf pondweed in the northern portion of the Flathead Basin in Flathead County. This plan does not address public education and outreach, or regional prevention and coordination with federal, state and private partners, which are already part of the Flathead Basin Aquatic Invasive Species Program.

Surveys conducted from 2010 through 2015 indicate that only three sites in Flathead Lake are currently infested with curlyleaf pondweed: Lakeside, North Shore, and Big Fork Condominium Marinas. Infestations are characterized by widely scattered plants and small patches located within about 5.5 acres. It is estimated that at least 5000 acres in Flathead Lake are susceptible to colonization by the weed. Thus, current infested acres represent about 0.11% of Flathead Lake littoral zone that is at risk for invasion.

In the Flathead River, curlyleaf pondweed is scattered from the mouth of the river upstream 12 miles (river mile 105 to 117) and in Fennon Slough. About 34% of the littoral zone is infested; however, only 4.5% had greater than 1% cover of curlyleaf pondweed with less than 2.5 acres of the weed combined (based on each plant in occupying 10 cm²). Eagle Bend Yacht Harbor and the associated channel located on the Flathead River adds an additional 12.5 acres infested with widely scattered curlyleaf pondweed plants.

Three management options are proposed based on priority for action and financial resources.

- Management Option 1 (Baseline Management) includes complete control with the goal of eradication of curlyleaf pondweed at three marinas in Flathead Lake and one on the Flathead River (Eagle Bend Yacht Harbor); monitoring high risk waters both within and outside Flathead Lake; rapid control of new infestations; and reducing spread from public boat launches in the Flathead River: Estimated cost is \$56,624/year for 5 years [Note: costs should decline over time as plants become less abundant].
- Management Option 2 includes the 'baseline effort' and expands management to include containment and control of curlyleaf pondweed in the upper three miles of the infestation in the Flathead River: Estimated cost is \$123,865/year.
- Management Option 3 includes the 'baseline effort' and complete containment and control of curlyleaf pondweed in the Flathead River from the mouth of the river upstream 12 miles: Estimated cost is \$319,595/year.