St. Croix River Basin

Aquatic Invasive Species

Strategic Plan

(7 July 2015)

*created by*

St. Croix River Association

To protect, restore, and celebrate the St. Croix River and its watershed



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EXECUTIVE SUMMARY

The interconnectedness of river systems presents unique challenges not applicable to isolated waterbodies such as lakes and ponds, especially for aquatic invasive species (AIS) management. Those challenges, coupled with human traffic between waterbodies, make large river systems and their watersheds susceptible to AIS invasion. The St. Croix River Basin is at risk of being deeply and negatively impacted by a suite of harmful AIS, due to both its physical connection with the Mississippi River; its proximity to the St. Paul – Minneapolis lakes, Lake Mille Lacs, and Lake Superior, all of which have a variety of AIS; and its status as a regional recreational destination.

The outdoor opportunities for hundreds of thousands of paddlers, boaters, anglers, birders, wildlife watchers, photographers, waterfowl and wildlife hunters, and others that recreate in the St. Croix River Basin depends on the health of the St. Croix River system and its diversity of native species and ecosystems. Entire communities along the river depend on the business that recreationalists supply, and the regional economy relies heavily on the state of the river. If AIS such as invasive Asian carp, New Zealand mudsnails, spiny waterfleas, or zebra mussels established in the St. Croix River or its Basin, the natural landscape would be forever altered. Jumping 90 pound silver carp would make boating hazardous. New Zealand mudsnails would consume algae while spiny waterfleas consumed zooplankton and both would independently deplete native fisheries. Zebra mussels, which clarify water, would lead to severe filamentous algal blooms that would wash up on shore and act as a perfect incubating site for *Clostridium botulinum*, leading to outbreaks of avian botulism and dying waterfowl. However, many of these scenarios are preventable, and hinge upon the willingness of stakeholder groups to take action in AIS prevention, containment, and control efforts.

Since 2014, the creation of this Strategic Plan and its ongoing implementation has been supported by a unique partnership of stakeholders with a vested interest in preserving the integrity of the St. Croix River Basin. The St. Croix River Association developed the Strategic Plan and facilitated the contributions of several key partners from the following organizations or institutions: the Wisconsin Department of Natural Resources (WI DNR), Minnesota Department of Natural Resources (MN DNR), National Park Service (NPS), and many of the counties from within the watershed.

Through this partnership, this Strategic Plan was developed to prevent future introductions of AIS and to contain or control AIS already present in the St. Croix River Basin. The intent of this Strategic Plan is to guide future efforts of partners and stakeholders in the Basin, including federal, state, county and local governments, non-governmental organizations and citizen conservation, sporting, and recreation groups. To that end, this Strategic Plan’s overarching goal is to “prevent, contain, and control AIS in the St. Croix River Basin”. This goal can be achieved through four main Strategies: Prevention, Research & Monitoring, Control, and Implementation of this Strategic Plan.

We recommend management objectives and actions to **actively work to prevent the introduction and dispersal of AIS into St. Croix River Basin waterbodies** (Goal 1: Prevention). One effective method of preventing the introduction and spread of AIS into and throughout the St. Croix River Basin is through engaging stakeholders in education, outreach, and partnership efforts. We can keep AIS problems small - allowing for successful rapid response efforts – by identifying locations within the Basin that may act as conduits for AIS introduction and spread and by managing those locations along with other pathways of introduction. We further recommend improving AIS regulations compliance and enforcement.

We recommend management objectives and actions to **contain AIS infestations through early detection and rapid response, and by fostering good communication and knowledge among partners** (Goal 2: Containment). Increased monitoring and reporting of new populations of AIS can enable rapid response efforts. Furthermore, developing management strategies collaboratively will limit the spread of established populations of AIS to and from the St. Croix River Basin waterbodies. We outline means in which to establish clearly-defined roles and responsibilities and coordinate between the various government agencies, non-governmental organizations, and citizen groups working on AIS issues in the St. Croix River Basin, specifically by organizing and maintaining a regional St. Croix River Basin AIS Work Group. In addition to coordination between partners within the basin, we must also maintain communication with national partners to learn what research is occurring elsewhere in the nation and world and can benefit the St. Croix River Basin.

Additionally, we recommend management objectives and actions to **control and eradicate AIS infestations already present in the St. Croix River Basin and prevent them from spreading** (Goal 3: Control). We support developing a general AIS control plan to allow resource managers to act collectively, and utilizing that plans ensure that new and existing populations of AIS are appropriately and uniformly targeted. The plan will promote integrated pest management strategies, stress coordination and collaboration, and promote citizen education.

Finally, we maintain that this plan must be implemented, coordinated, and assessed, and recommend objectives and actions to **ensure that this AIS Strategic Plan is implemented, and monitor its effectiveness** (Goal 4: Coordination and Assessment). We need to seek sustainable funding for AIS activities and staff positions, as well as regularly monitor the effectiveness of this Strategic Plan. To be truly effective, we must also increase community capacity to effect change in AIS prevention and control practices on the community level throughout the St. Croix River Basin.

Over the past year, St. Croix River Basin partners have made great progress toward the coordination and mobilization of AIS stakeholders in the basin; the publication of this Strategic Plan is a continuation of this work. We now move to implement this Strategic Plan with the St. Croix River Association implementing certain components of this Strategic Plan, and serving as a catalyst and advocate for remaining components. The success of this next phase ultimately relies on the involvement and support of all of the partners who have contributed thus far to this effort as well as partners that will contribute in the future.

INTRODUCTION

One of the original eight nationally designated wild and scenic rivers, the St. Croix is the cleanest tributary to the Mississippi River. It is a high value fishery, and the healthy, diverse ecosystem includes 38 species of mussels, several of which are rare or endangered. This complex system is threatened by aggressive invasive species. The St. Croix River has high quality natural ecosystems, beautiful scenery, striking geologic features, unique cultural resources, and abundant recreation opportunities.



The St. Croix River Association is a regional 501c3 non-profit organization that advocates for conservation and sees to protect, restore, and celebrate the St. Croix and its watershed.

St. Croix River Association works to realize a vision for the St. Croix River as a place where:

* Rivers run free and clean,
* A diverse habitat sustains our unique and diverse flora and fauna,
* People have access to our National Park and the park flourished,
* Towns throughout the Basin thrive, and
* People celebrate the river.

The WI DNR considers the St. Croix River a “superspreader.” For years stakeholders within the St. Croix River basin have recognized AIS as a threat to the overall health of the river’s ecosystem and resource management throughout the watershed. Invasive species impact the ecology of a water body by degrading water quality, reducing species diversity, and altering the food web resulting in a change in game fish populations. Dense infestations and nuisance growth of aquatic invasive species (AIS) also affect recreational opportunities such as boating, swimming, and fishing. Local economies depend on the pristine nature of the river for the multimillion dollar recreation and tourism business brought to the area by boaters, paddlers, wildlife watchers, cold and warm water anglers, and many others.

The St. Croix River Association used a basin-wide approach in this planning process due to the prevalence of waterbodies (rivers and streams, floodplain lakes, sloughs, impoundments, lakes, and wetlands) in the region and the connections between them. Additionally, the connections between waterbodies via the movement of recreational users also necessitated a regional approach to the issue. Furthermore, a basin-wide approach entails consideration of the myriad stakeholder groups, ecosystem types, and species affected by AIS.

In May of 2014, the St. Croix River Association received an Aquatic Invasive Species Planning, Prevention, and Outreach grant from the Wisconsin Department of Natural Resources (WI DNR) to develop a strategic plan for limiting the introduction and spread of aquatic invasive species (AIS) in the St. Croix River Basin. Following that initial funding, the St. Croix River Association received follow-up funding in 2015 through a second AIS Planning, Prevention, and Outreach grant from the WI DNR as well as through AIS prevention funding from Chisago, Pine, and Washington Counties in Minnesota. This money funded complete development of this plan, as well as implementation through 2017.

**Purpose**

The primary purpose of this plan is to coordinate St. Croix River Basin stakeholders and partners in achieving the broad goal of preventing, containing, and controlling AIS and their impacts through the strategies outlined below (Prevention, Research and Monitoring, Control, and Implementation). In coordinating between stakeholders, we hope to raise the profile of AIS issues in the St. Croix River Basin, and build the institutional capacity of stakeholder groups to prepare for and respond to AIS issues. Proposed AIS management strategies and objectives should be evaluated by stakeholder groups, organizations, and institutions, and incorporated into their respective work and practices as appropriate.

**Scope**

The geographical scope of this plan is the 7,760 square miles of the St. Croix River Basin. The basin includes 24 subwatersheds, and 40% falls in Minnesota and 60% in Wisconsin. The Basin includes the St. Croix and Namekagon Rivers, as well as all other tributary rivers and streams, floodplain lakes, sloughs, lakes, and wetlands within the watershed. While this plan is all encompassing of the St. Croix River Basin, due to the biotic diversity of the St. Croix River, its multitude of recreational users and variety of recreational opportunities, and existence of the St. Croix National Scenic Riverway, there is a significant focus on the St. Croix River itself.

**Goals and Strategies**

The goals of this plan are to prevent, contain, and control AIS and their spread, and ensure that this plan is implemented:

Goal 1 – Prevention: Actively work to prevent the introduction and dispersal of AIS into St. Croix River Basin waterbodies.

Goal 2 – Containment: Contain AIS infestations through early detection and rapid response, and by fostering good communication and knowledge among partners.

Goal 3 – Control: Control and eradicate AIS infestations already present in the St. Croix River Basin and prevent them from spreading.

Goal 4 – Coordination and Assessment: Ensure that this AIS Strategic Plan is implemented, and monitor its effectiveness.

ST. CROIX RIVER BASIN BACKGROUND INFORMATION

*Background information on the St. Croix River Basin is compiled and summarized largely from the 2009 Conservation Action Plans produced by The Nature Conservancy for the Upper St. Croix River, Lower St. Croix River, Snake River, and Kettle River. For more information, please refer to those reports.*

The St. Croix River of Minnesota and Wisconsin is one of the last undisturbed, large floodplain rivers in the upper Mississippi River System. The St. Croix River originates at Upper St. Croix Lake in northwestern Wisconsin and flows approximately 165 miles until it reaches the Mississippi River at Prescott, WI. The upper 25 miles of the St. Croix River lie solely within Wisconsin. The remaining 140 miles delineate the boundary between Wisconsin and Minnesota. Much of the St. Croix River is designated National Scenic Riverway by Congress in 1968, and the Lower St. Croix in 1972. The entire St. Croix River watershed comprises 7,760 square miles, and falls within 10 counties in Minnesota and 9 in Wisconsin. The St. Croix River Basin lies approximately 60% in Wisconsin and 40% in Minnesota.

**Summary of Basin and unique resources threatened by AIS**

*Upper St. Croix River*

The Upper St. Croix River begins at Upper St. Croix Lake in northwestern Wisconsin and flows through a diverse landscape down to a hydroelectric dam at St. Croix Falls, WI. The Upper St. Croix River watershed covers over 1 million acres in Wisconsin and 350,000 acres in Minnesota and includes the St. Croix River and its tributaries upstream of the mouth of the Yellow River, as well as the Tamarack, Moose, Eau Claire, Namekagon, and Totagatic Rivers. The Upper St. Croix River is one of the original eight rivers designated as a wild or scenic river by federal legislation in 1964. Additionally, large segments of the Upper St. Croix River watershed are classified as Outstanding Resource Waters (ORW) by the state of Wisconsin, qualifying for a higher level of state water quality standards.

Overall, water quality of the Upper St. Croix watershed is among the best in the St. Croix River Basin. Additionally, this part of the Basin contains high quality natural ecosystems, including northern hardwoods with patchy wetlands, pine barrens, marshes, various mixed conifer-hardwood forests and swamps, sedge meadows, bog complexes, and major barrens. Aquatic systems range from low to moderate gradient headwaters to small rivers. Coldwater reaches are widespread and support wild trout and other coldwater species. Important aquatic species conservation targets include lake sturgeon, native brook trout, greater and river redhorse, gilt darter, and southern brook lamprey, as well as several mussel species listed as species of concern in Wisconsin and/ or Minnesota.

*Lower St. Croix River*

The Lower St. Croix River is the section of the mainstem that begins at the hydroelectric dam at St. Croix Falls, WI, and travels all the way to Prescott, WI, to join the Mississippi River. The Lower St. Croix River is one of the most biologically diverse rivers in the Upper Mississippi River Basin, and is especially notable for aquatic species diversity. Furthermore, this stretch is one of the premiere rivers for mussels in North America, and is an important refuge for endemic mussel communities. At least 40 species of mussel are known from the Lower St. Croix River, including Higgins’ eye mussels and one of the only remaining viable populations of the endangered winged mapleleaf mussel.

The primary threat to the Lower St. Croix River comes from the significant development pressures it has been subject to over the past 20-30 years. While the St. Croix River’s upper watersheds are relatively undeveloped and contain large parcels of public land, the Lower St. Croix River sits on the edge of the Minneapolis-St. Paul metropolitan area, and is within easy commuting distance. The rapid population growth that has occurred over the past several decades has generated hundreds of acres of new construction each year. This development has led to a myriad of effects on both aquatic and terrestrial native ecosystems. Furthermore, water levels are dependent on releases through the hydroelectric dam, which supplies electricity to the surrounding area and new developments and puts additional stress on the river.

*Kettle River*

The Kettle River originates in east central Minnesota and flows south 100 miles to its confluence with the St. Croix River in St. Croix State Park, near Pine City, MN. Tributaries include the West Branch Kettle, Dead Moose, Split Rock, Moose Horn, Willow, Pine, and Grindstone Rivers. The entire watershed drains approximately 1,050 square miles. Overall, the Kettle River is an exceptional Minnesota tributary to the St. Croix River, boasting high biodiversity as well as some of the most impressive whitewater rapids in Minnesota and relatively good water quality.

Important systems in the watershed include headwater creeks and tributaries, small and medium river systems, inland deep lakes, shallow lakes, marshes, wet forests, wet meadows, and fire dependent, northern, and mesic hardwood forest system types. Aquatic systems range from perennial, low to moderate gradient coolwater streams to relatively high gradient small river systems. Some coldwater segments can be found in the extreme upper and lower Kettle River system. Additionally, some sections of the river are extremely deep, with pools (or “kettles”) greater than 100 feet deep.

Most shallow lakes and marshes in the Kettle River watershed remain in natural condition with low levels of development. Inland deep lakes, however, are in great demand for recreation and seasonal and year-round housing and experience development pressures, fishing pressures, eutrophication and water quality degradation, and AIS infestations.

The diversity of habitat types make the river suitable habitat for many sport and nongame fish species, including many that are relatively intolerant of pollution and habitat degradation. The Kettle is home to a viable population of lake sturgeon, and to southern brook lamprey, gilt darter, beaver, muskrat, river otters, eagles, osprey, great blue herons, ducks, cerulean warblers, red-shouldered hawks, Blanding’s turtle, wood turtles, 17 species of mussels, and hundreds of other species.

*Snake River*

The Snake River is a small to medium size tributary river to the St. Croix River that covers just over 1,000 square miles in east-central Minnesota. Important systems in the watershed include headwater creeks, small and medium river systems, inland deep lakes, shallow lakes and marshes, wet forest and wet meadow systems, large intact wetlands (including rich and poor fens, sedge meadows, and swamps), and extensive peatlands, as well as fire dependent, northern, and mesic hardwood forest system types. Aquatic systems range from low to moderate gradient coolwater streams to relatively high gradient small river systems.

Most shallow lakes and marshes in the Snake River watershed are in relatively natural condition, while inland deep lakes are in great demand for recreation and seasonal and year-round housing. As a result, those deeper lakes are subject to development pressures, fishing pressures, and AIS infestations.

The Snake River is home to relatively intact and regionally significant mussel and fish faunas. The river has as many as 65 fish species, including lake sturgeon and gilt darter. It is also home to at least 15 species of freshwater mussels, including abundant and viable populations of several species listed in Minnesota and Wisconsin as state species of concern. Other species in the river include southern brook lamprey, cerulean warblers, red-shouldered hawks, and coolwater and warmwater fish assemblages.

**Overview of AIS in the St. Croix River Basin**

The St. Croix River Basin, as described above, encompasses a significant portion of northwestern Wisconsin and east-central Minnesota. The watershed is characterized by diverse landscapes and ecosystems, and that myriad of different terrestrial and aquatic habitats provide ecological niches for an abundance of native and invasive species. Though this plan addresses “aquatic” invasive species, included in it – and considered “aquatic” for these purposes – are riparian terrestrial species, or species that are found on lands bordering waterways (such as Phragmites).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Common name** | **MN Status** | **WI Status** | **Lower St. Croix** | **Upper St. Croix** | | **Kettle River** | **Snake River** |
|  | | | | | | | |
| **Invertebrates** | | | | | | | |
| Asian clam | Unregulated | Prohibited | X |  | |  |  |
| Banded mystery snail | Regulated | Restricted | X | X | | X | X |
| Chinese mystery snail | Regulated | Restricted | X | X | | X | X |
| Japanese mystery snail | Regulated | Restricted |  | X | |  |  |
| Rusty crayfish | Regulated | Restricted | X | X | | X | X |
| Spiny waterflea | Regulated | Prohibited |  | X | |  |  |
| Zebra mussels | Prohibited | Restricted | X |  | |  |  |
|  | | | | | | | |
| **Fishes and pathogens** | | | | | | | |
| Bighead carp | Prohibited | Prohibited | X |  | |  |  |
| Common carp | Regulated | Restricted | X | X | |  |  |
|  | | | | | | | |
| **Plants and algae** | | | | | | | |
| Common buckthorn | Prohibited: Restricted | Restricted | X | X | X | | X |
| Curly-leaf pondweed | Prohibited | Restricted | X | X | X | | X |
| Eurasian water milfoil | Prohibited | Restricted | X | X | X | | X |
| Flowering rush | Prohibited | Restricted | X |  |  | |  |
| Giant knotweed | Specially regulated | Prohibited | X | X |  | |  |
| Giant reed | Prohibited: Restricted | Prohibited/ Restricted | X | X | X | | X |
| Japanese knotweed | Specially regulate | Restricted | X | X | X | | X |
| Purple loosestrife | Prohibited | Restricted | X | X | X | | X |
| Yellow iris | Regulated | Restricted | X | X | X | | X |

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| **INVASIVE SPECIES DEFINITIONS** |
| *Wisconsin*  **Invasive species** are species that the Department of Natural Resources has listed under s. NR 40.04 (2) as likely to survive and spread if introduced into the state of Wisconsin, potentially causing economic or environmental harm or harm to human health.  **Prohibited invasive species** are invasive species which are not found in the state or in that part of the state where listed as “Prohibited”. This excludes small stands, isolated individuals, or isolated watersheds. Statewide or regional eradication may be feasible for prohibited species.  **Restricted invasive species** are already established in the state or in that part of the state where listed as “Restricted”. Statewide or regional eradication or containment may not be feasible for restricted species.  *Minnesota*  **Invasive species** are species that are known to be detrimental to human or animal health, the environment, public roads, crops, livestock or other property. The Minnesota Department of Natural Resources has regulatory authority over aquatic plants and animals, and terrestrial vertebrates. The Minnesota Department of Agriculture has regulatory authority over terrestrial plants (noxious weeds) and plant pests. Invasive species are classified as prohibited, regulated, unregulated nonnative species, or are unclassified and remain as unlisted nonnative species.  **Prohibited invasive species** are designated as species to eradicate or control. Plants on the **Prohibited: Eradicate** list are plants that are not currently known to be present in Minnesota or are not widely established. These plants must be eradicated. Plants on the **Prohibited: Control** list are plants that are established throughout Minnesota or regions of the state. Species on this list must be controlled.  **Regulated invasive species** are legal to possess sell, buy, and transport, but may not be introduced into a free-living state, such as being released or planted in public waters. |

**Summary of threats and impacts posed by AIS**

The potential impacts of invasive species – both aquatic and terrestrial – are significant and widespread, ranging from ecological to economic to cultural.

*Ecological Impacts*

Native species are regularly displaced by invasive species, which, in the absence of natural predators outcompete native species for habitat and resources. Reed canary grass (*Phalaris arundinacea*) is a widespread and prolific grass that invades wet areas and riparian plains. Blanding’s turtle (species), a Minnesota state threatened species found in the St. Croix River Basin, has seen much of its habitat degraded by species like reed canary grass. Other species compete directly with native species for resources. As mentioned, the St. Croix River is home to 38 species of native mussels including the federally endangered winged mapleleaf mussel. Invasive zebra mussels (*Dressenia polymorpha*) compete for habitat with and displace those native mussels.

*Economic Impacts*

The economic impacts of invasive species can be considerable. According to a 2001 report, the United States spends $137 billion per year on AIS. Today, that number is likely much higher[[1]](#footnote-1). Specific industries that may be negatively affected by invasive species include: fisheries, recreation, power generation, agriculture, forestry, trade, and tourism and recreation.

In the St. Croix River Basin, the economic impact of recreation is significant – particularly recreational fishing, boating, and hunting. A 2014 National Park Service (NPS) report shows that 671,582 visitors to the St. Croix National Scenic Riverway in 2014 spent $27,645,600 in communities near the park. That spending supported 439 jobs in the local area and had a cumulative benefit to the local economy of $37,646,100. This spending depends on a healthy, appealing riverway – not one decimated by AIS impacts.

*Cultural Impacts*

Harder to quantify, but no less important, are cultural impacts of invasive species. Family trips to the beach are no fun if the beach is littered with razor-sharp zebra mussel shells. Boating or other watercraft-based recreation becomes dangerous with the presence of jumping 90 pound silver carp. Fishing is difficult if spiny waterfleas and viral hemorrhagic septicemia decimate fish populations. Wild rice, a resource central to the Ojibwa culture, has already been greatly diminished due to common carp and may continue to decline. The outdoor heritage of water users relies on a healthy and diverse watershed.

**Past and current AIS management practices in the St. Croix River Basin**

The management of AIS issues and concerns in the St. Croix River Basin occurs at varying levels, from statewide to local, and consists of preventative statewide policy framework supported by local monitoring/ surveying efforts to contain known AIS populations.

*Statewide policies and regulations*

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| **MINNESOTA LAW** |
| TRANSPORTATION   * It is unlawful to possess, import, purchase, transport, or introduce prohibited invasive species except under a permit. * It is unlawful to introduce regulated invasive species into a free-living state. * It is unlawful to place boats, seaplanes, or trailers that have aquatic plants or prohibited invasive species attached into state waters. * Boat lifts, docks, & swim rafts may not be placed in another body of water until at least 21 days have passed.   WATER TRANSPORT   * A person leaving state waters must drain all water before leaving the access point. * Drain plugs must be removed or opened while transporting watercraft. * Emergency response vehicles may be transported with the drain plug replaced after all water has been drained from the equipment.   INFESTED WATERS   * Infested waters must be posted with Invasive Species Alert signs at public water accesses and listed in the annual DNR Fishing Regulations booklet. * Taking wild animals from infested waters for bait or aquatic farms is prohibited. * All nets and other equipment used for commercial fishing or harvesting in infested waters may not be used in any other waters. * Equipment used for commercial fishing in infested waters that are designated solely because they contain Eurasian watermilfoil must be dried or frozen before being used in noninfested waters. * Water from infested waters may not be used to transport fish except by permit. * Water from infested waters may not be transported except in emergencies or under permit.   CRAYFISH   * The transportation of live native and invasive crayfish from one waterbody to another within the state is prohibited, except by permit. * Live crayfish or crayfish eggs may not be imported without a permit. * Live crayfish may not be sold for live bait or for use in aquariums. * Live crayfish taken from a waterbody can only be used as bait in that same waterbody. |
| **WISCONSIN LAW** |
| TRANSPORTATION   * It is unlawful to transport, possess, transfer, or introduce a prohibited or restricted invasive species. * It is unlawful to transport any material identified as having the potential for carrying an invasive species from a DNR infestation control zone, a DATCP quarantine area, or a USDA APHIS quarantine area. * It is unlawful to introduce a nonnative algae or cyanobacteria species in any water in the state.   WATER & AQUATIC PLANT TRANSPORT   * A person leaving state waters must remove all aquatic plants or animals attached to any vehicle or equipment immediately after removal from the water, and before leaving a boat launch or associated parking area. * A person leaving state waters must drain all water from any vehicle or equipment (i.e., live well, boat motor) immediately after removal from the water, and before leaving a boat launch or associated parking area. * A person transporting any vehicle or equipment for use on waters of the state must first remove all attached aquatic plants and aquatic animals and drain all water. * It is unlawful to operate a vehicle, watercraft, or other object of any kind in any wetland or non-navigable water of the state if the vehicle, watercraft, or other object has an aquatic plant or aquatic animal attached to the exterior.   FISH & CRAYFISH   * It is unlawful to fail to notify the DNR of the escape of a restricted invasive fish species within 24 hours. * It is unlawful to use a live prohibited fish invasive species as fishing bait. * It is unlawful to use live non-native crayfish for bait on inland or outlying waters. * It is unlawful to move live fish away from a waterbody. |

*Surveying and monitoring*

<Section in progress>

*USGS and NPS eDNA testing*

<Section in progress>

*NPS zebra mussel sampling*

<Section in progress>

*Project RED & AIS Snapshot Day*

Project RED (Riverine Early Detectors) and aquatic invasive species (AIS) Snapshot Day are volunteer programs for citizen groups to learn about AIS identification and become early detectors. In Project RED, citizens learn which invasive species threaten local rivers, how to differentiate them from native look-a-likes, and how to keep an eye out for them by canoe, kayak, or on foot. Project RED has been hosted in Polk County, WI since 2013 as a partnership program between the River Alliance of Wisconsin, St. Croix River Association, National Park Service, and Polk County Land and Water Resources Department. Project RED has also been hosted in Douglas County, WI since 2014 as a partnership between Douglas County and the St. Croix Eau Claire Headwaters Watershed group (2014) and the St. Croix River Association (2015).

During AIS Snapshot Day, volunteers learn to identify and search for invasive species including released aquarium and garden plants that could choke out our rivers and streams if undetected. AIS Snapshot Day has been hosted in Polk County since 2014 as a partnership between the St. Croix River Association and Polk County Land and Water Resources Department and in Douglas County since 2014 as a partnership between Douglas County and the St. Croix Eau Claire Headwaters Watershed group.

*Algae Alert Network*

In the past five years, reports of large blue-green algae blooms have increased along the St. Croix River. Resource managers are concerned that these algae, also known as Cyanobacteria, have the capacity to threaten public health and significantly impact recreational opportunities through the formation of toxic algal blooms. Several strains of Cyanobacteria already found in the St. Croix River and Lake St. Croix are linked to the production of toxins. Contact with these bacteria can result in contact dermatitis, flu-like symptoms, and even neurotoxicity in people, pets, and livestock.

To monitor these blooms, the St. Croix River Association has teamed up with National Park Service (NPS) managers and U.S. Geological Survey (USGS) scientists to train, recruit, and rely on citizen scientists in the Algae Alert Network. Citizen scientists in the Algae Alert Network collect water samples that allow scientists to understand when and where algae blooms happen and how and under what conditions harmful blooms develop. This information allows resource managers to respond to the harmful blooms, and get information out to the public.

*Boat inspection programs*

With growing concern over the spread of aquatic invasive species (AIS) throughout the upper Midwest, many communities are looking for ways to protect their waters. Boat inspection programs are one opportunity to actively prevent the spread of AIS.

In Minnesota, inspections are done through the Watercraft Inspection Program. The Watercraft Inspection Program dates back to 1992, and aims to prevent the spread of invasive species through boater education, watercraft inspections, and watercraft decontaminations at public water accesses. Inspectors are DNR authorized and can prohibit the launching or operation of water-related equipment if a person refuses to allow an inspection or does not remove water or AIS. There are two tiers of inspectors: Level I inspectors inspect watercraft visually and tactiley and can deny access, and Level II inspectors have those authorizations and are also trained to use decontamination equipment. Citizens who are interested in informing the public about AIS and how to slow their spread can receive volunteer training from the Watercraft Inspection Program staff. Within the St. Croix River Basin, Washington, Chisago, and Pine Counties have active Watercraft Inspection Program staff that spend time at lake and river public access points.

In Wisconsin, inspections are done through the “Clean Boats, Clean Waters” Watercraft Inspection Program. Clean Boats, Clean Waters was created in 2003, and promotes water resource stewardship by actively involving individuals in preventing the spread of harmful AIS. To accomplish this goal, the program sponsors statewide training workshops and has developed resource handbooks, tool kits, and educational information. Inspectors are trained volunteers who provide information to watercraft operators and can assist in watercraft inspections if requested. In Wisconsin, many lake associations have paid and unpaid Clean Boats, Clean Waters volunteers. Along the St. Croix River, the St. Croix River Association runs a program with interns and volunteers at public landings between Prescott and St. Croix Falls.

<Other sections in progress>

ST. CROIX RIVER BASIN AIS OF CONCERN

<Work on this section has begun but will be largely done during the winter of 2015-2016>

**Identifying high-priority AIS of concern for the St. Croix River Basin**

The St. Croix River Association convened an AIS Work Group consisting of federal, regional, and local resource managers, biologists, business owners, and association members, as well as community members. Beginning in 2015, the group discussed and identified AIS of concern in the St. Croix River Basin. The group worked primarily with species on Wisconsin’s NR-40 list of prohibited and restricted species, as well as with Minnesota’s list of noxious weeds and AIS.

Using a process modelled by the River Alliance of Wisconsin to develop an AIS Strategic Plan for the lower Wisconsin River, the AIS Work Group identified certain AIS as “high priority” for the St. Croix River Basin. Each member of the group provided feedback on via a species ranking system that evaluated which species were most likely to become established within the basin and/or have substantial ecological or economic impacts. Sixty-three species were initially identified: 12 invertebrates, 32 plants and algae, 17 fish and crayfish, one virus, and one parasite. Group members provided feedback on these species per their respective areas of expertise.

The Work Group added and eliminated AIS of concern to the list based on: the likelihood of introduction and relative proximity of the AIS to the St. Croix River Basin, the rate and impact of spread, the cost of eradication, and an assessment of the ecosystems affected. Using this feedback, the St. Croix River Association selected XX of the original 63 species as “high priority” species (XX invertebrates, XX plants and algae, XX fish and crayfish, and XX viruses). Of the remaining species, XX were identified as “low priority” but already present in the Basin.

**High Priority AIS not yet present in Basin (prevention)**

<TBD 2015/2016>

**High Priority AIS that are present in Basin (containment/ control)**

<TBD 2015/2016>

**Low Priority AIS that are present in Basin (containment/ control)**

<TBD 2015/2016>

ORIGINAL LIST OF AIS FOR CONSIDERATION & RANKING:

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| **Invasive Invertebrates (12)** | |
| Faucet snail | *Bithynia tentaculata* |
| Spiny water flea | *Bythotrephes cederstroemi* |
| Fishhook water flea | *Cercopagis pengoi* |
| Chinese/Japanese mystery snail | *Cipangopaludina chinensis/japonica* |
| Asian clam | *Corbicula fluminea* |
| Water flea | *Daphnia lumholtzi* |
| Zebra mussel | *Dreissena polymorpha* |
| Quagga mussel | *Dreissena bugensis* |
| Bloody shrimp | *Hemimysis anomala* |
| New Zealand mud snail | *Potamopyrgus antipodarum* |
| Banded mystery snail | *Viviparus georgianus* |

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| **Invasive Plants and Algae (32)** | |
| Garlic mustard | *Alliaria petiolata* |
| Flowering rush | *Butomus umbellatus* |
| Fanwort | *Cabomba caroliniana* |
| Oriental bittersweet | *Celastrus orbiculatus* |
| Australian swamp crop or New Zealand pygmyweed | *Crassula helmsii* |
| Didymo or rock snot | *Didymosphenia geminata* |
| Brazilian waterweed | *Egeria densa* |
| Water hyacinth | *Eichhornia crassipes* |
| Leafy spurge | *Euphorbia esula* |
| Japanese knotweed | *Fallopia japonica* var*. japonica* |
| Giant knotweed | *Fallopia sachalinensis* |
| Japanese hops | *Humulus japonicus* |
| Hydrilla | *Hydrilla verticillata* |
| European frogbit | *Hydrocharis morsus−ranae* |
| Yellow Iris | *Iris pseudocorus* |
| Oxygen−weed, African elodea or African waterweed | *Lagarosiphon major* |
| Purple loosestrife | *Lythrum salicaria* |
| Parrot feather | *Myriophyllum aquaticum* |
| Eurasian water milfoil | *Myriophyllum spicatum* |
| Brittle naiad | *Najas minor* |
| Watercress | *Nasturtium officinale* |
| Starry stonewort | *Nitellopsis obtusa* |
| Yellow floating heart | *Nymphoides peltata* |
| Reed canary grass | *Phalaris arundinacea* |
| Phragmites or Common reed | *Phragmites australis* |
| Water lettuce | *Pistia stratiotes* |
| Curlyleaf pondweed | *Potamogeton crispus* |
| Common buckthorn | *Rhamnus cathartica* |
| Glossy buckthorn | *Rhamnus frangula* |
| Water soldier | *Stratiotes aloides* |
| Water chestnut | *Trapa natans* |
| Narrow-leaf cattail | *Typha angustifolia* |

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| **Invasive viruses & parasites (2)** | |
| VHS | *Viral hemmorhagic septicemia* |
| Heterosporis | Heterosporis parasite |

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| **Invasive Fish and Crayfish (17)** | |
| Snakehead | *Channidae* |
| Grass carp | *Ctenopharyngodon idella* |
| Red shiner | *Cyprinella lutrensis* |
| Common Carp | *Cyprinus carpio* |
| Western mosquitofish | *Gambusia affinis* |
| Eastern mosquitofish | *Gambusia holbrooki* |
| Ruffe | *Gymnocephalus cernuus* |
| Silver carp | *Hypophthalmichthys molitrix* |
| Bighead carp | *Hypophthalmichthys nobilis* |
| White Perch | *Morone americana* |
| Black carp | *Mylopharyngodon piceus* |
| Round Goby | *Neogobius melanostomus* |
| Rusty crayfish | *Orconectes rusticus* |
| Red swamp crayfish | *Procambarus clarkii* |
| Zander | *Sander lucioperca* |
| Rudd | *Scardinius erythrophthalmus* |
| Tench | *Tinca tinca* |

RECCOMMENDED MANAGEMENT OBJECTIVES & ACTIONS SPECIFIC TO GOALS

Detailed below are recommended management objectives and actions, associated with the four goals for this Plan.

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| **Goal 1: Prevention**  Actively work to prevent the introduction and dispersal of AIS into the St. Croix River Basin waterbodies. | |
| **Objective 1: Encourage action through education in order to prevent the introduction and spread of AIS.** | |
| Action 1: Ensure current AIS signage at waterbody public access points in the St. Croix River Basin and eliminate signage repetition. | Partners will work within their areas of jurisdiction to remove outdated AIS signs, remove or consolidate redundant signs, and ensure the information on all posted signs is current and accurate and indicates who to contact if an AIS is found. High traffic locations may be sites for customized displays with more information. Partners will work collaboratively to ensure all AIS signs throughout the watershed relay a consistent message.  Partners: National Park Service, Polk County, Douglas County, Burnett County, Washington County, Chisago County, Bone Lake, St. Croix County, SCRA. |
| Action 2: Educate waterway users and watershed residents about AIS threats, impacts, identification, and removal. | Educational programs should make information available to waterway users and watershed residents, should engage different generations including youth, and may involve using new tools including smart-phone ready technology. Partners will work with diverse target audiences (including civic groups, youth groups, bait dealers, marina owners, and more), acknowledge the differences between river and lake users and residents, and target education to each stakeholder group separately. Educational programs will include: Project RED (Riverine Early Detectors), the Bait Shop Incentive Program, AIS Snapshot Day, and other independent and local opportunities (classrooms, fairs, fishing tournaments, etc.). Education will encourage action.  Project RED partners: SCRA, National Park Service, Polk County, Bayfield County, River Alliance, Douglas County, St. Croix-Eau Claire Headwaters Watershed  Bait Shop Incentive Program partners: Polk County, Burnett County, Bayfield County, SCRA  AIS Snapshot Day partners: SCRA, Polk County, Douglas County, Bayfield County, River Alliance, St. Croix-Eau Claire Headwaters Watershed  Citizen Lake Monitoring Network: Polk County, SCRA  Other education opportunities: National Park Service, Washington County, Polk County, Douglas County, Burnett County, Chisago County, GLIFWC, Bone Lake, St. Croix County, CMSCWD, SCRA |
| **Objective 2: Prevent the introduction of AIS by managing dispersal pathways.** | |
| Action 1: Identify locations within the Basin that may act as a conduit for spread or introductions of AIS. | Identify key locations in the watershed that may be sites for prevention measures and actions.  Partners: National Park Service, local lake and river associations, WI DNR, MN DNR |
| Action 2: Produce site-specific blueprints for physical barriers or other deterrence mechanisms. | Work with researchers to determine how to install a barrier at the confluence of the St. Croix with the Mississippi to stop/slow the introduction of invasive carp into the river. Assess and consider the potential negative effects of a barrier to sturgeon, as they frequently migrate back and forth between the St. Croix and Mississippi Rivers.  Partners: National Park Service, University of Minnesota |
| Action 3: Prevent the introduction of AIS from movement of large equipment or construction. | Encourage companies and agencies that maintain or create infrastructure throughout the watershed to promote clean equipment. Advise local officials and planners that roadway projects may have adverse effects on the health of water systems that cross their projects, and may be a source of AIS introduction or vector of their spread.  Partners: Xcel Energy |
| Action 4: Increase ramp watercraft inspections on high traffic waterbodies in the St. Croix River Basin. | Continue and expand watercraft monitoring and inspection programs such as Clean Boats, Clean Waters throughout the summer and fall recreation season at high traffic waterbody access points throughout the St. Croix River Basin. Support any local (county, lake organizations, etc.) partner efforts with the inspection programs and assist in filling inspection gaps as needed, prioritizing any St. Croix and Namekagon direct boat access points. Train watercraft inspectors, and encourage 1-on-1 conversations between the inspectors and water users and have inspectors ask water users where they are coming from to gauge the threat of an AIS introduction. Encourage inspectors to check bait buckets for AIS minnows. Ensure that AIS education is readily available at access points, including examples of AIS for identification training.  Partners: Polk County, Douglas County, Burnett County, Chisago County, St. Croix County, Washington County, Pine County, CMSCWD, Washburn County, SCRA, WI DNR (water guard), MN DNR (inspectors) |
| **Objective 3: Improve AIS regulations compliance by the public and increase enforcement by all levels of law enforcement.** | |
| Action 1: Educate local law enforcement through technical trainings. | Provide AIS technical training opportunities for local law enforcers.  Partners: National Park Service, Polk County, Burnett County, Chisago County, SCRA, MN DNR |
| Action 2: Educate youth and families on laws and regulations to increase compliance. | Reach out to schools and educational groups to educate youth about AIS issues and regulations. Develop activities that appeal to families and that are educational on AIS issues. Again, this may mean using new tools and smart-phone ready technology.  Partners: Polk County, Burnett County, Bone Lake, SCRA |

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| **Goal 2: Containment**  Contain AIS infestations through early detection and rapid response, and by fostering good communication and knowledge among partners. | |
| **Objective 1: Increase monitoring and support early detection and rapid response.** | |
| Action 1: Expand AIS monitoring and early detection. | Continue and increase monitoring for AIS. Local partners will work within their jurisdictions to monitor waterbodies within the St. Croix River Basin. Monitoring will use state-approved protocols, state-supported reporting procedures, and partners will follow their state’s rapid response communications charts to report new findings. Regional partners with the ability to monitor will work to fill monitoring gaps at the local level. Additionally, partners will promote citizen action through educational trainings (as outlined in Goal 1, Objective 1, Action 2) and ask citizens to implement their identification skills and notify local AIS coordinators with their findings.  Partners: National Park Service, Polk County, Douglas County, Burnett County, Bone Lake, St. Croix County, CMSCWD, SCRA, Washington County, GLIFWC, local watershed management organizations |
| Action 2: Support development and expansion of new early detection tools and strategies. | Support use of new early detection tools and strategies in St. Croix River Basin waterbodies. This should include using environmental DNA as a regular tool in detecting new, anticipated AIS in high risk parts of the St. Croix River Basin.  Partners: National Park Service, USGS (?) |
| Action 3: Develop a general, and, if needed, species-specific rapid response plan outlining actions required for the first detection of a species not previously known in the St. Croix River Basin. | Develop a regional AIS rapid response plan that will include a decision-making process to organize the response to new AIS infestations based upon the local ecology, institutional frameworks, and available resources. Encourage partners to use this plan, and work collaboratively where needed.  Partners: St. Croix County, local watershed management organizations, CMSCWD, SCRA |
| Action 4: Work with partners to conduct rapid response and projects. | If and when a new AIS is detected, partners will work collectively to eradicate that species using the regional AIS rapid response plan (Goal 2, Objective 1, Action 3).  Partners: National Park Service, local watershed management organizations, CMSCWD, SCRA, Bone Lake |
| **Objective 2: Develop management strategies to limit the spread of established populations of AIS to and from the St. Croix River Basin waterbodies.** | |
| Action 1: Sustain and build an AIS Work Group that meets regularly. | Sustain the initial partnership that has come together to develop this Strategic Plan and pursue additional partners to increase its capacity. Ensure that the partnership meets regularly to discuss ongoing AIS news, new infestations, new management practices, and other AIS topics. The group should establish a memorandum of understanding, which will define roles and responsibilities and coordination.  Partners: National Park Service, Washington County, Polk County, Douglas County, Burnett County, Chisago County, GLIFWC, Bone Lake, St. Croix County, CMSCWD, SCRA (lead) |
| Action 2: Build regional and national partnerships and establish clearly defined roles and responsibilities, and coordinate between partners working on AIS issues in the St. Croix River Basin. | Engage local stakeholders in a coordinated effort to address AIS issues through a regional St. Croix River Basin AIS Working Group. This will allow partners to:   1. Maintain and increase regional and national partnerships through ongoing communication and collaboration efforts. 2. Coordinate all levels of AIS work to avoid duplication, leverage resources, and share knowledge and expertise among federal, state, and local governments; tribal interests; nongovernmental organizations; and private sector interest. 3. Foster the development and participation of local partnerships to address AIS using watershed-wide approaches.   Partners: National Park Service, Washington County, Polk County, Douglas County, Burnett County, Chisago County, GLIFWC, Bone Lake, St. Croix County, CMSCWD, SCRA (lead) |
| Action 3: Develop a communications network between local natural resources managers and AIS researchers across the nation and world. | Develop and encourage communication between stakeholders, local natural resource managers, and AIS researchers throughout the world. This network will serve as a communications highway to understand and learn about what research is occurring elsewhere in the nation and world, and can allow the St. Croix River and its Basin to be included as a replicate in existing projects.  Partners: SCRA |
| Action 4: Develop a clearinghouse for AIS inventory data and AIS-related information for the St. Croix River Basin. | Develop an online clearinghouse that will serve as a communication forum between different stakeholders in the St. Croix River Basin and will facilitate information sharing. This forum will be a place where partners can house information on ongoing projects, success stories, lessons learned, resources available to loan to others in need, and geographical data on known AIS locations, among other things. (Note: this will not replace existing AIS geographical databases but may source data from those locations to create a complete map for the entire watershed.  Partners: National Park Service, Polk County, Douglas County, Burnett County, GLIFWC, Bone Lake, SCRA |

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| **Goal 3: Control**  Control and eradicate AIS infestations already present in the St. Croix River Basin and prevent them from spreading. | |
| **Objective 1: Control AIS in the St. Croix River Basin.** | |
| Action 1: Develop a regional AIS control and eradication plan. | Develop a regional AIS control plan that will include a decision making process to prioritize the response to existing AIS infestations based upon the local ecology, institutional frameworks, and available resources. Encourage partners to use this plan, and work collaboratively where needed.  Partners: St. Croix County, SCRA, MN DNR, WI DNR |
| Action 2: Use integrated pest management to manage populations of invasive species. | Use current research, best management practices, and best technologies to minimize AIS threats, control and manage infestations, and restore biodiversity of native communities.  Partners: WI DNR, MN DNR, Polk County, Washburn County, Douglas County, local watershed management organizations |
| Action 3: Coordinate AIS control efforts throughout the St. Croix River Basin. | Coordinate, facilitate, and review control efforts among the federal, tribal, state, and local units of government, and non-governmental organizations in order to improve the efficiency and effectiveness of the management efforts and to ensure compliance with applicable laws.  Partners: SCRA, MN DNR, WI DNR |
| Action 4: Train and encourage citizens to control AIS. | Build an on-the-ground network of watershed residents that can respond quickly and knowledgably to local AIS infestations. Train citizens in species-specific integrated pest management control strategies. Help citizens make sure they have any required permits and assist with control grant applications.  Partners: Polk County, local watershed management organizations, SCRA, MN DNR, WI DNR |

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| **Goal 4: Coordination and Assessment**  Ensure that this AIS Strategic Plan is implemented, and monitor its effectiveness. | |
| **Objective 1: Seek sustainable funding for AIS activities.** | |
| Action 1: Seek sustainable funding for AIS activities. | Identify and pursue sustainable funding sources and seek partners and sponsors to ensure actions in this Strategic Plan are accomplished. Seek funding sources to support AIS research, monitoring, planning, restoration, and education activities. Work collaboratively with partners to seek funding and to leverage resources. Additionally, support efforts to fund AIS staff positions on the local and regional level throughout the St Croix River Basin.  Partners: SCRA, WI DNR, MN DNR |
| Action 2: Periodically monitor the effectiveness of this Strategic Plan. | The AIS Work Group will meet 2-4 times per year to assess progress on the deliverables of this Strategic Plan and identify actions to take collectively if certain deliverables are not or are unsuccessfully produced.  Partners: Polk County, Bone Lake, SCRA, National Park Service, Washington County, Douglas County, Burnett County, Chisago County, St. Croix County, CMSCWD, MN DNR, WI DNR |
| **Objective 2: Increase community capacity to effect change in AIS prevention and control practices on the community level throughout the St. Croix River Basin** | |
| Action 1: Determine current community capacity for addressing AIS issues in the St. Croix River Basin and increase that level. | Assess current efforts throughout the communities of the St. Croix River Basin. Identify ongoing efforts and practices to prevent, contain, and control AIS, as well as key community supporters and advocates. Identify strategies for building community capacity using this baseline. Develop sustainable and meaningful relationships with the citizens and stakeholders that live, work, and recreate within the St. Croix River Basin to prevent, contain, and control AIS. Work AIS education into lake and river groups’ annual meetings, and into a component of the Northwest Lakes Conference in future years. Target opinion leaders and enhance their perceived knowledge and self-efficacy.  Partners: SCRA |
| Action 2: Increase public participation and knowledge in AIS prevention, containment, and control. | Maintain an open invitation to the public for joining the AIS Work Group as a hands-on opportunity for community members to be engaged in AIS activities. Furthermore, increase diversity of partners – involve key stakeholders and find leaders of engaged interest groups (i.e., fishermen, lake associations, etc.) to assist in preventing, containing, and controlling AIS. These key stakeholders will be approached with specific actions and ideas to generate interest.  Partners: SCRA |
| Action 3: Provide leadership in the movement to increase community capacity. | Focus the attention of the AIS Work Group on advising and leading efforts to increase community capacity as needed. Consider developing a subcommittee to oversee this work if needed or desired.  Partners: SCRA |

1. Pimentel, D., S. McNair, J. Janecka, J. Wightman, C. Simmonds, C. O’Connell, E. Wong, L. Russel, J. Zern, T. Aquino and T. Tsomondo. 2001. Economic and environmental threats of alien plant, animal, and microbe invasions. *Agriculture, Ecosystems & Environment* **84(1)**: 1-20. [↑](#footnote-ref-1)