



Final Report

Yellow Iris Rapid Response on Upper Lake St. Croix in Douglas County, Wisconsin

AIS Control Grant # AIRR-153-14
July 1, 2013 - December 31, 2015



Photos taken by Carrie Sanda

Final Report Prepared: July 1, 2015
Prepared By: Carrie Sanda, Outreach Specialist, UW-Superior's Lake Superior Research
Institute

Introduction

At 828 acres, Upper St. Croix Lake is one of the largest lakes in Douglas County and is also the headwaters of the St. Croix River¹⁰. The river flows south into the St. Croix Flowage and below the Gordon dam it is designated as a National Scenic River. In the summer of 2012, during a release of *Galerucella* beetles to control Purple Loosestrife growing on the lake and river, it was noted that a significant population of *Iris pseudacorus* (Yellow Iris) was present.

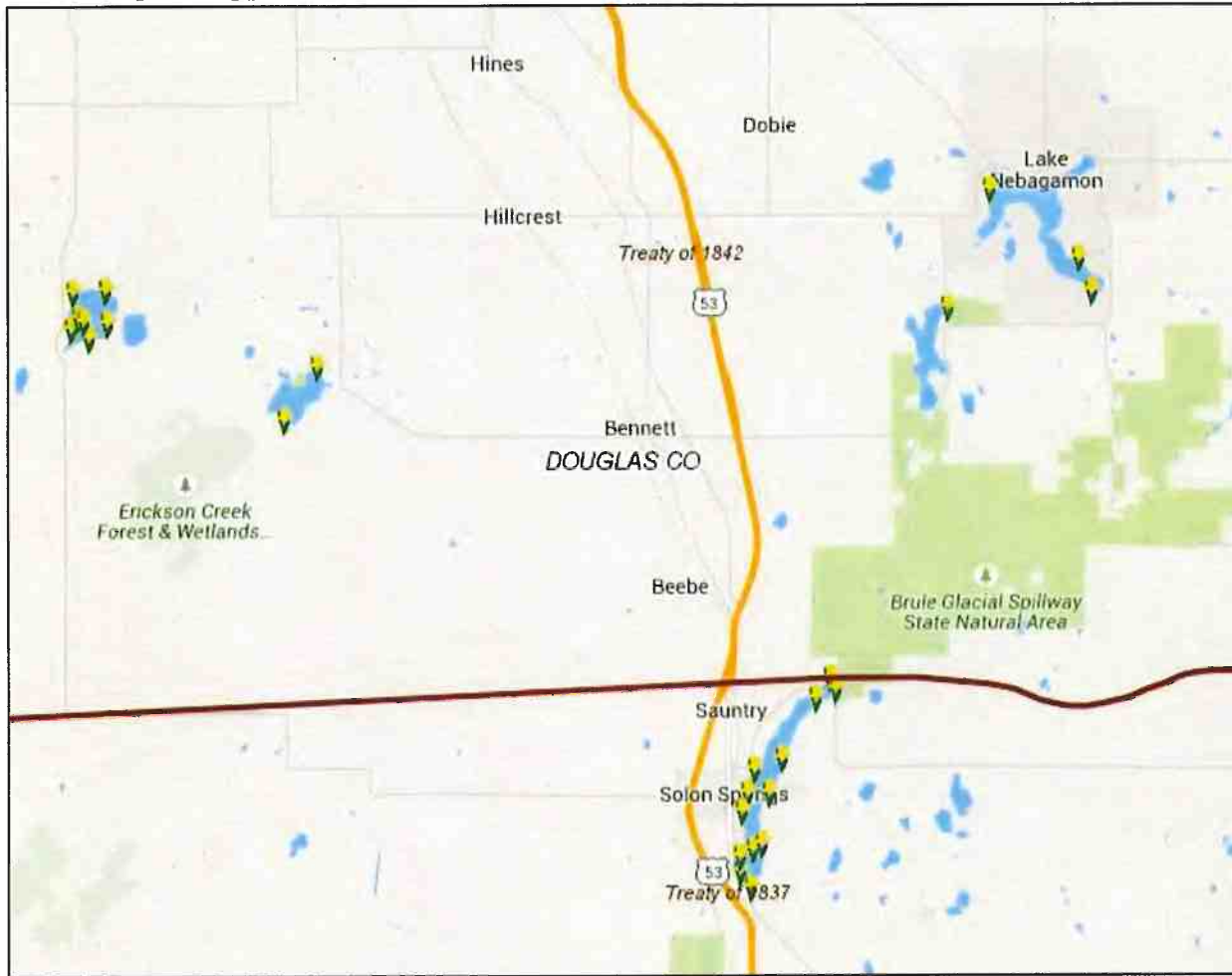
Research into *Iris pseudacorus* showed that is a perennial wetland invasive plant that displaces native vegetation along streambanks, wetlands, and shorelines. It reduces available nesting and cover habitat needed by both waterfowl and fish¹. It is also capable of reproducing through both seeds and vegetative rhizome mats. These rhizome mats can prevent the germination and seedling growth of native plant species¹. They may also compact the soil and trap sediment, leading to an alteration of shoreline and streambank elevations¹. All parts of *Iris pseudacorus* are toxic, and therefore are not a viable wildlife food source. This toxic nature may also then be considered a human health threat if the plant sap is exposed to the skin or if any plant parts are ingested^{1,2}.

Prior to the start of the project, *Iris pseudacorus* was being considered as an addition to the "Restricted Invasive Species" list in Wisconsin's NR 40 Invasive Species Identification, Classification and Control Code as a result of its invasive nature mentioned above. Restricted species are invasive species that are already established in the state and cause or have the potential to cause significant environmental or economic harm or harm to human health³. As of May 1, 2015, *Iris pseudacorus* is now considered a "Restricted" species⁴. This consideration and eventual designation in the state of Wisconsin illustrates that *Iris pseudacorus* is a species capable of considerable environmental impact and should be controlled.

Further research into *Iris pseudacorus* showed that while its presence was known in the county, (Map 1) it was not seen at the same abundance levels in the rest of the St. Croix system. Anecdotal evidence from residents who live on the St. Croix Flowage suggested that *Iris pseudacorus* had a minimal population compared to the southern outlet of Upper Lake St. Croix and the St. Croix River⁵. The headwaters of the St. Croix River, where *Iris pseudacorus* was observed to be growing, is also home to significant beds of Wild Rice and as a result is designated as a Critical Habitat Area by the WDNR^{6,7}. Wild Rice is an incredibly important and culturally significant wildlife and human food resource. *Iris pseudacorus* is known to grow not just along river edges, but can also grow in floating

mats, potentially in the same habitat suitable for Wild Rice. At this time, however, it is not clear whether *Iris pseudacorus* has the potential to outcompete Wild Rice for growing space.

Map 1: Mapped locations of *Iris pseudacorus* in Douglas County, WI⁸



Project Description

The “Yellow Iris Rapid Response on Upper Lake St. Croix in Douglas County, Wisconsin” project was developed with goals for control, local citizen education, Wild Rice seeding, and information on *Iris pseudacorus* abundance. The objectives and activities developed for the project are shown in Table 1 below. The project was developed to take place over three field seasons in 2013-2015. Vegetative frequency surveys were to be conducted at the beginning of each field season in 2013 and 2014 prior to control work with a final survey in 2015. Control work would then take place over the course of multiple days in 2013 and 2014 with the help of volunteers from the Solon Springs School. An informational flyer and invitation to a workshop sent to every riparian landowner on Upper St. Croix Lake would provide information on identification and control. Landowners would then be able to remove it from their own property so organized control days could focus on the southern outlet of the lake. Wild Rice seeding would then take place in the fall of 2013 and 2014 to enhance the current beds growing in the St. Croix River.

Table 1: Objectives, Activities, Methods, Products, and Deliverables for the “Yellow Iris Rapid Response on Upper Lake St. Croix in Douglas County, Wisconsin Project

Objective 1a: Use current research and BMPs to minimize Yellow Iris populations on target areas of the lake.		
Activity	Methods	Products or Deliverables
Develop and implement a plan for controlling Yellow Iris on Upper Lake St. Croix.	1. Gather information on Yellow Iris control. 2. Obtain needed equipment and coordinate control days.	1. Two to three Yellow Iris control days carried out on the lake in 2013 and again in 2014.
Objective 1b: Utilize local partners and volunteers to control Yellow Iris.		
Activity	Methods	Products or Deliverables
Identify local groups and volunteers to assist on Yellow Iris Rapid Response Project.	1. Contact Solon Springs and Northwoods School teachers. 2. Contact Upper Lake St. Croix Association members.	1. Students assist with Yellow Iris control days. 2. Lake residents assist during Yellow Iris control days.
Objective 2a: Provide Yellow Iris education to all residents on Upper Lake St. Croix.		
Activity	Methods	Products or Deliverables
Information is disseminated to all residents and businesses on Upper Lake St. Croix.	1. Information on Yellow Iris is gathered from WDNR, USDA, and other reliable sources. 2. Contact Douglas County for an address list of all residents and businesses on the lake.	1. A flyer with information on Yellow Iris and its control on the lake is developed. 2. A mailing list for lake residents and businesses is developed. 3. The flyer is mailed to all residents and businesses on the lake.
Objective 2b: Residents of Upper Lake St. Croix can identify and control Yellow Iris along their shoreline.		
Activity	Methods	Products or Deliverables
Provide Citizen Lake Monitoring Network AIS training to Upper Lake St. Croix residents.	1. CLMN AIS training is offered to all lake residents. 2. Provide attendees with information on how to identify and control Yellow Iris.	1. One CLMN AIS workshop held on the lake during 2013 and/or 2014.

Objective 2c: Support residents who want to control Yellow Iris on their shoreline.		
Activity	Methods	Products or Deliverables
Provide support to residents of Upper Lake St. Croix who have Yellow Iris on their shoreline or property.	<ol style="list-style-type: none"> 1. Information is disseminated to residents on proper handling, control and disposal of Yellow Iris. 2. Residents with physical limitations are offered assistance with removal. 	<ol style="list-style-type: none"> 1. Information on controlling Yellow Iris and physical assistance options are included in the informational flyer developed for Objective 2a. 2. Any resident who requires assistance with Yellow Iris removal is helped.
Objective 3a: Use current Wild Rice seeding guidelines to most effectively seed the southern outlet.		
Activity	Methods	Products or Deliverables
Develop and implement a plan to seed Wild Rice in the southern outlet of Upper Lake St. Croix.	<ol style="list-style-type: none"> 1. Gather information on Wild Rice seeding guidelines and locate a seed source. 	<ol style="list-style-type: none"> 1. The southern outlet Wild Rice area is seeded once in 2013 and again in 2014.
Objective 4a: Gather data on Yellow Iris pre and post control efforts.		
Activity	Methods	Products or Deliverables
Data on Yellow Iris abundance on Upper Lake St. Croix is gathered.	<ol style="list-style-type: none"> 1. Information on appropriate survey methods is gathered and analyzed. 2. Pre and post control surveys are conducted on the southern outlet of Upper Lake St. Croix. 	<ol style="list-style-type: none"> 1. One pre-control work survey on Yellow Iris abundance is completed on the southern outlet of the lake in 2013. 2. Post-control surveys on Yellow Iris abundance are completed in 2014, and 2015.

Vegetative Frequency Survey and Control Methods

Before conducting the first frequency survey, Paul Hlina, Associate Researcher for the Lake Superior Research Institute at UW-Superior, volunteered to train staff on how to conduct frequency surveys. Paul Hlina has many years experience studying wetland plants and conducting field surveys. During the training, it was noted *Iris pseudacorus* was present on the St. Croix River outlet in amounts greater than previously realized, and more than a small group of volunteers would be able to address (figure 1.) As a result, it was decided to focus the survey and control work on a more manageable scale; the first ½ mile.

Figure 1: *Iris pseudacorus* growing along the edge of the St. Croix River



¼ mile of Yellow Iris growing approximately one - two feet deep along the river edge

Photo taken by Carrie Sanda

Frequency surveys were conducted using LSRI's "Conducting Vegetation Surveys of Wisconsin Lake Superior Coastal Wetlands Using the Great Lakes Coastal Wetlands Consortium Protocol"⁹. Approximately every 30 feet a GPS waypoint was taken. At each waypoint, a one meter square quadrat was placed on top of vegetation and the presence or absence of five species within the quadrat were recorded. The following categories were chosen because they were the most abundant in the project area: Yellow Iris, Willow/Alder Brush, Sedges/Grasses, Water Lilies, Open water, and Other. The

“Other” category was included as a catchall for those species such as ferns and flowering plants that occurred infrequently. “Open Water” was noted when the quadrat included water without water lilies growing in it. The frequency survey was conducted along both sides of the first ½ mile of the river. The Southwest side of the river was designated Transect A, and the Southeast side of river was designated Transect B. A total of 100 waypoints were taken, 60 along Transect A and 40 along Transect B.

Iris pseudacorus control work was accomplished in three ways. The first control method was hand pulling. Whenever possible, *Iris pseudacorus* was hand pulled, and as much of the rhizome was taken as possible. The second control method was underwater cutting. If the plant was not able to be hand pulled and was also growing underwater, hand-held pruners were used to cut all vegetative and flowering stalks under the water. A study on different control methods performed in Washington State showed that underwater cutting was an effective treatment for *Iris pseudacorus*¹¹. The third method of control was removing floating mats. Floating mats of *Iris pseudacorus* of approximately 30 pounds or less were removed entirely. If the floating mats were too large to be lifted, and vegetative stalks were growing out of the water, only flowering stalks were cut to reduce the possibility of *Iris pseudacorus* spreading further through seeds. Any vegetation growing under the water on these floating mats was either hand pulled or cut underwater. These control methods were chosen to minimize the disturbance to native plants.

Control work took place from canoes launched from Prevost Landing, approximately ½ mile north of the project area. All volunteers were instructed on how to identify *Iris pseudacorus* and the three methods of control at the beginning of each control day prior to paddling to the control site.

Prior to beginning the project Mark Sundeen, Water Resources Management Specialist for the Wisconsin Department of Natural Resources, was contacted to discuss the need for an aquatic plant management permit. After discussing the control methods he determined we did not require a permit for the project. Email correspondence can be viewed in Appendix A.

Project Activities Summary and Timeline

On July 2, 2013, work began on the Project. A frequency survey was completed at one hundred waypoints along Transects A and B of the St. Croix River. On July 10th and 11th of 2013, control work began with the assistance of Upper Lake St. Croix Association and Solon Springs High School student volunteers. July 18, 2013 was the final control day for the season. On July 20, 2013, a presentation on the Yellow Iris Project was given to the Upper St. Croix Lake Association to review the project goals and progress to date.

In May of 2014, the project picked up again with development of an informational mailing that was sent to all 241 riparian property owners on Upper St. Croix Lake. The mailing provided information on how to identify and control Yellow Iris, as well as an invitation to attend a workshop. The mailing and powerpoint presentation are included in Appendix B & C. On June 21, 2014, five people attended the workshop held at the Solon Springs Community Center. At the workshop they learned how to identify and control *Iris pseudacorus* by viewing live samples. The Douglas County AIS Program display was also available to view so citizens could get additional information on other invasive species that threaten their lake.

On June 25, 2014, the same GPS waypoints were visited and a frequency survey was completed. Two final control days were held on July 2nd and July 3rd, 2014 again with help from Upper Lake St. Croix Association and Solon Springs School student volunteers. During the course of the project, volunteers donated a total of 107.5 hours doing control work and removed 41½, 45 gallon garbage bags of *Iris pseudacorus*. All plant material was brought to a local landfill for disposal.

On July 15th, 2014 the Douglas County Land and Water Conservation Committee held their monthly meeting at the Forestry Department office building in Solon Springs where they heard a presentation on the Yellow Iris Project and then paddled out to the project area. On June 30, 2015, the same GPS waypoints were visited and a frequency survey was completed a final time. Maps of the project area can be found in Appendix D.

Wild Rice seeding was planned to take place in the fall of 2013 and again in 2014. However, Wild Rice seed was not able to be obtained for the project. Options and maps for completing Wild Rice seeding are included in Appendix E.

Vegetative Frequency Surveys Pre and Post-Control

Table 3: 2013-2015 Frequency of Occurrence in Entire Project Area

Frequency of Occurrence (% of total data points)			
Targeted Species	2013 (Pre-Control)	2014 (Post-Control)	2015 (Post-Control)
Yellow Iris	73	74	64
Water Lilies	59	23	51
Sedges/Grasses	92	93	95
Alder/Willow Brush	45	57	40
Open Water	76	42	63
Other	77	76	77

Table 4: 2013-2015 Frequency of Occurrence in Targeted Control Area

Frequency of Occurrence in Targeted Control Area; Waypoints 13-43 (% of 31 data points)			
Targeted Species	2013 (Pre-Control)	2014 (Post-Control)	2015 (Post-Control)
Yellow Iris	71	68	52
Water Lilies	65	52	48
Sedges/Grasses	97	90	97
Alder/Willow Brush	71	84	58
Open Water	74	58	77
Other	65	61	90

Table 5: 2013-2015 Frequency of Occurrence Outside Control Area

Frequency of Occurrence Outside Control Area; Waypoints 44-112 (% of 69 data points)			
Targeted Species	2013 (Pre-Control)	2014 (Post-Control)	2015 (Post-Control)
Yellow Iris	74	77	70
Water Lilies	57	10	52
Sedges/Grasses	90	94	94
Alder/Willow Brush	33	45	32
Open Water	77	35	57
Other	83	83	71

Discussion

As noted in the Vegetative Frequency Survey and Control Methods section, it became apparent after the initial survey there was more Yellow Iris present in the St. Croix River than would be possible to remove by hand with a small volunteer group. As a result, control efforts were concentrated on approximately the first ¼ mile of the southwest side of the river in both 2013 and 2014.

Upon completion of the final frequency survey in 2015, percent frequencies of occurrence were calculated from the data (Tables 3-5.) Pre-control frequency was 71% in 2013 and was calculated at 52% post-control in 2015 (Table 2.) This indicates a 19% reduction of *Iris pseudacorus* in the project control area. When you compare this to the frequency of Yellow Iris occurrence outside of the control area, a decline of 4% was observed. Overall, the control area showed a 15% greater decline in Yellow Iris than in the non-control project area. These results indicate the underwater cutting and hand pulling appears to be a somewhat effective control method for a small infestation or targeted control effort. However, the St. Croix River has more Yellow Iris present than a small group of people can control manually.

It was observed during the project that *Iris pseudacorus* grew mostly along the river edges. However, *Iris pseudacorus* did occur in floating mats regularly in the control area. Actual size and frequency of these mats was not recorded. However, one of the biggest mats observed was approximately six feet or larger in diameter and too heavy to be manually removed (Figure 2.) Mats like this were also not able to be effectively cut as the Yellow Iris leaves grew mostly above the water line. These large floating mats would most likely need to be mechanically removed.

It is interesting to note that in many instances, the “other” category was observed to be Purple Loosestrife. This was fairly consistent on both sides of the river in both the control and non-control areas. However, actual frequency cannot be calculated for Purple Loosestrife since it was not included as a separate entry in the species list. Raw data is included in Appendix F.

Figure 2: A floating mat of *Iris pseudacorus* approximately six feet or larger in diameter.



Photo taken by Carrie Sanda

Bibliography

- 1) King County Noxious Weed Control Program. 2009. Yellow-flag iris best management practices. Retrieved February 14, 2013 from <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/yellow-flag-iris-control.pdf>
- 2) Wisconsin Department of Natural Resources. 2015. Yellow Iris (*Iris pseudacorus*). Retrieved July 20, 2015 from <http://dnr.wi.gov/topic/invasives/fact/yellowflagiris.html>
- 3) Wisconsin Department of Natural Resources. 2012. Invasives Rule – NR 40 terminology. Retrieved July 20, 2015 from <http://dnr.wi.gov/topic/Invasives/terminology.html>
- 4) State of Wisconsin Legislative Reference Bureau. 2015. 2013–14 Wisconsin Statutes & Annotations. Chapter NR 40 Invasive Species Identification, Classification and Control. Retrieved July 20, 2015 from http://docs.legis.wisconsin.gov/code/admin_code/nr/001/40.pdf
- 5) Wilson, L. 2013. Personal communication.
- 6) Smith, A. 2013. St. Croix River Critical Habitat Designation Report, Douglas County, WI. Retrieved February 19, 2013 from <http://dnr.wi.gov/lakes/criticalhabitat/Project.aspx?project=25645541>
- 7) Smith, A. 2013. Upper St. Croix Lake Critical Habitat Designation Report, Douglas County, WI. Retrieved February 19, 2013 from <http://dnr.wi.gov/lakes/criticalhabitat/Project.aspx?project=25645541>
- 8) Great Lakes Indian Fish and Wildlife Commission. 2015. GIS Map. Retrieved July 20, 2015 from <http://maps.glifwc.org/>
- 9) Eliot, A. 2103. Conducting Vegetation Surveys of Wisconsin Lake Superior Coastal Wetlands Using the Great Lakes Coastal Wetlands Consortium Protocol. Retrieved July 29, 2015 from <https://www.uwsuper.edu/lstri/sops/sops2.cfm>
- 10) Wisconsin Department of Natural Resources. 2014. Lakes. Retrieved July 28, 2015 from <http://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2747300>
- 11) Simon, B. 2008. Yellow Flag Iris Control and Education Final Report. Washington State Department of Agriculture Aquatic Weeds Management Fund. Retrieved February 14, 2013 from <http://www.ecy.wa.gov/programs/wq/plants/weeds/YFI%20Final%20Report%20to%20DOE%206-30-08.pdf>

Appendix Guide

Appendix A: Aquatic Plant Management Permit Correspondence

Appendix B: Yellow Iris Mailing - Workshop Invitation

Appendix C: Yellow Iris Powerpoint Presentation

Appendix D: Maps of the Yellow Iris Project Area

Appendix E: Wild Rice Seeding Plan and Maps

Appendix F: Baseline Vegetation Survey Data for Yellow Iris Project Area

Appendix A: Aquatic Plant Management Permit Correspondence

From: [Sundeen, Mark R - DNR](mailto:Sundeen.Mark.R@dnr.wisconsin.gov)
To: [Sanda, Carrie E](mailto:Sanda.Carrie.E@uwsuper.edu)
Subject: RE: APM Permit
Date: Wednesday, July 03, 2013 10:03:03 AM

Hi Carrie

No permit needed. Manual removal of invasive species does not require an APM permit. Permission from property owners, if plants are on private property, must be obtained and proper disposal of the removed vegetation is required.

Mark Sundeen
Water Resource Management Specialist
Northern Region
810 W. Maple St.
Spooner, Wisconsin
Wisconsin Department of Natural Resources
(O) phone: (715) 635-4074
(O) fax: (715) 635-4013
(O) e-mail: mark.sundeen@wisconsin.gov

How did I do? Fill out this customer survey -- <https://www.surveymonkey.com/s/WDNRWater>

-----Original Message-----

From: Sanda, Carrie E [<mailto:csanda@uwsuper.edu>]
Sent: Wednesday, July 03, 2013 9:22 AM
To: Sundeen, Mark R - DNR
Subject: APM Permit

Hi Mark,

I left you a voicemail also regarding this, but wanted to follow up with an email as well. I recently received an AIS Control grant to work on Yellow Iris on Upper Lake St. Croix in Douglas County. I am wondering if I need an APM permit. We are doing an underwater cutting by hand with pruning shears to remove the plants. Can you let me know if we need one or not? Thank you!

Carrie Sanda
Douglas Cty AIS Coordinator
218-349-0264

Sent from my iPhone

Appendix B: Yellow Iris Mailing - Workshop Invitation



Name
Address
City, State

Hello,

Last summer, a large population of invasive Yellow Iris was found on the southern outlet of Upper Lake St. Croix. In winter of 2012, we received a Rapid Response Grant from the Wisconsin Department of Natural Resources to begin a control project. The southern outlet of Upper Lake St. Croix (the beginning of the St. Croix River) is not the only area of the lake where Yellow Iris is growing and we need your help! Please join us for an informational meeting on Saturday, June 21st, from 9:00am-10:00am at the Community Center. We will be discussing the project and what you can do on your own property to control invasive species over coffee and a continental breakfast.

After the meeting, join us for a paddle on the lake! We'll be leaving from the Prevost Road landing at 10:30am and paddling to our main Yellow Iris control area. Canoes will be provided by the Friends of the St. Croix Headwaters Canoes on Wheels Program. Please RSVP so we can plan accordingly.

If you need assistance to remove Yellow Iris on your property, would like to learn more about invasive species, or would like to receive the county's invasive species newsletter, "The Douglas County Monitor", contact us by phone or email. We hope to see you in June!

Sincerely,

Carrie Sanda
Watershed Coordinator, St. Croix Headwaters
csanda@uwsuper.edu
(715) 394-8525

Farrah Wirtz
Douglas County AIS Coordinator
fwirtz@uwsuper.edu
(715) 394-8334



Pulling Yellow Iris with the help of Joanne Zosel and students from Solon Springs High School

Yellow Iris

Yellow Iris is a beautiful, robust plant. The roots form dense mats, making mature plants difficult to remove and allow the plant to spread readily. Small plants can be hand pulled or dug easily. Gloves should be worn when removing this plant as the sap can cause skin irritation. All parts of the Yellow Iris plant are poisonous to most animals, including humans. Consider removing and replacing this invasive plant with the native Blue Flag Iris.

Native Blue Flag Iris



Invasive Yellow Flag Iris

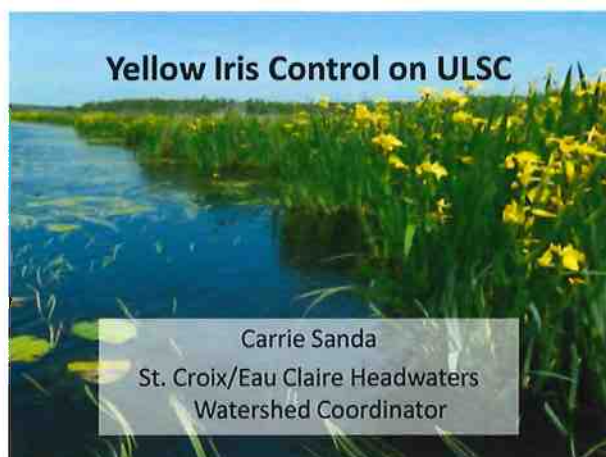


Identifying Characteristics: The easiest way to identify is by its bright yellow flower. The native Blue-Flag Iris is very similar in size, shape and bloom time, but its flower is purple-blue. Yellow Iris can grow to 6 feet in height while Blue Flag grows to about 3 feet tall. Prior to bloom they also resemble cattails.

Commonly Found: Along shorelines and riverbanks.

Best Time of Year to Find: Yellow Iris blooms during the months of June and July.

Appendix C: Yellow Iris Powerpoint Presentation



- Spreads within an established site through root growth and to new locations from seeds dropped into the water which float to other sites.
- Can establish dense, monotypic stands, outcompeting other plants, eliminating natural habitat.



How to Identify

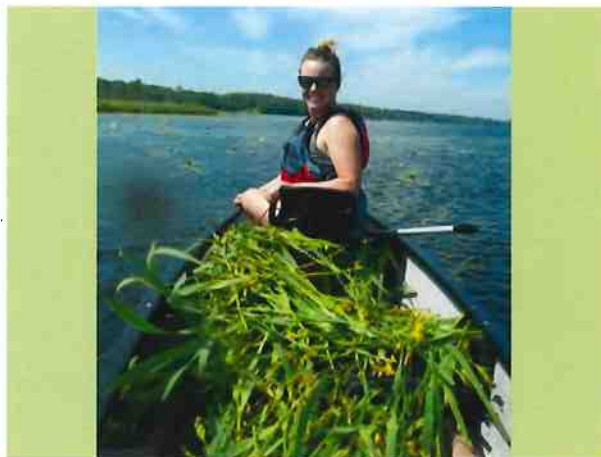
- Bright yellow flower, grows to 6 feet in height
- Broad, sword shaped leaves green with a grayish blue cast
- Prior to bloom they resemble cattails
- Found along shorelines and riverbanks
- Blooms June and July



Project Overview

- Rapid Response Grant from the Wisconsin DNR
- Summer 2013
 - Frequency survey of 100 data points along the first ½ mile of the river outlet
 - Hand pulling & underwater cutting
- Summer 2014
 - Frequency survey of same data points
 - Hand pulling & underwater cutting
 - Wild Rice Seeding
- Summer 2015
 - Frequency survey
 - Wild Rice Seeding





To date a total of 24 bags (45 gallon) of Yellow Iris removed

We Need Your Help!

- If you find Yellow Iris on your property...
 - Small plants can be pulled/dug out
 - Replant Native Blue Flag Iris
 - Cut it below the water line
- Wear gloves, sap can cause skin irritation when exposed to sunlight
- All parts of the Yellow Iris plant are poisonous to most animals, including humans
- If you require assistance contact us



Questions?

csanda@uwsuper.edu

715-394-8525

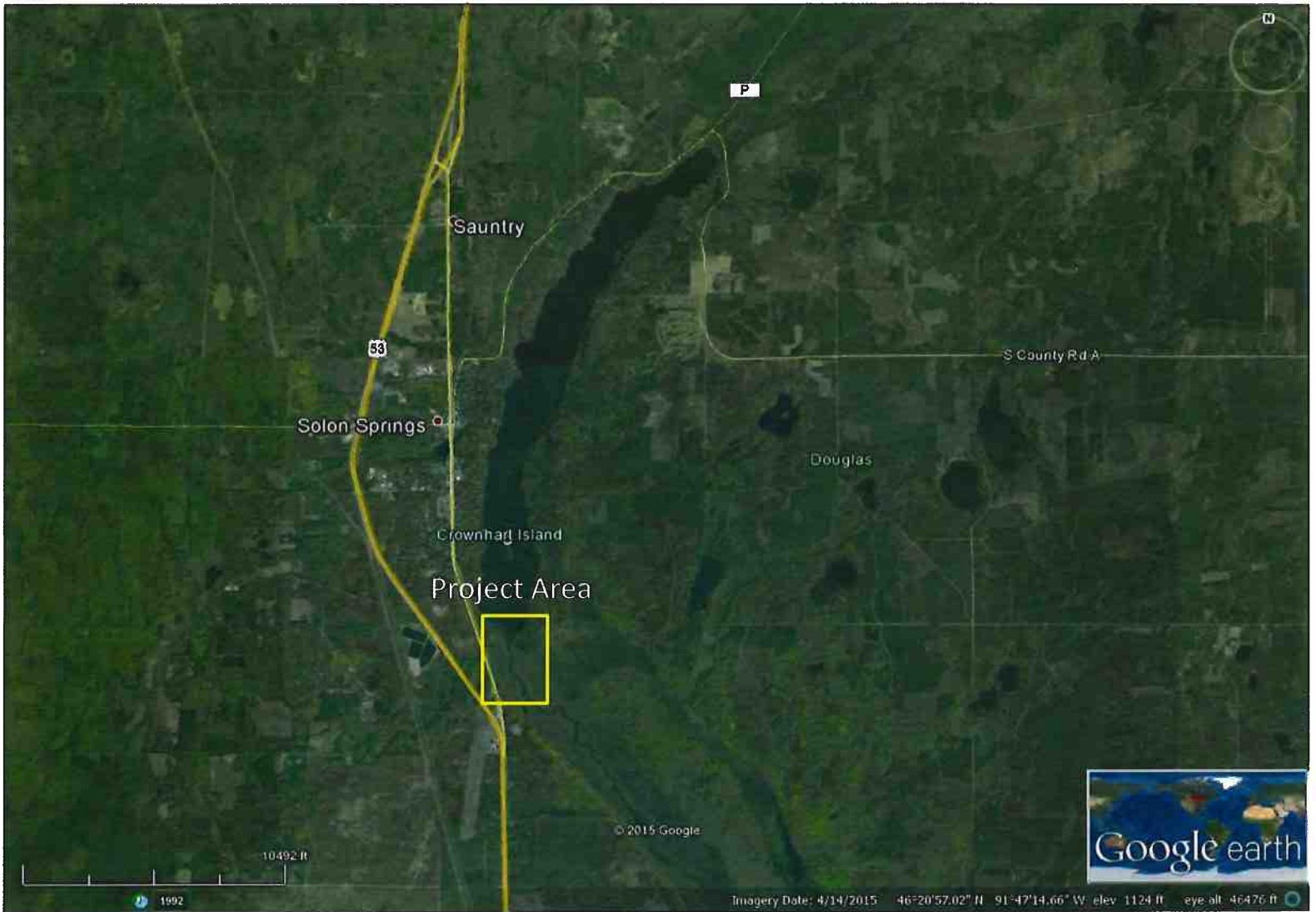


Hands on Identification

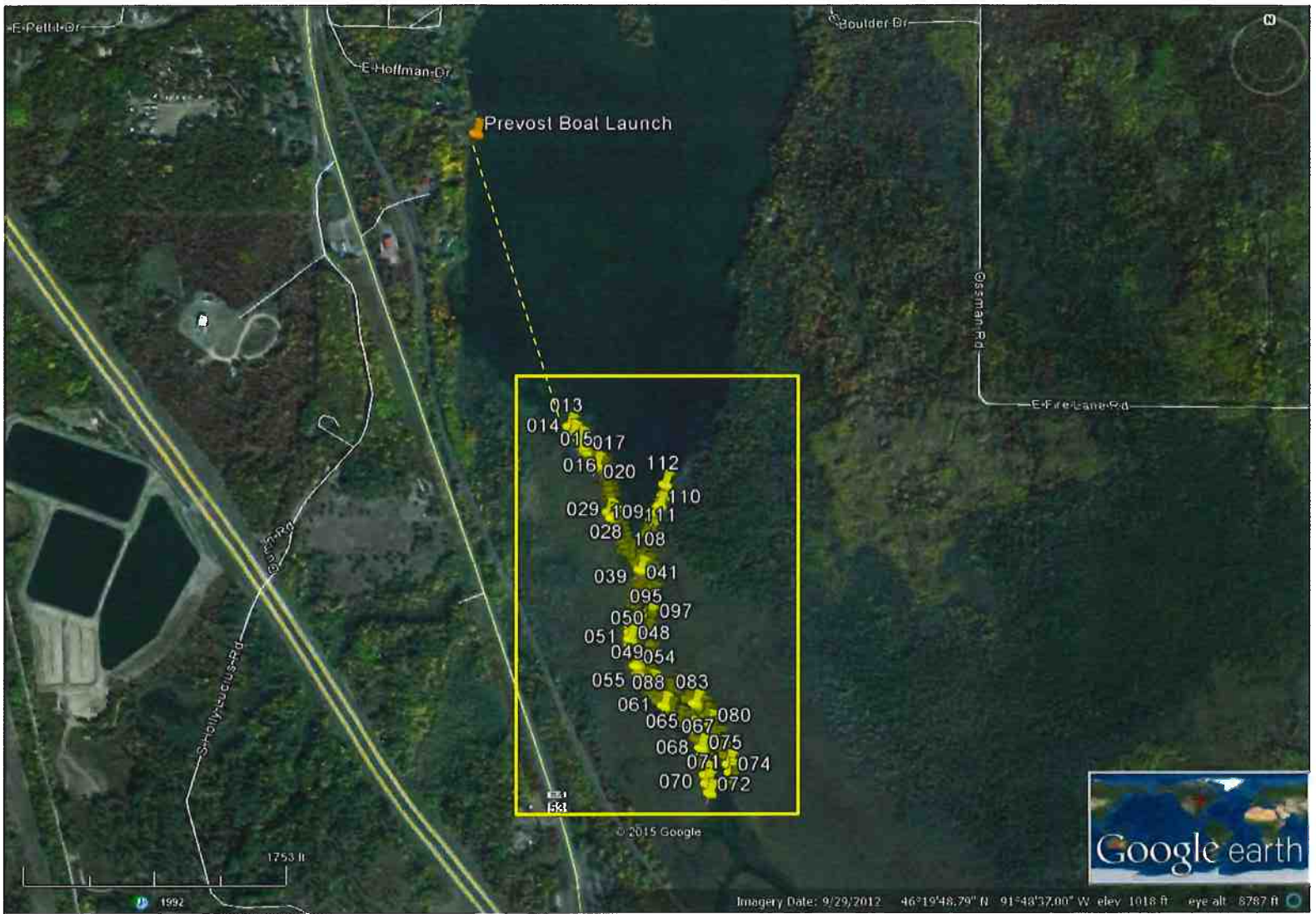
- Yellow Iris
- Blue Flag Iris
- Eurasian Water Milfoil, Curly Leaf Pondweed
- Japanese Knotweed, Purple Loosestrife
- Zebra Mussels, Asian Clams, New Zealand Mudsnails
- Red Swamp Crayfish

Appendix D: Maps of the Yellow Iris Project Area

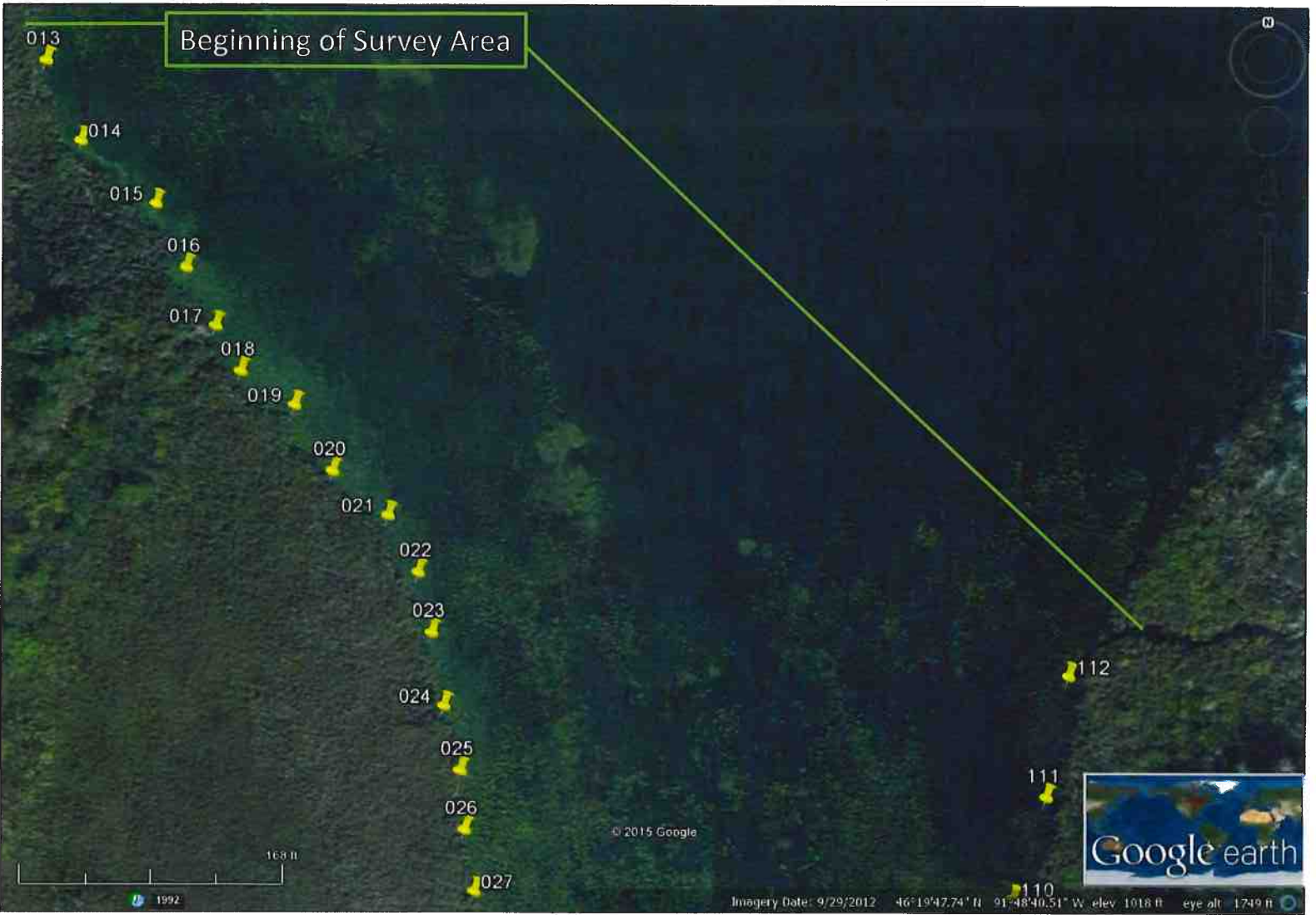
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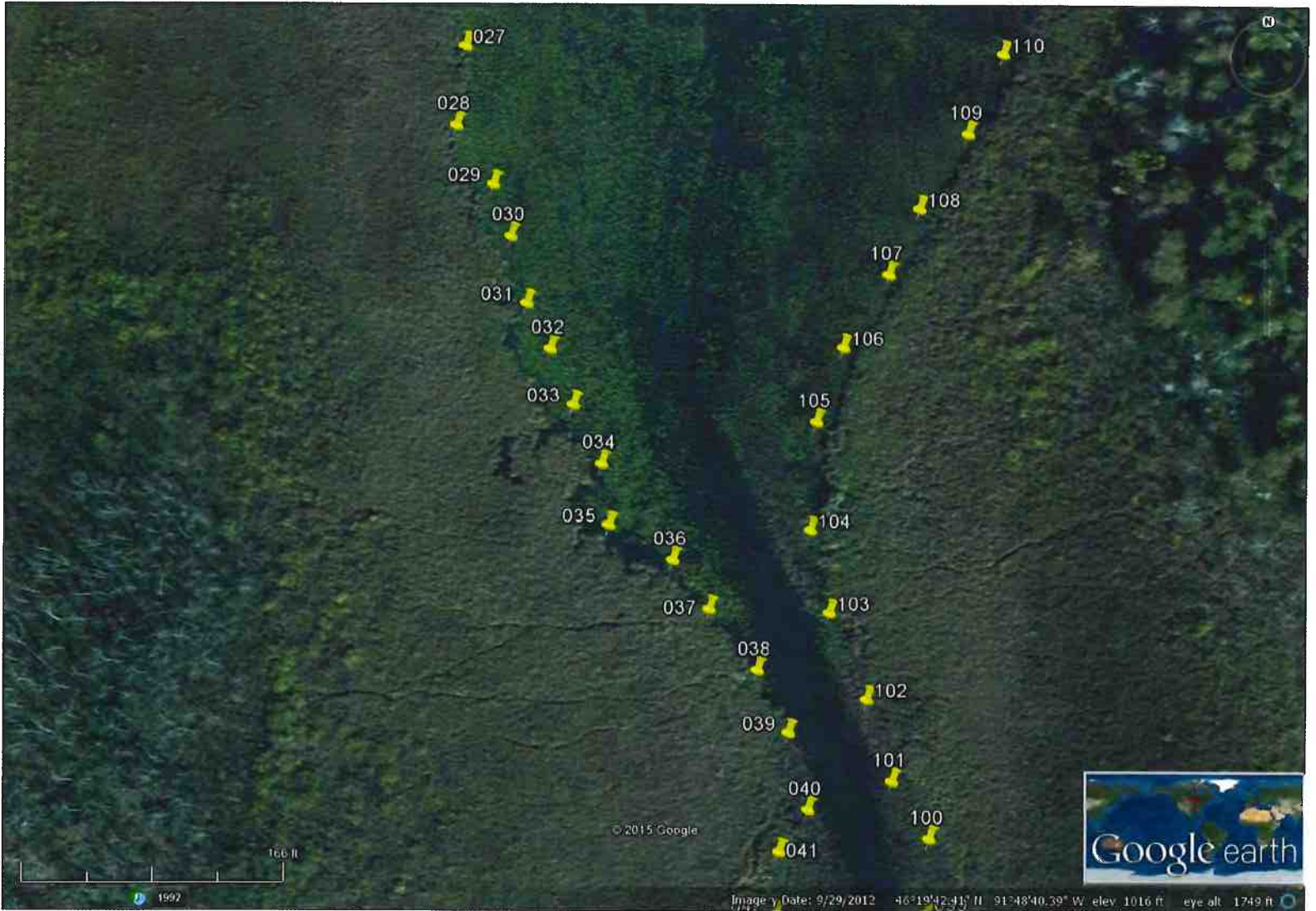
Yellow Iris Rapid Response Project on Upper Lake St. Croix -Launch Site and Project Area-



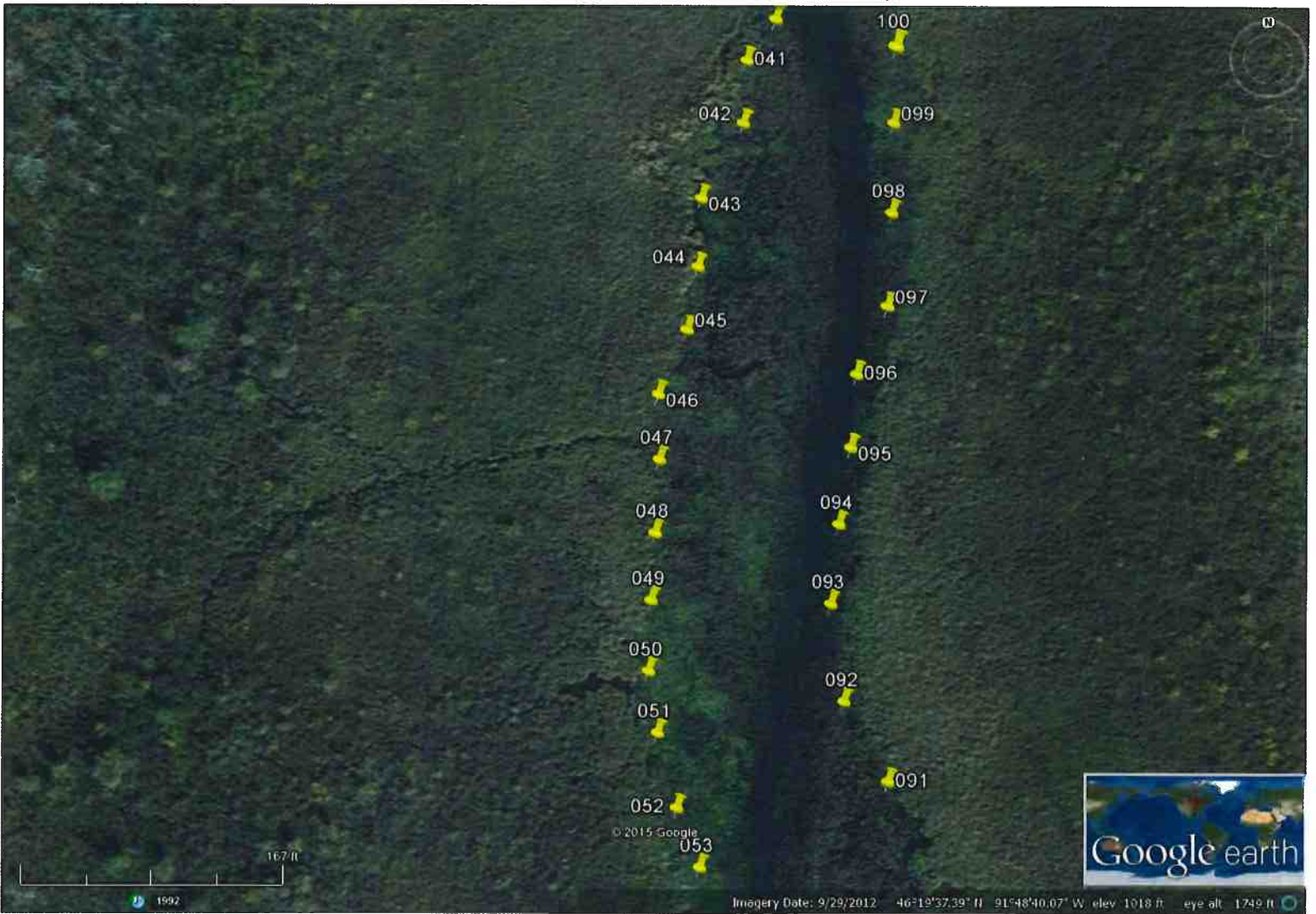
Yellow Iris Rapid Response Project on Upper Lake St. Croix
-Baseline Vegetative Survey Waypoint Map 1 of 5-



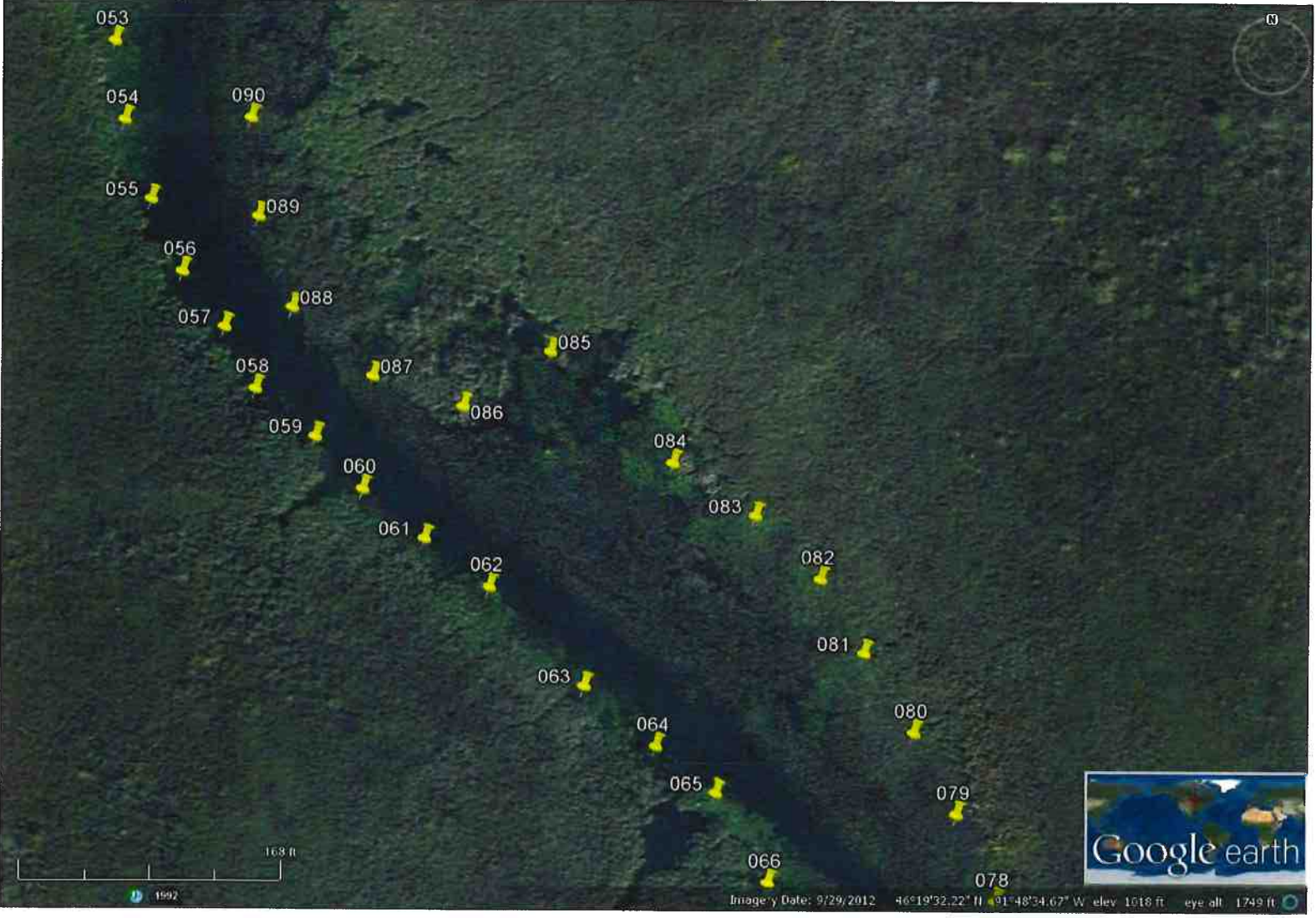
Yellow Iris Rapid Response Project on Upper Lake St. Croix
-Baseline Vegetative Survey Waypoint Map 2 of 5-



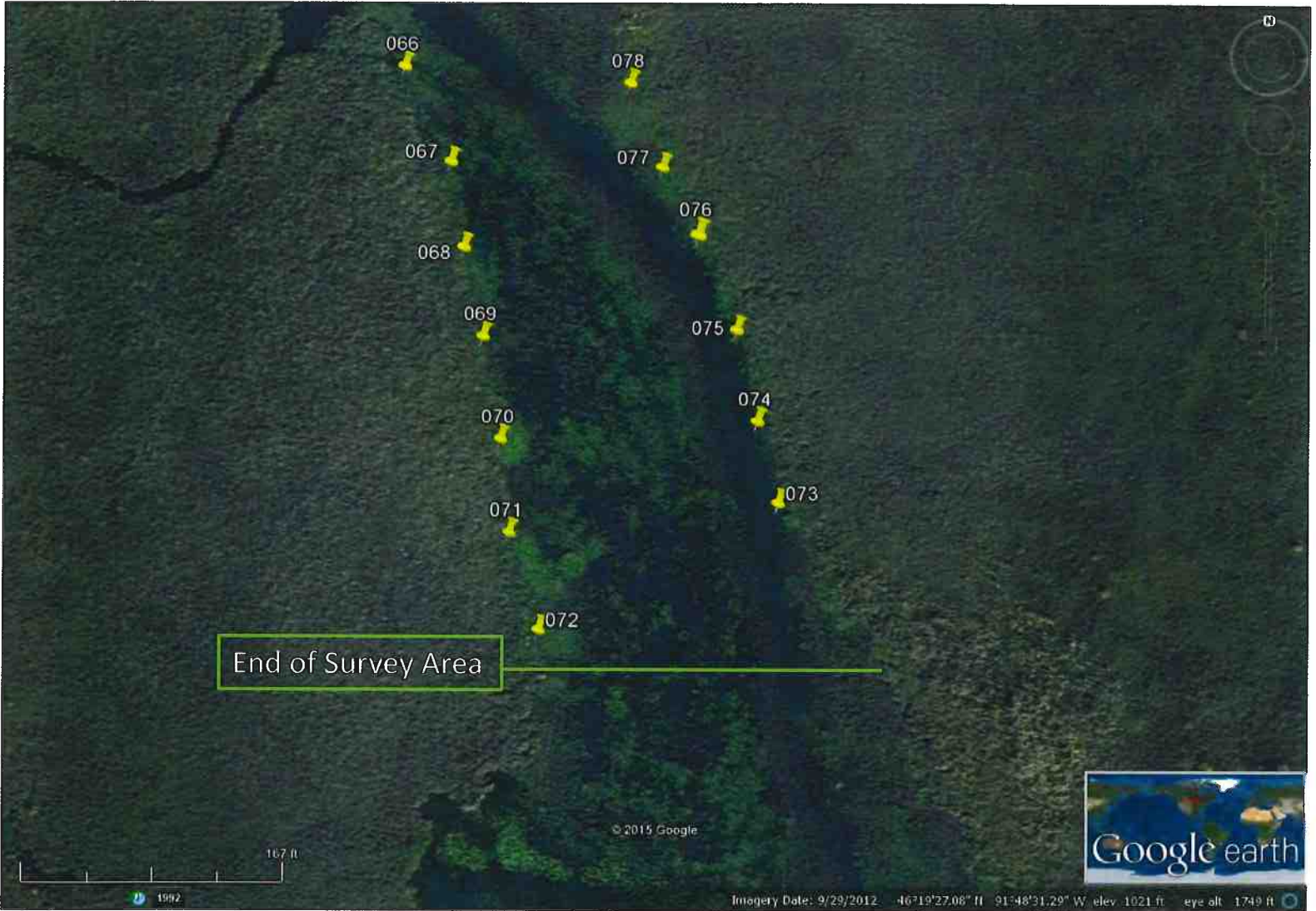
Yellow Iris Rapid Response Project on Upper Lake St. Croix
-Baseline Vegetative Survey Waypoint Map 3 of 5-



Yellow Iris Rapid Response Project on Upper Lake St. Croix -Baseline Vegetative Survey Waypoint Map 4 of 5-



Yellow Iris Rapid Response Project on Upper Lake St. Croix
-Baseline Vegetative Survey Waypoint Map 5 of 5-



Appendix E: Wild Rice Seeding Plan and Maps

The original proposal was to spread 250 pounds of Wild Rice seeds in the project area in 2013 and again in 2014. Due to climactic factors, seed was not available in 2013 and 2014. Three alternatives for this deliverable are listed below

Option 1: Seed approximately 3.5 acres with 250 pounds of Wild Rice in fall of 2015 after harvest. Seeding areas are outlined in Maps 1-3. The remaining balance of funds is returned to WDNR.

Option 2: Seed approximately 3.5 acres with 250 pounds of Wild Rice in fall of 2015 after harvest. Seeding areas are outlined in Maps 1-3. The remaining balance of funds is used to do water quality monitoring in the project area.

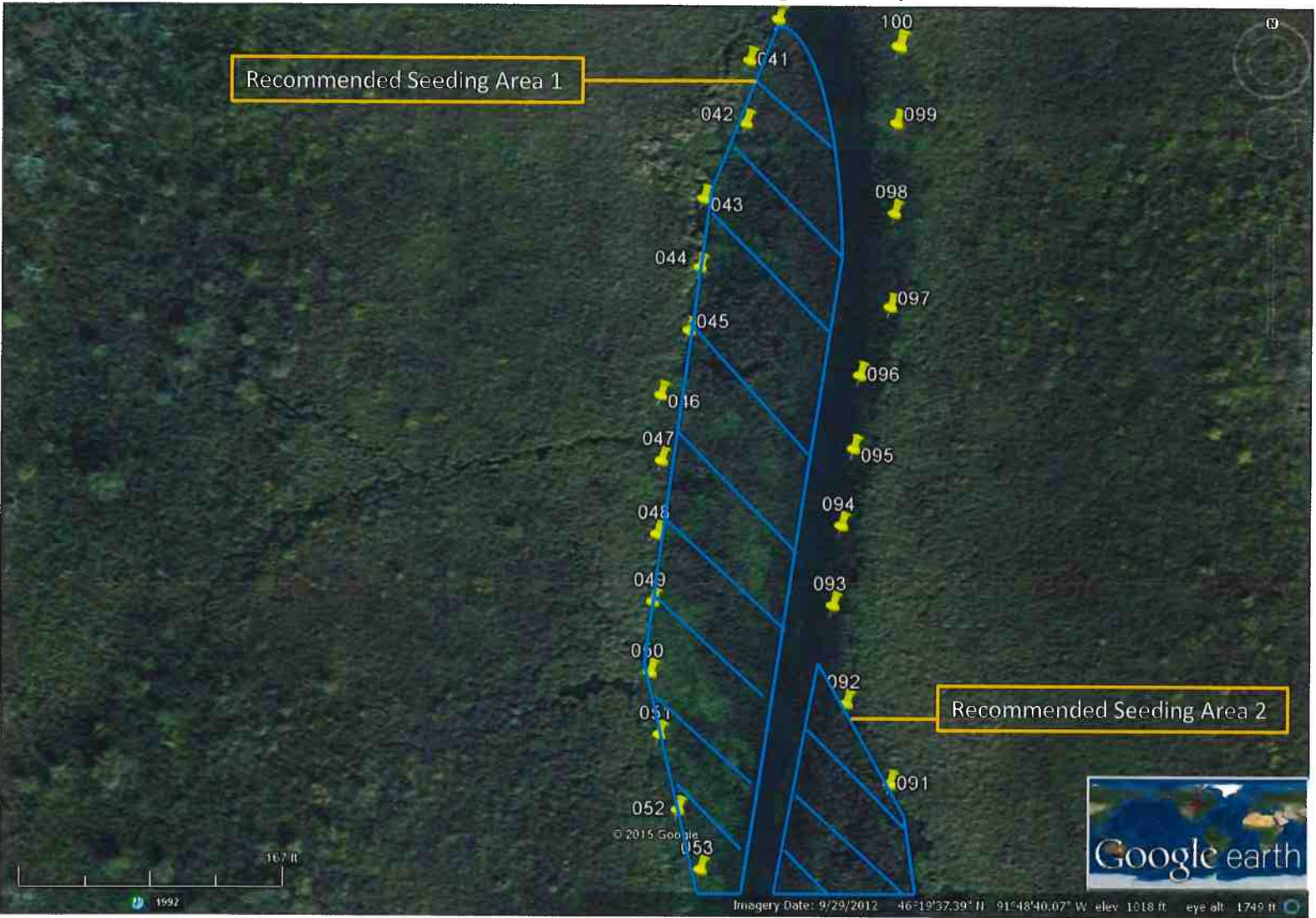
Option 3: Seed approximately 7 acres with 500 pounds of Wild Rice in fall of 2015 after harvest. Seeding areas for spreading approximately 3.5 acres with 250 pounds of Wild Rice are outlined in Maps 1-3. Additional seeding of 250 pounds would occur further downstream, outside of the project area.

Option 4: Remaining funds are used to do additional control work by supporting the Friends of the St. Croix Headwaters Yellow Iris control grant project currently being developed.

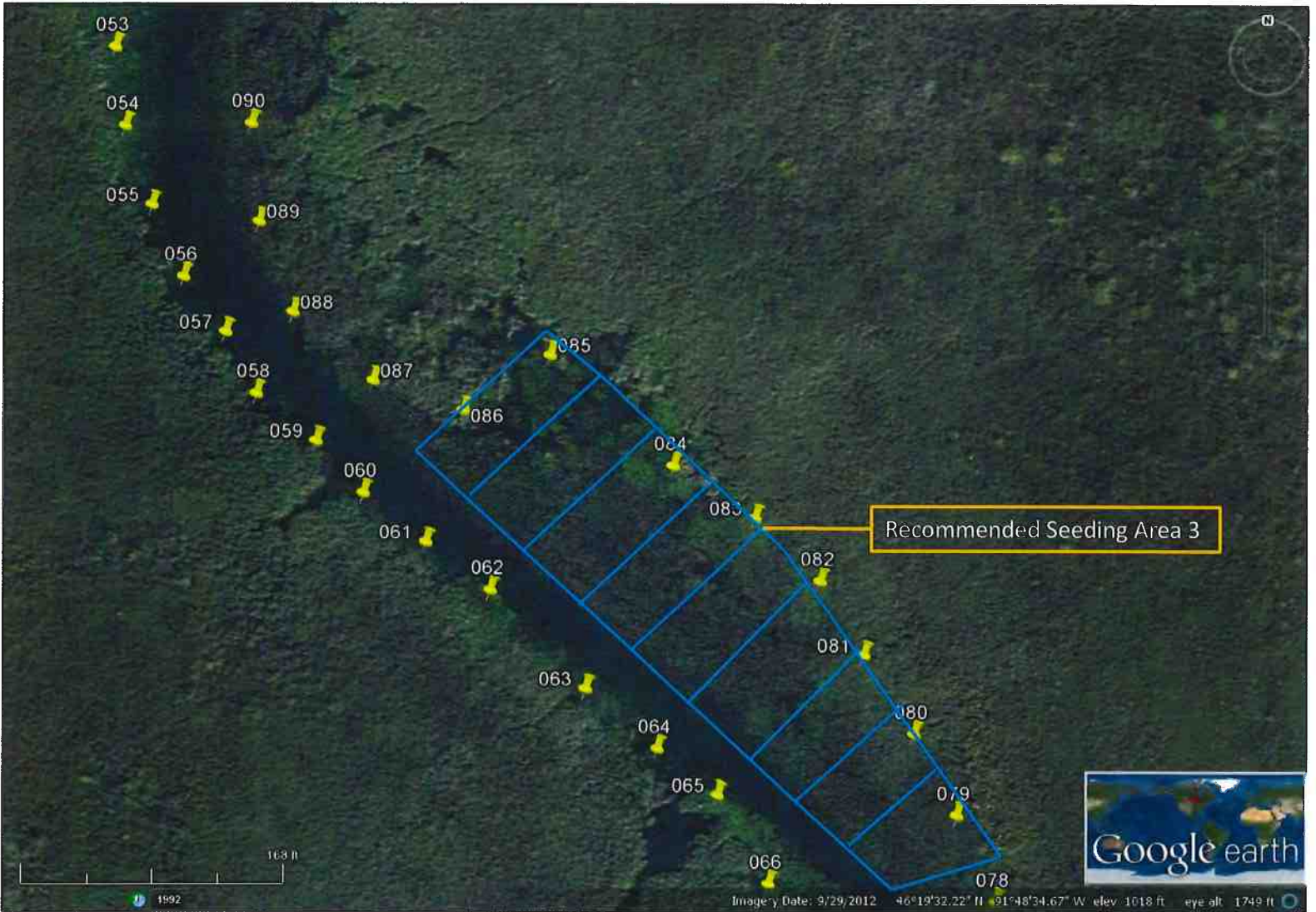
Option 5: Remaining funds are returned to WDNR and no seeding will take place.

*Options 1-3 are viable only if Wild Rice seed is available for purchase in fall of 2015.

Yellow Iris Rapid Response Project on Upper Lake St. Croix -Wild Rice Recommended Seeding Area Map 1 of 3-



Yellow Iris Rapid Response Project on Upper Lake St. Croix
-Wild Rice Recommended Seeding Area Map 2 of 3-



Yellow Iris Rapid Response Project on Upper Lake St. Croix
-Wild Rice Recommended Seeding Area Map 3 of 3-



Appendix F: Baseline Vegetation Survey Data for Yellow Iris Project Area

Date Surveyed: 7-2-2013	COMMENTS: Transect A= SW side of stream. Transect B=SE side of stream.
Wetland Name: Upper Lake St. Croix	*Many species marked as "other" are ferns/purple loosestrife
Local Jurisdiction:	
Surveyor: CES	Frequency Sampling
Recorder: FMW	

Transect (A-C): A																						
Waypoint #		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
Species		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Yellow Iris		0	0	0	0	0	1	1	0	1	0	1	0	1	1	1	0	1	1	1	1	
Water Lilies		0	1	1	0	0	1	1	0	1	0	1	0	1	1	1	1	1	1	0	1	
Sedges/Grasses		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Alder/Willow Brush		0	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	
Open Water		1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	
Other		0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	

Transect (A-C): A																						
Waypoint #		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
Species		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
Yellow Iris		1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	
Water Lilies		1	1	1	1	0	1	0	1	1	0	0	1	0	1	1	0	1	0	1	1	
Sedges/Grasses		1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	
Alder/Willow Brush		0	0	1	1	1	1	1	1	0	1	1	0	0	1	0	0	0	1	1	0	
Open Water		0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	1	1	
Other		1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	

Transect (A-C): A																						
Waypoint #		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	
Species		41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	
Yellow Iris		1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	
Water Lilies		1	1	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	1	1	1	
Sedges/Grasses		1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	
Alder/Willow Brush		0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	
Open Water		1	1	0	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	
Other		1	1	0	1	1	0	1	1	1	0	1	1	1	1	0	0	0	1	1	1	

Totals (60 total data points)	Total # points	Presence (% of total data points)
Yellow Iris	47	78.33
Water Lilies	36	60.00
Sedges/Grasses	57	95.00
Alder/Willow Brush	33	55.00
Open Water	43	71.67
Other	44	73.33

Date Surveyed: 7-2-2013	COMMENTS: Transect A= SW side of stream. Transect B=SE side of stream
Wetland Name: Upper Lake St. Croix	*Many species marked as "other" are ferns/purple loosestrife
Local Jurisdiction:	
Surveyor: CES	Frequency Sampling
Recorder: FMW	

Transect (A-C): B																				
Waypoint #	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Yellow Iris	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	1	1	0	1
Water Lilies	0	1	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	1	0	0
Sedges/Grasses	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1
Alder/Willow Brush	0	0	0	1	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	1
Open Water	0	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1
Other	0	1	0	1	0	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1

Transect (A-C): B																				
Waypoint #	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
Species	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Yellow Iris	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0	0	0
Water Lilies	0	0	1	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	0
Sedges/Grasses	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Alder/Willow Brush	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	1
Open Water	0	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
Other	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1

Transect (A-C):																				
Waypoint #																				
Species	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Yellow Iris																				
Water Lilies																				
Sedges/Grasses																				
Alder/Willow Brush																				
Open Water																				
Other																				

Totals (40 total data points)	Total # points	Presence (% of total data points)
Yellow Iris	26	65.00
Water Lilies	23	57.50
Sedges/Grasses	35	87.50
Alder/Willow Brush	12	30.00
Open Water	33	82.50
Other	33	82.50

Date Surveyed: 6-25-2014	COMMENTS: Transect A= SW side of stream. Transect B=SE side of stream.
Wetland Name: Upper Lake St. Croix	*Many species marked as "other" are ferns/purple loosestrife
Local Jurisdiction:	
Surveyor: CES	Frequency Sampling
Recorder: FMW	

Transect (A-C): A																																
Waypoint #	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32												
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20												
Yellow Iris	0	0	0	0	0	1	1	0	1	0	1	0	0	1	1	1	1	1	1	1												
Water Lilies	0	1	0	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1												
Sedges/Grasses	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1												
Alder/Willow Brush	0	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1												
Open Water	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0												
Other	1	0	0	0	0	1	0	0	0	1	0	1	1	1	1	1	0	1	1	1												

Transect (A-C): A																																
Waypoint #	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52												
Species	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40												
Yellow Iris	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1												
Water Lilies	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0												
Sedges/Grasses	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1												
Alder/Willow Brush	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	1												
Open Water	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0												
Other	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1												

Transect (A-C): A																																
Waypoint #	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72												
Species	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60												
Yellow Iris	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1												
Water Lilies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0												
Sedges/Grasses	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1												
Alder/Willow Brush	0	1	1	1	0	1	0	1	1	0	1	0	1	1	1	0	1	1	1	0												
Open Water	0	1	1	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0												
Other	1	0	0	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1												

Totals (60 total data points)	Total # points	Presence (% of total data points)
Yellow Iris	44	73.33
Water Lilies	18	30.00
Sedges/Grasses	56	93.33
Alder/Willow Brush	42	70.00
Open Water	25	41.67
Other	43	71.67

Date Surveyed: 6-25-2014	COMMENTS: Transect A= SW side of stream. Transect B=SE side of stream
Wetland Name: Upper Lake St. Croix	*Many species marked as "other" are ferns/purple loosestrife
Local Jurisdiction:	
Surveyor: CES	Frequency Sampling
Recorder: FMW	

Transect (A-C): B																					
Waypoint #	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Yellow Iris	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1
Water Lilies	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
Sedges/Grasses	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1
Alder/Willow Brush	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0
Open Water	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1
Other	1	1	0	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1

Transect (A-C): B																					
Waypoint #	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	
Species	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
Yellow Iris	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	0	0	
Water Lilies	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sedges/Grasses	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Alder/Willow Brush	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	
Open Water	0	1	1	0	0	0	0	0	1	0	0	0	0	1	0	1	1	1	1	1	
Other	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	0	1	

Transect (A-C):																					
Waypoint #																					
Species	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	
Yellow Iris																					
Water Lilies																					
Sedges/Grasses																					
Alder/Willow Brush																					
Open Water																					
Other																					

Totals (40 total data points)	Total # points	Presence (% of total data points)
Yellow Iris	30	75.00
Water Lilies	5	12.50
Sedges/Grasses	37	92.50
Alder/Willow Brush	15	37.50
Open Water	17	42.50
Other	33	82.50

Date Surveyed: 6-30-2015	COMMENTS: Transect A= SW side of stream. Transect B=SE side of stream.
Wetland Name: Upper Lake St. Croix	*Many species marked as "other" are purple loosestrife
Local Jurisdiction:	
Surveyor: CES	Frequency Sampling
Recorder: JZ	

Transect (A-C): A																																
Waypoint #	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32												
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20												
Yellow Iris	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	1												
Water Lilies	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0												
Sedges/Grasses	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1												
Alder/Willow Brush	0	1	1	1	0	1	0	1	1	0	1	1	1	1	0	1	0	0	0	1												
Open Water	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1												
Other	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1												

Transect (A-C): A																																	
Waypoint #	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52													
Species	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40													
Yellow Iris	1	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1	0	1														
Water Lilies	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	0	1	0	1													
Sedges/Grasses	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1													
Alder/Willow Brush	0	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1													
Open Water	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1												
Other	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	0													

Transect (A-C): A																																
Waypoint #	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72												
Species	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60												
Yellow Iris	1	1	0	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1												
Water Lilies	0	1	0	0	0	0	0	1	1	0	1	0	1	1	0	1	0	1	1	1												
Sedges/Grasses	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1	1	1	1												
Alder/Willow Brush	1	0	1	0	0	1	1	0	0	1	1	0	1	0	0	0	1	1	0	0												
Open Water	0	0	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1												
Other	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	0	0	0	1												

Totals (60 total data points)	Total # points	Presence (% of total data points)
Yellow Iris	37	61.67
Water Lilies	30	50.00
Sedges/Grasses	56	93.33
Alder/Willow Brush	28	46.67
Open Water	39	65.00
Other	49	81.67

Date Surveyed: 6-30-2015	COMMENTS: Transect A= SW side of stream. Transect B=SE side of stream
Wetland Name: Upper Lake St. Croix	*Many species marked as "other" are purple loosestrife
Local Jurisdiction:	
Surveyor: CES	Frequency Sampling
Recorder: JZ	

Transect (A-C): B																				
Waypoint #	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Yellow Iris	1	1	1	0	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1
Water Lilies	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	1	1	1
Sedges/Grasses	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
Alder/Willow Brush	0	0	0	1	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0
Open Water	1	1	0	1	1	0	1	1	0	1	1	1	1	1	1	0	1	0	1	0
Other	0	1	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1

Transect (A-C): B																				
Waypoint #	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
Species	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Yellow Iris	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0
Water Lilies	0	0	0	0	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0
Sedges/Grasses	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Alder/Willow Brush	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	1	1	0
Open Water	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	1	1	1	1	1
Other	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	1	0	0	0

Transect (A-C):																				
Waypoint #	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Species																				
Yellow Iris																				
Water Lilies																				
Sedges/Grasses																				
Alder/Willow Brush																				
Open Water																				
Other																				

Totals (40 total data points)	Total # points	Presence (% of total data points)
Yellow Iris	27	67.50
Water Lilies	21	52.50
Sedges/Grasses	39	97.50
Alder/Willow Brush	12	30.00
Open Water	24	60.00
Other	28	70.00