2/19/2021

FINAL REPORT

YELLOW FLAG IRIS MITIGATION – LAKE MINNESUING

JUNE 3, 2015 – DECEMBER 31, 2020

AIRR19216

SPONSOR – LAKE MINNESUING SANITARY DISTRICT
PROJECT PARTICIPANTS – LAKE MINNESUING ASSOCIATION
PROJECT MANAGER – Jim Giffin, sailjbg@gmail.com

Part of the 2019 YFI team

Report Organization

1. **Introduction**

2. **Summary: Results, Conclusions, Observations, and Recommendations**

3. **Annual Assessment and Inventory**

4. **Mitigation Activity by Year**

5. **Project Detail**
   - **Annual Assessment and Inventory**
   - **Native Blue Flag Iris**
   - **Education and Communication**
   - **Mitigation Techniques Used**
   - **Treatment Effectiveness**
   - **Site Comparisons**

6. **Next Steps**

7. **Appendix**
   - **Sample Volunteer Signup Sheets**
   - **Additional LakeLink Articles**
   - **Typical Written Communication with Property Owners**
   - **Typical Property Owner Response to Communication**

1. Introduction

Yellow Flag Iris (YFI) seemed to first appear in significant volume on Lake Minnesuing in 2014. We now understand that the reality is that it had been on the lake for a long time. In 2014 the stands of YFI seemed to be much more prevalent, perhaps because of weather conditions that promoted a prolific June bloom. The plants were all, or at least early in our process seemed to be, located in the immediate shore area, generally within a few feet of the ordinary high water mark (OHWM) either in the water or shoreward.

Conversations with board members of the Upper St Croix Lake Association, about 10 miles south of Lake Minnesuing, revealed they also had an infestation of YFI and had undertaken actions to mitigate it. These were primarily cutting of plants and removal of seed pods.

Our organized mitigation efforts on Lake Minnesuing began 6/3/2015, followed by Lake Minnesuing Sanitary District's (LMSD) submission of an Early Detection and Response (EDR) Grant application on 8/3/2015. The application was approved 10/1/2015 as Grant AIRR19216 and covered the period from 6/3/2015 to 12/31/2018. The application specified a plan to conduct pretreatment monitoring, geotagged photos of YFI sites, education of property owners and control work to include digging, cutting, and herbicide as needed.

After considerable success at below projected costs and with high volunteer participation, LMSD requested a 2 year grant extension which was granted to run through 12/31/2020.

Detailed files, both digital and paper, and not included here, have been retained by LMSD.

In this report the terms "sites" and "properties" are often used interchangeably. As explained in the following pages, understanding who owned the property on which a stand of YFI was located was very important to LMSD, from both an education and treatment perspective. While YFI growing below the OHWM is in the Public Trust, much of the YFI growing around Lake Minnesuing is above the OHWM, making it privately owned. While a property might include several sites, only on occasion does a site cross properties and in that case, for our purposes, we considered those instances 2 sites. In other words, even though individual sites (unless they overlapped) were geotagged separately, our YFI tracking and management work was oriented on a property by property basis.

2. Results, Conclusions, Observations and Recommendations

Summary: Our Process Continues

- We will likely always have YFI on Lake Minnesuing
- YFI can be managed
- Community participation is a must
- Digging, cutting seed pods, and spot herbicide treatments will be necessary
- Restoration of significant disturbances will be required
- We have made progress!

- Based on the 2020 assessment plenty of YFI remains, however the majority of large, mature (seed pod forming) and extremely dense stands have been eliminated or substantially reduced to smaller plants in much reduced density. This has made a major impact on reducing the spread on new infestations.
- In the years following the end of the EDR, communication and education must continue flowing to stakeholders and property owners with the goal of continuing to inspire lake shore property owners to self-maintain any YFI growing on their own and also on public properties. "Maintenance" should include seed pod cutting and/or cutting of the entire plant along with spot cut stump herbicide treatments.
- Each year of the project YFI seed pods were removed, plants were cut and/or dug, and detritus was bagged and disposed of as garbage. In 2020, the consensus of volunteers was that the total volume of detritus collected from the entire lake (all 7+ miles of shoreline) filled only about three 45 gal bags. **Compare this to the 50 similar sized bags collected in 2015 when only 2.5 of the 7+ miles of shoreline were covered**. In 2015, from one site alone (property 2100 in Site Comparisons), Jeremy Bates and Project Manager Jim Giffin filled Jim's canoe to the gunwhales with cut pods before that one site had been completely cut.

- While YFI infestations occur in various locations on the shoreline, they are significantly more robust where the natural shoreline has been disturbed; when natural plant growth (i.e. trees, shrubs, forbs and grasses) has been removed, and the location's sun load is high.
- Because Lake Minnesuing's YFI is located primarily "on the shore", rather than using a true point-intercept locating method, LMSD found using a locating/tracking system based on property lines was much more practical and effective. This was especially true since the vast majority of work effort over the project was completed by volunteers working from their own canoes and kayaks, rather than lake scientists. As tasks were delegated to volunteers, a simple paper map showing YFI locations, property ownership, and property lines was much more understandable to a volunteer than the need to understand and use a gps device and its latitude-longitude grid system.
- The main outflow from Lake Minnesuing is Minnesuing Creek, located in the NE quadrant of the lake. By 2015 the lake shoreline just north and south of the mouth was heavily infested with YFI as were both banks of the creek just downstream from the mouth. This proves the propensity of YFI to spread by seed dissemination, reinforcing the importance of removing and containing seed pods when it is impractical to either dig the entire plant or use herbicide treatments on other infestations around the lake.
- Digging YFI is simply not practical in locations other than small, relatively contained sites. This process is beyond the capability of many property owners. It is brutal work and most property owners will not take this on. Digging of larger stands of YFI, particularly those with well-developed rhizomes, leaves the shore totally disturbed and prone to immediate erosion. Restoration must follow immediately on these sites.
- Many property owners took action as a result of our LakeLink newsletter articles on YFI and our discussions at annual lake meetings throughout the years of the project. In the 2015 to 2016 period alone, an estimated 8-10% of property owners took their own initiative to dig or cut YFI on their own property. The number of property owners cutting YFI grew in succeeding years. A small number chose herbicide self-application with at least one property displaying significant collateral damage to other vegetation as a result.
- Herbicide treatment of specific high density, mature YFI stands needed to be completed if significant progress was to be made. While cutting plants and seed pods is very effective at preventing most new growth, it does nothing to mitigate existing plants. Cutting YFI is much like mowing grass.
- Chemical treatment offers a challenge. Often, the denser infestations are on privately held, sometimes quite developed properties. This necessitates execution of a strong plan to contact and motivate owners for permission to treat with herbicide. Chemical treatment is

controversial. Property owner education is an absolute requirement. WDNR chemical application permitting requires property owner contact with full transparency. Resistance to herbicide treatment waned as our educational program became a part of our annual YFI mitigation process. In 2020, the final year of the EDR, 44 properties were targeted as having significant stands of YFI suitable for herbicide application. 44 sites may sound like a lot, however all of these sites were considerably smaller and less dense than sites treated in prior years. Of the 44 targets, we were unable to reach 2 property owners and 2 declined herbicide treatment. In 2020, 40 individual properties received herbicide treatment; 18 using a foliar (spray) technique and 22 using the cut stump technique.

- A fully successful transition to property owner management will likely require an herbicide component to the EDR project. The cut stump technique, brushing herbicide on cut leaves is an easy method of herbicide treatment with minimal collateral damage. It is a good technique to use once large, dense stands of YFI have been eliminated.
- Over the course of the project 499 hours were expended by volunteers – thank you Lake Minnesuing Association(LMA)! - and 135 hours by employees. In addition, a licensed herbicide applicator spent about 22 hours on the project.

Part of the 2016 YFI Crew

3. Annual Assessment and Inventory

This annual process included digitally photographing and geotagging occurrences of YFI infestation on Lake Minnesuing, usually beginning in mid June and continuing into the month of July. The goal was to conduct the assessment as flowers were peaking. This timing made identifying mature stands of YFI, those plants which would later develop seed pods, easier. This information set the stage for each year's action plan.

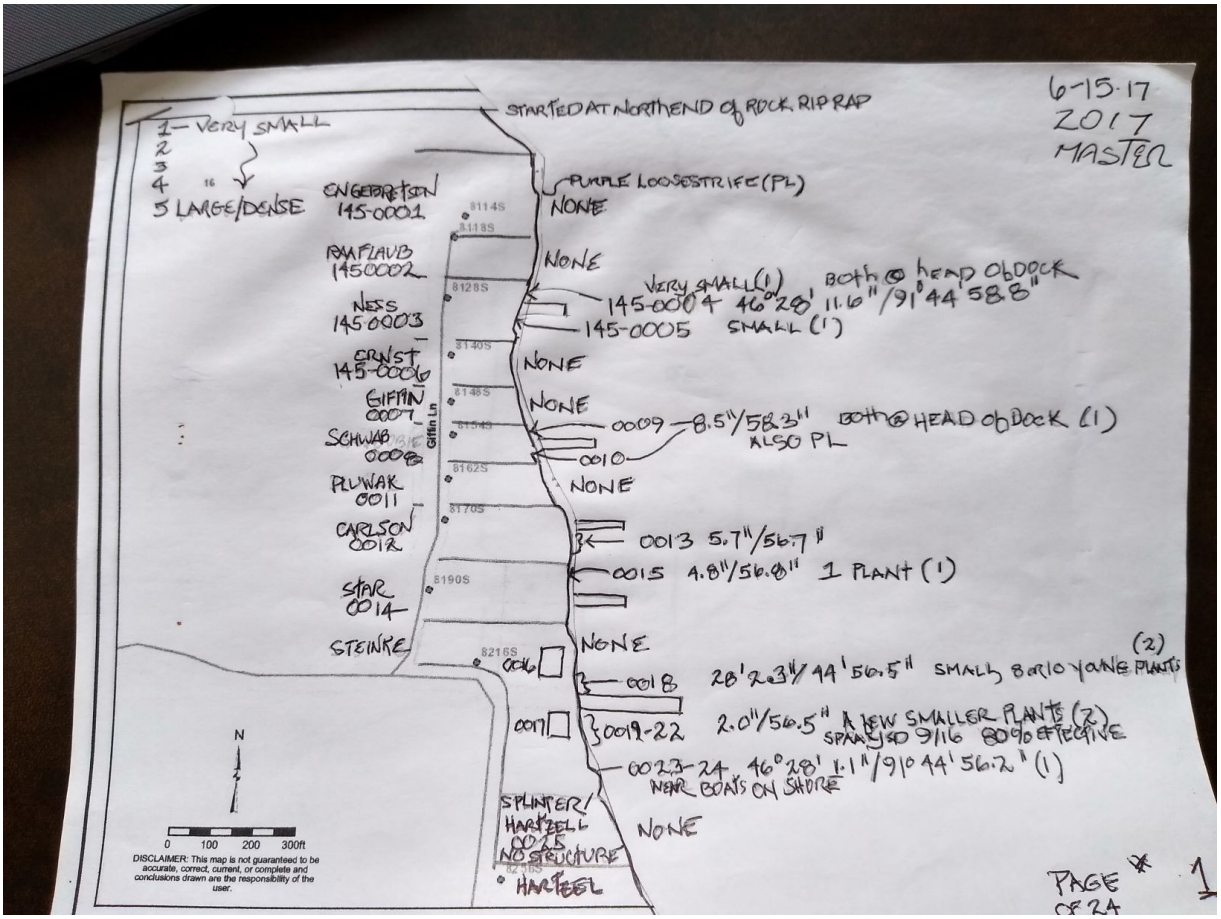
Lake Minnesuing has a reasonable population of Northern Native Blue Flag Iris (iris versicolor). Most casual observers, project volunteers, and paid mitigators are unable to differentiate between native blue and invasive yellow when the plants are not in bloom. See the Project Detail section of this report for differentiation details.

By noting the locations of native blue, mistakenly cutting and digging of these important plants can be avoided later in the year. It should be noted that in 2015 many of these photos were taken after the period in which flowers were present and it became difficult to differentiate the native blue that year.

In the 2015 assessment, a total of 236 photos were taken, geotagged, and logged. In each of the succeeding years of the project the same assessment process was followed. In 2015 this process took 17.25 hours, was completed in a canoe, and occurred over the course of 5 days from 6/28/2015 to 7/7/2015.

Typical shoreline photo taken during the annual assessment process. Photo is dated, sequenced, geotagged and labeled with property owner name.

After the learning experience of 2015 it became clear that some type of simple, easily understandable map log was necessary to track YFI. Because of the tendency of YFI to grow right in the shore area, maps of the lake shoreline were created using Douglas County's GIS mapping system. The shoreline was divided into 24 manageable segments and printed on 24 sheets. Please note we did this in a very low-tech way. Each of the 24 pages is simply a piece of paper; a printed map onto which photo numbers, locations, plant density on a simple 1-5 scale, and property owner names were recorded. This series of maps was carried in the canoe, on a clipboard, as the assessment took place.



Typical map page

The purpose of this mapped assessment was to establish a baseline of YFI population and density on the lake and to allow LMSD to speak with individual property owners from a position of knowledge when these individual discussion opportunities arose. In many cases, rather than a specific "density" since photos depicted the condition, notes were made as to the appropriate action to be taken later in the summer. Identifying the owner's of YFI infested properties became a very important tool over the course of the six-year project; in fact it was critical. Without that knowledge, chemical treatments would not have been possible as WDNR permits require that information be provided to affected owners. Educational and communication techniques could also be tailored for specific property owners. This education and communication process would become critical at the end of the 6 year program as the

process is transitioned to the property owners. This same YFI ASSESSMENT/INVENTORY process was followed each of the succeeding years of the project.

Each year, an action plan was developed after the assessment. 2015's plan was typical:

- Utilize Lake Minnesuing Sanitary District and Lake Minnesuing Association annual meetings to inform and educate property owners and other attendees.
- Depending on staff available, establish a schedule to cut seed pods, to cut plants as low as possible to ground or water, and to dig selective stands/clumps of YFI.
- Shoreline areas were selected based on the results of the assessment.

Plans in succeeding years contained more components in terms of education and communication and added herbicide as a treatment.

Lunch break 2017 YFI Work Days

4. Mitigation Activity by Year

2015

TOTAL HOURS EXPENDED

- Volunteer hours – 78.25
- Paid hours – 25.0

MITIGATION ACTIVITIES

- Seed pod cutting – After the assessment but prior to this mitigation activity, shoreline property owners were contacted either in person, by email, or by phone advising them of what was planned. We sought permission from property owners to either dig or cut the entire plant. Where property owner contact was not made or such permission was not received, all seed pods were cut regardless. LMSD took the position that these seed pods will spread well beyond an individual property owner's shoreline and are a menace to lake ecology.
- Cutting – In many locations the plant itself was fully cut at ground level when growing above the waterline and below the water surface when rhizomes were below the waterline.
- Digging – In many locations the entire plant structure, including the root system, was dug and removed in its entirety. Examples where digging was undertaken include sites on the west central shoreline, the Brule River State Forest lake shoreline, and the Douglas County Park at the lake's NE quadrant. It should be noted that digging is a massive undertaking and physically demanding even on relatively small stands. The removed plant mass is often large, extremely heavy, and difficult to bag and manage. Where dug, the shoreline is significantly disturbed, resulting in erosion by wave action until the area stabilizes (years). Ensuing years of the project revealed that digging as a primary mitigation technique was not practical. Without immediate shore restoration, the cost of digging (both financial and ecological) was determined to be less effective than the use of herbicide.
- Area covered – 2.5 of the 7+ miles of lake shore in 2015. Removed plant material was bagged and deposited at various locations for later pickup. These bags were taken to town or county garbage disposal sites. It is estimated well over 50 bags of plant material (about 45-gallon size) were removed.

2016

HOURS EXPENDED

- Volunteer hours – 80.5
- Paid hours – 37.5 (2 hours pay was donated to the Listening Point Foundation in Ely, Minnesota at the request of one of our paid workers.)

MITIGATION ACTIVITIES

- Seed pod cutting – All YFI seed pods on the entire 7+ mile shoreline were cut and bagged
- Cutting – Many property owners cut/weed whacked YFI on their own shores
- Digging – Only about 10 sites were dug due to the damage created on the shore. A new technique using a serrated butcher knife was used to "dig" small stands without much shore damage. This knife is easy to control and effective at getting the rhizomes, often in their entirety. See the Project Detail section of this report for further information on this technique and its effectiveness. The knife works well in rocky shore areas including rip rap. Thanks to one of our property owners for developing this technique.
- Spraying – A WDNR herbicide application permit was secured. LMSD decided herbicide treatment should only be used when property owner permission was received regardless of whether the YFI was above or below the OHWM. During the annual assessment, 13 sites were targeted for spraying totaling .0313 acres. Following WDNR requirements the property owners were contacted, herbicide information was provided, and adjacent property owners were informed. See the appendix for a sample of written communication to property owners. A licensed applicator was hired and the spraying was conducted on 9/8/2016 at 9 of the 13 sites targeted. See the Project Detail section of this report for further information on this technique and its effectiveness.
- Wipe on glove treatment – Conducted 9/14/2016 at 11 sites. See the Project Detail section of this report for further information on this technique and its effectiveness.
- Cut stump treatment – Conducted 9/14/2016 at 2 sites. See the Project Detail section of this report for further information on this technique and its effectiveness.

2017

HOURS EXPENDED:

- Volunteer hours – 82.5
- Paid hours – 26.0

MITIGATION ACTIVITIES

- Seed pod cutting – All YFI seed pods on the entire 7+ mile shoreline were cut and bagged

- Spraying – Conducted 9/8/2017. 17 sites were sprayed.
- Cut stump treatment – Conducted 9/8/2017 at 5 sites, one by property owner.

2018

HOURS EXPENDED

- Volunteer hours – 89.0
- Paid hours – 16.0

MITIGATION ACTIVITIES

- Seed pod cutting – All YFI seed pods on the entire 7+ mile shoreline were cut and bagged
- Digging – After 2018 digging was no longer a key component due to the disturbed shoreline it creates. The "butcher Knife" technique continued to be used, but only on a small number of sites.
- Spraying – On 8/1/2018 LMSD filed an application with Douglas County for exemption to the county's ban on herbicide usage on county property to allow for spraying YFI at Minnesuing Creek headwaters south side on a Douglas County special use property. LMSD's YFI Project Manager attended the Douglas County Forestry, Parks, and Recreation meeting to make the case to secure an herbicide exemption from Douglas County to spray. A majority of the committee supported and approval was granted.

  16 sites were sprayed including the south side headwaters of Minnesuing Creek on 9/12/2018 after securing the requisite WDNR permit and the exemption.

2019

YFI ASSESSMENT/INVENTORY

By 2019 significant progress had been made on Lake Minnesuing's population of Yellow Flag Iris. Plenty of YFI remained, however the large, mature (seed pod forming) and extremely dense stands had been eliminated or substantially reduced to smaller plants in much reduced density. See the Project Detail section of this report for further information for typical before and after same site examples of what has happened with most of those dense stands found at the beginning of our project

Property owner cutting resulted in smaller plants with no seed pods forming on the cut properties.

Cutting all seed pods for the preceding 3 years substantially reduced the spread of new plants.

ACTION PLAN DEVELOPED AFTER 2019 ASSESSMENT

- Based on assessment, herbicide treatment by spraying will not be done in 2019. Herbicide treatment will focus on cut stump technique.
- Continue to utilize Lake Minnesuing Sanitary District and Lake Minnesuing Association annual meetings to inform and educate property owners and other attendees. Continue updates in the LakeLink Newsletter.
- Continue the seed pod cutting process.

HOURS EXPENDED

- Volunteer hours – 85.5
- Paid hours – 30.75

MITIGATION ACTIVITIES

- Seed pod cutting – All YFI seed pods on the entire 7+ mile shoreline were cut and bagged.
- Cut stump treatment - A DNR permit was received and on September 4, 6, and 7, 2019 the cut stump herbicide treatment was used on the YFI on 17 properties around the lake. As recommended by Jeremy Bates of WDNR a 50% mixture of Rodeo and water was used with a rate of 0.6 ounces of AquaSurf surfactant per gallon. Less than ½ gallon of mix was used to complete treatment.

In an effort to simplify the cut stump process LMSD purchased applicators typically used to cut trunk treat the cut trunks of buckthorn. Unfortunately the “daubers” were not effective on YFI. The pressure required to flow herbicide through the “sponge” of the dauber onto the cut portion of the plant was too much for the plant and caused the cut portion of the plant to bend over making herbicide application difficult. The process was changed back to include swabbing the cut portion of the plant with a paint brush dipped in mixed herbicide. Using the brush, this remained a process that provides good herbicide control, limiting collateral damage.

Using the cut stump treatment is a great process to treat smaller stands of YFI and for individual property owners, trained in the application, to use on their own property in the future. As stated, in trained hands the potential for collateral damage is low. It is labor intensive however. Time to treat the 17 properties involved, one of which was Minnesuing Acres with a longer shoreline, was 16.5 hours. If individuals were treating their own properties the time involved would be small.

2020

YFI ASSESSMENT/INVENTORY

- This year's assessment revealed that the mature, flower/seed pod forming plants were limited to only 20 sites around the lake and they were much smaller than the mature sites of prior years. Volunteers were later assigned to these sites only to cut seed pods rather than canvassing the entire 7 miles of shoreline.
- The majority of the mature stands of YFI present at the beginning of the project in 2015 have been eliminated or reduced to smaller, younger, less dense plants.

HOURS EXPENDED

- Volunteer hours – 83.0
- Paid hours – 0

MITIGATION ACTIVITIES

- Seed pod cutting – All YFI seed pods on the entire 7+ mile shoreline were cut and bagged. As mentioned above, in 2020 this was a targeted process. While each volunteer cut and collected pods in bags at their assigned sites on their own, consensus of volunteers was that the total volume of detritus would have filled only about three 45 gal bags. **Compare this to the 50 similar sized bags collected in 2015 when only 2.5 of the 7+ miles of shoreline were covered.**
- Spraying – A DNR permit was applied for and received. 18 sites were sprayed on 9/10/2020. Again, as noted earlier, these sites were much smaller and less dense than the problem sites of earlier years.
- Cut stump treatment – 22 sites were treated on 8/30, 9/1, and 9/4/2020.

7/25/2017 Jerry and the boys take a well earned break from YFI

5. Project Detail

YFI ASSESSMENT/INVENTORY

This process has been previously discussed and was followed similarly each year except 2018. Mid-June of that year Lake Minnesuing had about 12” of rain over a 36-hour period. The lake level rose 3’ – 4’ to levels not seen by 50-year residents. During 2018 the assessment was conducted, though later in the year. High water subdued the development of YFI flowers and seed pods in 2018.

NATIVE BLUE FLAG IRIS

As mentioned Native Blue flag Iris is present along the shore of Lake Minnesuing and most casual observers, project volunteers, and paid mitigators are unable to differentiate between native blue and invasive yellow when the plants are not in bloom. Comparisons follow:

6/22/16 (P6220437) Yellow and Native Blue growing side by side on Lake Minnesuing’s island

The “Beautiful Blue” Challenge-
Native Blue Flag Iris

28

Leaf comparison Yellow above, Blue below

The “Beautiful Blue” Challenge-
Native Blue Flag Iris (Pics Andy Teal)

31

In each photo, left is yellow, right is blue. The YFI leaf is generally wider, a little thicker & has a more pronounced mid leaf vein running well up the leaf (almost a diamond shaped cross section). The blue mid leaf vein is less pronounced & does not usually run as far up the leaf (1/2 to ¾). On our lake the blue leaf can be light colored at base. It’s difficult to differentiate when plants are not side by side.

Seed pods Yellow above, blue below

Seed pods Yellow on right, Blue on left

The "Beautiful Blue" Challenge-
Blue Pod Left – Yellow Right

(Pics Jeremy Bates)

33

Seed pods – blue on the left, yellow on the right. Again, from the "Mistaken Identity" pamphlet, Yellow pods are six angled/sided and blue are three.

EDUCATION/COMMUNICATION

Even though LMSD's EDR was not initiated until 2015, the 2014 LMSD Annual meeting, 6/28/2014, included coverage of YFI. This coverage served to begin the YFI education process on Lake Minnesuing.

At the 2015 annual meeting photos of YFI on Lake Minnesuing were shown. The annual meeting presentation included everything necessary for property owners to easily identify YFI and specifically detailed the plant's invasive nature and how it spreads by rhizomes and by seed. Techniques of control/mitigation were discussed with the recommended technique being digging of the plant if the size and density allowed, total cutting of the entire plant, or seed pod removal at a minimum. Set up a "volunteer sign in sheet" and solicited volunteers for help on the water. Eight lake property owners volunteered and participated. 44 attendees at the combined meeting on 6/27/15. Annual lake meeting attendance ranged from 30-44.

Prior to the Lake Management Plan which was created in 2020, LMSD developed a "Lake Minnesuing Needs Plan" listing initiatives required. In 2015, 3 needs were added at the annual meeting. These are shown in red below.

Precursor to Lake Management Plan

Lake Minnesuing Needs – LMSD Future Initiatives- 2015

- Citizen Lake Monitor – 25 volunteer hours/year
  Onboard and ongoing as of 2014, need backup
- CBCW - continue in 2015 – need comanager
  Comanager 4-25-15, need operations manager for 2016
- Comprehensive Lake Water Quality Study – follow up to 1997
  Needs being defined, approx $20,000 project, target 2017?
- Define/Understand Lake Minnesuing's Water Budget
  30% Groundwater+10% Precip+60% Surface Runoff

  Watershed map completed 2014, acreage analysis ongoing in 2015
- Develop Strategic Plan to Positively Influence Inflows
  No progress as of 6-27-15

- Continue Cooperation w/ LMA to Leverage Resources

  Achieved and ongoing as of 6-27-15
- Recruit an LMSD Board Member

  Active search continues
- Implement the Healthy Lakes Initiative
- Install an ongoing process to educate lake property owners re: shoreland zoning requirements
- Pursue a rapid response grant to mitigate the spread of Yellow Flag Iris

At the 2016 annual meeting, Jeremy Bates, EDR Specialist with the WDNR, brought in a live YFI plant. He also brought in live cattail plants to differentiate between the two. He demonstrated the techniques required to chemically treat YFI using the hand swipe and cut stump methods including safety precautions and mix ratios for each technique. He presented the following mix ratios:

Jeremy Bates, EDR Specialist Wi DNR

Yellow Iris chemical control:

Always follow manufacturer's label if different than below:

Glyphosate (ie. Roundup or Rodeo (aquatic):

Spray: 5% (6oz herbicide/gallon of mix) with .6 oz surfactant

Wipe-on-glove: 33% (43 oz herbicide/gallon of mix) with 12 oz surfactant

Cut and spray: 50% (64oz herbicide/gallon of mix) with .6 oz surfactant

Imazapyr (ie. Habitat)

Spray: 1% (1 1/3 oz/gallon of mix) with 1/3 oz surfactant

LMSD used these suggested mix ratios for wipe on and cut stump work.

As attendees entered the 2017 annual lake meeting and throughout the coffee and doughnuts socializing, a slideshow of all the YFI on Lake Minnesuing played on the big screen.

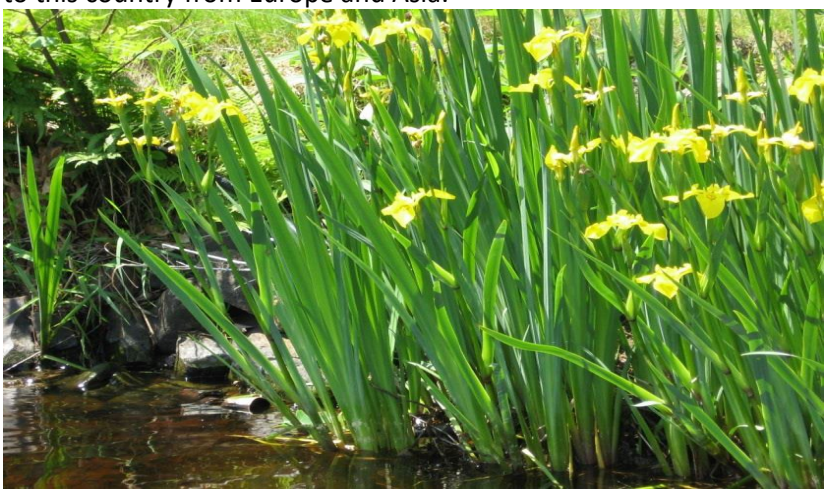
Lake Minnesuing's LakeLink Newsletter, provided both on paper and digitally, was used as a forum to further educate lake stakeholders. This newsletter is well read and reaches approximately 100 of the 130 owners with developed property on the lake. Following is our initial YFI article:

Lake Link

SPRING 2015

Everything's Coming Up Yellow

OK. Just give it a little time. On toward the end of June our lakeshore will erupt in yellow flowers. Those of you with a bit of history on our lake will think back to the days, not so long ago, that this did not happen. Only in recent years have we seen the proliferation of a plant called Yellow Flag Iris, *Iris Pseudacorous* which is not native to Wisconsin. It was brought to this country from Europe and Asia.



So what! We have many beautiful plants brought here from other places. Many are very beautiful (which Yellow Flag Iris can be) and many that are not harmful, with some in fact, even beneficial. Please know that **Yellow Flag Iris is not one of them**. Unlike its "cousin", Blue Flag Iris which is a native to our area of Northern Wisconsin, Yellow Flag is extremely aggressive and you are watching it attempt to take over the Lake Minnesuing shore. All parts of the Yellow Flag Iris plant are poisonous and our local wildlife knows it! The problem is that it is stronger and wins out over other aquatic vegetation native to our lake.

So what! What's all this business about natives and non-natives? The answer isn't that natives are necessarily prettier or more appealing "because they were here". The real answer is that the ecology of Lake Minnesuing as we have come to know it depends on the natives. When they are crowded out, and you see that happening right now, the ecology of our lake changes. The diversity of plants shrinks and those living organisms that rely on this diversity react. More unwanted limited species vegetation grows in a more "unchecked manner". The food chain in Lake Minnesuing is altered. Desirable fish species are affected.

Here's the bottom line: **If you have Yellow Flag Iris on your shoreline get rid of it**. Pull it or dig it out. Touching this plant can cause an irritation for some people. Wear gloves until you know how you will react. This plant spreads in a couple of ways. First, it develops pods on its stems which contain seeds and second, if pieces of the "rhizome or tuber like" root are left they will regenerate the plant. At the very least, cut the entire plant back very low before those seeds can fly. While this will not kill the plant, it can serve to retard its growth. Cutting back year after year in this manner will slow its spread. Composting is not recommended. Seed pods and rhizomes should be bagged and go in the trash.


Seed Pods

Lake Minnesuing needs an individual to be a leader on the lake to help property owners manage this Yellow Flag Iris issue. If you would be willing to continue property owner education, organize some help for property owners to do their own eradication work, and/or perhaps take on the task in public areas, please let someone on your LMA or LMSD board know. This would be a great benefit to our lake.
End of article.

Several more articles followed over the course of the project and they are included in the Appendix.

Face to face communication has been a major part of the education phase of the project. The process of locating, photographing, and eventually digging, cutting and bagging YFI afforded the opportunity to talk with a number (15-20) of property owners at their locations each year. A positive educational experience was achieved with many. There were those however who saw YFI as a beautiful plant in the landscape and didn't want them cut or removed. At least one owner, when first approached for herbicide treatment in 2016, commented that she has had them on her shoreline for 15 or more years and knows they have not spread. That view is representative of mitigation difficulty. The good news is that after our program of continuing education, this property owner asked to treat her property during our 2018 treatment cycle.

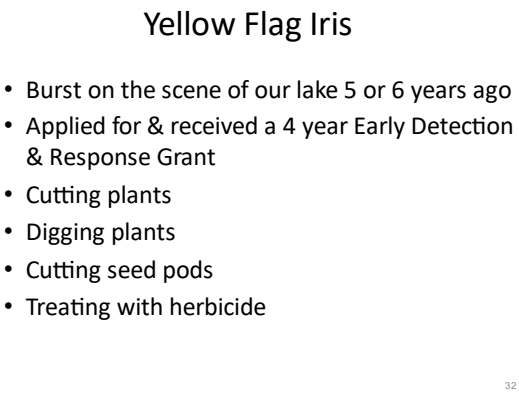
The LMSD YFI Project Manager was invited to speak at the Northwest Wisconsin Lakes Conference 6/16/2017. The title page of the presentation:

Why We Matter To Our Lakes

- Lake Minnesuing
- Douglas County

Jim Giffin
Lake Minnesuing Association
Lake Minnesuing Sanitary District
sailjbg@gmail.com

The following YFI related subjects were covered in the presentation:



The goal of the presentation was to share the action plans and activities for managing our "natural resource" on Lake Minnesuing. A significant section of the presentation was devoted to YFI mitigation, our successes and failures, and what we have learned.

Networking occurred after the meeting which resulted in further discussion with other lake groups challenged by YFI.

Shortly after the 2017 Northwest Wisconsin Lakes Conference, Alex Smith of the WDNR connected one of the board members of the Spider Chain of Lakes Association, near Hayward, with LMSD and the following email was received:

Fwd: Yellow Iris

Inbox

Marv Ramsay <marvramsay@gmail.com> Jun 26, 2017, 12:28 PM

to me

Jim,
Could you help us? We just found out about the Yellow Irises on four of the lakes in our Chain of five from Matt Berg during our Point Intercept. With so many property owners at the lake for the Fourth, we want to get the word out. We also realize seed pods are getting ready to pop!

I should of signed up for your session at the lake conference versus Zebra Mussels! 😀
Many thanks,
Candy

LMSD and the Ramsay's corresponded several times sharing information regarding YFI.

Eventually these communications led to an invitation from The Spider Chain of Lakes Association for the LMSD YFI Project Manager to present at their annual lake meeting on

5/25/2019. The presentation covered the history of the YFI project on Lake Minnesuing, the assessment and action plan, and the success and failure of treatment techniques. The title page of the presentation:

YFI: One Lake's Experiences

Early Detection & Response
Lake Minnesuing
Douglas County Wisconsin
2015-2018

Jim Giffin
Lake Minnesuing Association
Lake Minnesuing Sanitary District
Director – Northwest Region
Wisconsin Lakes
Ambassador – WDNR Healthy Lakes

Spider Chain of Lakes Association, May 25, 2019

2

Methods, timing, tools, training and education were discussed. Approximately 55 people attended. After the meeting the Project Manager toured the lake with Spider Association board members to view YFI sites and discuss appropriate techniques for mitigation.

Spider Chain Association Meeting 5/25/2019

In 2019, again as a result of the presentation at the 6/16/2017 Northwest Wisconsin Lakes Conference, LMSD received the following email:

On Thu, Jun 20, 2019, 10:47 PM Boyd Zander <boydzander@aol.com> wrote:
Jim Giffin,

My name is Boyd Zander. WDNR Rep Ty Krajewski obtained permission to give me your contact information. I'm working on attending to a Yellow Iris infestation in Crab Lake in Vilas County. Ty had told me he was aware of other efforts to study management or elimination is infestation on other lakes and was kind enough to provide your contact information in this regards.

Most residents of Crab Lake don't know there is an infestation. The Crab Lake Property Owners Association (CLPOA) Board was made aware last fall. I'm planning on mapping the infestation this weekend with photos and GPS locations. Primary reason for map is to convey the extent of infestation to CLPOA members.

My understanding of the infestation is that it has not grown beyond management and eventual elimination through a reasonable effort. We will be organizing removal of seed pods or blossoms to curtail further spread where it is already established.

I will be presenting extent of infestation and next steps to the CLPOA board on July 6th. I would like to report on progress other lakes have made in regards to developing best practices for management.

I did read on WDNR website that "*Lake Minnesuing Sanitary District is sponsoring a four-year Yellow Flag Iris response project.*" I'd be interested in finding out if this project did get started and if so how has it progressed.

I would also be interested in hearing any wisdom you'd be willing to share relative to this concern.
I would enjoy a call, at your convenience, to my mobile phone to discuss if you would be willing to help me inform and act regards YFI.

Regards,

Boyd Zander

LMSD went on to share several communications with Boyd, both via email and over the phone. Networking all happening as a result of the conference presentation and the EDR grant system.

Technique

24

<u>Cutting</u>

Over the course of the project many YFI sites were cut down to the level of water they were in or quite short on shore. This has the result of stopping seed pod formation. Even after repeated cutting, however the existing YFI plant is really not stressed much and remains in place much like turf grass faced with repeated mowing. When practiced by individual property owners this is a great technique to reduce spread to additional sites.

When YFI plants are cut, a type of sap is usually emitted at the cut. Because some people can have a skin reaction to the sap we included this information when communicating with volunteers and employees:

"As related to participants last year, this plant can cause a skin reaction when some people come in contact with it. For that reason we supply rubber/nitrile gloves, as well as work gloves, for all participants. I am not aware that any of our workers or volunteers had any difficulty last year but it is important that you be aware of the possible reaction."

Nitrile gloves

LMSD used both 5 mil and 7 mil gloves and preferred the 7 mil. Regular garden working gloves were used over the nitrile gloves. No LMSD employees or volunteers suffered a reaction to the sap over the course of the project. One property owner, working independently on a large stand of YFI, suffered a reaction on the skin of his feet while wearing open footwear.

Seed Pod Cutting

Seed pod cutting is a relatively "time efficient" process, easily practiced by volunteers with limited training. It is an excellent way to minimize site spread and has been very effective on Lake Minnesuing when conducted along with digging of small sites and herbicide treatment of larger sites.

Small pruners are most effective

Small, sharp, pruning shears with either straight or curved blades are the most effective tool for cutting YFI leaves and seed pod stalks. They are inexpensive, efficient, and easy to use. These cutting blades are only about 2" long. We used this pair for 5 years. Cleaning and oiling after each seasonal use prolonged their useful life.

Digging

Digging large stands of YFI is impractical, it is extremely labor intense, and damages the shoreline. Without immediate replanting/restoration the shore is subject to severe erosion. LMSD discontinued this practice after year 2 of the project.

"Targeted" digging can be very successful, especially when done with an old serrated butcher knife in trained hands. See the example covered in the SITE COMPARISONS section of the report.

Note the use of the serrated butcher knife. On small stands of YFI this technique can be very effective, allowing most if not all of the rhizome material to be removed. Pictured – Dara Fillmore, WDNR, participating in LMSD'S YFI Work Days. Thank you Dara!

Herbicide Treatment

Over the course of the project 62 properties had sites sprayed and over 80 were treated with either a wipe on or cut stump treatment. Rodeo was the herbicide used throughout this project:

Herbicide - Rodeo

- Treatment can result in oxygen depletion in water due to decomposition of dead plants (Dow)
- This product is a broad spectrum, systemic, post emergent herbicide with no soil residual activity (Dow)
- Supplier: Seed Ranch $93.72/2.5 gallons

48

When spraying, our WDNR licensed applicator determined the mix ratio based on his years of experience. We employed Dale Dressel of Northern Aquatics and we would highly recommend him to others.

Various surfactants are recommended and available. After research by one of our lake property owners, a professional chemist, we selected and used Brandt Aqua Surf:

Surfactant

Brandt AquaSurf
Aquatic Non-Ionic Spreader Adjuvant (surfactant)
1 Gal. $48.95

Order# 11160312
http://www.ShorelineAquatic.com
Date: Friday, August 12, 2016

49

Both herbicide and surfactants were purchased in the smallest readily available amounts. After 6 years of treatment more than half the original amount of Rodeo remains as does the vast majority of the surfactant since it is used in such small volumes. Because Rodeo is not available in “homeowner sized” amounts unlikely to ever “transition” hand application of Rodeo herbicide treatment to trained property owners for use above the OHWM on their own properties. Those property owners choosing to use herbicide will resort to glyphosate based Round-Up without a surfactant because it is readily available.

Even after the YFI plant is no longer growing, herbicide treatments leave the rhizomes in the ground, holding the shore and reducing the erosion that occurs after digging.

WDNR permits were applied for and received prior to herbicide treatment. These permit applications reflect the small acreage actually affected. For example, our first herbicide treatment in 2016, included dimensions of the targeted 13 sites as follows:

A	20'x4'=.0018 acre
B	22'x3'=.0015 acre
C	40'x3'=.0028 acre
D	55'x3'=.0038 acre
E	45'x3'=.0031 acre
F	15'x2'=.0007 acre
G	10'x3'=.0007 acre
H	20'x4'=.0018 acre
I	40'x3'=.0028 acre
J	45'x2'=.0021 acre
K	15'x3'=.0010 acre
L	120'x3'=.0083 acre
M	20'x2'=.0009 acre
	Total=. 0313 acre

Subsequent permit applications were similar in area covered.

Process - Spraying

LMSD chose to conduct spraying late in the growing season, typically one or two weeks after Labor Day. By then families have kids back in school and “traffic” is generally lighter on the lake. At this time of the year the plants are still growing and continue to take in nutrients. Several photos are shown to demonstrate foliar (spray) application:

Dale Dressel of Northern Aquatics prepares for the day. With knowledge of the lake and property owners, LMSD made it a practice to have the Project Manager always accompany the applicator.

Targeted application with back pack sprayer


Covering native plants prior to spraying YFI

Property owners watching the process and pleased with the care taken while spraying.

Many sites were difficult to reach. The applicator is standing on woody debris. Once off that wood you will sink to your hip in organic material. The Project Manager tells this based on numerous such experiences.

Photos of the Cut Stump Process

"Tools of the trade" – equipment recommended for cut stump process:
Large tote with cover
Clipboard with map of sites to be treated – in tote
Camera – in tote
Pail in which to carry the "working jar" of herbicide and the brush
Gloves for applicator – outer layer
Nitrile gloves (not shown – they are in tote) for applicator – inner layer
Small shears to cut stems and leaves of YFI
Jug of mixed herbicide
Smaller "working" jar of mixed herbicide limits damage should a spill occur
1 ½" or 2" brush to apply herbicide
Garbage bags for plant detritus
Canoe or small boat to work from
All herbicide related items go in the tote and are covered while in the canoe to prevent spills

YFI a perfect size for cut stump treatment

Brushing mixed herbicide on cut stump of YFI

Notice the “blue tint” of the cut stump after treatment. It may not seem like it but it is often difficult to find the YFI stumps you have just cut and to know which of them you have already

treated when they are mixed in with other vegetation. A blue dye, mixed with the herbicide, is very helpful to know where you have already treated.

Cut YFI prior to treatment

The cut stump process is highly targeted with very limited collateral damage. When using the techniques described here, herbicide spills are highly unlikely. If they do occur it usually would involve only what is in the working jar. While cut stump requires bagging and disposing of the cut leaves, it is a more efficient process than the wipe on technique

Glove Wipe on Treatment Process

LMSD used this process only a few times during the project. It involves holding the leaves of a plant with one hand while dipping a fleece gloved hand into a batch of mixed herbicide and sliding the wet glove down the length of the plant's leaf. We found the process messy, highly labor intensive, and less targeted than the favored cut stump process.

Fleece Glove Wipe On Treatment #1

59

6/22/2016 - Not only was this a YFI treatment candidate but we have a storm water drainage pipe problem in this area too! LMSD treated this site in 2016 using the fleece glove treatment.

During our assessment 6/12/17 this plant appeared to be gone (it was earlier in the growing season however). On 9/12/2018 regrowth of reduced size was observed. This site was retreated by spraying in 2018.

TREATMENT EFFECTIVENESS

Cutting plants low has little effect on the vitality of the plant. It does prevent flower and seed pod formation, eliminating spreading by seed. This eliminates “widespread plant travel”.

Cutting seed pods is easy, fast, and effective. It prevents flower and seed pod formation eliminating spreading by seed. This also eliminates “widespread plant travel”.

Digging plants, as noted elsewhere in this report, can be very effective at eliminating plants. Care must be taken to remove the entire rhizome. Large areas must be restored immediately to reduce erosion. Targeting smaller plants with the use of a serrated butcher knife is an excellent technique.

Herbicide treatment effectiveness varies based on the maturity of the plants being treated. Generally, spraying was effective 60% to 80% of the time with retreatments required on very mature plants with heavy rhizome structures.

Wipe on treatments were about 40% - 50% effective and cut stump treatments ranged from about 40% on dense plants with heavy rhizome structures to 70% on smaller, younger plants that had not yet developed large rhizome structures. Retreatments are often required, sometimes multiple times, with either of these techniques.

SITE COMPARISONS

Property 9800

Property 9800 was treated in 2015 and 2016 using a “butcher knife” digging or carving technique. The property owner developed the process and completed the work. Where a shovel was impractical in the fully rocked shore the knife was very controllable and allowed targeted digging with nearly complete removal of rhizomes resulting in very limited collateral damage to the shore.

6/18/2015 Prior to treatment Property 9800 North – multiple stands of flowering YFI are apparent

6/15/2017 Property 9800 north “after” – there is one YFI plant remaining shown in close up in the “after” photo that follows

6/18/2015 Property 9800 south “before”

6/15/2017 Property 9800 “after” – this was the only plant noted in the area covered by both the Property 9800 “before” photos above. The area remained clear of YFI in 2020.

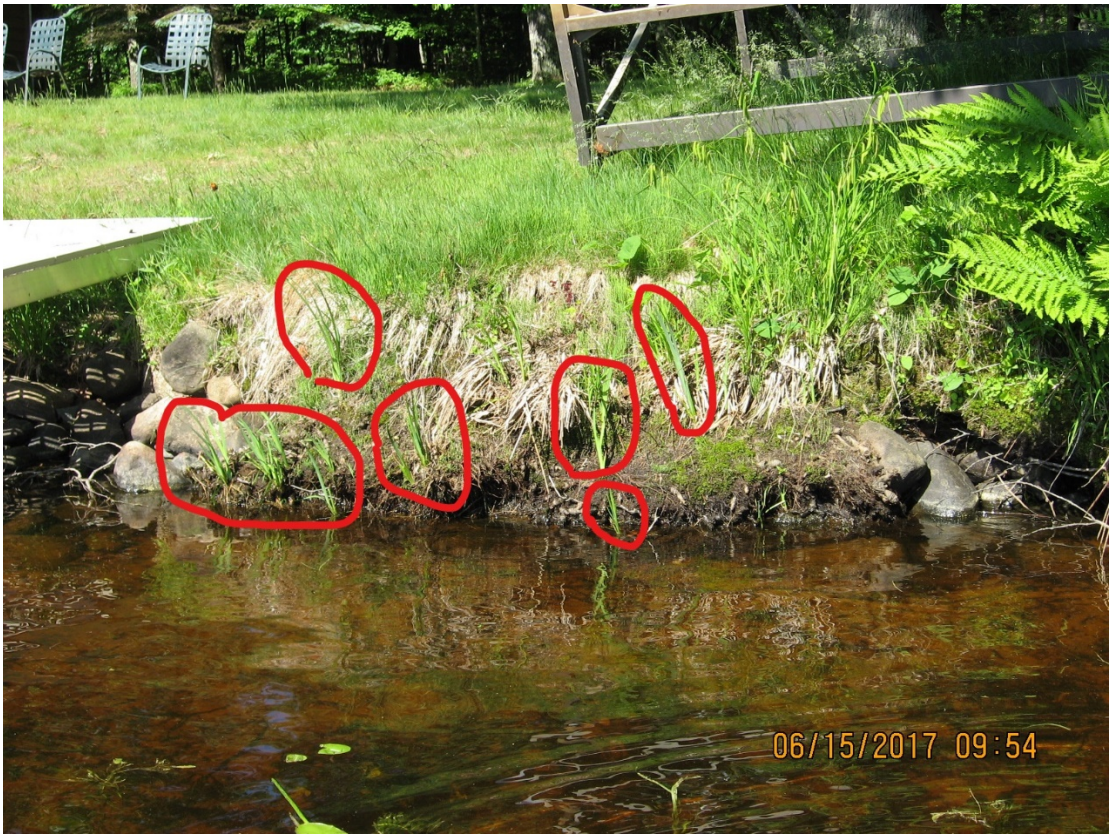
Property 0200

As can be seen in the “before” photos Property 0200 shore was infested with mature, fully flowering YFI. Years ago much of the natural shore was cleared to provide for an “open” lawn to the lake. The property faces east and receives abundant sun. This became a “haven” for YFI. Shoreline adjacent to and just south (same owner) remains nearly undisturbed and only a few small YFI have emerged. This is in spite of fall NE breezes that moved seeds from the infested area toward that adjacent more natural shore for years.

The property was sprayed in 2016 and retreated, also by spraying, in 2017. In 2020 several small, isolated plants were treated using the cut stump technique.

As is typical, spraying Rodeo is non-selective and most vegetation, YFI and others, is killed by the herbicide. As can be seen in the 7/1/2020 photo some of the natural plants have begun to return.

6/18/2015 Property 0200 dock area “before”– large stands of flowering YFI on either side of dock



6/15/2017 Property 0200 dock north side “after” 9/8/2016 spraying. Some smaller YFI plants remain.

7/1/2020 Property 0200 dock north side “after” 2106 spraying and spray retreat in 2017– one small plant remains which was cut stump treated 9/1/2020

6/18/2015 Property 0200 dock south side “before” (note position of lamp post)


6/17/2016 Property 0200 dock south side “before” (note position of lamp post)

6/12/2017 Property 0200 dock south side “after” spraying 9/8/2016 (black vertical tube is the lamp post in the “before” photos). One relatively small YFI plant is seen in about the center of the photo. This photo does depict the collateral damage that occurs by spraying. The root system of the plants lost do remain in the ground, minimizing erosion that occurs when digging YFI is used as the alternate treatment technique.

6/15/2017 Property 0200 dock south close up “after” spraying 9/8/2016. Large stand has been reduced to fewer, smaller plants.