

Homeowner Perceptions of Aquatic Invasive Species: Results from a survey of lakeshore property owners in Wisconsin



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Executive Summary

Key Findings

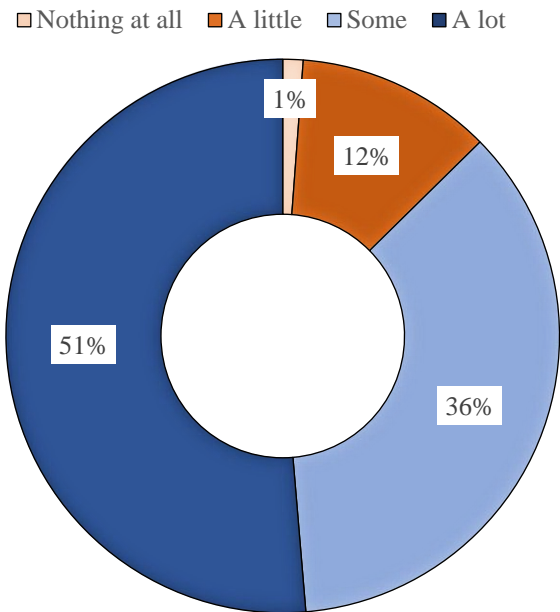
Key findings from a survey of 747 Wisconsin property owners surveyed on their attitudes towards aquatic invasive species are presented below.

- Although over half (50.4%) of respondents reported being either “very familiar” or “extremely” familiar with ways to prevent the spread of invasive species, a significant proportion of respondents reported they “don’t know” whether a specific management approach has been used on their own lake. 53.6% of respondents reported they “don’t know” whether the biological approach was used on their lake, while 52.8% reported they did not know whether the physical approach was used. Respondents reported similar numbers for the regulatory (47.8%), monitoring (46.2%), chemical (42.9%), mechanical (37.1%), and manual (35.4%) approaches.
- About a third (32%) of respondents reported they “don’t know” whether their lake has AIS or not. Of those who do say their lake has AIS, many do not know what approaches have been used on their lake. About 47% of people who said their lake had AIS reported that they “don’t know” whether a biological approach was used, 31% “don’t know” whether a chemical approach was used, 45% “don’t know” whether a physical approach was used, and 40% “don’t know” whether a regulatory approach was used.
- About a third of participants perceived greater risks vs. benefits for approaches like the chemical approach (48%) or the biological (38%), and about a third (28.5%) of participants reported agreeing that it is worth using a strategy to control invasive plants even if it harms native plants.
- Participants overall (80.7%) viewed AIS as having a negative impact on the health of plants or animals in the lake, the health of humans or pets (79.3%), the quality of the lake for swimming (80.9%), boating (77.7%), or fishing (77.9%).
- Most respondents (64.9%) perceived the benefits as outweighing the risks to monitoring for aquatic invasive species.

High Levels of Awareness; Low levels of Familiarity.

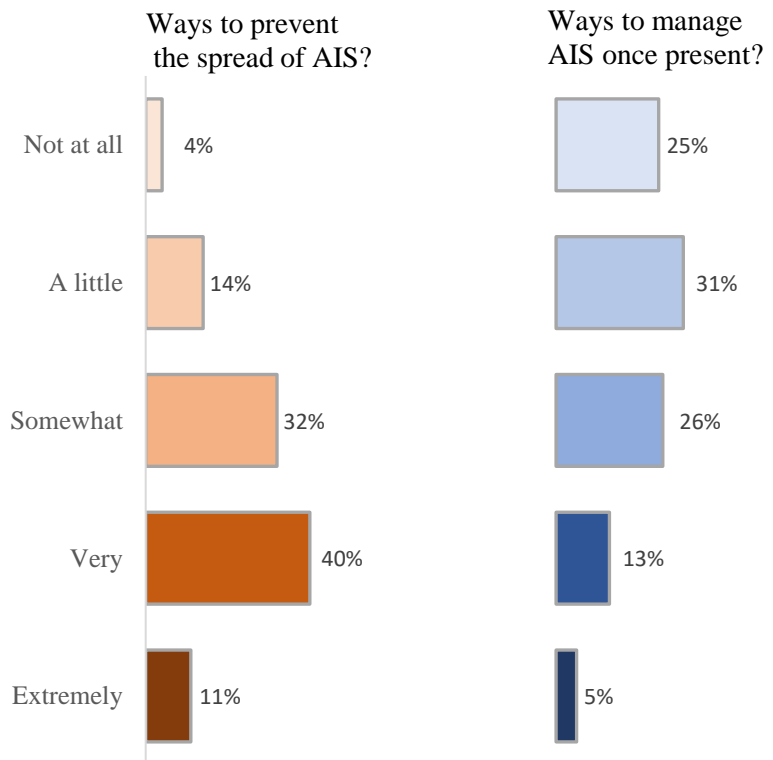
Overall, lakeshore property owners reported high levels of familiarity with AIS. The majority of respondents (51%) indicated that they heard “a lot” about AIS and 36% said they have heard ‘some’ about AIS. Only about 1% of respondents indicated they heard “nothing at all” about AIS.

How much have you heard about AIS?



Respondents were also asked how familiar they are with ways to prevent AIS and how familiar they are with ways to manage AIS once they are found in their lake. Respondents reported opposite patterns with regards to these two variables. While they tended to be more familiar with ways to prevent the spread of AIS, greater proportions of them expressed lower levels of familiarity with ways to manage AIS once they have been found on their lake.

How familiar are you with...



Recommendation: There appears to be a knowledge gap among waterfront property owners. While many know about AIS, they know less about what can be done if they are found on their lake. Waterfront property owners should be informed about these options to increase feelings of self-efficacy about managing AIS.

Moderate to low levels of awareness about ways to manage AIS.

Respondents reported moderate to low levels of awareness about the various approaches to managing AIS. The items were measured on a scale of 1 (“Not at all familiar”) to 5 (“Extremely Familiar”). The chemical approach was only somewhat familiar to respondents. The lack of familiarity with these management approaches represents an opportunity to capitalize on respondents’ curiosity about managing AIS on their lake by providing clear, digestible information about what each approach is intended to do and what one can expect when such an approach is used.

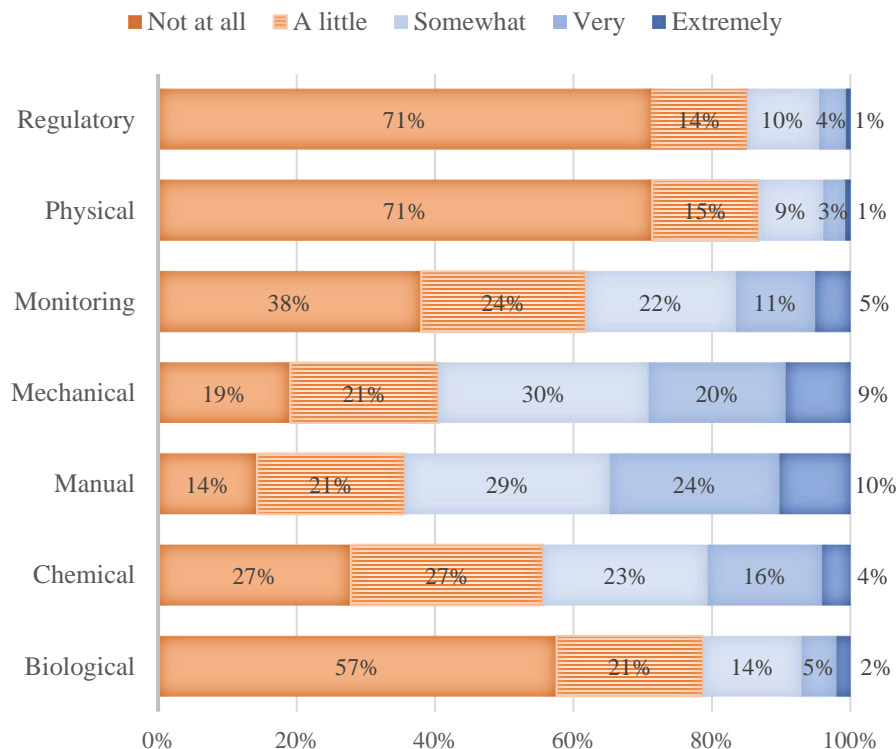
The approach most familiar to respondents was the manual approach, with 64% of respondents being at least “somewhat” familiar with it. The least familiar approaches were the regulatory and physical approaches, with the majority (71%) indicating they were “not at all” familiar with these approaches.

Recommendation: There are opportunities to educate property owners about all types of management, and outreach should aim to build awareness about management strategies other than chemical or mechanical approaches that they are less knowledgeable about.

Management approaches described in the survey:

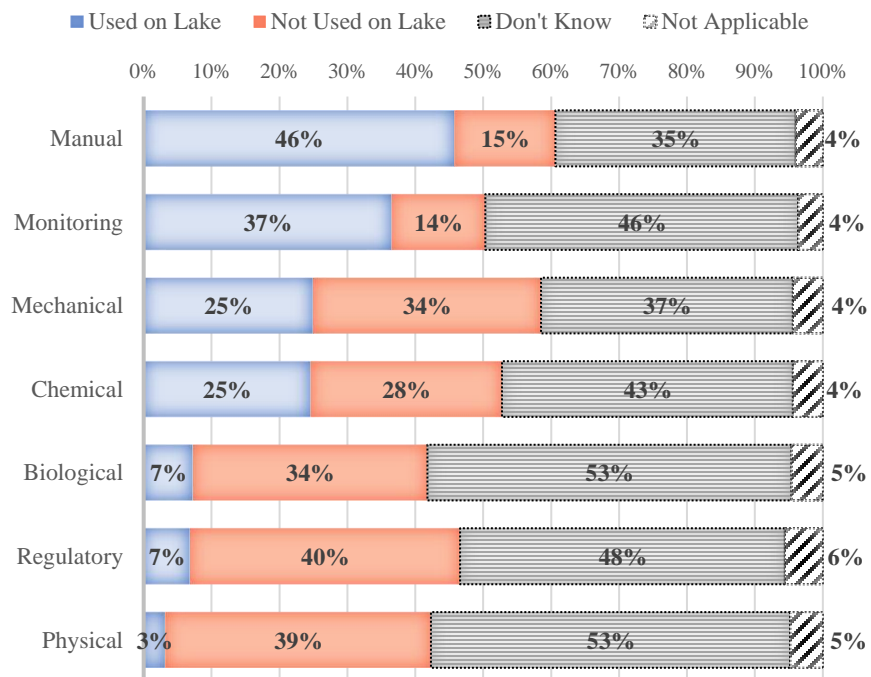
<i>Biological approach</i>	... using a known pest of a plant, such as an insect.
<i>Chemical approach</i>	... applying chemicals, also known as herbicides.
<i>Manual approach</i>	... pulling or raking plants by hand from the shore, by boat, or using divers.
<i>Mechanical approach</i>	... using motorized equipment such as a weed cutter or harvester.
<i>Monitoring approach</i>	... conducting surveys to track the growth of a plant over time.
<i>Physical approach</i>	... using a barrier, such as a tarp, to block the growth of plants.
<i>Regulatory approach</i>	... changing rules such as blocking off part of a lake or changing water levels.

How Familiar Are You With the Following Approaches?



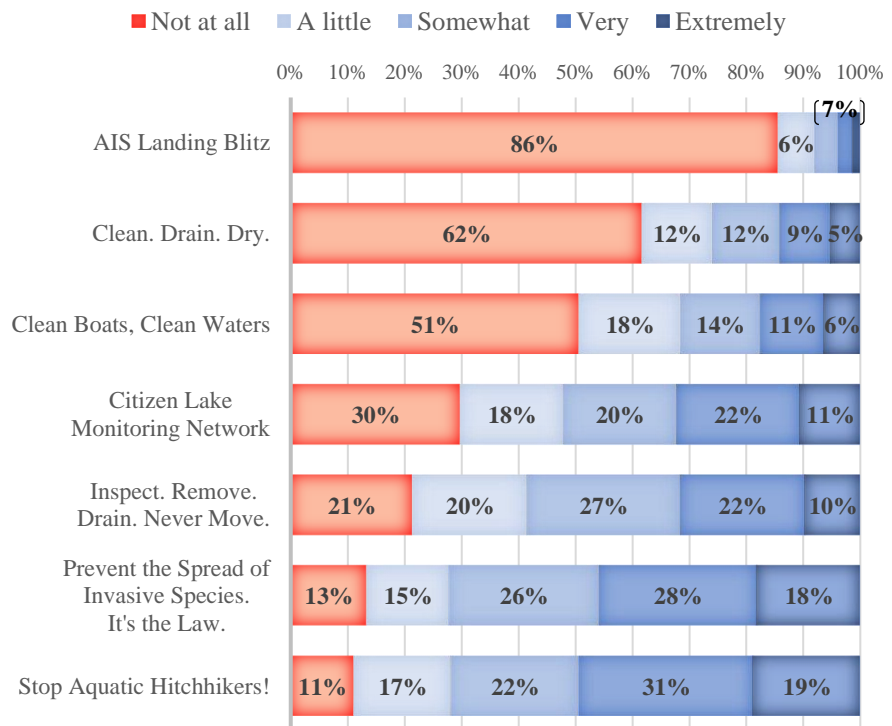
Respondents were also asked about management approaches used on their lake. Overall, awareness of the various approaches seems to be moderate to low for all approaches except manual. The percentage of respondents answering “Yes”, “No”, “Don’t Know”, and percentages of “Not Applicable” responses are reported in the adjacent table. For each approach, the percentage of respondents who “don’t know” is considerable, which represents an opportunity for improved communication with property owners. Lake groups could be an effective intermediary in communicating this information directly to property owners, since it is a source of information property owners already rely on for information about AIS on their lakes. It is also possible that individuals may answer “don’t know” because they do not actually see these approaches being used, so communicating with homeowners about the treatment history of their lake could be a worthwhile goal.

Which Approaches Were Used on your lake?



At the same time, familiarity with the various AIS programs and campaigns also remain moderate to low. Participants were asked to rate how familiar they were with several prominent campaigns designed to increase awareness about AIS. Respondents mostly reported being “somewhat” familiar with the campaigns, though few participants reported being “very” or “extremely” familiar with any particular campaign. The vast majority (86%) of respondents reported they were “not at all” familiar with the AIS Landing Blitz. Stop Aquatic Hitchhikers! was the most familiar to respondents; only 11% reported they were “not at all” familiar with the campaign.

How familiar are you with the following campaigns?

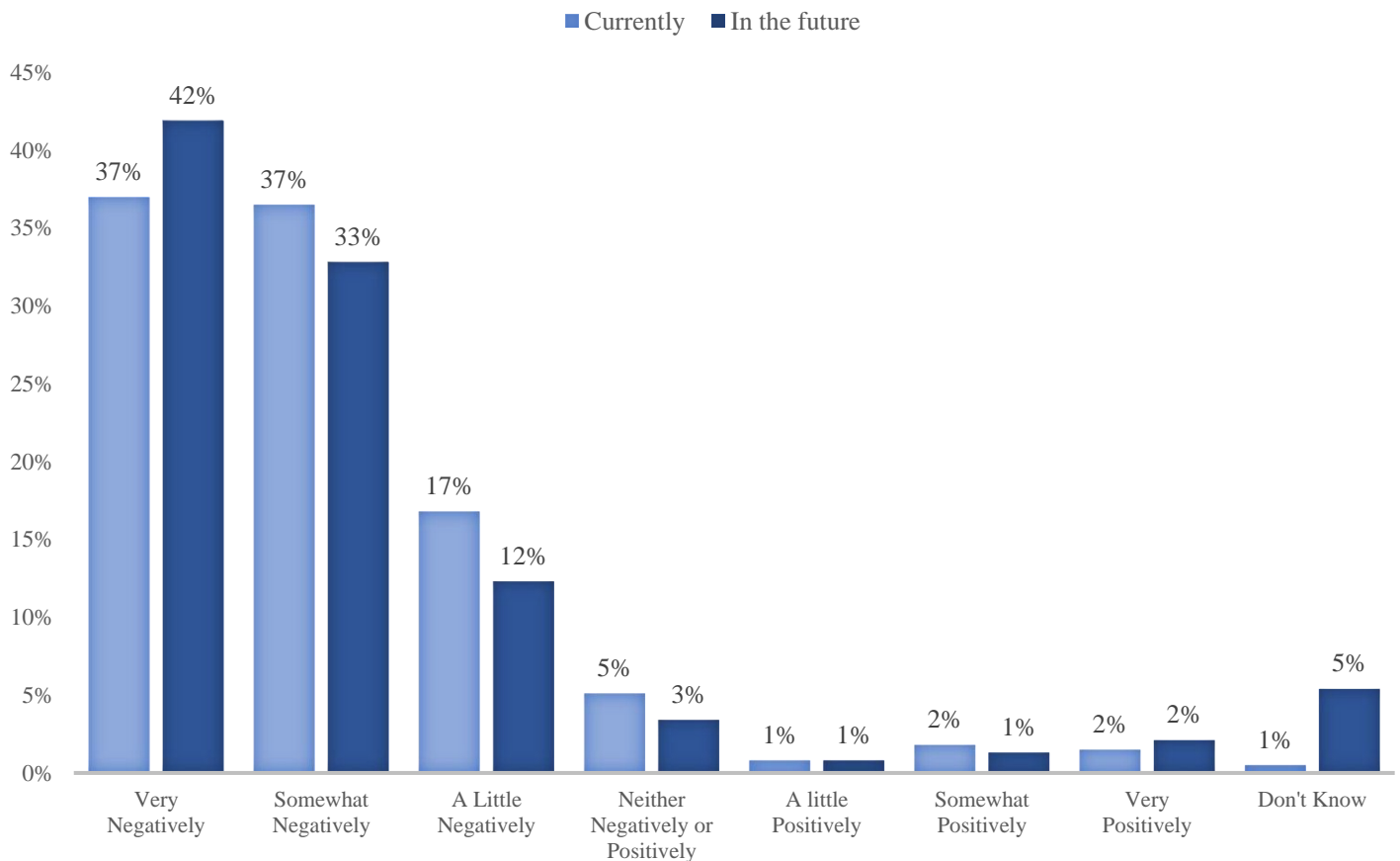


Overall, highly negative views of the impact of AIS on lakes

Respondents were asked about the impact of existing AIS on various factors, including environmental factors like scenic beauty and water clarity as well as recreational values like the quality of the lake for swimming, boating, and fishing.

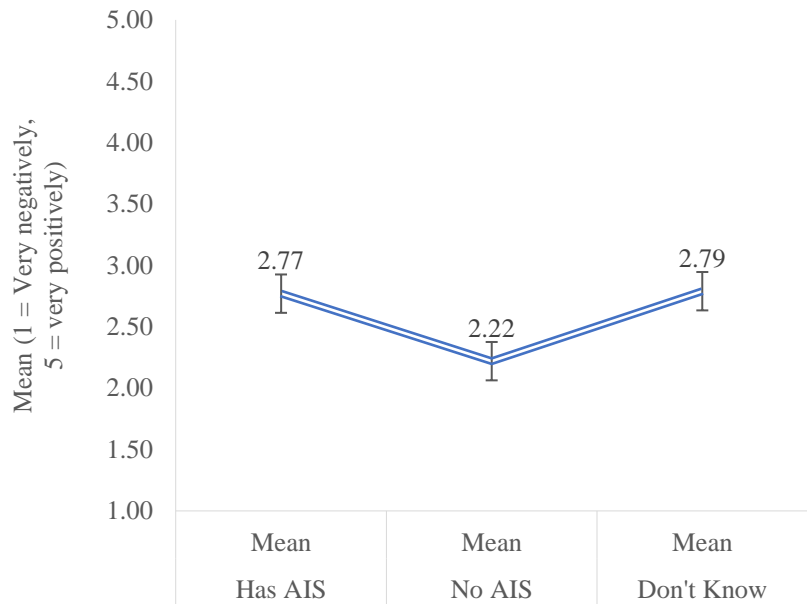
Respondents were also asked about how they perceive AIS impact lakes in Wisconsin currently, as well in the future, with response options ranging from “very negatively” to “very positively.” In general, participants had a negative view of the impact of AIS in Wisconsin lakes. Most respondents indicated AIS currently affect Wisconsin lakes “very negatively” (43.8%) or “somewhat negatively” (34.7%), while similar proportions of respondents indicated AIS would “very negatively” (50%) or “somewhat negatively” (28.9%) affect Wisconsin lakes in the future. Few respondents indicated they did not know how AIS currently affected lakes in Wisconsin (4.5%) or how AIS would affect Wisconsin lakes in the future (5.1%).

How will AIS impact Wisconsin lakes?



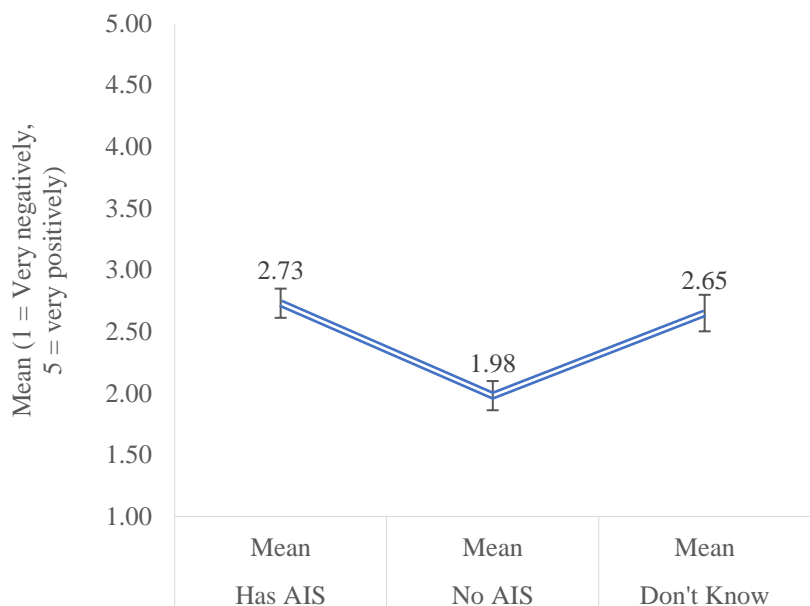
Comparisons were also made based on whether respondents perceived their lake to have AIS or not. An analysis of variance (ANOVA) was performed to examine differences between perceived AIS status and belief in the impact of finding new AIS in their lake on the quality of their lake for fishing, boating, and swimming, as well as the impact of AIS on the health of plants or animals, the health impact on humans, the impact of AIS on property values and the impact of AIS on scenic beauty. Significant differences were found for the impact of AIS on the quality of the lake for fishing [F (2, 729) = 3.597, p = .028]. Post-hoc comparisons using Tukey's HSD test indicated that the mean score for Has AIS (M = 2.77 SD = 2.15) was significantly different from the mean score of No AIS (M = 2.22, SD = 1.72). Additionally, the mean score for No AIS was significantly different from the Don't Know (M = 2.79, SD = 2.17). This suggests that believing one's lake has AIS is related to perceiving a more negative impact on the quality of the lake for fishing. No significant differences were detected for the impact on boating or swimming, or for impacts on human health, property values, water quality, or scenic beauty.

Impact of new AIS on quality of lake for fishing



With regards to the impact of AIS on the health of plants and animals, significant differences were found [F (2, 732) = 5.472, p = .004]. Post hoc comparisons using Tukey's HSD test indicated that the mean score for Has AIS (M = 2.73 SD = 2.29) was significantly different from the mean score of No AIS (M = 1.98 SD = 1.65). Additionally, the mean score of No AIS is significantly different from Don't Know (M = 2.65, SD = 2.27). Much like for the impact of AIS on the quality of the lake for boating, both those who perceive AIS in their lake and those who are not sure report seeing greater negative impacts on their lake compared to those who do not perceive AIS in their lake.

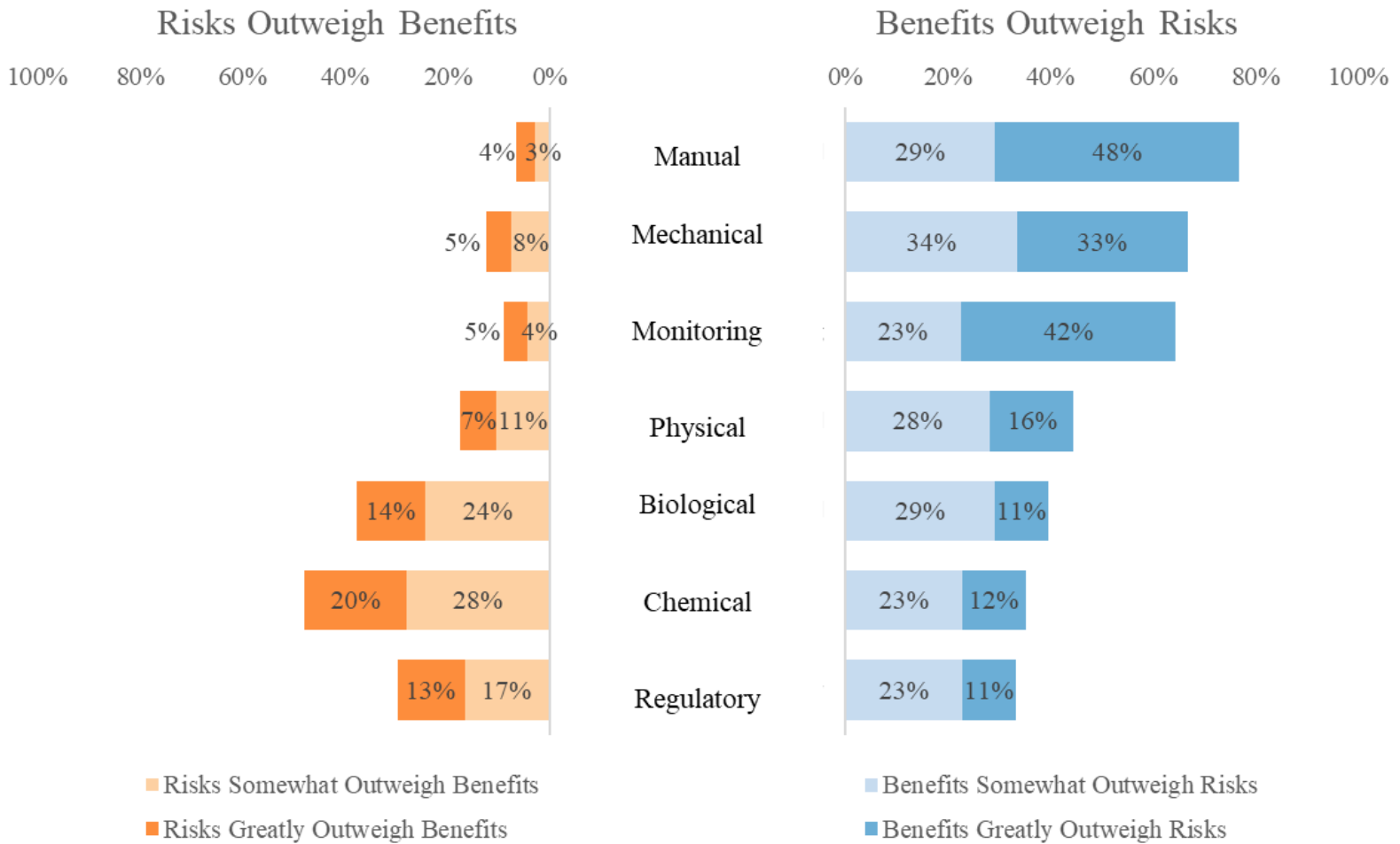
Impact of new AIS on the health of plants or animals



Risk Perception of Management Approaches

Respondents were asked to rate whether they perceived the benefits outweighed the risks, or the risks outweighed the benefits for different management approaches (see page 3 for definitions of each management approach used in the survey) used to manage invasive species. In general, respondents perceived the monitoring approach as the least risky, with few respondents indicating that the risks outweighed the benefits.

Respondents indicated that they are most supportive of the Manual approach¹, with 77% indicating the benefits outweigh the risks; the Mechanical approach, with 67% indicating the benefits outweighed the risks, and the Monitoring approach with 65% indicating the benefits outweighed the risks. The riskiest approaches were the Chemical, with 48% of respondents indicating that the risks outweighed the benefits; and the Biological, with 38% indicating that the risks outweighed the benefits.



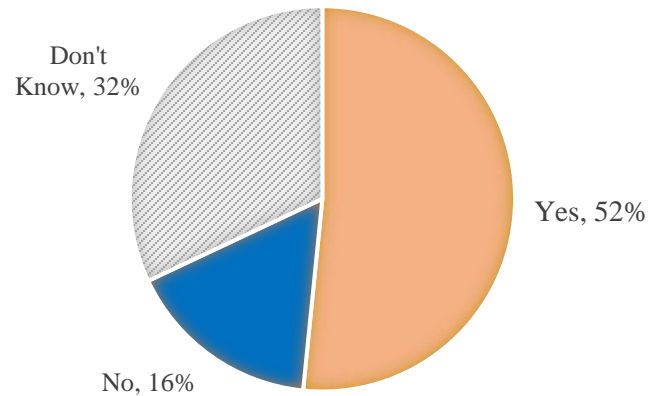
Recommendation: This risk/benefit information could be shared among waterfront property owners to help them better understand what their peers believe about aquatic invasive plant management strategies. Sharing this risk/benefit information can help establish social norms that may make waterfront property owners consider different management techniques.

¹ Respondents who indicated that the risks and benefits were “about equal” are not included in this graphic. About 26% of respondents reported the risks and benefits being “about equal” for the biological approach, 17% for the chemical, 17% for the manual, 17% for the mechanical, 21% for the monitoring, 38% for the physical and 37% for the regulatory approaches.

Risk Perception and Management Approaches

One item in the survey asked respondents to indicate whether they thought their lake currently had AIS. They were given three options: “Yes”, “No” or “Don’t Know. Approximately 52% of respondents thought that their lake had AIS.

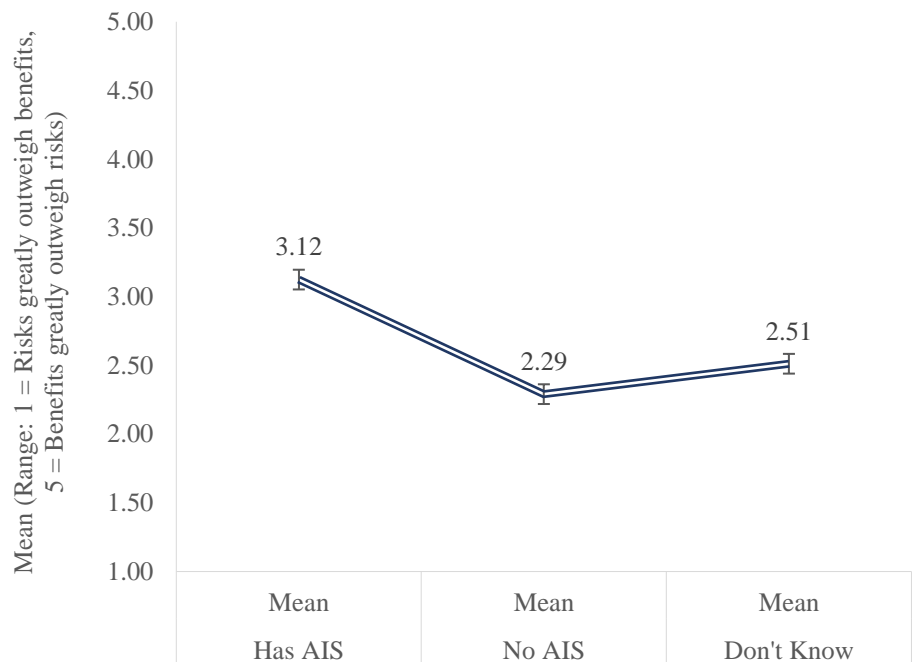
Does Your Lake Currently have AIS?



Significant Differences between groups for Chemical approaches, but not others.

After dividing respondents into the three categories based on their perception of the presence of AIS in their lake, an interesting, statistically significant difference emerges. An ANOVA was conducted to test for differences in the perception of risks and benefits of the chemical approach based on perceived AIS status and significant differences between groups was found [$F(2, 690) = 26.38, p < .001$]. Specifically, the mean score for Has AIS ($M = 3.12, SD = 1.37$) was significantly different from the mean score for both No AIS ($M = 2.29, SD = 1.11$) and Don’t Know ($M = 2.51, SD = 1.20$). No differences were found between No AIS and Don’t Know, suggesting that only those who perceive AIS in their lake perceive greater benefits to the chemical approach.

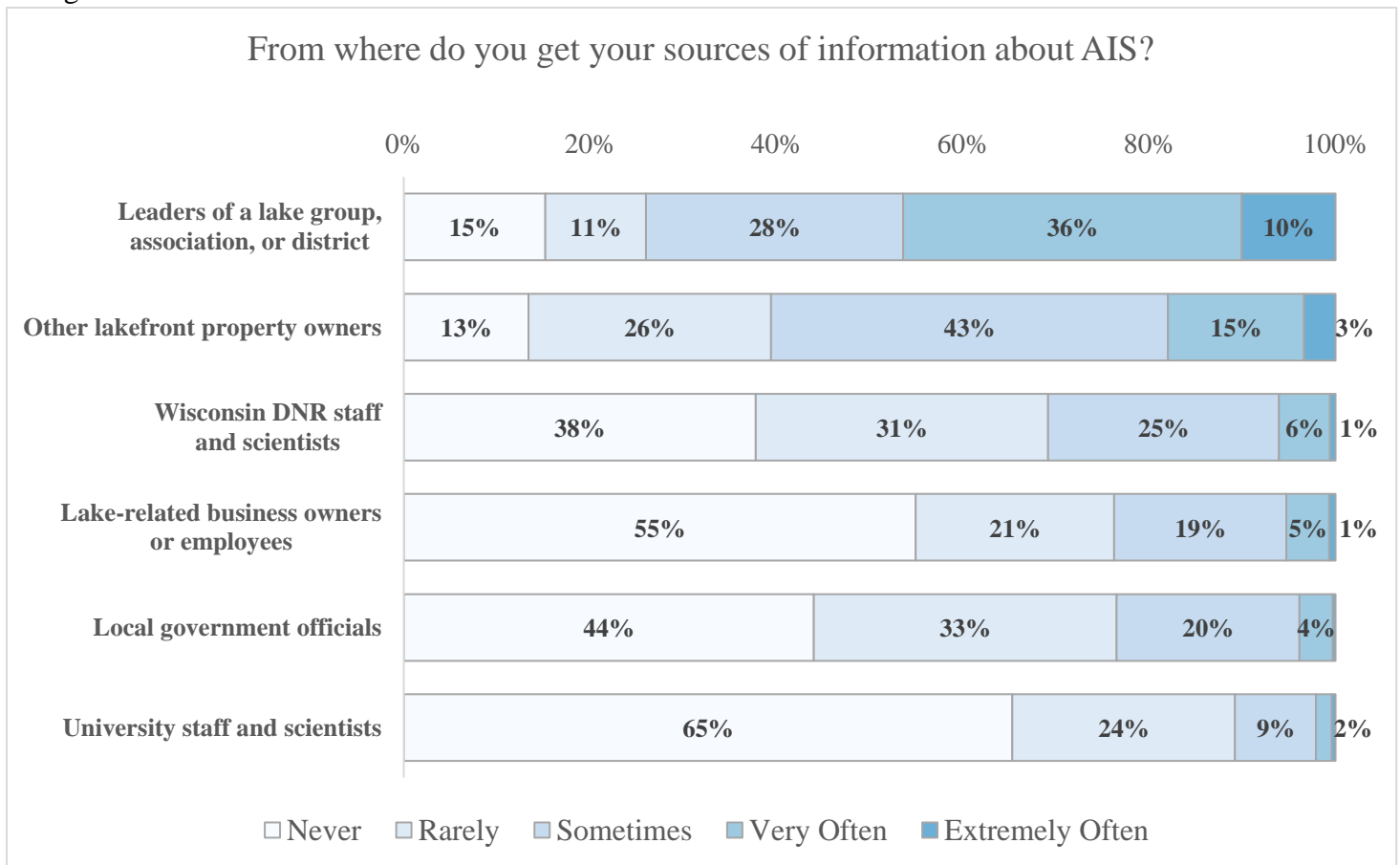
Risks vs benefits of the chemical approach



Recommendation: The perceived presence of AIS in a lake changes waterfront property owners’ risk/benefit calculation for using chemicals. Having property owners think about how they might want to manage AIS before they are present may allow them to consider other management strategies in case they are ever needed on their lake.

Sources of AIS-related information

The largest source of information for respondents was leaders of a lake group, association, or district with 46% of respondents reporting that they get information about AIS from this source “very often” or extremely often. Respondents also rely on other lakefront property owners for information about AIS, with 61% reporting that they at least “sometimes” get information from this source. Respondents appear to rarely rely on “official” sources of information, with large percentages of respondents reporting that they “never” get information about AIS from university staff and scientists (65%), local government officials (44%) or Wisconsin DNR staff and scientists (38%). It is important to note that these questions were not exclusive, and it is likely that lakeshore property owners get information about AIS from a variety of sources. However, it appears that “official” sources of information are not as frequently consulted in favor of more informal sources like other lakeshore property owners or leaders of lake groups, associations, or districts (who the property owner may already know). The quality or the accuracy of this information was beyond the scope of the study, though if a homeowner has questions about how they should manage AIS on their property, they may be more likely to consult individuals they know about treatments that worked for them, which may or may not be in line with the DNR’s goals or recommendations.



Recommendation: Continued efforts to educate local opinion leaders on AIS management options would be a good approach to get additional information about these approaches to waterfront property owners. Additionally, increased efforts to position traditionally trusted sources of information, like UW Extension employees, as resources for AIS management could also be useful. Currently few resources are dedicated to AIS management outreach through these sources, which is reflected by the results of this survey.

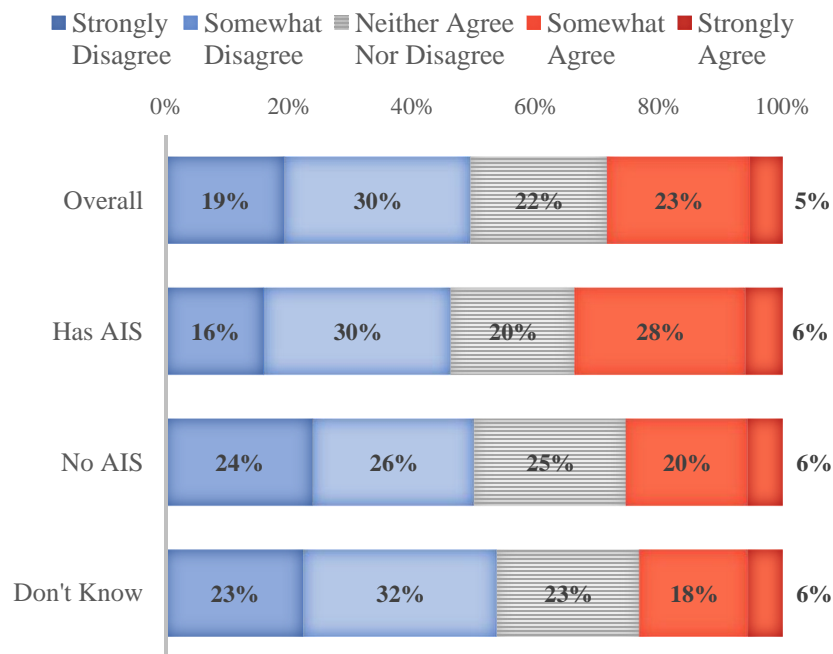
Significant proportion of respondents believe herbicides are worth it even if they harm native plants

Greater percentages of respondents who perceived AIS in their lake reported agreeing with the statement that herbicides are worth using even if it harms native plants. About a third (34%) of respondents who perceived AIS in their lake at least “somewhat” agreed with this statement, compared to 24% of respondents who “don’t know” and 26% of respondents who did not perceive AIS in their lake.

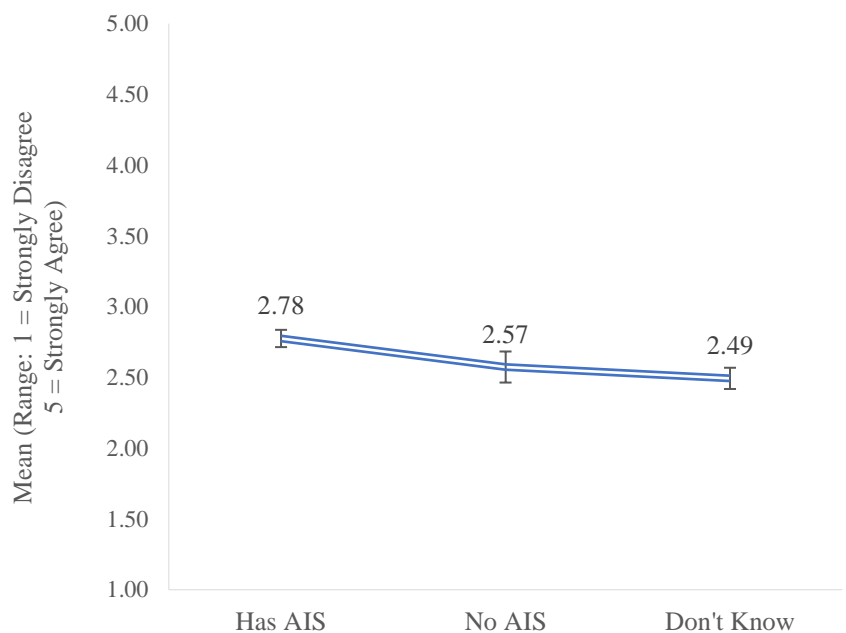
An ANOVA was also performed to examine the differences between perceived AIS status and the belief that an AIS management strategy is worth using even if it harms native plants, with significant differences found between groups [F (2, 737) = 4.49, p = .012]. Specifically, the mean score for Has AIS (M = 2.78, SD = 1.19) was significantly different from Don’t Know (M = 2.49, SD = 1.15) but not No AIS (M = 2.57, SD = 1.21). So, while those who do perceive AIS in their lake are more likely to agree that a control method is worth using even if it harms native plants, those who do not know are less likely to agree with this statement, suggesting a more cautious approach.

Recommendation: More outreach about the benefits of native plants, the uncertain individual lake impacts of invasive plants, and the uncertain long-term results of herbicide treatments could help close this gap. Some of this is already being done by the DNR.

A Chemical Herbicide is Worth Using Even if it Harms Native Plants



It is worth using a strategy that can control invasive plants even if it harms native plants



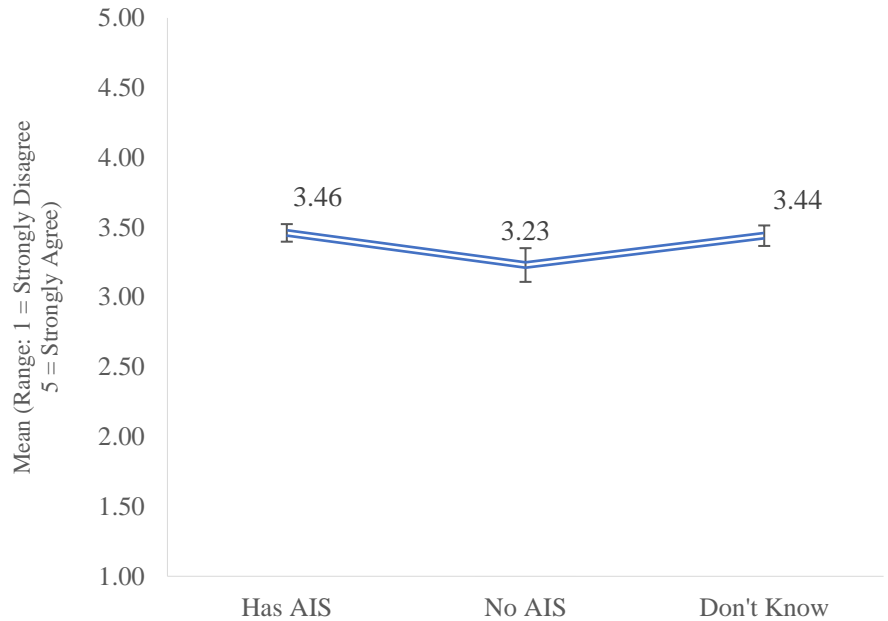
Attitudes towards AIS treatment

Several ANOVAs were conducted to examine the impact of perceived AIS status on whether respondents agreed with the statements that “it is best to treat invasive plants just in case”, “lakeshore property owners should be able to take management of AIS into their own hands” and “if a new invasive plant is found, it is best to wait and see”. There were no differences between groups in terms of agreement on treating AIS “just in case” [$F(2, 734) = 1.78, p = .170$], or whether respondents believed lakefront property managers should be able to take management of AIS into their own hands [$F(2, 733) = 2.739, p = .065$].

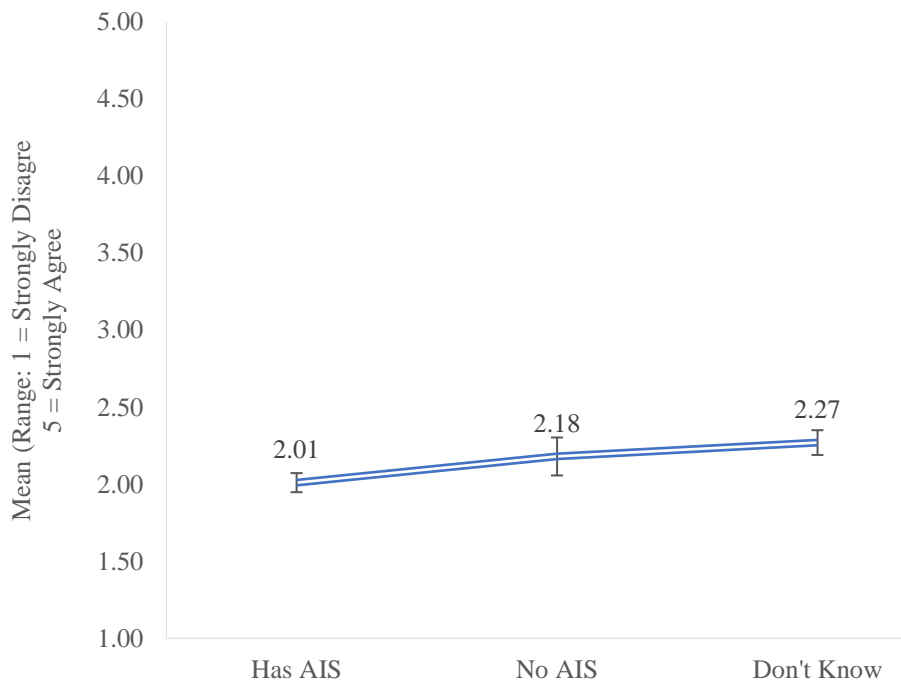
For the “wait and see” question, significant differences between groups were found [$F(2, 731) = 3.39, p = .034$]. Tukey’s HSD post-hoc test showed that the mean score for Has AIS ($M = 2.01, SD = 1.21$) was significantly different from Don’t Know ($M = 2.27, SD = 1.30$). No significant differences were found between Has AIS and No AIS, or between No AIS and Don’t Know. Those who perceive AIS in their lake are less likely to want to wait and see compared to those who do not know.

Recommendation: The perception that their lake had AIS could prompt homeowners to want some sort of observable action beyond simply observing the development of AIS. It may be the case that the AIS present in a particular lake has no or minimal adverse environmental impacts. In such cases, it might be prudent to monitor the development of the AIS to see if it becomes a problem before deciding on the best course of action. Individuals who discover AIS in their lake may want to consider adopting a monitoring approach to see if it becomes a problem before proceeding to more aggressive action.

It is best to treat invasive plants just in case



If a new invasive plant is found, it is best to wait and see



Higher levels of negative emotions for homeowners who perceive their lake has AIS.

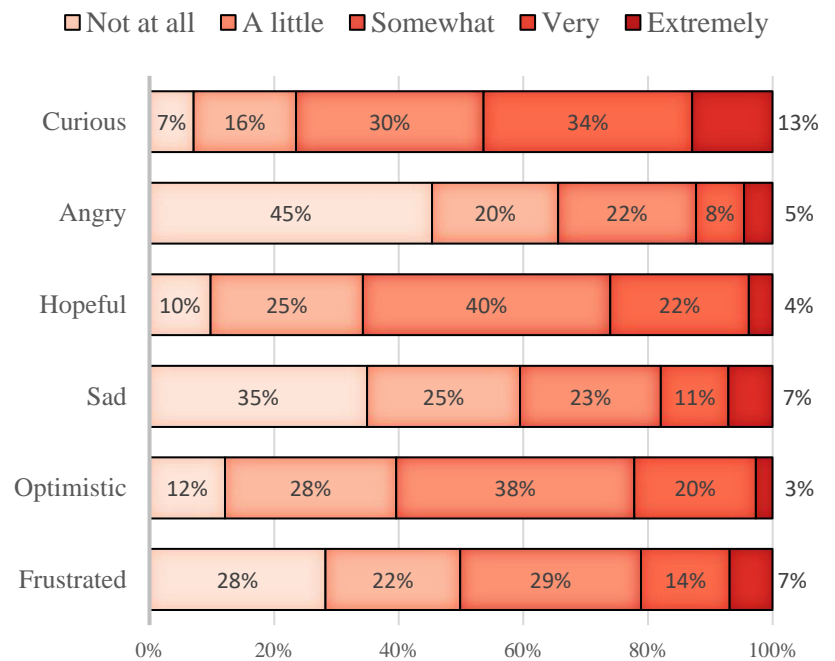
Significant differences were found in terms of negative emotions based on whether an individual perceived their lake as having AIS or not [$F(2, 719) = 28.191$]

Individuals who perceive AIS in their lake ($M = 7.67, SD = 3.35$) are statistically significantly more likely to report feeling negative emotions² (frustration, sadness, anger) when thinking about managing AIS on their lake than those who did not perceive AIS in their lake ($M = 5.64, SD = 2.86$).

In general, respondents reported feeling more curious, with 93% of respondents reporting feeling at least “a little” curious about managing AIS on their lake. This could potentially represent an opportunity for the DNR, as it may mean individuals are open to learning more about AIS and the impacts they have on the lake ecosystem.

Recommendation: These results suggest that individuals are curious about effective management strategies used to control the spread of AIS. An active and engaging program to raise awareness by the DNR and its partners could capitalize on feelings of curiosity about AIS while building lakeshore property owners’ sense of efficacy about the AIS management strategies available to them in order to reduce feelings of frustration and other negative emotions.

When thinking about managing AIS on your lake, how do you feel?



² Negative emotions in this analysis are represented by a variable that aggregates Frustration, Anger, and Sadness into a variable called Negative Affect.

Key Recommendations

1. As a common source of information for lakeshore property owners, education efforts should partner with lakeshore property associations. Additional efforts could focus on better positioning university staff and scientists (such as Extension) as unbiased sources of information on AIS management.
 - a. Greater effort could be made to inform lakeshore property owners about the array of management approaches available to them, as well as the types of treatments that have been used on their lake in the past.
2. Targeted communication should emphasize to lakeshore property owners:
 - a. Whether their lake has AIS and what management strategies have been used to manage AIS on their lake
 - b. Communicate with lakeshore property owners about the various approaches to managing AIS populations on their lakes and what effects these might have
 - c. Clarify the impact of excess chemical treatment on lake ecosystems
 - d. Emphasize monitoring as an active, appropriate, and effective management strategy for lakeshore property owners
 - e. The feelings of other lakeshore property owners about the risks and benefits of different AIS management actions to better establish social norms around their use
3. Lakeshore property owners have strong negative emotions about AIS so may make emotion-based decisions when faced with a new introduction of AIS on their lake. Efforts should be made to alleviate these negative emotions and capitalize on their sense of curiosity about AIS management options. This curiosity of property owners about AIS management can build a sense of efficacy about the different options they have available to manage AIS on their lake while making them feel fewer negative emotions.
4. The presence of AIS can impact the risk/benefit calculations of property owners, with lakeshore property owners that believe they have AIS being more open to management options that are perceived to be risky. Helping property owners think through these options before they have AIS can help them be more open to other potentially more appropriate management options if AIS are discovered in their lake.
5. Since monitoring invasive species can catch population changes early, allowing for adjustment to a treatment approach, emphasizing monitoring as an appropriate and effective management strategy for lakeshore property owners should therefore be included in communication strategies.

About this report

This study was conducted to gain insight into the beliefs and attitudes lakeshore property owners have about aquatic invasive species and their management. The survey was conducted in October 2020 and administered by the University of Wisconsin Survey Center.

A survey with an explanatory letter was sent by mail to a random sample of 1,200 individuals identified as owning a property on a lake in Wisconsin, followed by a reminder letter a week later. A \$1 incentive was included with this reminder letter. An additional reminder was sent approximately two weeks after the survey was initially distributed to respondents who had not yet participated.

Of the 1200 surveys mailed, 747 were returned completed. Of those who did not complete the survey, 31 were determined to be eligible, but did not respond, 407 did not respond and 15 were determined not to be eligible, either because the address to which the survey was mailed was a non-residence (e.g., a business or government office), or the respondent did not own a property on a Wisconsin lake. The response rate was calculated according to the American Association for Public Opinion Research (AAPOR) calculator version 4.1 and was found to be 63.04%,

This report was released in July 2021, and the study was conducted with funding from the Wisconsin Department of Natural Resources.

Primary limitations to the research include that 1) the data is based on self-reported information, not observation, and 2) we report significant associations, but cannot claim causality.

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