AQUATIC INVASIVE SPECIES PREVENTION

Wisconsin Boaters and Anglers Survey Report

This report was prepared by the University of Wisconsin–Madison Division of Extension, Natural Resources Institute

Extension
UNIVERSITY OF WISCONSIN-MADISON

November 2019

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Acknowledgements

The report was written by Evelyn Hammond, Evaluation Specialist, UW–Madison Division of Extension, Natural Resources Institute with valuable contributions from the following Natural Resources Institute colleagues:

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Executive summary

The Wisconsin Department of Natural Resources (DNR) collaborates with research groups and volunteers to promote behaviors that help prevent the spread of aquatic invasive species (AIS). In 2009 and 2013 registered boaters in Wisconsin were surveyed to better understand their opinions and behaviors in terms of AIS prevention. The longitudinal nature of this study enables stakeholders to determine any changes that may have occurred in opinions and behaviors of boaters and anglers over time.

In December 2018, the survey was mailed to registered boaters in Wisconsin. Of the 1,498 surveys mailed, 532 were returned with a response rate of 36%. Data collected were analyzed and compared to that from the 2013 and 2009 surveys.

Of the 532 respondents, 91% were male, 8% were female and 1% preferred not the answer the question. The majority were white and almost half were 61 years or older. Most respondents had at least some college education. Over half (67%) of respondents both boated and fished and about half of respondents solely used their boats for fishing.

Mean levels of both awareness with AIS and familiarity with spread prevention steps were high among respondents, a trend that reflects the high rate of reported compliance to AIS prevention steps. Also, the majority of respondents acknowledged that AIS threatened the quality of fishing and boating, negatively affected lakes and rivers, and posed problems to boaters and anglers.

The majority (87%) of respondents indicated that they were capable of performing AIS prevention steps. About 97% of respondents reported that it was important to prevent the spread of AIS, and more than half (59%) reported that following the steps was likely to slow the spread of AIS.

A large percentage of respondents (84%) reported that they are *extremely* or *very likely* to follow all the AIS steps. This supports the finding that 66% needed little to no persuasion to follow AIS prevention steps.

When asked to identify the sources from which they had seen or heard about AIS-related information, 47% respondents chose S*igns at boat landings*. Other sources included *lake associations* (24%) and from a *person stationed at a boat landing* (15%).

About 75% preferred obtaining information at a *boat launch*. Other preferred sources included *TV* (33%) and *lake associations* (27%).

Respondents were categorized into two groups: transient users and non-transient water body users. Transient users used their boat on more than one water body in the last year. Non-transient

users used their boat on only one water body. Transient users were further categorized into *high* or *low* transience . High transience users used their boat on more than one water body within a 5-day period. About half (53%) of respondents were transient and 47% were non-transient. Of those classified as transient, 57% were classified as *low transience*, 39% as *high transience* and 4% didn't remember if they had used their boat on more than one body of water within a 5-day period.

A majority (68%) of respondents boated recreationally or fished in counties with 25 or more public boat landings, and 70% boated or fished in the Great Lakes Basin (GLB).

Although, *awareness of AIS, familiarity with AIS steps* and *compliance* have increased since 2013, *knowledge about AIS laws* has decreased.

While high transience levels among boaters and anglers decreased from 47% (2013) to 39% (2018), low transience levels increased from 53% (2013) to 57% (2018). Also, high transient and non-transient users are more familiar with the AIS prevention steps than they were in 2013. The number of high transience waterbody users in counties with 25 or more public boat landings and in the Great Lakes Basin has increased since 2013.

Signs at boat landings are an excellent source of information for waterbody users and their use are highly recommended. Furthermore, based on respondents' preferences, information should be made available on boat launches. Most importantly, AIS spread prevention outreach activities should be targeted at anglers since they comprise the majority of transient users.

Key findings

At least 50% of respondents showed *an extremely large* or *very large amount* of awareness of, knowledge about and familiarity with AIS.

Respondents felt AIS threatened the quality of fishing, negatively affected lakes and rivers, and posed problems for boaters and anglers.

Overall, reported compliance to AIS prevention steps is high although mean compliance to water-related behaviors was higher than that for other behaviors.

The AIS prevention step with the lowest reported level of compliance was: *Put your catch on ice when you leave water body.*

The majority (87%) of respondents indicated they were capable of performing the AIS prevention steps

The principal source from which respondents had seen AIS-related information was *Signs at boat landings.*

A little over half (53%) of respondents were transient (i.e. low and high transience combined) users of water bodies.

The majority (68%) of respondents boated and fished in counties with more than 24 public boat launches; and about 70% of respondents boated or fished in the Great Lakes Basin (GLB).

Significant differences between 2013 and 2018 survey data

Increased changes

- Awareness of AIS and Familiarity with AIS steps have increased since 2013.
- The number of transient (i.e. low and high transience combined) waterbody users has increased since 2013.
- A statistically significant increase in awareness of AIS was observed among low-transient users.
- Non-transient users were more knowledgeable about AIS in 2018 than they were in 2013.
- High transience and non-transient users are more familiar with the AIS prevention steps than they were in 2013.
- The number of high transience water body users in counties with 25 or more public boat landings and in the Great Lakes Basin has increased since 2013.
- Low transience levels increased from 53% (2013) to 57% (2018).

Decreased changes

- High transience levels decreased from 47% (2013) to 39% (2018).
- Knowledge about AIS laws has decreased since 2013.
- Three AIS spread prevention steps recorded a decrease in compliance when compared to 2009 and 2013 data. They were:
    - Put your catch on ice when you leave a water body recorded a decrease in compliance when compared to 2009 and 2013 data.
    - Add lake or river water to your minnow container and
    - Transport your catch away from a waterbody using a livewell, bucket or other container filled with water
- Respondents of the 2018 survey reported lower scores in terms of social norms than in the 2013 survey.

Recommendations

- AIS campaigns should emphasize the importance of these AIS prevention steps and their contribution to AIS spread prevention. The steps are:
  - Transport your catch away from a waterbody using a livewell, bucket or other container filled with water,
  - Add lake or river water to your minnow container and
  - Put your catch on ice when you leave a water body
- Increase water body users' familiarity with laws and regulations regarding the following behaviors:
  - Use the same boat on more than one body of water without power washing or other disinfection, such as drying for 5 days (Legal, but 44% indicated it was not legal)
  - Keep fish caught in waters known to contain VHS fish disease (Legal, but 47% indicated they didn't know)
  - Leave a boat landing with your catch in water (Not legal, but 69% indicated it was legal)
- Intensify outreach efforts in the Central and Winnebago regions since they have high percentages of transient users which has a higher potential to increase AIS spread.
- Anglers comprise the majority of transient users, therefore AIS spread prevention outreach activities should be targeted at them

Introduction

The Wisconsin Department of Natural Resources (DNR) collaborates with research groups and volunteers to promote behaviors that help prevent the spread of aquatic invasive species (AIS). In 2009 and 2013 registered boaters in Wisconsin were surveyed to better understand their opinions and behaviors in terms of AIS prevention. The longitudinal nature of this study enables stakeholders to determine any changes that may have occurred in opinions and behaviors of boaters and anglers over time.

In November 2018, a postcard was mailed to a random sample of registered boaters in Wisconsin to inform them of the survey. In December, the survey was mailed. A second copy of the survey was mailed in February 2019 to residents from whom responses had not been received. Of the 1,498 surveys mailed, 532 were returned with a response rate of 36%.

The 2013 report created a framework for multivariate analysis of the 2018 survey data. Data were analyzed using IBM SPSS Statistics 26. Descriptive analysis of the data was done and used as a guide for further analysis. When calculating the mean values, responses like *Not applicable* and *Don't know* were excluded. Mean values were compared based on being parametric or non-parametric.

For in-depth data analysis and a comprehensive report structure, responses to questions were grouped under the following themes:

1. Demographics of respondents
2. Boating and fishing experiences
3. Awareness, familiarity and knowledge
4. Knowledge of AIS laws and regulations
5. Opinions of AIS
6. Compliance to AIS prevention steps
7. Beliefs about AIS prevention steps
8. Sources of AIS-related information
9. Transience levels of waterbody users

Several statistical tests were run to investigate the differences between categories. The Kruskal-Wallis Test was used to compare variables that were not normally distributed such as *Compliance to AIS prevention steps* and *Opinions of AIS*. The Dunn's Multiple Comparison Test was used to investigate the statistically significant differences between each pair of groups where the p-value was smaller than 0.05 according to the Kruskal-Wallis Test. One-way ANOVA was used to test the difference across groups for variables with a normal distribution such as *awareness, familiarity*

and *knowledge*. When there was a significant difference obtained after comparing means, inter-group differences were tested by using appropriate post-hoc tests such as Tukey HSD and Game Howell. These tests were appropriate for region-based data analysis, the results of which are shown in Appendices B1–B11. Respondents in the regions were grouped into "Region" and "Not-Region" (e.g. "Central" and "Not-Central").

A One-Sample T-Test was used to compare 2013 data with 2018 by using the 2013 score as the test value. Variables without a normal distribution could not be compared across years and the statistical difference could not be calculated.

This report covers the themes listed above, respondents' comments on their experiences with AIS, comparison of 2013 and 2018 (and in some cases 2009) data and Appendices.

Demographics of respondents

Respondents were:

532 out of 1498 responses

Response rate = 36%

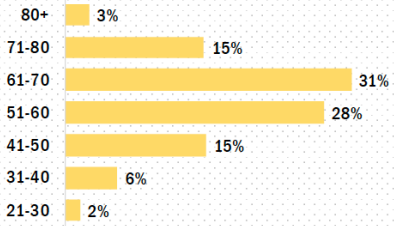
Gender

466 (91%) males

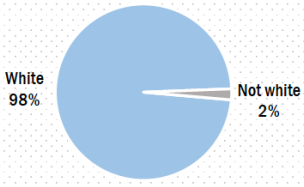
38 (7%) females

8 (2%) prefer not to answer/other

Age



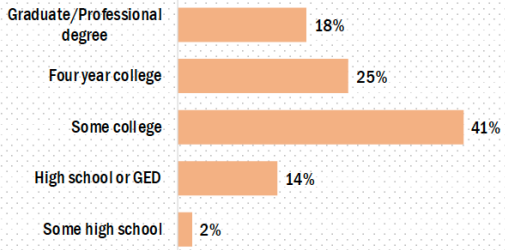
Race/Ethnicity



Top 5 counties where respondents reside

Waukesha - 8%
Dane - 4%
Wood – 4%
Milwaukee – 4%
Marathon – 3%
Outside WI – 7%

Highest level of education



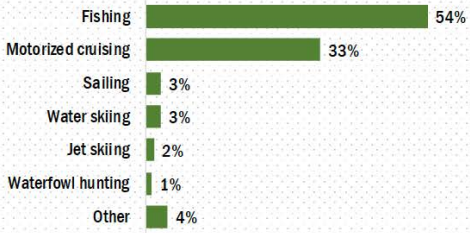
Boating and fishing experiences

Does your household own more than 1 boat registered in the state of WI?

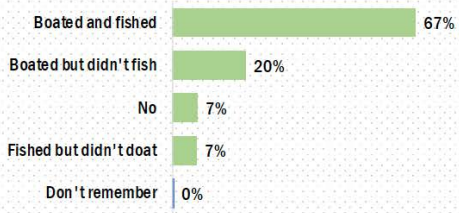
275 (56%) Yes

217 (44%) No

What was the primary use of your boat in 2018? Check only one



Did you do any recreational boating and fishing in the state of WI in 2018?



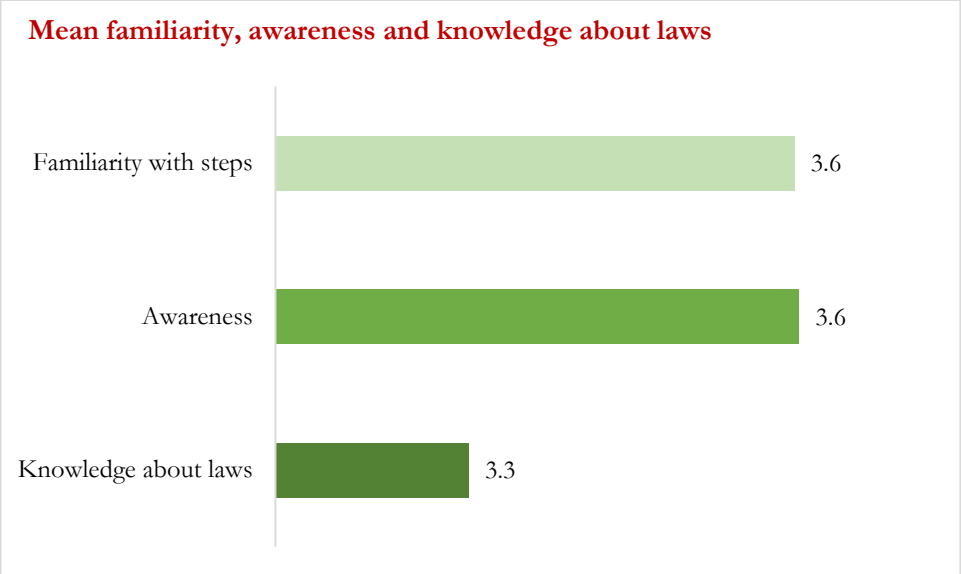
Top 5 counties for recreational fishing/boating

Vilas – 8%
Oneida – 6%
Waukesha – 5%
Winnebago – 4%
Adams – 3%

Awareness, familiarity and knowledge of AIS-related issues

The survey sought to investigate respondents' familiarity with and awareness of AIS-related issues. Respondents answered questions that gauged how much they had heard, read, or seen about AIS (awareness), how much they knew about laws and regulations related to AIS (knowledge) and their familiarity with AIS spread prevention steps (familiarity with steps). At least 50% of respondents showed *an extremely large amount* or *very large amount* of awareness, knowledge and familiarity.

Responses were scored on a scale of 1 to 5, where 1 = not at all and 5 = extreme. Mean responses showed high levels of awareness (3.6), familiarity with steps (3.6) and knowledge about AIS laws (3.3). Respondents' high levels of awareness and familiarity with steps validated the high compliance reported.



Knowledge of AIS laws and regulations

To determine how conversant respondents were with AIS-related laws and regulations, the survey asked respondents to indicate which behaviors they believed were *legal, not legal or don't know*. Out of nine behaviors listed, three were legal and six were not.

Of the three legal behaviors, a majority (71%) of respondents chose the correct response for *use leftover minnows on the same body of water*. Very few respondents chose the correct responses for the two remaining behaviors, *Use the same boat on more than one body of water without power washing or other*

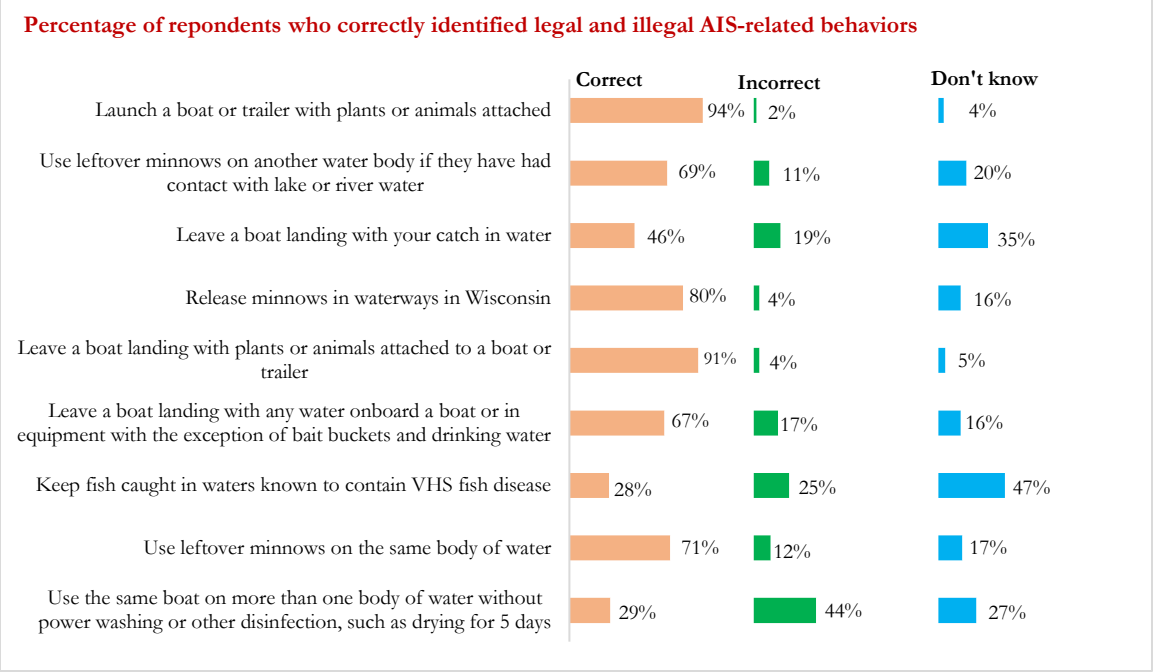
disinfection, such as drying for 5 days (29%) and *Keep fish caught in waters known to contain VHS fish disease* (28%).

Almost half (47%) of respondents reported they did not know if it was legal to keep fish caught in waters known to contain VHS fish disease.

Respondents chose correct responses for the illegal behaviors. However, about 35% did not know if *leave a boat landing with your catch in water* was legal or not.

Outreach efforts should be focused on behaviors for which up to half of respondents chose the incorrect response. They are:

1. *Use the same boat on more than one body of water without power washing or other disinfection, such as drying for 5 days*
2. *Keep fish caught in waters known to contain VHS fish disease* and
3. *Leave a boat landing with your catch in water*



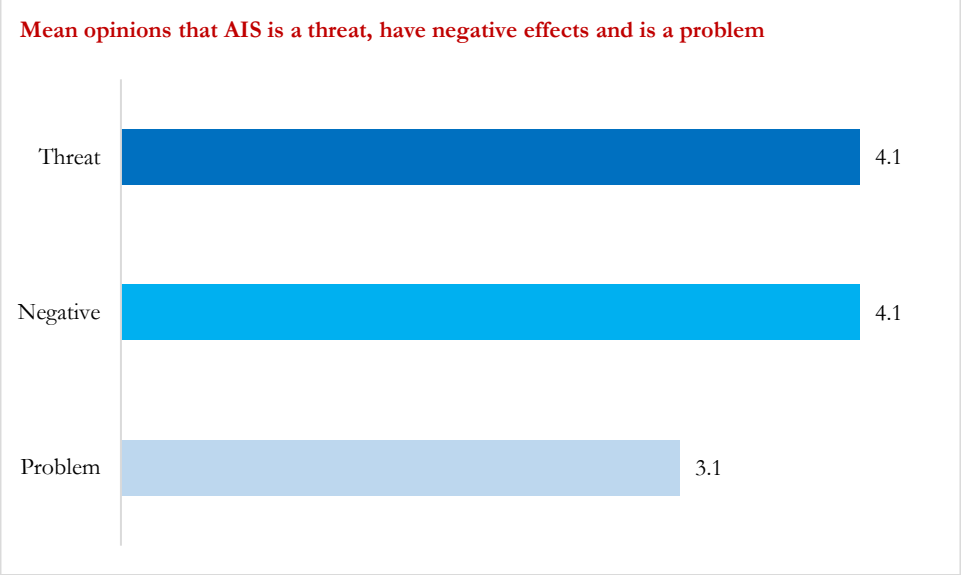
Opinions of AIS

Respondents' opinions of AIS were determined from three questions: How much of a threat AIS posed to quality of fishing, how much of a negative effect AIS can have on lakes and rivers, and to what extent AIS was a problem to boaters and anglers.

A majority of respondents acknowledged that AIS was a threat to the quality of fishing (76%), negatively affected lakes and rivers (72%) and posed problems to boaters and anglers (72%). Very few respondents saw AIS as a "small threat" (2%), "not at all negative" (1%), or "not a problem" (4%).

Responses were scored on a scale of 1 to 5, where 1 = none and 5 = extreme. Mean responses were observed to be high and suggested that respondents thought AIS were a threat to quality of fishing (4.1), had a negative effect on lakes and rivers (4.1), and were a problem to boaters and anglers (3.1).

Responses were scored on a scale of 1 to 5, where 1 = none and 5 = extreme. Mean responses were observed to be high and suggested that respondents felt AIS threatened the quality of fishing (4.1), had a negative effect on lakes and rivers (4.1), and were a problem for boaters and anglers (3.1).



Compliance to AIS prevention steps

In this study, compliance was defined as adherence to AIS spread prevention steps. Questions related to compliance were categorized under two themes: water-related and other behaviors. Water-related behaviors included draining water from the boat, motor, livewell, or containers before leaving the landing or waterbody. Other behaviors included, putting your catch on ice when you leave a water body, adding lake or river water to your minnow container etc.

A majority of respondents reported being compliant with several water-related behaviors, such as draining their boat (84%), removing plants and animals (80%), draining the livewell (79%), draining the motor (66%), and draining containers (61%). While 69% never use leftover live bait minnows on a different water body, very few (2%) always do. Compliance with these steps was high with less than 15% of respondents reporting that they are *often/sometimes* non-compliant.

In the case of compliance with other behaviors, respondents always remove mud from anchor (84%) and put catch on ice (23%). However, they never transport catch away from waterbody (57%), add lake/river water minnows (42%) or put ice on catch (34%).

Mean compliance was calculated using a scale of 1 to 5, where 1 means *never* and 5 means *always*.

Compliance levels with most AIS spread prevention steps were high	
Behavior	**Mean**
Use leftover live bait minnows on a different body of water	1.6 (4.5) *
Drain water from the boat before leaving the landing	4.6
Remove plants and animals from the boat and equipment before leaving the landing	4.6
Transport your catch away from a waterbody using a livewell, bucket or other container filled with water	2.1 (4.0) *
Drain water from livewell before leaving the landing	4.5
Drain water from a bucket or other container holding your daily catch before leaving the waterbody	4.1
Add lake or river water to your minnow container	2.3 (3.7) *
Drain water from motor before leaving the landing	4.0
Put your catch on ice when you leave a water body	2.8
Remove mud from your anchor	4.7

*Depending on the wording of the question, either 1 or 5 might indicate better compliance, so some items show the reverse coded score in parentheses for reference

Although reported compliance is high, *put your catch on ice when you leave water body* recorded the lowest compliance. Overall, mean compliance to water-related behaviors (4.4) was higher than that for other behaviors (3.5).

Do awareness, knowledge and familiarity with AIS influence compliance?

The survey sought to investigate whether respondents' awareness, knowledge and familiarity influenced their compliance with AIS prevention steps. To achieve this, responses for awareness, familiarity and knowledge were grouped into *high (very and extremely)* and *low (not at all, small and moderate)* to enable easier analysis of data. A cross tabulation of responses in the *high* group and compliance were run.

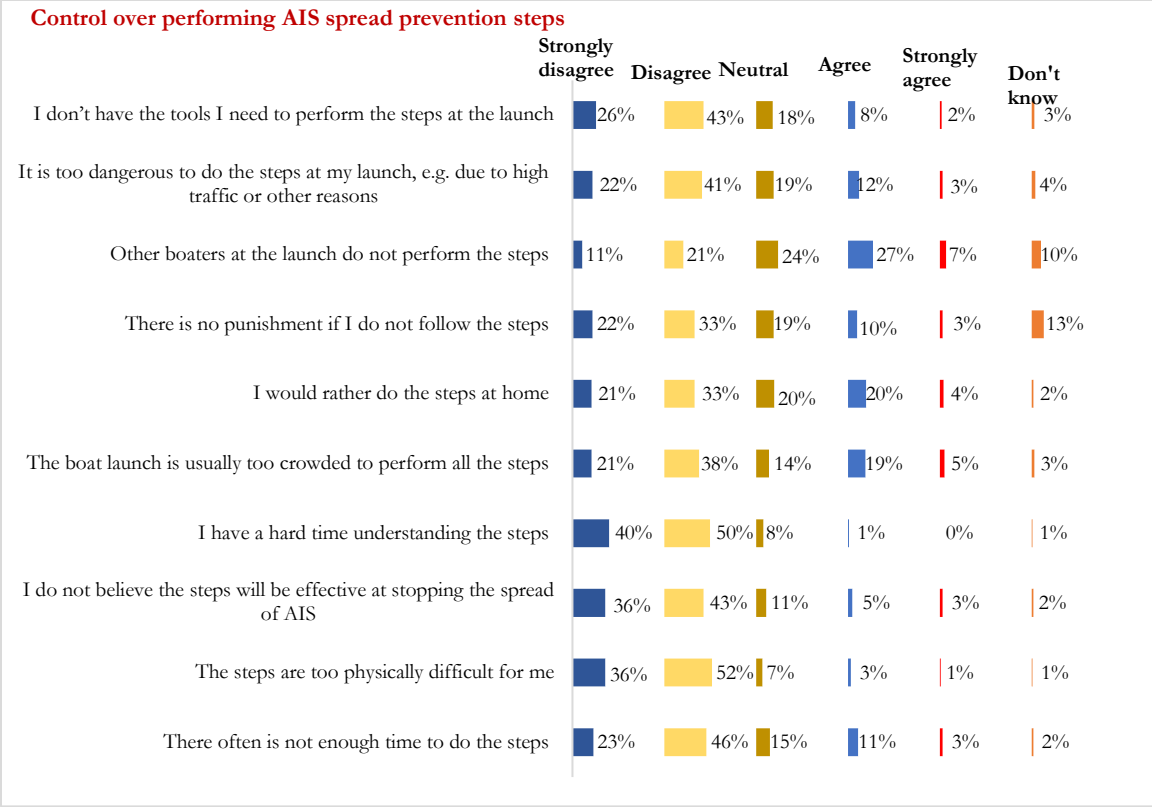
About 80% of respondents in the *high* group were compliant with most (six) of the steps. Lower responses (less than 42%) were recorded for the remaining four steps since they have a negative impact on AIS spread control. The data suggest compliance is high among respondents who are highly aware of, knowledgeable about and familiar with AIS issues, which validates the relationship between awareness of, familiarity with and knowledge about AIS with compliance to AIS steps.

Beliefs about AIS prevention steps

Questions to assess respondents' beliefs about AIS spread prevention steps were grouped under three themes. These were: *capable of performing steps, control over performing steps, social norms (others approve and/or succeed at steps)*.

A majority of respondents (87%) indicated they were capable of performing AIS prevention steps, while 11% said they were somewhat capable, and very few (3%) indicated they were not capable. The high score for capability validates the high compliance observed.

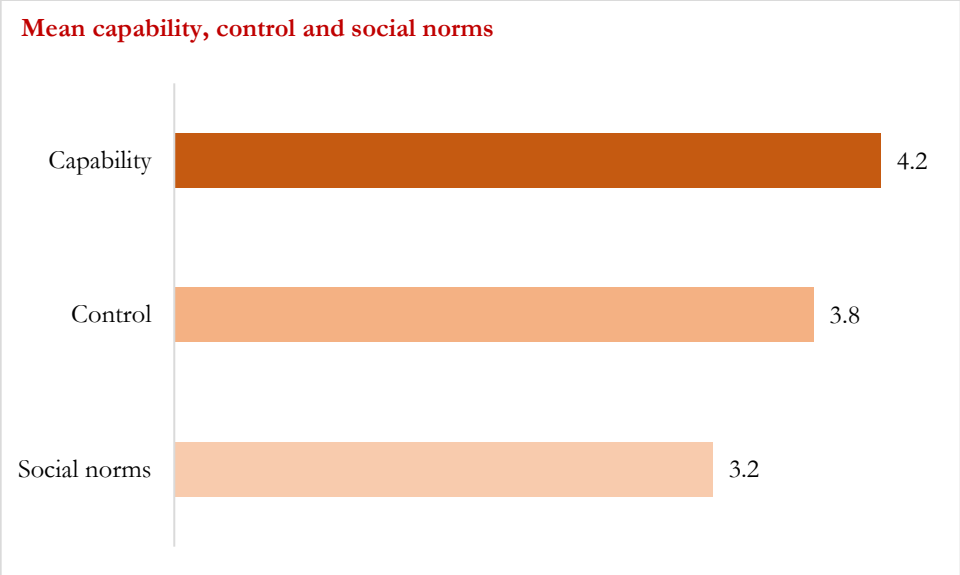
Statements related to *control over performing steps* were possible reasons respondents might not have followed AIS spread prevention steps. They included lack of time, lack of tools to perform steps, difficulty of steps etc. Response options assessing respondents' *control over performing steps* ranged from *strongly disagree* to *strongly agree*. The distribution of responses is shown below:



Respondents demonstrated that they had very good control over the steps. This is depicted by the high percentages recorded for the items they disagreed with. For instance, more than half disagreed that *the steps are too physically difficult* (88%) or that they *have a hard time understanding the steps* (90%). Some (27%) agreed, however, that *other boaters at the launch do not perform the steps,* which could be a disincentive for boaters and anglers who do. A majority (97%) of respondents indicated that it was important to prevent the spread of AIS, and more than half (59%) reported that following the steps was likely to slow the spread of AIS.

To assess the impact of social norms on beliefs of respondents, the survey asked seven questions related social pressure to perform AIS prevention steps. The questions included persuasion to follow steps, success at steps and approval from others. Most (84%) respondents reported that they are *extremely* or *very likely* to follow all the AIS steps. This supports the observation that 66% said they needed little to no persuasion to follow the steps. These observations notwithstanding, 54% of respondents think other boaters and anglers have been *somewhat* successful at following the steps. In terms of approval from others, most respondents indicated that their friends, family and other boaters and anglers would approve if they followed the AIS steps.

The responses were scored on a scale of 1 to 5, where 1 = none and 5 = extremely. Mean responses for capability of performing the steps was the highest (4.2). Mean responses for control and social norms were 3.8 and 3.2 respectively. The data suggest that if waterbody users are capable of following the steps then they would be willing to do so voluntarily irrespective of social influence since they have control over performing the steps.



Sources of AIS-related information

In order to influence behavior and prevent the spread of AIS, it is crucial to make information easily accessible. To this end, the survey asked respondents to indicate from which sources they had seen or heard AIS-related information and their preference for receiving information.

Sources from where respondents had seen or heard about AIS information were rated on a scale of 1 (*not at all)* to 5 *(a lot).* As shown, *signs at boat landings* were the principal source from which respondents had seen AIS-related information.

Source of AIS-related information	Mean
Signs at boat landings	4.2
Lake associations	3.0
A person stationed at a boat landing	2.6
Fishing clubs or organizations	2.4
TV news	2.3
TV ads or public service announcements	2.3
Other anglers	2.2
Newspaper	2.1
Other boaters	2.1
Internet	2.0
Radio ads or PSA	1.9
Bait shop staff	1.9
Radio news	1.7

About 47% respondents had seen these signs *a lot*. Other sources from which respondents had received *a lot* of information was from *lake associations* (24%), *person at a boat launch* (15%) and *fishing clubs/organizations* (10%).

Respondents also reported that sources from which they had not received any information i.e. *not at all* were radio news shows (51%), bait shop owners (45%), radio advertisements (43%), internet (41%), newspapers (38%), and other boaters (34%) and anglers (32%). The data emphasize that outreach efforts should be focused on making signs at boat landings visible so they cannot be missed by water body users.

Effect of information from lake associations on users' knowledge of AIS issues

To throw more light on the importance of information obtained from Lake Associations, we ran a cross tabulation of the variables. Two groups for knowledge were created – 'highly knowledgeable' (very and extremely knowledgeable) and 'less knowledgeable' (not at all knowledgeable, not too knowledgeable and moderately knowledgeable). The extent of information was also grouped into *a lot* (quite a bit and a lot) and *a little bit* (not at all, a little bit and some).

It was observed that whereas majority (61%) of 'highly knowledgeable' respondents obtained *a lot* of information from lake associations, few (35%) of 'less knowledgeable' respondents obtained *a little bit* of information from lake associations.

Preferred sources of AIS information

When respondents were asked to choose at least two preferred AIS information sources, the majority (75%) preferred obtaining information at a boat launch. Other sources included TV (33%), lake associations (27%) and bait shops (27%).

Transience levels of waterbody users

Respondents were categorized into two groups based on the number of water bodies they used their boats on. Those who used their boats on more than one body of water were considered *transient,* and those who used their boat on a single waterbody year-round were considered *non-transient*. Transient users were further categorized into *high* or *low* transience. A high transient user boats on more than one body of water within a 5-day period, while a low transient user boats on more than one body of water but not within a 5-day period.

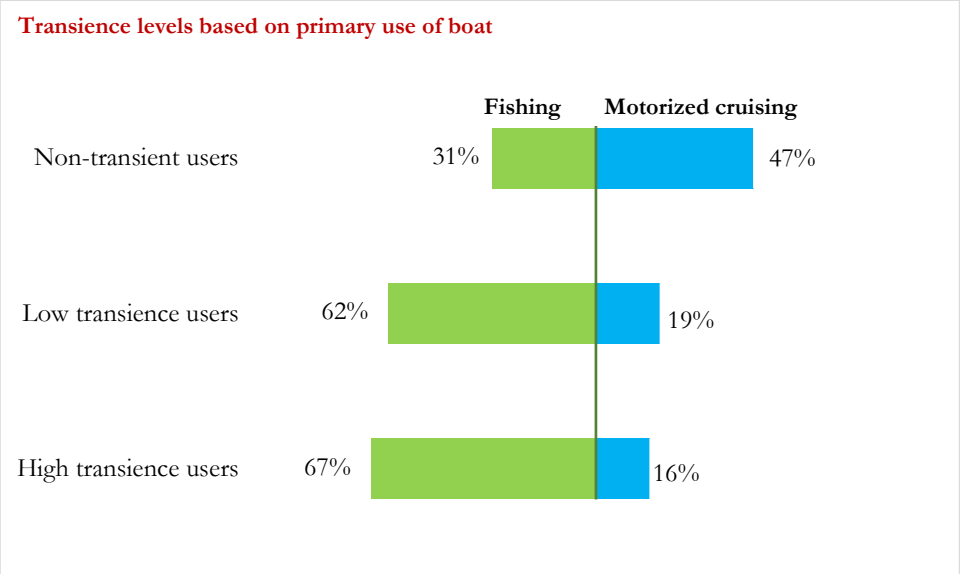
Since transience can impact the spread of AIS, data were analyzed based on transience levels to provide relevant information and suitable recommendations for outreach activities. In this section data which were significantly different among the transient groups are discussed.

Based on the definitions, about half (53%) of respondents were transient and 47% were non-transient. Among transient respondents, 57% were classified as low transient users and 39% as high transient users. About 4% did not remember if they had used their boat in more than one body of water within a 5-day period.

Use of boat by transience level

Considering the potential impact of boat use and transience levels on AIS spread, the survey asked respondents to indicate the primary use of their boats. Respondents primarily used their boats for fishing (54%) and motorized cruising (34%), but they also engaged in water skiing (3%), sailing (3%), jet skiing (2%) and waterfowl hunting (1%). Other uses included canoeing, kayaking, tubing and wakeboarding.

A cross tabulation of respondents' transience levels and the two most popular boat uses: fishing and motorized cruising was run. Whereas fishing was the most popular activity for the high transience category, motorized cruising was more common among non-transient users. The data suggest that AIS spread prevention outreach activities should target anglers since they comprise the majority of transient users.



Awareness, familiarity and knowledge of AIS by transience level

In terms of awareness, high transient respondents reported a statistically higher level of awareness than other waterbody users. Moreover, significant differences were determined in familiarity with AIS spread prevention steps between the three categories of waterbody users. In contrast, no significant difference was recorded between the categories for knowledge about AIS-related laws and regulations.

Compliance to AIS steps across transience level

The relationship between transience and compliance with AIS prevention steps was examined. The data suggested that compliance varied across transience level although not for all prevention steps. The behaviors for which significant differences were recorded are:

1. High transient users *remove plants and animals from their boats and equipment* more frequently than non-transient users before leaving the landing.
2. Transient users *drain water from the boat before leaving the landing* more frequently than non-transient users.
3. Transient *users drain water from the motor* more frequently than non-transient users before leaving the landing.
4. Transient users *put their catch on ice when they leave a water body* more frequently than non-transient users.
5. High transient users are *less likely to use live bait minnows* on a different body of water than non-transient users.

It is important to note that no significant difference was found when overall compliance scores were compared by groups.

Sources of AIS-related information by transience level

Using Dunn's non-parametric comparison, we observed significant differences between transience levels and how users obtained AIS-related information. Significant differences were observed between the three transience levels for *signs at boat landings,* with the high transience level having a higher mean than the low transience and non-transient levels. Also, significant differences were observed between high transience and non-transient for information *in a newspaper;* between low transience and non-transient for information from *lake associations* and between high transience and non-transient for information from *other anglers.* The findings also suggested that respondents in the high transience category get most of their information from *signs at boat landings*.

Transience levels across regions

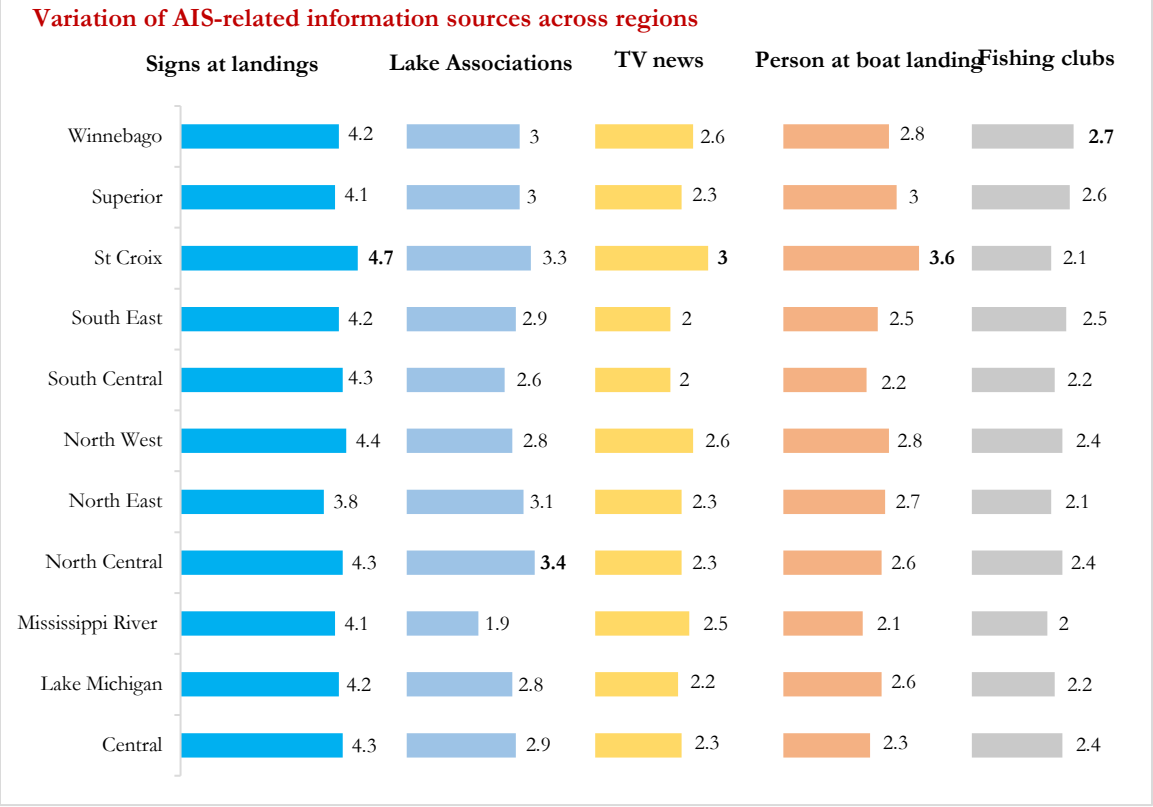
The Department of Natural Resources (DNR) has divided Wisconsin into 11 AIS management regions (see Appendix A). Data of respondents who fished and boated were compared to data of those who did not boat or fish. Also, data from respondents who used waterbodies in

multiple regions were counted in all those regions. This led to over representation but there was no other way of otherwise analyzing the data. It is important to note that because boaters and fishers who visit waterbodies in multiple regions may pose a higher risk of spreading AIS, it is crucial we collect data on their experiences with AIS prevention."

The regions with the high percentages of transient users (i.e. low and high combined) were Central (72%), Winnebago (70%) and Mississippi River (64%). The percentage of non-transient users was highest in South East region (51%).

Sources of AIS-related information across regions

To investigate how respondents across the regions obtained AIS-related information, we performed a cross tabulation of the variables and focused on the top 5 sources of information. As already mentioned, majority of respondents obtained information from *signs at boat landings*. Respondents who boated and fished in St Croix (4.7) obtained more information from *signs at boat landings* than the other regions. Obtaining information from *Lake Associations* was not popular in the Mississippi River (1.9) region.



Transience levels based on availability of public boat landings

Counties in Wisconsin were grouped into two categories based on the number of public boat landings available. Using an average of 25 landings, counties with 25 or more landings were designated *high* and those with 24 or fewer landings were designated *low* as shown in Appendix C.

The majority (68%) of respondents boated and fished in counties in the *high* category. This could be attributed to easy access to boat landings. About three-quarters (75%) of high transient users, 68% of low transient users and 62% of non-transient users boated or fished in counties in the *high* category.

Transience levels in the Great Lakes Basin

Counties in Wisconsin were further categorized based on their location inside or outside the Great Lakes Basin (GLB) (see Appendix D). This enabled us to compare boating and fishing activities of respondents in the two areas.

We observed that 70% of respondents boated or fished in the GLB. About 75% of high-transience users, 78% of low transience users, and 64% of the non-transient users boated or fished in the GLB.

Respondent comments

In all, forty-seven comments were recorded. Comments depicted respondents' experiences with AIS. Some of the comments are grouped under relevant themes below:

Compliance

Our boat is put in water in the spring and remains in that body of water all summer, is removed in the fall and boat and motor is professionally cleaned by marina, so most of the survey does not apply to our watercraft. We answered questions as accurately as possible.

Have pontoon boat that is launched once per year at one lake. Concerned about the spread of variation species. If I used other lakes would be extremely careful about cleaning boat before transfer.

I have transported my catch home in a filled livewell in hot weather but always drain all rinse at home. My boat always dries for days before I go out again but washing the hull, I don't do. I do remove all weeds.

Opinions of AIS

While I agree that AIS poses a threat, I wonder how much of a threat in *[sic]* truly is in the long term. I fish Lake Michigan and there were several years where it really negatively affected the ecosystem. But the ecosystem had adapted, and the water is very clean and the fish that are caught are bigger and healthier than in the past.

I feel birds (geese, pelicans, herons) are more responsible for moving AIS in Wisconsin than boaters are. Also, I believe boaters vs fisherman are more responsible for moving AIS. Fisherman are more informed than skiers/rec boaters.

Critiques

Not all boat launch areas have water available to clean trailer and boat.

The biggest reason not to do the steps is the quality of most launches.

Respondents' recommendations for proper AIS management

I feel the landing in most places in WI if better equipped (cleaning stations) and regular spot checking by the DNR it would greatly help eliminate the problem or at least keep it better under control.

Cramped spare and poorly lit launches (or not lit at all) have a large impact on the ease of checking the boats at the launch. Personally, I come off lakes after sunset, when everyone is coming off. On suburban lakes, if you take too long in the launch lot, you are making others wait. As a courtesy, I do my checking at home or in a restaurant parking lot - where I can actually see and get out of the way of other fishermen. I think well-lit spacious launches (not always possible) would go a long way toward preventing transfer of AIS.

I don't know what the state (or even country) *[sic]* doing about Zebra mussels. I pulled out all of our boat lifts, pier, I was amazed at all the zebra mussels that were attached to them. Too bad someone doesn't come up some type of spray bottle type of solution that boaters could spray onto their boats, lifts and pier systems beforehand that would act as a surfactant that would help reduce or prevent AIS attaching to the surface

Make an effort to inform (and persuade?) that AIS require effort, cost, and actions to protect water use enjoyment. Agencies need support to provide services for the user's benefits and protect the values water users want to enjoy. Citizens action is a first line action, but agencies need the resources to give citizens the knowledge and abilities to know what they can do. The costs are ultimately personal. Explore mechanisms to better fund AIS

prevention to encourage and emphasize it takes personal action to protect personal enjoyment and that every individual can do their part. Thanks for the efforts.

More landing water hoses wash down-section, better signs, or educate the public especially for new and non-resident users. Help educate all interested free workshops at DNR facilities etc. many do not read informative pamphlets or instructions.

I work for the DNR in fisheries. I would like to see more strict rules and laws for AIS. Keep DNR staff up to date on AIS. The AIS folks I see at boat landings do a great job. More boat wash stations at lakes with spinney water flats, VHS, MILGOIL, etc. Keep lake associations up to date on AIS-especially since some associations are staffing landings. Keep boat landing signage up to data (yearly sign checks). Create DNR (LTE) positions to monitor more AIS or staff at high profile landings, or boat wash stations. Increase the fines for AIS violations.

Make sure all launch area and dock/marinas have signs posted and inspectors CK for compliance on random inspections

Lake residents should be prevented from fertilizing launch eye *[sic]* to the shoreline. Also, skies and power boat users should not be able to speed within 500 feet of all shoreline and especially near beaches where children are swimming.

Criticism about survey

This survey is slanted toward visitors and is different for residents whose watercraft never go to other lakes and may be only annually leave the lake they are on.

Comments on Q6 of section 4 - why this question? I almost threw this survey out because of this question. Who cares if you are liberal or conservative on AIS?

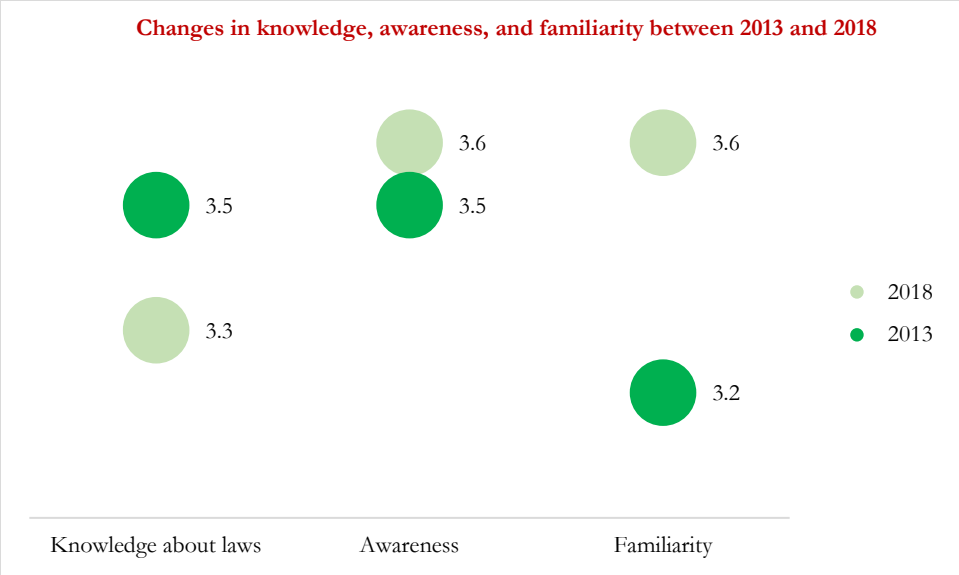
I feel you would have more questionnaires returned if it was not as long. But I am glad to fill it out.

Comparison of 2013 and 2018 survey data

As already indicated, this survey has been conducted for 2009, 2013 and 2018. In this section, we compared data obtained from the 2013 survey with those from 2018. Mean responses to key questions across regions for both years are shown in Appendix B (Tables B1 – B11). Those for which significant differences were observed are bolded. Comparisons for other specific data are discussed below. When available, comparisons with data from 2009 are also highlighted.

Level of AIS awareness, familiarity and knowledge over the years

On the whole, boaters and anglers reported high levels of awareness, familiarity and knowledge about AIS. Of the three items, *familiarity with steps* showed the highest increase from 3.2 (in 2013) to 3.6 (in 2018). However, *knowledge about laws*, decreased from 3.5 (in 2013) to 3.3 (in 2018). All three differences were statistically significant ($p < 0.05$)



Similar to data from the 2013 survey, the majority (97%) of respondents indicated that it was important to prevent the spread of AIS. More than half (59%) reported that following the steps was likely to slow the spread of AIS.

Knowledge of AIS-related laws and regulations

According to the 2013 report, since 2009 the percentage of respondents who correctly identified which behaviors were *legal* or *not legal* increased. The 2013 report further indicated that the percentage of respondents selecting *Don't know* for some questions also increased between 2009 and 2013. Three behaviors for which respondents selected the incorrect or *Don't know* response in 2018 were the same ones reported in the 2013 report. They were:

1. *Use the same boat on more than one body of water without power washing or other disinfection, such as drying for 5 days*
2. *Keep fish caught in waters known to contain VHS fish disease*
3. *Leave a boat landing with your catch in water*

Compliance

Mean reported compliance to AIS prevention steps listed from highest to lowest for survey years 2009, 2013 and 2018 are as shown below. Overall, reported compliance has increased since 2009. Data obtained for the 2018 survey were slightly higher but not significantly different from those for 2013. It is important to note that, three of the steps - *Transport your catch away from a waterbody using a livewell, bucket or other container filled with water, add lake or river water to your minnow container, and put your catch on ice when you leave a water body* recorded decreases in compliance when compared to 2009 and 2013 data

Compliance to most AIS spread prevention steps was higher in 2018		
Behavior	Survey year	Mean
Use leftover live bait minnows on a different body of water	2018	1.55 (4.45)*
	2013	1.50 (4.50)*
	2009	1.30 (4.70)*
Drain water from the boat before leaving the landing	2018	4.64
	2013	4.50
	2009	3.90
Remove plants and animals from the boat and equipment before leaving the landing	2018	4.61
	2013	4.50
	2009	3.30
Transport your catch away from a waterbody using a livewell, bucket or other container filled with water	2018	2.05 (3.95)*
	2013	2.10 (3.90)*
	2009	2.40 (3.60)*
Drain water from livewell before leaving the landing	2018	4.53
	2013	4.30
	2009	3.20
Drain water from a bucket or other container holding your daily catch before leaving the water body	2018	4.08
	2013	4.00
	2009	3.00
Add lake or river water to your minnow container	2018	2.27 (3.73)*
	2013	2.20 (3.80)*
	2009	2.20 (3.80)*
Drain water from motor before leaving the landing	2018	3.96
	2013	3.80
	2009	3.10
Put your catch on ice when you leave a water body	2018	2.83
	2013	2.9
	2009	Not asked

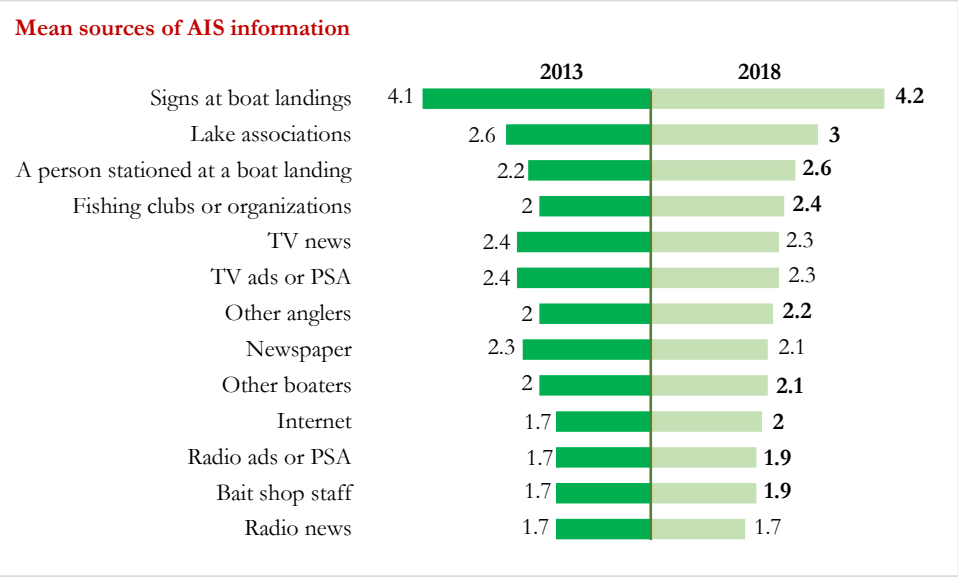
*Depending on the wording of the question, either 1 or 5 might indicate better compliance, so some items show the reverse coded score in parentheses for reference

In 2018, no significant differences in compliance were recorded between the three transience categories for both water-related and other behaviors. The 2013 survey, however, reported a

significant difference between categories, with low transience users reporting higher compliance to water-related behaviors.

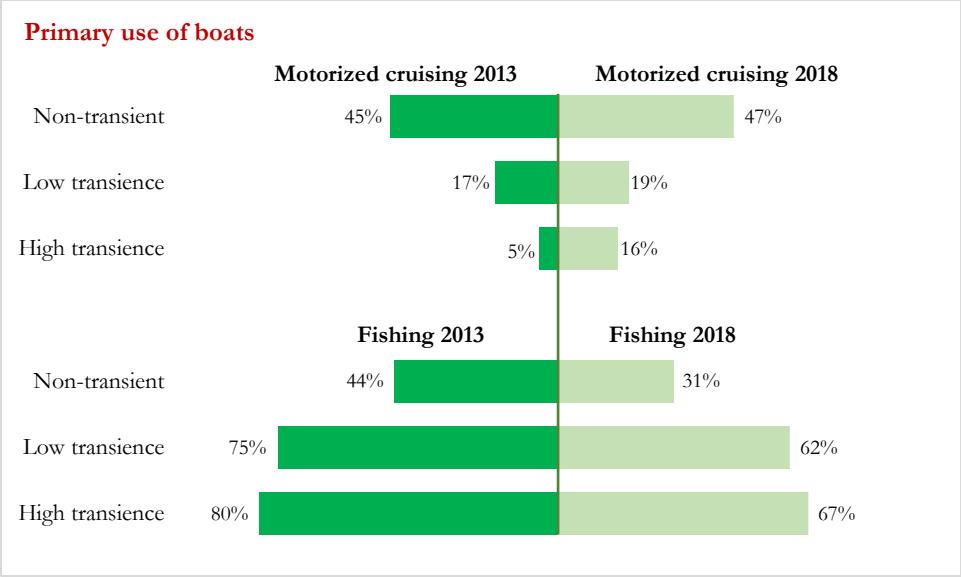
Sources of AIS-related information

Sources from where respondents had seen or heard about AIS were rated on a scale of 1 (*not at all)* to 5 *(a lot)*. Generally, there was little change in means from 2013-2018. Means for years with observed increases are bolded. For 2013 and 2018, *signs at boat landings* was most highly rated with a mean of 4.1 and 4.2 respectively. Radio news had the lowest rating for both years. The data suggest that sources of information with a mean less than 2 may not be appropriate sources for dissemination of AIS-related information.



Primary use of boat

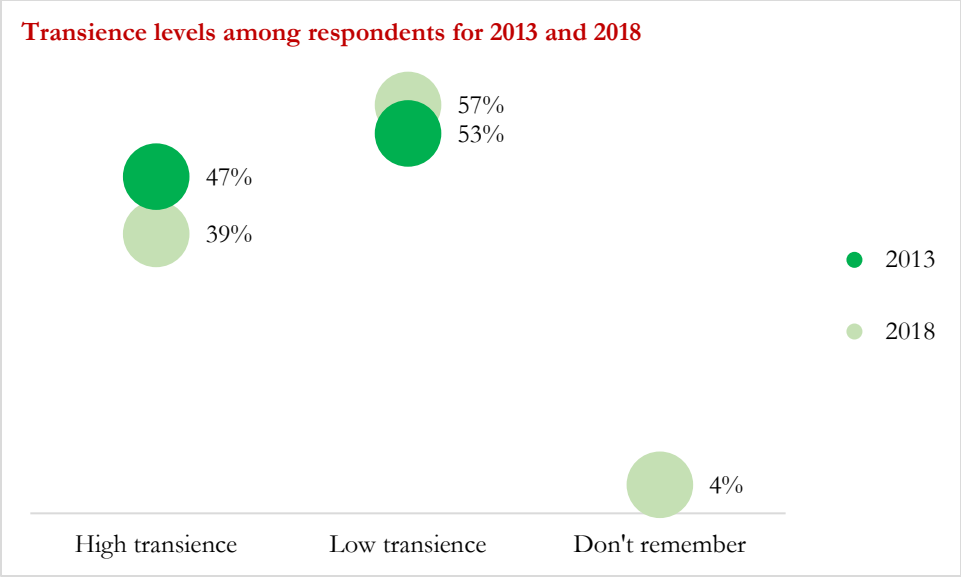
Although more respondents were involved in motorized cruising in 2018 than in 2013, the percentage of anglers decreased from 2013 to 2018. As shown in the diagram below, for both years, most transient water body users were anglers. AIS spread prevention would benefit from outreach programs that target anglers since they comprise the majority of transient users.



Transience levels across years

The number of transient boaters increased since 2013. In 2018, a little over half (53%) of respondents had used their boats in more than one water body compared to 47% recorded in the 2013. This implies that the number of non-transient users decreased from 53% (2013) to 47% (2018).

High transience levels decreased from 47% (2013) to 39% (2018), and low transience levels increased from 53% (2013) to 57% (2018). As with the 2013 survey report, dividing respondents into three categories resulted in smaller sample sizes, which may have caused loss of information about possible significant differences between them.



Mean responses to key questions across transience levels for 2013 and 2018 data are shown in Appendix A1. Those with significant differences are bolded.

Geographic differences since 2013

As mentioned, the Central, Winnebago and Mississippi River regions were observed to have high percentages of transient users (i.e. low and high combined). In 2013, the Central, Northwest and Winnebago regions had statistically significant greater rates of transience. Therefore, transience in the Central and Winnebago regions have a higher potential of AIS spread and outreach efforts should be intensified in those regions.

While in 2018 North Central users reported higher awareness than the Non-North Central users in 2013, there is no significant difference in terms of awareness between the two groups.

Public boat landings since 2013

An increase was observed in 2018 where, 75% of high transience users boated and fished in the 'high' category regions. This is in comparison to 55% of respondents found to be highly transient in the same regions in 2013.

Great Lakes Basin since 2013

While a little over half (52%) of high transience users in 2013 boated or fished in the GLB, 75% of high transience users did so in 2018. This suggests an increase in the number of high transience users in the GLB.

Appendices

Appendix A – Responses to key survey questions by high, low and non-transience

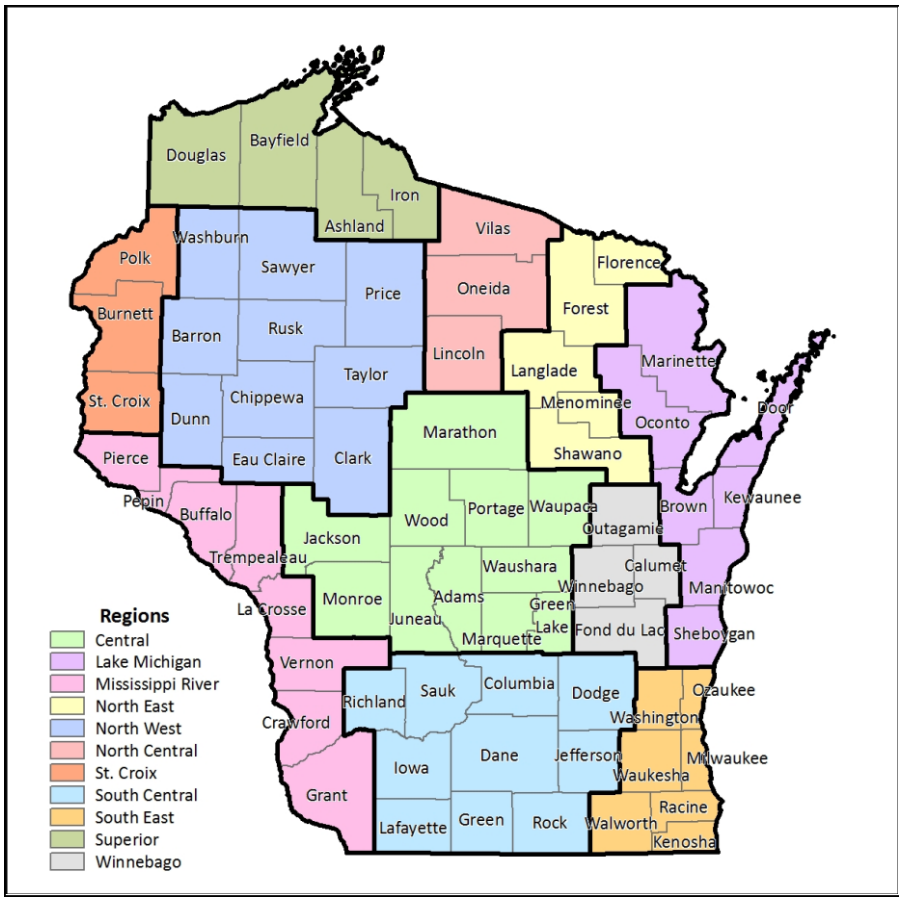
Table A1 shows the distribution of responses to key survey questions across transience levels for 2013 and 2018. We used a one-sample t-test to determine differences between the two data sets. Statistically significant differences were recorded for some of the responses; these appear in bold. In cases where one group was different simultaneously from the other two groups, a lower case "a" and "b" are used to indicate the groupings.

Table A1: Mean responses to key questions across transience levels for 2013 and 2018 data

		High transience	Low transience	Non-transient
N (# of respondents)		128 (27%)	119 (25%)	229 (48%)
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	**2018 3.8** **2013 3.7a**	2018 3.7 **2013 3.4b**	**2018 3.5** **2013 3.4b**
	Knowledge about laws	2018 3.4 **2013 3.4**	2018 3.3 2013 3.2	2018 3.3 **2013 3.1**
	Familiarity with prevention steps	**2018 3.7** 2013 3.6	2018 3.6 2013 3.5	2018 3.5 2013 3.4
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.0 2013 4.1	2018 4.1 **2013 4.0**	2018 4.1 **2013 4.2**
	AIS is negative	**2018 3.8** 2013 4.2	2018 4.2 2013 4.0	**2018 4.1** 2013 4.2
	AIS is a problem	2018 3.1 2013 3.1	2018 3.1 2013 3.0	2018 3.1 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	**2018 4.4a** **2013 4.5a**	**2018 4.3a** **2013 4.3a**	**2018 4.0b** **2013 3.9b**
	Lake associations	2018 2.9 2013 2.7	**2018 2.6** **2013 2.2**	**2018 4.0b** **2013 3.9b**
	Person at launch	2018 2.7 **2013 2.5**	2018 2.7 2013 2.3	2018 2.4 **2013 2.1**
	TV ads or PSA	2018 2.4 2013 2.4	2018 2.3 2013 2.4	2018 2.3 2013 2.3
	Newspaper	**2018 2.0** 2013 2.3	2018 1.8 2013 2.1	**2018 2.2** 2013 2.4
	TV news	2018 2.4 2013 2.3	2018 2.3 2013 2.4	2018 2.2 2013 2.4
	Other anglers	**2018 2.4** **2013 2.3a**	2018 2.3 **2013 1.9b**	2018 2.0 **2013 1.9b**
	Other boaters	2018 2.2 **2013 2.2**	2018 2.1 **2013 1.9**	2018 2.03 2013 2.0
	Radio ads or PSA	2018 1.9 2013 2.2	2018 1.9 2013 1.9	2018 1.8 2013 1.9
	Fishing clubs or organizations	2018 2.4 2013 2.2	2018 2.2 2013 1.9	2018 2.4 2013 1.9
	Bait shop staff	2018 1.9 2013 1.8	2018 1.9 2013 1.7	2018 1.8 2013 1.7
	Internet	2018 2.2 2013 1.8	2018 1.9 2013 1.6	2018 2.0 2013 1.7
	Radio news	2018 1.9 2013 1.7	2018 1.6 2013 1.7	2018 1.7 2013 1.8
Beliefs (1 = not at all, 5 = extreme)	Capable of performing prevention steps	**2018 4.3b** 2013 4.2	**2018 4.3b** 2013 4.2	**2018 4.0a** 2013 4.1
	Control over performing steps	2018 3.8 2013 4.0	2018 3.9 2013 3.9	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.3 2013 3.6	2018 3.3 2013 3.6	2018 3.3 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.5 2013 4.0	2018 4.6 **2013 4.0**	2018 4.1 **2013 3.8**
	Compliance - other	2018 3.6 2013 4.5	2018 3.6 2013 4.6	2018 3.4 2013 4.5

Statistically significant differences appear in bold

Appendix B – Survey Data by Wisconsin Region



Counties in each region:

- **Central:** Adams, Green Lake, Jackson, Juneau, Marathon, Marquette, Monroe, Portage, Waupaca, Waushara, Wood
- **Lake Michigan:** Brown, Door, Kewaunee, Manitowoc, Marinette, Oconto, Sheboygan
- **Mississippi River:** Buffalo, Crawford, Grant, La Crosse, Peirce, Pepin, Trempealeau, Vernon
- **North Central:** Lincoln, Oneida, Vilas
- **North East:** Florence, Forest, Langlade, Menominee, Shawano
- **North West:** Barron, Chippewa, Clark, Dunn, Eau Claire, Price, Rusk, Sawyer, Taylor, Washburn
- **St. Croix:** Burnett, Polk, St. Croix
- **South Central:** Columbia, Dane, Dodge, Green, Iowa, Jefferson, Lafayette, Richland, Rock, Sauk
- **South East:** Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, Waukesha
- **Superior:** Ashland, Bayfield, Douglas, Iron
- **Winnebago:** Calumet, Fond du Lac, Outagamie, Winnebago

T**able B1:** Mean responses to key questions for **Central** and **Not Central** areas for 2013 and 2018

		Central	**Not Central**
N (# of respondents)		2018 100 (19%) 2013 136 (17%)	2018 432 (81%) 2013 688 (83%)
Transience (%)	Transient[1]	2018 72 2013 60	2018 47 2013 44
	Highly transient[2]	2018 38 2013 43	2018 24 2013 47
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.7 2013 3.5	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.4 2013 3.2	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.6 2013 3.5	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.2 2013 4.1	2018 4.1 2013 4.1
	AIS is negative	2018 4.1 2013 4.0	2018 4.1 2013 4.2
	AIS is a problem	2018 3.3 2013 3.0	2018 3.1 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	2018 4.3 2013 4.2	2018 4.2 2013 4.2
	Lake associations	2018 2.9 **2013 2.2**	2018 3.0 **2013 2.8**
	Person at launch	**2018 2.3** 2013 2.0	**2018 2.6** 2013 2.3
	TV ads or PSA	2018 2.2 2013 2.4	2018 2.3 2013 2.4
	Newspaper	2018 1.9 2013 2.1	2018 2.1 2013 2.3
	TV news	2018 2.3 2013 2.3	2018 2.3 2013 2.4
	Other anglers	2018 2.1 2013 1.9	2018 2.2 2013 2.0
	Other boaters	2018 2.1 2013 1.8	2018 2.1 2013 2.1
	Radio ads or PSA	2018 1.9 2013 1.9	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.4 2013 1.8	2018 2.4 2013 2.0
	Bait shop staff	2018 1.8 2013 1.6	2018 1.9 2013 1.8
	Internet	2018 2.0 2013 1.7	2018 2.1 2013 1.7
	Radio news	2018 1.7 2013 1.6	2018 1.7 2013 1.8
Beliefs (1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 3.7 2013 4.1	2018 4.0 2013 4.1
	Control over performing steps	2018 3.7 2013 3.9	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.1 2013 3.5	2018 3.3 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.5 2013 3.9	2018 4.4 2013 3.9
	Compliance - other	2018 3.4 2013 4.6	2018 3.6 2013 4.5

Table B2: Mean responses to key questions of **Lake Michigan** and **Not Lake Michigan** areas for 2013 and 2018

		Lake Michigan	Not Lake Michigan
N (# of respondents)		2018 62 (12%) 2013 119 (14%)	2018 470 (88%) 2013 705 (86%)
Transience (%)	Transient[1]	2018 61 2013 52	2018 51 2013 46
	Highly transient[2]	2018 32 2013 53	2018 26 2013 44
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.7 2013 3.5	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.3 2013 3.1	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.6 2013 3.5	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.2 2013 4.1	2018 4.1 2013 4.1
	AIS is negative	2018 4.0 2013 4.2	2018 4.1 2013 4.1
	AIS is a problem	2018 3.2 2013 3.3	2018 3.1 2013 3.0
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	2018 4.2 2013 4.2	2018 4.2 2013 4.2
	Lake associations	2018 2.8 2013 2.5	2018 3.0 2013 2.7
	Person at launch	2018 2.6 2013 2.3	2018 2.6 2013 2.3
	TV ads or PSA	2018 2.1 2013 2.4	2018 2.3 2013 2.4
	Newspaper	2018 1.8 2013 2.6	2018 2.1 2013 2.2
	TV news	2018 2.2 2013 2.5	2018 2.3 2013 2.4
	Other anglers	2018 2.2 2013 2.0	2018 2.2 2013 2.0
	Other boaters	2018 2.0 2013 1.9	2018 2.1 2013 2.0
	Radio ads or PSA	2018 1.8 2013 1.9	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.2 2013 2.1	2018 2.4 2013 2.0
	Bait shop staff	2018 1.8 2013 1.8	2018 1.9 2013 1.7
	Internet	2018 2.3 2013 1.6	2018 2.0 2013 1.7
	Radio news	2018 1.6 2013 1.7	2018 1.7 2013 1.8
Beliefs (1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.2 2013 4.2	2018 4.2 2013 4.1
	Control over performing steps	2018 3.9 2013 3.8	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.4 2013 3.4	2018 3.2 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.6 2013 3.7	2018 4.2 2013 3.9
	Compliance - other	2018 3.6 2013 4.5	2018 3.5 2013 4.5

Statistically significant differences appear in bold

Table B3: Mean responses to key questions of **Mississippi River** and **Not Mississippi River** areas for 2013 & 2018

		Mississippi River	Not Mississippi River
N (# of respondents)		2018 31 (6%) 2013 59 (7%)	2018 501 (94%) 2013 765 (93%)
Transience (%)	Transient	2018 64 2013 46	2018 51 2013 47
	Highly transient	2018 39 2013 44	2018 26 2013 46
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.7 2013 3.6	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.3 2013 3.1	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.4 2013 3.3	2018 3.6 2013 3.2
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.0 2013 4.2	2018 4.1 2013 4.1
	AIS is negative	2018 4.0 2013 4.2	2018 4.0 2013 4.1
	AIS is a problem	2018 3.0 2013 2.9	2018 3.1 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	2018 4.1 2013 4.2	2018 4.2 2013 4.2
	Lake associations	**2018 1.9** **2013 2.0**	**2018 3.1** **2013 2.7**
	Person at launch	2018 2.1 2013 **1.8**	2018 2.6 **2013 2.3**
	TV ads or PSA	2018 2.5 2013 2.3	2018 2.3 2013 2.4
	Newspaper	2018 1.7 2013 2.2	2018 2.1 2013 2.3
	TV news	2018 2.5 2013 2.3	2018 2.3 2013 2.4
	Other anglers	2018 2.3 2013 2.1	2018 2.2 2013 2.0
	Other boaters	2018 2.3 2013 2.1	2018 2.1 2013 2.0
	Radio ads or PSA	2018 1.8 2013 2.2	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.0 2013 2.0	2018 2.4 2013 2.0
	Bait shop staff	2018 1.6 2013 1.6	2018 1.9 2013 1.7
	Internet	2018 2.0 2013 1.6	2018 2.0 2013 1.7
	Radio news	2018 1.6 2013 1.9	2018 1.7 2013 1.7
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.2 2013 4.1	2018 4.2 2013 4.1
	Control over performing steps	2018 3.8 2013 3.9	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.3 2013 3.5	2018 3.2 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.4 2013 4.0	2018 4.5 2013 3.9
	Compliance - other	2018 3.3 2013 4.6	2018 3.5 2013 4.5

Table B4: Mean responses to key questions of **North Central** and **Not North Central** areas for 2013 and 2018 data

		North Central	Not North Central
N (# of respondents)		2018 100 (19%) 2013 157 (19%)	2018 432 (81%) 2013 667 (81%)
Transience (%)	Transient	2018 64 2013 53	2018 49 2013 45
	Highly transient	2018 32 2013 56	2018 26 2013 43
Familiarity & awareness **(1 = none, 5 = extreme)**	**Awareness about AIS**	2018 3.6 **2013 3.7**	2018 3.6 **2013 3.4**
	Knowledge about laws	2018 3.2 2013 3.3	2018 3.4 2013 3.2
	Familiarity with prevention steps	2018 3.6 2013 3.6	2018 3.6 2013 3.4
Opinions **(1 = none, 5= extreme)**	AIS is a threat	2018 4.1 2013 4.2	2018 4.1 2013 4.1
	AIS is negative	2018 4.0 2013 4.2	2018 4.1 2013 4.1
	AIS is a problem	2018 3.0 2013 3.0	2018 3.2 2013 3.1
Information sources **(1 = heard nothing, 5 = heard a lot)**	Signs at landings	2018 4.3 2013 **4.5**	2018 4.2 **2013 4.1**
	Lake associations	**2018 3.4** **2013 3.2**	**2018 2.9** **2013 2.5**
	Person at launch	2018 2.6 2013 2.6	2018 2.6 2013 2.2
	TV ads or PSA	2018 2.2 2013 2.5	2018 2.3 2013 2.4
	Newspaper	2018 2.2 2013 2.5	2018 2.0 2013 2.2
	TV news	2018 2.3 2013 2.5	2018 2.3 2013 2.4
	Other anglers	2018 2.1 2013 2.2	2018 2.2 2013 2.0
	Other boaters	2018 2.1 2013 2.1	2018 2.1 2013 2.0
	Radio ads or PSA	2018 1.9 2013 2.2	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.4 2013 2.2	2018 2.4 2013 1.9
	Bait shop staff	2018 1.8 2013 1.9	2018 1.9 2013 1.7
	Internet	2018 2.0 2013 1.8	2018 2.1 2013 1.7
	Radio news	2018 1.8 2013 1.8	2018 1.7 2013 1.7
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.1 2013 4.1	2018 4.2 2013 4.1
	Control over performing steps	2018 3.7 2013 4.0	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.2 2013 3.6	2018 3.3 2013 3.6
Compliance **(1 = not compliant at all, 5 = perfect compliance)**	Compliance - water related behavior	2018 4.4 2013 3.9	2018 4.5 2013 3.9
	Compliance - other	2018 3.6 2013 4.6	2018 3.5 2013 4.5

Statistically significant differences appear in bold

Table B5: Mean responses to key questions of **North East** and **Not North East** areas for 2013 and 2018

		North East	Not North East
N (# of respondents)		2018 28 (5%) 2013 71 (9%)	2018 504 (95%) 2013 753 (91%)
Transience (%)	Transient	2018 56 2013 52	2018 52 2013 46
	Highly transient	2018 36 2013 57	2018 26 2013 45
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.5 2013 3.6	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.3 2013 3.3	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.4 2013 3.6	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.1 2013 4.3	2018 4.1 2013 4.1
	AIS is negative	2018 4.1 2013 4.3	2018 4.1 2013 4.1
	AIS is a problem	2018 3.4 2013 3.3	2018 3.1 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	**Signs at landings**	**2018 3.8** 2013 4.4	**2018 4.2** 2013 4.2
	Lake associations	2018 3.1 2013 2.9	2018 3.0 2013 2.6
	Person at launch	2018 2.7 2013 2.6	2018 2.6 2013 2.2
	TV ads or PSA	2018 2.4 2013 2.5	2018 2.3 2013 2.4
	Newspaper	2018 2.0 2013 2.5	2018 2.1 2013 2.3
	TV news	2018 2.3 2013 2.6	2018 2.3 2013 2.4
	Other anglers	2018 2.0 2013 2.2	2018 2.2 2013 2.0
	Other boaters	2018 2.0 2013 2.2	2018 2.1 2013 2.0
	Radio ads or PSA	2018 2.0 2013 2.1	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.1 2013 2.1	2018 2.4 2013 2.0
	Bait shop staff	2018 1.9 2013 1.8	2018 1.9 2013 1.7
	Internet	2018 2.0 2013 1.7	2018 2.0 2013 1.7
	Radio news	2018 1.7 2013 1.8	2018 1.7 2013 1.7
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.2 2013 4.2	2018 4.2 2013 4.1
	Control over performing steps	2018 3.7 2013 3.9	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.1 2013 3.6	2018 3.3 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.2 2013 4.1	2018 4.5 2013 3.9
	Compliance - other	2018 3.5 2013 4.6	2018 3.5 2013 4.5

Table B6: Mean responses to key questions of **North West** and **Not North West** areas for 2013 and 2018

		North West	Not North West
N (# of respondents)		2018 95 (18%) 2013 161 (20%)	2018 437 (82%) 2013 663 (80%)
Transience (%)	Transient	2018 59 2013 60	2018 50 2013 44
	Highly transient	2018 37 2013 48	2018 25 2013 45
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.6 2013 3.4	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.4 2013 3.2	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.6 2013 3.4	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.0 2013 4.0	2018 4.1 2013 4.2
	AIS is negative	2018 4.1 2013 3.9	2018 4.1 2013 4.2
	AIS is a problem	**2018 2.8** 2013 2.9	**2018 3.2** 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	**Signs at landings**	**2018 4.4** 2013 4.3	**2018 4.2** 2013 4.2
	Lake associations	2018 2.8 2013 2.8	2018 3.0 2013 2.6
	Person at launch	2018 2.8 2013 2.3	2018 2.5 2013 2.2
	TV ads or PSA	**2018 2.5** 2013 2.6	**2018 2.2** 2013 2.3
	Newspaper	2018 2.1 2013 2.1	2018 2.0 2013 2.3
	TV news	**2018 2.6** 2013 2.4	**2018 2.3** 2013 2.4
	Other anglers	2018 2.3 2013 2.1	2018 2.1 2013 2.0
	Other boaters	2018 2.1 2013 2.0	2018 2.1 2013 2.0
	Radio ads or PSA	2018 1.9 2013 2.1	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.4 2013 2.1	2018 2.4 2013 2.0
	Bait shop staff	2018 1.7 2013 1.6	2018 1.9 2013 1.8
	Internet	2018 2.1 2013 1.7	2018 2.0 2013 1.7
	Radio news	2018 1.8 2013 1.9	2018 1.7 2013 1.7
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.2 2013 4.1	2018 4.2 2013 4.2
	Control over performing steps	**2018 4.0** 2013 3.9	**2018 3.8** 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.3 2013 3.6	2018 3.2 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.4 2013 3.8	2018 4.5 2013 3.9
	Compliance - other	2018 3.6 2013 4.4	2018 3.5 2013 4.6

Statistically significant differences appear in bold

Table B7: Mean responses to key questions of **St. Croix** and **Not St. Croix** areas for 2013 and 2018

		St. Croix	Not St. Croix
N (# of respondents)		2018 32 (6%) 2013 44 (5%)	2018 500 (94%) 2013 780 (95%)
Transience (%)	Transient	2018 55 2013 51	2018 52 2013 47
	Highly transient	2018 31 2013 53	2018 27 2013 46
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.8 2013 3.5	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.5 2013 3.3	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.8 2013 3.7	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 3.9 2013 4.0	2018 4.1 2013 4.1
	AIS is negative	2018 3.9 2013 4.0	2018 4.1 2013 4.1
	AIS is a problem	2018 3.1 2013 2.9	2018 3.1 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	**Signs at landings**	**2018 4.7** 2013 4.4	**2018 4.2** 2013 4.2
	Lake associations	2018 3.3 2013 3.0	2018 3.0 2013 2.6
	Person at launch	**2018 3.6** 2013 2.6	**2018 2.5** 2013 2.2
	TV ads or PSA	**2018 2.9** 2013 2.4	**2018 2.3** 2013 2.4
	Newspaper	2018 2.2 2013 2.3	2018 2.0 2013 2.3
	TV news	**2018 3.0** 2013 2.5	**2018 2.3** 2013 2.4
	Other anglers	2018 2.4 2013 2.0	2018 2.2 2013 2.0
	Other boaters	**2018 2.7** 2013 1.9	**2018 2.0** 2013 2.0
	Radio ads or PSA	2018 1.9 2013 2.1	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.1 2013 2.1	2018 2.4 2013 2.0
	Bait shop staff	2018 1.6 2013 1.6	2018 1.9 2013 1.7
	Internet	2018 1.9 2013 1.5	2018 2.1 2013 1.7
	Radio news	2018 1.6 2013 1.8	2018 1.7 2013 1.7
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.3 2013 4.2	2018 4.2 2013 4.1
	Control over performing steps	2018 4.3 2013 4.0	2018 4.2 2013 3.9
	Social norms (others approve and/or succeed at steps)	**2018 3.7** 2013 3.7	**2018 3.2** 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.6 2013 3.8	2018 4.5 2013 3.9
	Compliance - other	2018 3.1 2013 4.6	2018 3.5 2013 4.5

Table B8: Mean responses to key questions of **South Central** and **Not South-Central** areas for 2013 and 2018

		South Central	Not South Central
N (# of respondents)		70 (13%)	462 (87%)
Transience (%)	Transient	2018 59 2013 56	2018 51 2013 45
	Highly transient	2018 24 2013 38	2018 27 2013 47
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.5 2013 3.3	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.3 2013 3.1	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.6 2013 3.4	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	**AIS is a threat**	**2018 4.3** 2013 4.1	**2018 4.1** 2013 4.1
	AIS is negative	**2018 4.3** 2013 4.1	**2018 4.0** 2013 4.1
	AIS is a problem	2018 3.2 2013 3.1	2018 3.1 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	2018 4.3 2013 4.1	2018 4.2 2013 4.2
	Lake associations	2018 2.6 2013 2.2	2018 3.0 2013 2.7
	Person at launch	**2018 2.2** 2013 1.8	**2018 2.6** 2013 2.3
	TV ads or PSA	**2018 1.9** 2013 2.3	**2018 2.3** 2013 2.4
	Newspaper	2018 1.9 2013 2.1	2018 2.1 2013 2.3
	TV news	**2018 2.0** 2013 2.2	**2018 2.4** 2013 2.4
	Other anglers	2018 2.1 2013 1.9	2018 2.2 2013 2.1
	Other boaters	2018 2.0 2013 1.9	2018 2.1 2013 2.0
	Radio ads or PSA	2018 1.7 2013 1.8	2018 1.9 2013 2.1
	Fishing clubs or organizations	2018 2.2 2013 1.8	2018 2.4 2013 2.0
	Bait shop staff	2018 1.9 2013 1.5	2018 1.9 2013 1.8
	Internet	2018 2.1 2013 1.6	2018 2.0 2013 1.8
	Radio news	2018 1.6 2013 1.6	2018 1.7 2013 1.8
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.2 2013 4.2	2018 4.2 2013 2.0
	Control over performing steps	2018 3.7 2013 3.9	2018 3.8 2013 2.7
	Social norms (others approve and/or succeed at steps)	2018 3.1 2013 3.6	2018 3.3 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.7 2013 4.0	2018 4.4 2013 3.9
	Compliance - other	2018 3.8 2013 4.6	2018 3.5 2013 4.5

Statistically significant differences appear in bold

Table B9: Mean responses to key questions of **South East** and **Not South East** areas for 2013 and 2018

		South East	Not South East
N (# of respondents)		2018 82 (15%) 2013 126 (15%)	2018 450 (85%) 2013 698 (85%)
Transience (%)	Transient	2018 49 2013 47	2018 52 2013 47
	Highly transient	2018 26 2013 57	2018 27 2013 43
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.6 2013 3.6	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.3 2013 3.2	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.6 2013 3.5	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.3 2013 4.2	2018 4.1 2013 4.1
	AIS is negative	2018 4.2 2013 4.1	2018 4.1 2013 4.1
	AIS is a problem	2018 3.3 2013 3.2	2018 3.1 2013 3.0
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	2018 4.2 2013 4.3	2018 4.2 2013 4.2
	Lake associations	2018 2.9 2013 2.7	2018 3.0 2013 2.7
	Person at launch	2018 2.5 2013 2.3	2018 2.6 2013 2.3
	TV ads or PSA	2018 2.1 **2013 2.1**	2018 2.3 **2013 2.4**
	Newspaper	2018 1.9 2013 2.3	2018 2.1 2013 2.3
	TV news	**2018 2.0** **2013 2.2**	**2018 2.4** **2013 2.5**
	Other anglers	2018 2.3 2013 2.1	2018 2.2 2013 2.0
	Other boaters	2018 2.2 2013 2.2	2018 2.1 2013 2.0
	Radio ads or PSA	**2018 1.6** 2013 1.9	**2018 1.9** 2013 2.0
	Fishing clubs or organizations	2018 2.5 2013 1.9	2018 2.4 2013 2.0
	Bait shop staff	**2018 2.2** 2013 1.9	**2018 1.8** 2013 1.7
	Internet	**2018 2.3** 2013 1.8	**2018 2.0** 2013 1.7
	Radio news	2018 1.6 2013 1.7	2018 1.7 2013 1.8
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.3 2013 4.2	2018 4.1 2013 4.1
	Control over performing steps	2018 3.8 2013 3.9	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.3 2013 3.5	2018 3.2 2013 3.5
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.6 2013 3.9	2018 4.4 2013 3.9
	Compliance - other	**2018 4.0** 2013 4.5	**2018 3.5** 2013 4.5

Statistically significant differences appear in bold

Table B10: Mean responses to key questions of **Superior** and **Not Superior** areas for 2013 and 2018

		Superior	Not Superior
N (# of respondents)		2018 38 (7%) 2013 49 (6%)	2018 494 (93%) 2013 775 (94%)
Transience (%)	Transient	2018 62 2013 62	2018 51 2013 46
	Highly transient	2018 37 2013 68	2018 26 2013 44
Familiarity & awareness (1 = none, 5 = extreme)	**Awareness about AIS**	**2018 3.9** 2013 3.6	**2018 3.6** 2013 3.5
	Knowledge about laws	2018 3.6 2013 3.4	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.8 2013 3.6	2018 3.6 2013 3.5
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.1 2013 4.3	2018 4.1 2013 4.1
	AIS is negative	2018 4.1 2013 4.2	2018 4.1 2013 4.1
	AIS is a problem	2018 3.2 2013 3.1	2018 3.1 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	2018 4.1 2013 4.4	2018 4.2 2013 4.2
	Lake associations	2018 3.0 2013 3.0	2018 3.0 2013 2.6
	Person at launch	2018 3.0 **2013 2.9**	2018 2.5 **2013 2.2**
	TV ads or PSA	2018 2.6 **2013 2.9**	2018 2.3 **2013 2.4**
	Newspaper	2018 2.1 2013 2.6	2018 2.1 2013 2.3
	TV news	2018 2.3 2013 2.6	2018 2.3 2013 2.4
	Other anglers	2018 2.4 2013 2.2	2018 2.2 2013 2.0
	Other boaters	2018 2.1 2013 2.2	2018 2.1 2013 2.0
	Radio ads or PSA	2018 2.1 2013 2.3	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.6 2013 2.3	2018 2.4 2013 2.0
	Bait shop staff	2018 1.8 2013 2.0	2018 1.9 2013 1.7
	Internet	2018 2.2 2013 2.0	2018 2.0 2013 1.7
	Radio news	2018 1.7 2013 2.1	2018 1.7 2013 1.7
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.4 2013 4.1	2018 4.1 2013 4.1
	Control over performing steps	**2018 4.2** **2013 4.1**	**2018 3.8** **2013 3.9**
	Social norms (others approve and/or succeed at steps)	2018 3.3 2013 3.7	2018 3.2 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.8 2013 4.1	2018 4.4 2013 3.9
	Compliance - other	2018 3.3 2013 4.6	2018 3.5 2013 4.5

Table B11: Mean responses to key questions of **Winnebago** and **Not Winnebago** areas for 2013 and 2018 data

		Winnebago	Not Winnebago
N (# of respondents)		2018 55 (10%) 2013 88 (11%)	2018 477 (90%) 2013 736 (89%)
Transience (%)	Transient	2018 70 2013 61	2018 50 2013 45
	Highly transient	2018 36 2013 52	2018 26 2013 45
Familiarity & awareness (1 = none, 5 = extreme)	Awareness about AIS	2018 3.7 2013 3.4	2018 3.6 2013 3.5
	Knowledge about laws	2018 3.4 2013 3.4	2018 3.3 2013 3.2
	Familiarity with prevention steps	2018 3.6 2013 3.8	2018 3.6 2013 3.4
Opinions (1 = none, 5= extreme)	AIS is a threat	2018 4.1 2013 4.1	2018 4.1 2013 4.1
	AIS is negative	2018 4.0 **2013 4.4**	2018 4.1 **2013 4.1**
	AIS is a problem	**2018 3.4** 2013 3.2	**2018 3.1** 2013 3.1
Information sources (1 = heard nothing, 5 = heard a lot)	Signs at landings	2018 4.2 2013 4.4	2018 4.2 2013 4.2
	Lake associations	2018 2.7 2013 2.3	2018 2.3 2013 2.7
	Person at launch	2018 2.8 2013 2.4	2018 2.5 2013 2.2
	TV ads or PSA	2018 2.4 2013 2.4	2018 2.3 2013 2.4
	Newspaper	2018 2.0 2013 2.2	2018 2.1 2013 2.3
	TV news	**2018 2.6** 2013 2.5	**2018 2.3** 2013 2.4
	Other anglers	2018 2.2 2013 2.2	2018 2.2 2013 2.0
	Other boaters	2018 2.1 2013 2.1	2018 2.1 2013 2.0
	Radio ads or PSA	2018 2.0 2013 2.0	2018 1.9 2013 2.0
	Fishing clubs or organizations	2018 2.7 2013 2.2	2018 2.3 2013 2.0
	Bait shop staff	2018 2.1 2013 1.7	2018 1.8 2013 1.7
	Internet	2018 2.3 2013 1.8	2018 2.0 2013 1.7
	Radio news	2018 1.6 2013 1.6	2018 1.7 2013 1.8
Beliefs(1 = not at all, 5 = extreme)	Capable of performing prevention steps	2018 4.2 2013 4.3	2018 4.2 2013 4.1
	Control over performing steps	2018 3.8 2013 3.9	2018 3.8 2013 3.9
	Social norms (others approve and/or succeed at steps)	2018 3.3 2013 3.6	2018 3.2 2013 3.6
Compliance (1 = not compliant at all, 5 = perfect compliance)	Compliance - water related behavior	2018 4.5 2013 4.1	2018 4.4 2013 3.9
	Compliance - other	2018 3.7 2013 4.6	2018 3.5 2013 4.5

Appendix C - Public Boat Landings

Counties were categorized by number of public boat landings using the DNR "Find a Lake" resource, available here:

http://dnr.wi.gov/lakes/lakepages/Results.aspx?page=boating

The average number of public boat landings per county was 24.5. Counties with 24 or fewer landings were put into one category, and those with 25 or more were in another.

Counties with 24 or fewer public boat landings:

Adams, Brown, Buffalo, Calumet, Clark, Columbia, Crawford, Dane, Dodge, Door, Dunn, Eau Claire, Fond du Lac, Grant, Green, Green Lake, Iowa, Jackson, Jefferson, Juneau, Kenosha, Kewaunee, La Crosse, Lafayette, Manitowoc, Marathon, Marquette, Menominee, Milwaukee, Monroe, Outagamie, Ozaukee, Pepin, Pierce, Racine, Richland, Rock, Rusk, Sauk, Shawano, Sheboygan, St. Croix, Taylor, Trempealeau, Vernon, Washington, Winnebago, Wood

Counties with 25 or more public boat landings:

Ashland, Barron, Bayfield, Burnett, Chippewa, Douglas, Florence, Forest, Iron, Langlade, Lincoln, Marinette, Oconto, Oneida, Polk, Portage, Price, Sawyer, Vilas, Walworth, Washburn, Waukesha, Waupaca, Waushara

Appendix D - Great Lakes Basin Counties

To compare responses of individuals who boat or fish in a county that includes land that is part of a Great Lakes Basin with the responses of those who do not, the following county divisions were used:

Part of a Great Lakes Basin:

Adams, Ashland, Bayfield, Brown, Calumet, Columbia, Dodge, Door, Douglas, Florence, Fond du Lac, Forest, Green Lake, Iron, Kenosha, Kewaunee, Langlade, Manitowoc, Marathon, Marinette, Marquette. Menominee, Milwaukee, Oconto, Oneida, Outagamie, Ozaukee, Portage, Racine, Sauk, Shawano, Sheboygan, Vilas, Washington, Waukesha, Waupaca, Waushara, Winnebago

Not part of a Great Lakes Basin:

Barron, Buffalo, Burnett, Chippewa, Clark, Crawford, Dane, Dunn, Eau Claire, Grant, Green, Iowa, Jackson, Jefferson, Juneau, La Crosse, Lafayette, Lincoln, Monroe, Pepin, Pierce, Polk, Price, Richland, Rock, Rusk, Sawyer, St. Croix, Taylor, Trempealeau, Vernon, Walworth, Washburn, Wood