2008 SURVEY OF INDIANA ANGLERS TO DETERMINE THEIR AWARENESS OF AQUATIC INVASIVE SPECIES AND STEPS TAKEN TO PREVENT THEIR SPREAD

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EXECUTIVE SUMMARY

A survey of Indiana licensed anglers was undertaken in 2008 to determine their knowledge of aquatic invasive species (AIS) and steps that are taken to prevent their spread. A total of 1,015 people submitted surveys. The Mississippi River Basin Panel on Aquatic Nuisance Species encouraged and partially funded this project.

Most respondents had some knowledge of zebra mussels and Asian carp likely due to the national and regional media attention these species have received. There was an obvious lack of awareness for AIS plants, round goby, and VHS (a fish pathogen). Those that were well aware of AIS felt a strong need to prevent their spread, but those who were less aware, placed less urgency on preventing their spread.

The best sources of AIS information reported by respondents included newspaper articles, TV news and programs, magazines, and signs. Less important sources included information at marinas or boat launches, internet websites, and in fishing and boating regulation pamphlets. Anglers were already motivated to prevent the spread of AIS because of their feelings of personal responsibility to keep AIS out of our lakes and streams. Some motivations identified that would likely lead survey participants to take preventative actions included the threat that AIS could damage equipment, regulations preventing the transport of AIS on equipment including enforcement and fines, fishing or boating pamphlets, and signs at boat launches.

A considerable number of boaters did not know if they boated on AIS infested waters, consequently, they did not know if they traveled between infested and uninfested waters. Of the few who were aware of the presence of AIS in a particular body of water, most said they learned this from signs at the boat launch, visual identification of the AIS, and hearing about an infestation from acquaintances. A large portion of boaters performed three important prevention steps: draining water from their boat, visually inspecting for AIS, and avoiding release of bait. Relatively few allowed their boat to dry for 5 days,

flushed the motor's cooling system, or rinsed the boat with high pressure water. All of these prevention steps are recommendations from the national Stop Aquatic Hitchhikers campaign.

Nearly 80% of the anglers surveyed were willing to pay an additional $1 to over $10 for a fishing license if that money went to AIS prevention and control.

Most anglers fish with artificial baits, earth worms or night crawlers, insects or larvae, or minnows purchased from a bait shop. Very few anglers catch wild minnows or crayfish and use them as bait.

The survey showed that boaters were slightly more aware of AIS than non-boaters. Boaters who had good knowledge of AIS were far more likely to take precautions to prevent the spread of AIS than those with little awareness. For those who knew that they were traveling between infested and uninfested waters, a large majority performed prevention. Unfortunately, a considerable number did not know when waters were infested and nearly half of them did not take prevention steps. The amount of times an angler fishes is positively correlated to the prevention steps taken.

AIS awareness definitely needs to be increased. When anglers and boaters are aware of AIS and the dangers they pose to future aquatic recreational opportunities, the more likely they will be to perform the simple yet very important prevention measures. Users must understand that prevention should occur no matter whether AIS are known to occur in a body of water or not.

The popular sources where anglers and boaters get their information should be used to increase AIS education. A similar survey should be performed in 2013 to determine if knowledge and prevention have increased as a result of improved outreach and education efforts.

ACKNOWLEDGEMENTS

The Indiana Department of Natural Resources, Division of Fish and Wildlife is extremely grateful to the 1,015 people who took the time to complete and submit the 2008 Indiana Aquatic Invasive Species Survey. Without the input of our dedicated anglers, it would be difficult to know how to strengthen the Aquatic Invasive Species program. We also have to thank the Mississippi River Basin Panel on Aquatic Nuisance Species in providing $5,000 to support the implementation of the survey. Kevin Hoffman with the Division of Fish and Wildlife assisted in the development of the survey and selected potential survey participants. Finally, thank you to the support staff at SurveyGold who corrected minor glitches that were encountered during the development of the electronic survey.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

2008 SURVEY OF INDIANA ANGLERS TO DETERMINE THEIR AWARENESS OF AQUATIC INVASIVE SPECIES AND STEPS TAKEN TO PREVENT THEIR SPREAD

INTRODUCTION

Aquatic Invasive Species (AIS) present many challenges in Indiana. A number of the invasives that have been present in the state for many years are widespread and often create nuisance conditions in our waters and wetlands. For these species, eradication is not possible and even controlling them can be a challenge. For other species that have recently invaded Indiana, there is hope that they can be eliminated or steps can be taken to at least prevent their spread to other waters.

AIS are of great concern since they impact so many water users. Zebra mussels and dense invasive plant growth clog water intakes of industries and utility companies. These companies must spend money to maintain ample water intake volume. AIS also greatly impact aquatic recreation. Dense aquatic plant growth reduces use by anglers, boaters and swimmers. Excessive weed growth can also cause fish population imbalances resulting in reduced angling opportunities. AIS fish species will compete for food and space with desirable sport fish which again can lead to decreased fishing. Zebra mussels can make for unpleasant swimming as the sharp shells easily cut feet. Zebra mussels can clog water intakes of boats which can cause overheating and damage to motors. If AIS controls are available, they are generally very costly to implement and in many cases the benefits of control are short lived. Eradication is only occasionally feasible. Finally, real estate values can decline on bodies of water with dense invasive plant growth. AIS are an economic drain in Indiana, the region, and the entire nation.

The Mississippi River Basin Panel on Aquatic Nuisance Species (MRBP) has encouraged states within the basin to conduct boater surveys to determine the effectiveness of AIS

outreach. As more states initiate surveys, the outreach strategies that appear most effective can then be used in other states to affect knowledge and behaviors of boaters. Without surveys, such as this, each state would have to use trial and error to find the most effective outreach strategies. MRBP will reimburse states $5,000 to perform surveys.

Initially it was planned that registered boat owners would be used for the survey. Difficulty in gathering boat registration data from the Bureau of Motor Vehicles forced an adjustment in the pool of potential survey participants from registered boaters to licensed anglers.

The purpose of conducting this survey was to learn how much knowledge Indiana licensed anglers have concerning AIS, where they receive their information, and what they currently do and are willing to do to stop the spread of AIS. With the answers gathered, the Indiana Department of Natural Resources (DNR) Division of Fish and Wildlife will strive to improve AIS awareness throughout the state by enhancing public outreach and education efforts. These efforts will hopefully affect behaviors and therefore slow the spread of AIS.

METHODS

The survey was created through the computer program SurveyGold, and responses were gathered, analyzed, and converted through the program. Most of the questions used in the survey came from AIS boater surveys conducted in other states. Similar questions were used in order to make comparisons to AIS knowledge and participation in prevention methods in other states. Additional questions were added and some questions were adjusted to make the survey relevant to Indiana's AIS concerns. The survey in its entirety can be found in Appendix 1.

Once the survey was developed, it was made available to participants in electronic format. The AIS survey was first uploaded to an Indiana DNR web page at www.in.gov/dnr/surveys/IndianaAquaticInvasiveSpeciesSurvey.htm. The link for the web page was sent out via e-mail (Appendix 2) to licensed anglers who at the time of

electronic license purchase voluntarily registered their e-mail accounts. These e-mail accounts were part of a dataset that has been collected since September 2005. The computer program Statistical Analysis Software stratified the potential participants by county and randomly chose them based on their weight in the dataset as a whole, meaning counties with more registered e-mail accounts received more requests to participate in the survey. Since the responses gathered through the program were anonymous, there was no way to recognize those persons that did not take the survey, and therefore, no second effort was made to encourage them to participate.

Overall, 11,092 e-mails were sent out with a link to the web page containing the survey and requesting the participation of the recipient. The minimum goal of the survey was to gather 1,000 completed surveys. The e-mails were sent in two waves. First, 5,047 e-mails were sent out on June 23, 2008, with 71 returned as undeliverable. After a few days it was clear that 1,000 surveys would not be returned from the first set of selected participants. A second wave sent on June 26, 2008 contained 6,045 e-mails, with 105 returned as undeliverable and one reply stating the person had already received the request during the first wave. Responses were acquired until the survey was closed on July 28, 2008. Though more responses may have been submitted after the acceptance period expired, they are not included in this report.

SURVEY RESPONSES

SurveyGold software provided a security option that ensured that no one person could submit a survey more than once from the same computer. Responses were gathered through SurveyGold and were then converted to Microsoft Excel tables. Of the 10,825 valid accounts that received e-mails, 1,015 people took time to complete and submit their responses within the time period from June 23 to July 28, 2008, giving the survey a response rate of 9.4%. Overall, 91 counties were represented in the survey, with only Vermillion county not submitting a response.

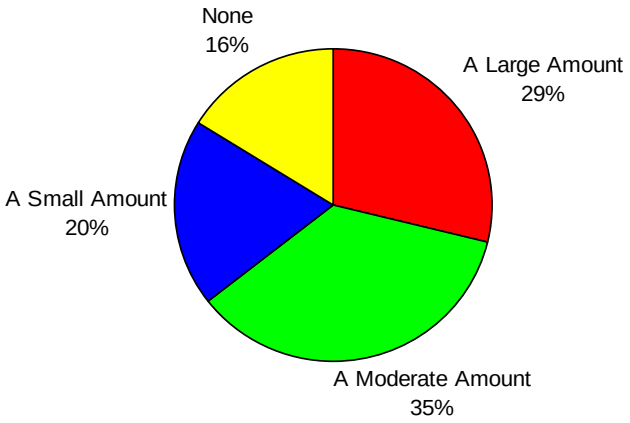
RESULTS OF SURVEY

General Knowledge of Aquatic Invasive Species

Respondents were asked to rank their knowledge (large, moderate, or small amount or none) on eight AIS: zebra mussel, Eurasian watermilfoil, purple loosestrife, Viral Hemorrhagic Septicemia (VHS), Asian carp, Brazilian elodea, hydrilla, and round goby.

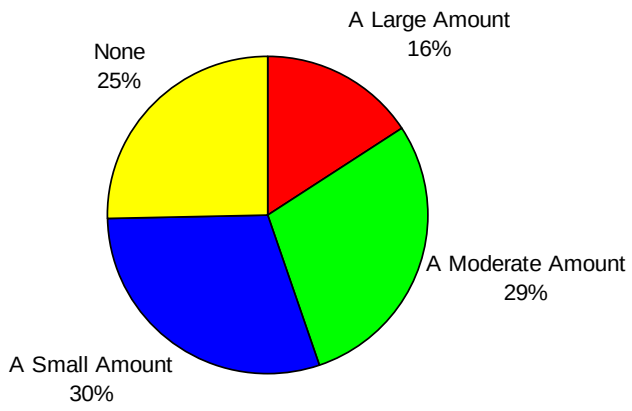
There were only two AIS where there were more respondents who knew at least a small amount about the species than knew nothing. Zebra mussel was the most well-known of the eight species with 84% having at least some knowledge of the species (Figure 1) and also had the most responses of a "large amount" (29%). The wide knowledge of zebra mussel was expected. Zebra mussels were discovered in U.S. waters exactly 20 years ago in Lake Erie. The quick spread of this species throughout the Great Lakes and other bodies of water received a large amount of media attention resulting in the kick off of AIS awareness. Although a number of other AIS have been present for a much longer period of time, the public could understand the threats that zebra mussels posed. This species quickly began colonizing water intakes restricting their capacity, they were a recognized threat to the base of the food web which could have devastating effects on sport fish populations, and even swimmers were impacted when shells cut their feet.

FIGURE 1. ZEBRA MUSSEL AWARENESS



Asian carp, a group of fish comprising bighead, black, grass, and silver carp, were known by a considerable proportion of the respondents with 75% of people having at least a small amount of knowledge (Figure 2). These numbers were somewhat expected even though the problem is relatively new. The media coverage that Asian carp have received from local and national news sources has spread knowledge effectively. The public pays attention when video footage shows 30 pound silver carp leaping into boats and sometimes hitting occupants. This awareness may be more strongly related to boating safety rather than awareness of the tremendous ecological threats this group of fish poses.

FIGURE 2. ASIAN CARP AWARENESS



The respondents' knowledge of the three species of submerged aquatic vegetation which included hydrilla, Eurasian watermilfoil, and Brazilian elodea, was a large drop from zebra mussel and Asian carp awareness. Of the three, hydrilla was the most well known with 43% knowing at least a small amount (Figure 3). Hydrilla has been known to occur in Indiana only since 2006 and is currently restricted to Lake Manitou in Fulton County. Since its discovery, hydrilla has been one of the largest targets of Indiana's AIS outreach and education efforts, especially in the natural lakes region of Northern Indiana. These numbers, though still low, show promise that outreach efforts can quickly reach the target audience.

FIGURE 3. HYDRILLA AWARENESS

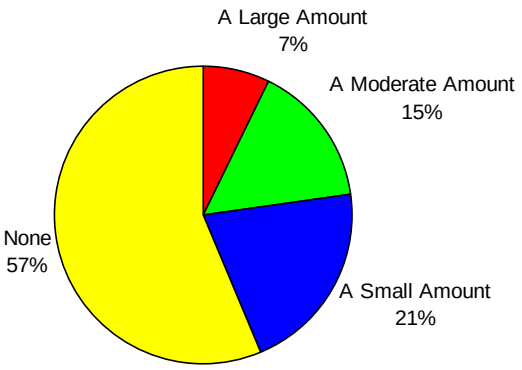
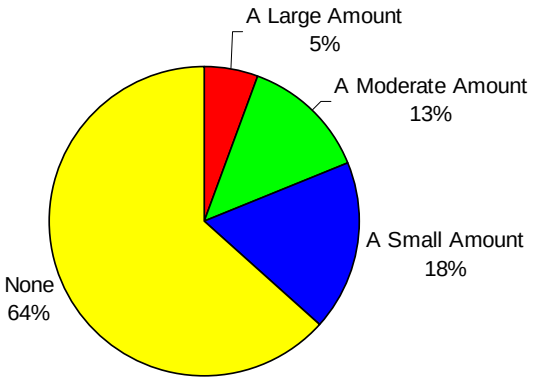
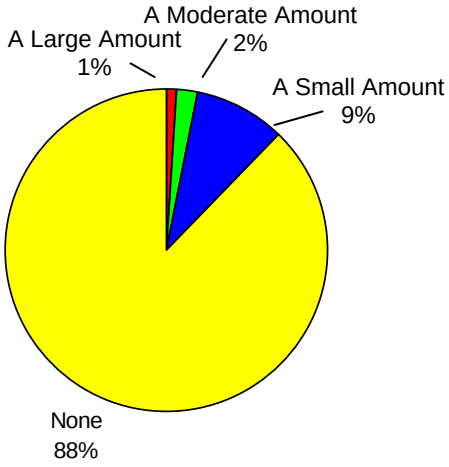


FIGURE 4. EURASIAN WATERMILFOIL AWARENESS



Eurasian watermilfoil invaded Indiana long ago and is now widely spread throughout the state. Despite its long history in the state, there was very little awareness of the plant with 64% of the respondents knowing nothing about it (Figure 4). Although current outreach efforts focus on encouraging people to watch for and report new invasive species, it is certainly disappointing that more people were not aware of Eurasian watermilfoil. Though many have certainly seen the nuisance conditions that Eurasian watermilfoil can commonly create, they may have considered it to be just another aquatic weed rather than recognizing it as an AIS. Unfortunately, if it is not recognized as an AIS by the public, they are probably not taking all of the necessary steps to prevent its spread.

FIGURE 5. BRAZILIAN ELODEA AWARENESS

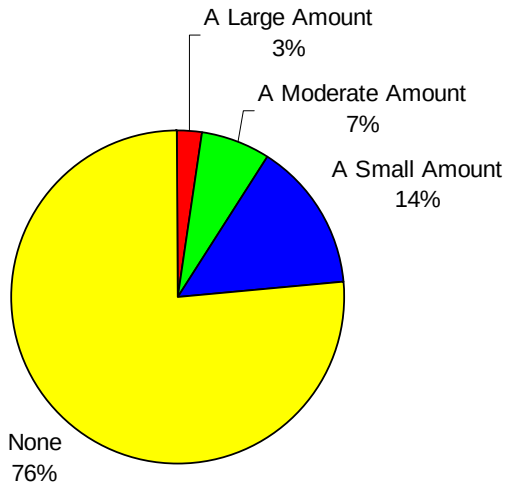


The awareness of Brazilian elodea, with just 12% responding they knew at least a small amount, was very disappointing for a new invader that has been the focus of heavy outreach (Figure 5). A mere 1% of the respondents said they knew a large amount about this plant. As opposed to hydrilla, Brazilian elodea has showed up in smaller waters with the only sizeable public water infested being 109 acre Griffy Lake in Bloomington. Nearly all of the 20 Brazilian elodea populations that either currently or once existed in the state are small private bodies of water. With Griffy Lake being relatively small, news of this AIS probably did not reach people from a large geographic

area. Relatively few people were probably impacted or paid attention when access to Griffy Lake was restricted while Brazilian elodea was being eradicated. Small private waters infested with Brazilian elodea really only impacts the owner of the water or shoreline residents.

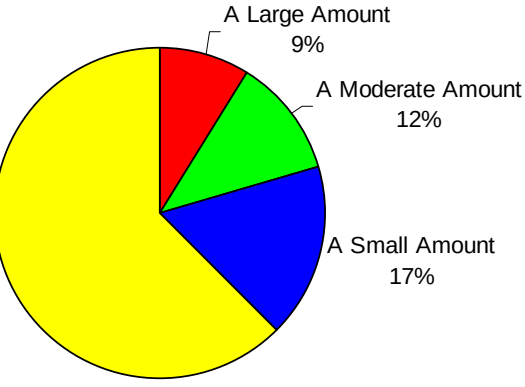
Viral Hemorrhagic Septicemia (VHS) is a newly introduced fish disease that is found in the Great Lakes region but has not yet been discovered in Indiana's waters. The absence of the disease in the state is likely why the awareness responses were disappointing with just 24% knowing at least a small amount (Figure 6). Education efforts have been high through a number of sources in the state and Great Lakes region ever since the disease was discovered, but Indiana anglers do not seem to be informed. This may indicate that little attention will be paid to this disease until it actually begins impacting fish populations in the state.

FIGURE 6. VHS AWARENESS



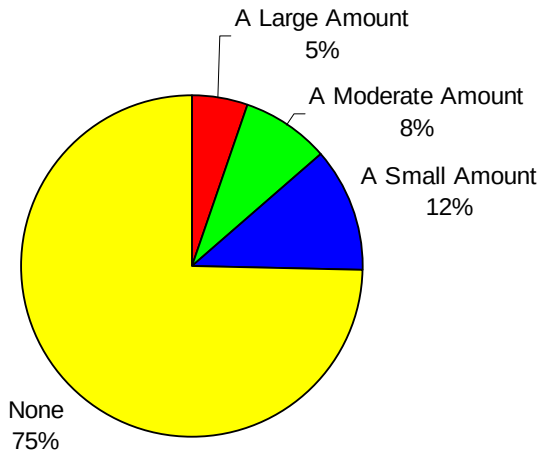
Round goby is another problem that has yet to make it into Indiana's lakes, streams, and rivers beyond Lake Michigan and its connecting waters, but it is a threat that the public needs to be aware of. Only 38% of the respondents had any awareness of round goby and 62% knew nothing of this species (Figure 7).

FIGURE 7. ROUND GOBY AWARENESS



Purple loosestrife is another widespread invader with low public awareness. Three-quarters of those surveyed had no knowledge of purple loosestrife (Figure 8). A high priority has not been placed on outreach and education for purple loosestrife due to its wide spread distribution. This can explain the lack of awareness. The beauty of this plant when in bloom may also lend to people enjoying purple loosestrife rather than deploring its high invasiveness in wetlands.

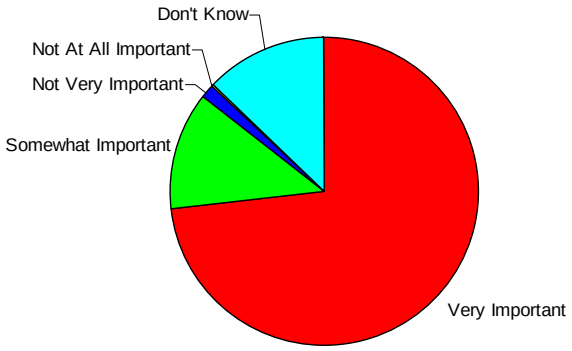
FIGURE 8. PURPLE LOOSESTRIFE AWARENESS



Importance of Preventing the Spread of Aquatic Invasive Species

Respondents were asked to rank the importance of preventing the spread of each AIS. Responses correlated with the general knowledge of each species. If knowledge of the AIS was high, the level of importance to prevent its spread was high. Even when knowledge was low, still nearly half the respondents (47%) thought that it was "very important" to prevent the spread of that AIS. Responses of "not at all important" or "not very important" were less than 3% of the responses for each AIS (Figures 9 through 16). It is very encouraging to know that if people are made aware that a species is an invasive threat, then they feel that it is important to prevent its spread to other waters.

FIGURE 9. ZEBRA MUSSEL IMPORTANCE TO PREVENT SPREAD



Nearly three quarters of the respondents feel that it is very important to control the spread of zebra mussel while just 13% were unsure about the need to prevent spreading. Asian carp also had high responses for "very important" to prevent their spread (63%) and low responses of "don't know" (22%). Unfortunately, a full 1% of respondents felt it is not at all important to keep them from spreading.

FIGURE 10. ASIAN CARP IMPORTANCE TO PREVENT SPREAD

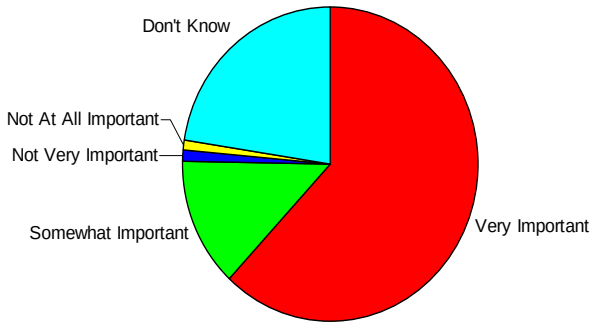


FIGURE 11. HYDRILLA IMPORTANCE TO PREVENT SPREAD

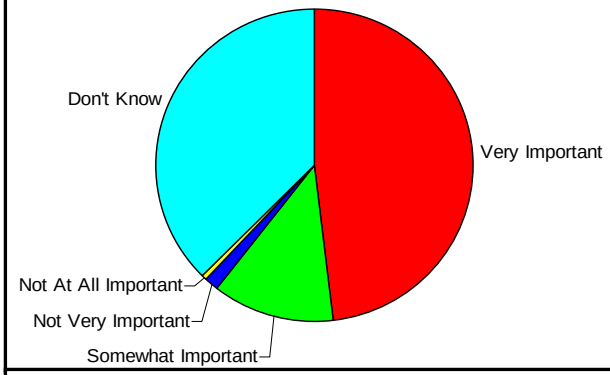


FIGURE 12. EURASIAN WATERMILFOIL IMPORTANCE TO PREVENT SPREAD

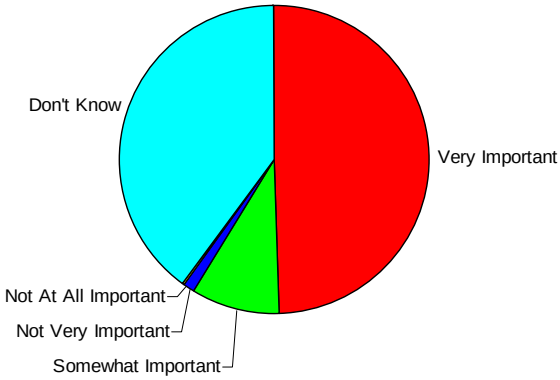
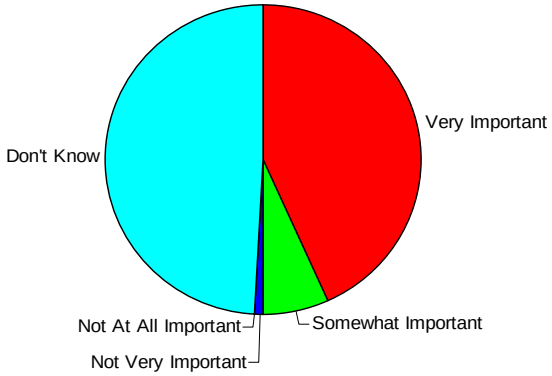


FIGURE 13. BRAZILIAN ELODEA IMPORTANCE TO PREVENT SPREAD



The responses for the importance of preventing the spread of Brazilian elodea reflect the fact that it was the least known of the eight species. It had the lowest responses for "very important" (43%) and the highest "don't know" response (49%).

FIGURE 14. VHS IMPORTANCE TO PREVENT SPREAD

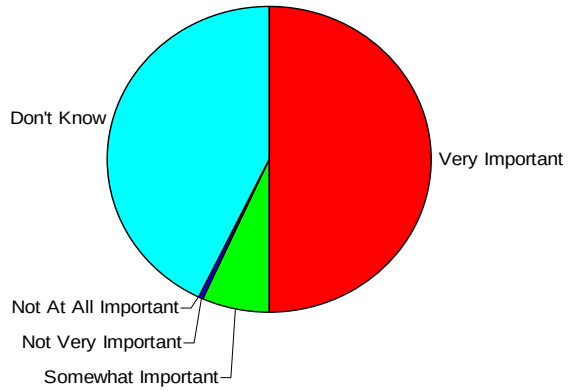


FIGURE 15. ROUND GOBY IMPORTANCE TO PREVENT SPREAD

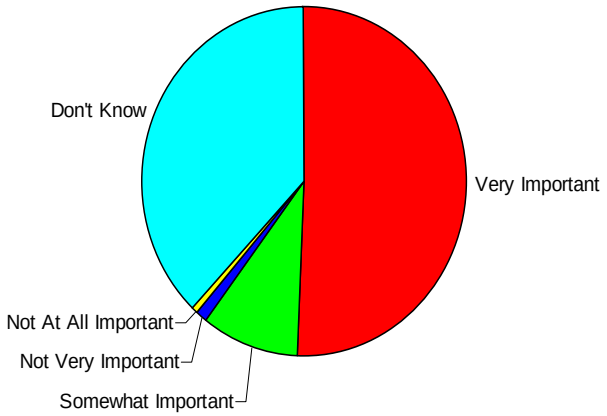
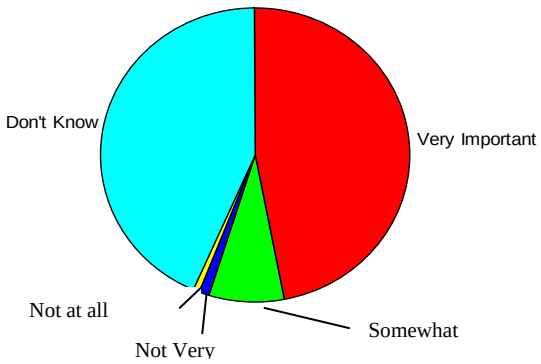


FIGURE 16. PURPLE LOOSESTRIFE IMPORTANCE TO PREVENT SPREAD



Sources of Information on AIS

In order to enhance AIS outreach programs, four series of questions were asked to determine how future efforts for public outreach and education should be disseminated. The first series was aimed at finding out where respondents have previously received their information on AIS. From a list of sources, respondents were asked if they received information from each source or if they didn't know. Newspaper articles, magazine and newsletter articles, and fishing and boating regulation pamphlets were each answered "yes" to by more than half the respondents (Table 1). Television news or programs, internet web sites, and signs and information provided at marinas or boat launches also received a high number of "yes" responses. Low responses with fewer than 10% having

heard or read AIS information from them included radio public service announcements, billboards, educational videos, and hot line or information clearinghouses. An option was given for people to list other sources they received information from. Most answers listed here were "word of mouth" (32).

Newspaper articles (62%) and magazine or newsletter articles (64%) scored the highest of the group. These two sources were expected to receive a high number of responses as an important source since there are many varieties of publications widely available.

Fishing and boating regulation pamphlet positive responses were surprisingly high. Over the last three years, there has only been a half-page dedicated to AIS in the Indiana Recreation and Fishing Guide yet 54% of respondents said they heard or read about AIS from this publication. More information placed in a variety of places throughout the publication may elevate this even more as an important source of AIS information.

Television news or programs (44%) was also among the highest, though it received fewer responses than expected. More coverage of AIS problems by local and national television news programs or television shows devoted to outdoor recreation would likely raise that percentage in the future.

Internet web sites scored high with 45% using this as a source of AIS information. There are numerous sites devoted exclusively to AIS and other types of websites including news, fishing, and outdoor sites also occasionally touch on AIS issues. Indiana DNR has a website devoted to invasive species, www.invasivespecies.in.gov, where abundant information pertinent to AIS and Indiana's bodies of water has been available for over three years.

A total of 44% of the respondents indicated that signs or information provided at marinas or boat launches provided them with information on AIS. Considering that many respondents might not even have a boat or ever visit a boat launch, this number is encouragingly high and represents an important location to provide information. For

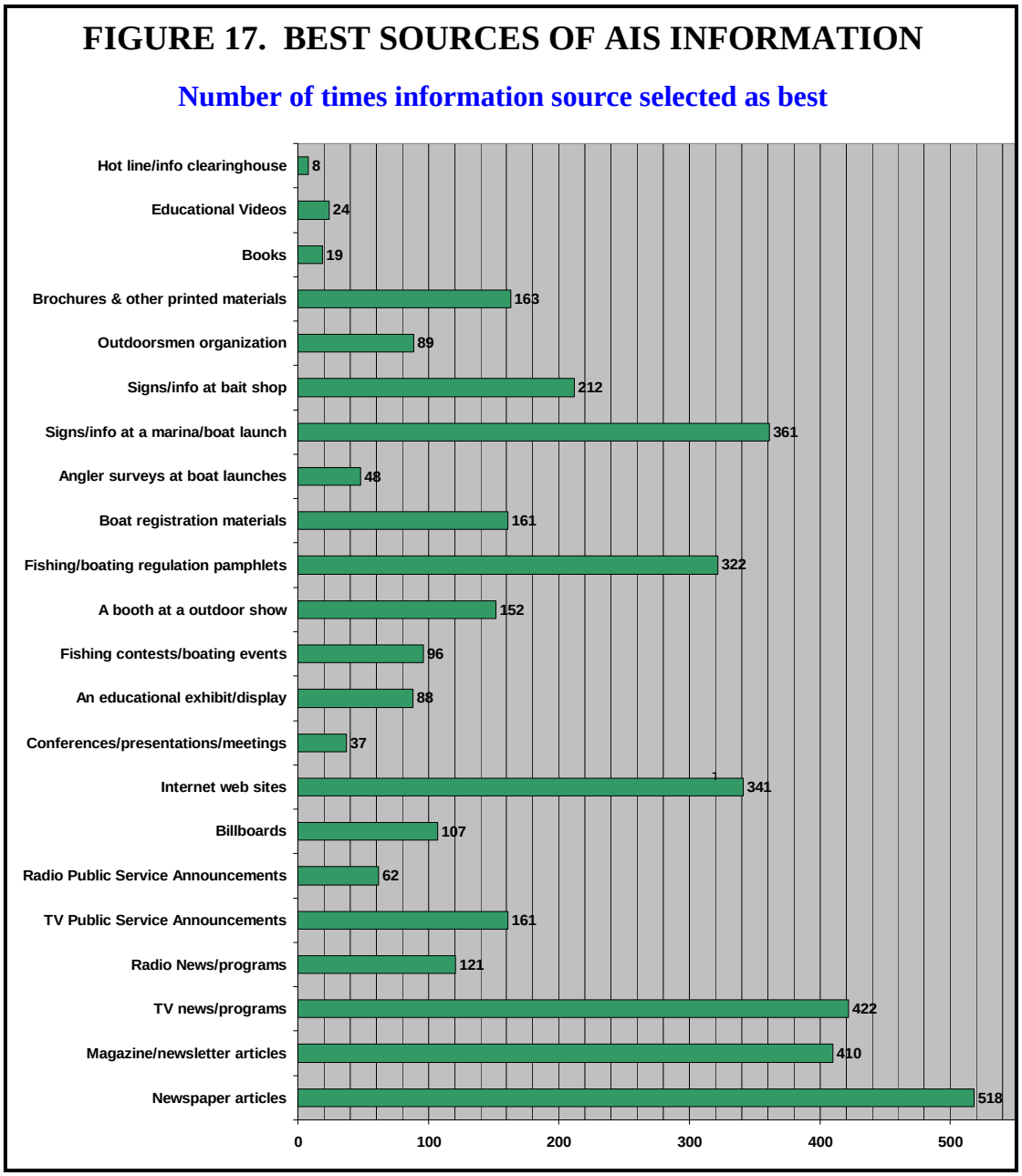
Table 1. Sources of AIS Information Yellow denotes effective sources. Red denotes ineffective sources.	Yes	No	Don't Know
Newspaper Article	62%	34%	4%
Magazine or Newsletter Article	64%	32%	4%
Television News or Program	44%	52%	4%
Radio News or Program	17%	76%	7%
Television Public Service Announcement	12%	80%	8%
Radio Public Service Announcement	6%	86%	8%
Billboard	8%	85%	7%
Internet Web Site	45%	50%	5%
Conference, Presentation, or Meeting	11%	83%	6%
Educational Exhibit or Display	27%	68%	5%
Fishing Contest, Derby, or Boating Event	21%	73%	6%
Booth at a Sport or Fishing Show or Similar Event	31%	63%	6%
Fishing or Boating Regulation Pamphlet	54%	41%	5%
Boat Registration Materials	21%	70%	9%
Angler Survey at Boat Launch	13%	79%	8%
Signs/Information Provided at Marina/Boat Launch	44%	49%	7%
Signs/Information Provided at Bait Shop	36%	56%	8%
Sport, Fish, Boat, or Environmental Organization	27%	65%	8%
Brochure, Species Identification Card, Fact Sheet	33%	60%	7%
Books	13%	80%	7%
Educational Video	3%	89%	8%
Hot Line or Information Clearinghouse	1%	91%	8%

those who launched at DNR-owned public access site in 2007, they likely saw the new "Stop Aquatic Hitchhikers" signs that have been posted at every site (Appendix 3). "Stop Aquatic Hitchhiker" is a national campaign aimed at educating aquatic users on simple steps they can take to prevent the spread of AIS.

Best Sources of Information on AIS

After completing the first series of questions in this section, the second question asked respondents to select up to four of the best sources of information on AIS (Figure 17).

FIGURE 17. BEST SOURCES OF AIS INFORMATION



The responses nearly mirrored those from the first series with the top responses being newspaper articles, magazine and newsletter articles, television news and programs, internet web sites, fishing and boating regulation pamphlets, and signs or information provided at access facilities. The lowest responses were for radio public service announcements, conferences or meetings, angler surveys at boat ramps, books, educational videos, and hot lines or information clearinghouses.

Motivation for Preventing the Spread of AIS

In a third series of questions relating to sources of information on AIS, respondents were asked how influential certain things would be at getting them to take steps to prevent the spread of AIS. Respondents could answer very effective, somewhat effective, not very effective, don't know/no opinion, or they could answer that they have already been led to action by that influence.

Talking with friends or acquaintances was fifth in the number of responses for "has already led you to take action" (16%) and 40% felt it would be effective at convincing them to take prevention steps (Table 2). As shown by respondents in their answers to the "other" option in the first series, word of mouth seemed to be a very important way respondents received information, and here it is shown that a considerable number of the people have already been influenced to take action by talking with friends and acquaintances.

A sense of personal responsibility was the largest in terms of people who had already been led to take action (28%). It was also rather high in "would be very effective" responses (51%). It is good to know that people feel that everyone has a role in ensuring the protection of Indiana's lakes, streams and rivers from invasions of AIS.

Similar in subject, the "desire to keep AIS out of our lakes and streams" received 27% of people's responses that it already leads them to take action. Those who answered "would be very effective" comprised 55% of the responses. This again shows Hoosier's desire to keep Indiana's waters and wetlands free from AIS.

Table 2. Motivations Leading to Actions To Prevent AIS Spread Yellow are effective sources. Red appear ineffective.	Has Already Led You to Action	Would be Very Effective	Would be Somewhat Effective	Would Not be Very Effective	Don't Know/No Opinion
Talking With Friends or Acquaintances	16%	40%	30%	5%	9%
A Sense of Personable Responsibility	28%	51%	14%	1%	6%
A Desire to Keep AIS Out of Our Lakes and Streams	27%	55%	11%	1%	6%
A Desire to Prevent Damage to Your Boat or Equipment	19%	56%	12%	4%	9%
Laws or Regulations to Prevent the Transport of AIS	10%	53%	20%	9%	8%
Enforcement Checks on the Road or at Boat Launches to Catch Violators	6%	54%	20%	11%	9%
Fines that Must be Paid by Violators	7%	54%	20%	11%	8%
Media Sources (Newspapers and Radio and TV News/Programs)	8%	52%	29%	5%	6%
Television or Radio Public Service Announcements	6%	50%	29%	8%	6%
Magazine or Newsletter Articles	10%	48%	30%	6%	6%
Internet Web Sites	10%	46%	29%	8%	7%
Fishing or Boating Regulation Pamphlets	14%	53%	23%	4%	6%
Conferences or Workshops for Boaters and Anglers	4%	36%	32%	17%	11%
Brochures, Species Identification Cards, Fact Sheets, or Other Printed Materials	11%	51%	25%	5%	7%
Signs at Marinas and Boat Launches	18%	55%	19%	2%	6%
Creel Surveys or Inspection-Education Programs on Roads or at Boat Launches	7%	43%	31%	8%	11%
Videos or Other Presentations to Boating, Lake, and Sporting Associations	4%	36%	34%	15%	11%

Personal property is always a concern and users certainly do not want to damage their equipment as a result of AIS. More than half of the respondents said that preventing damage to their boat or equipment would be effective to convince them to prevent the introduction and spread of AIS. One in five said the desire to protect equipment already causes them to take actions.

As it was in the previous series, signs at marinas and boat launches ranked high again. 18% indicated it already leads them take action and 55% saying it would be very effective. A simple reminder through the use of a sign at a boat ramp appears as though it would create action by users.

The least effective influences were billboards, conferences or workshops, and videos or other presentations to boating, lake, or other sporting associations. Each of these

influences only received 4% of people's responses for "has already led you to take action." Both billboards and conferences and workshops received 17% of the respondents saying the influence "would not be very effective" in getting them to take action and videos or presentations received 15%. AIS prevention billboards have not been used in Indiana but a number of states are investing heavily in billboards as an outreach tool for AIS. This survey indicates they would be one of the least effective outreach strategies. Responses to both videos or presentations and conferences or workshops seem appropriate as many people do not wish to attend something that would take a large amount of time to receive information.

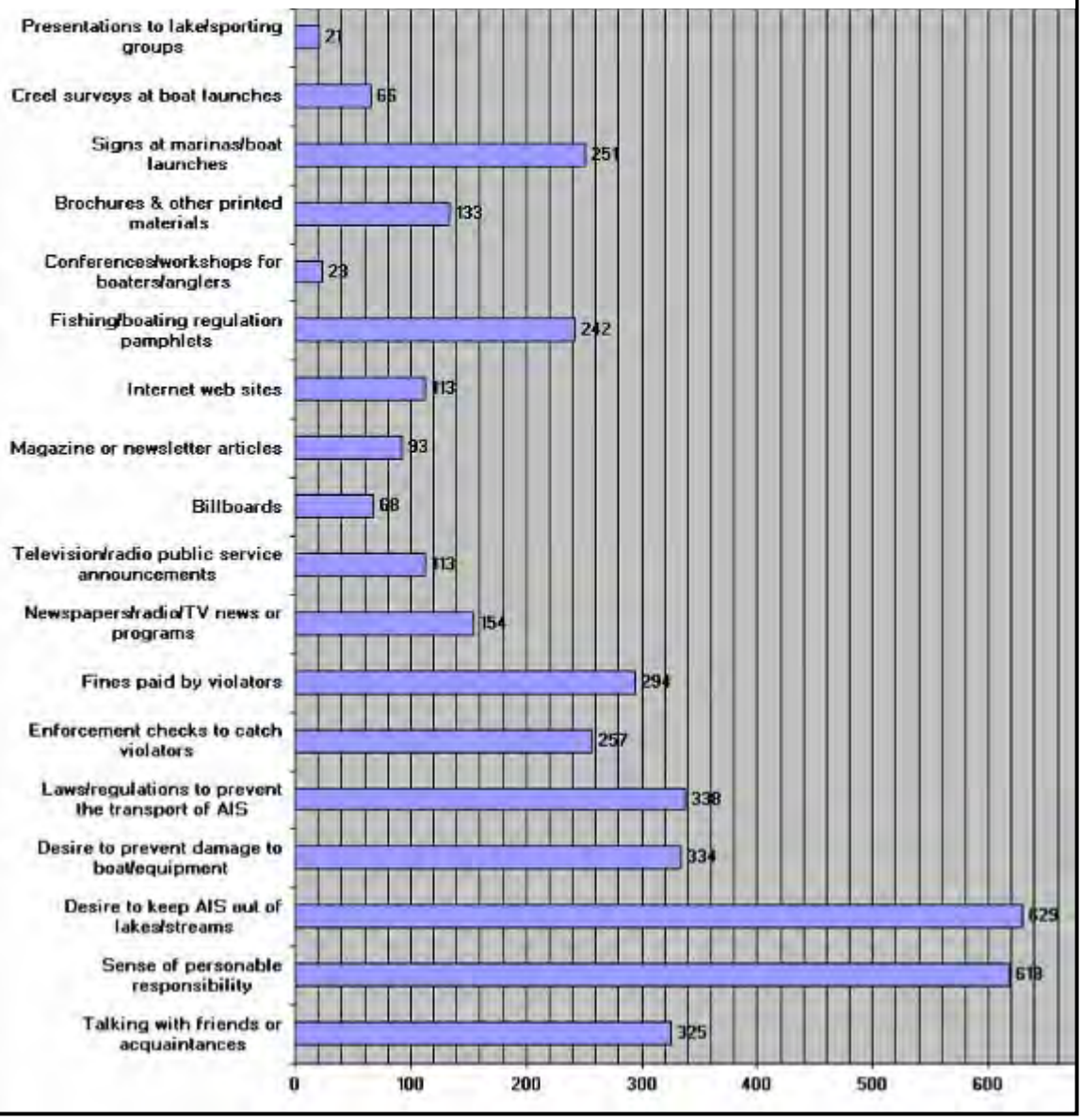
Fines paid by violators and enforcement checks on roads or at boat launches both had 11% of the respondents say that it would not be very effective. The two, however, also had "would be effective" responses of 54%. Comments to the survey were solicited at the end of the survey and a number of people suggested that enforcement, fine, and laws coming down hard and punishing people would be less effective than simply informing the public on AIS.

Most Effective Motivation or Influence

The last in the series of questions dealing with how people are influenced to prevent the spread of AIS, respondents were asked to select up to four of the most effective motivations or influences. These numbers somewhat reflected responses from the previous question, but this time laws and regulations to prevent the transport of AIS and the enforcement and fines associated with such regulations scored rather high where in the previous series they did not (Figure 18). A desire to keep AIS out of Indiana's lakes and streams was most commonly selected followed closely by a sense of personal responsibility. Again, conferences and workshops and videos and presentations scored low.

FIGURE 18. MOST EFFECTIVE MOTIVATION OR INFLUENCE FOR PREVENTING THE SPREAD OF AIS

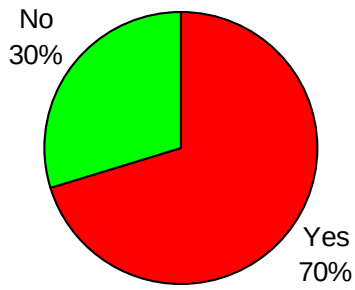
Number of times motivation selected as best



Boating Questions

Respondents were asked whether they boated in 2007. Answering "no" to this question took respondents to questions near the end of the survey and they did not have to answer questions only relevant to people who used boats in 2007. Those who responded "yes" (70%) were taken to more questions related to boating (Figure 19).

FIGURE 19. DID YOU USE A BOAT IN 2007?



Respondents were asked to select each type of boat that they used in 2007. Small powerboat greatly outnumbered other boat types followed by canoes or kayaks and large powerboats. Boating use responses are found in Table 3.

Table 3. What Boats Did You Use in 2007?	Totals
Small Sailboat (Less than 20 Feet)	59
Large Sailboat (20 Feet or Longer)	8
Personal Watercraft (Jet Ski)	45
Duckboat	65
Small Powerboat (Less than 20 Feet)	447
Large Powerboat (20 Feet or Longer)	137
Canoe or Kayak	154
Driftboat or Raft	28
Other (includes houseboats and float tubes)	4

Those who boated were asked if they moved their boat from one body of water to another in 2007. Those who answered "no" were sent to questions later in the boating section of the survey. Those who responded "yes" (58%) were taken to more questions about actions involved in moving their boat or boats.

Those who indicated they moved their boats were asked, how many times the boat(s) stayed "IN the water" for a number of given time periods. "IN the water" time does not include time when the boat is on a lift, just time when the boat remains in contact with the water. As seen in Table 4, there were far more people that never allowed their boat

to stay in the water for more than one day, but there were a considerable number who allowed their boat to stay in the water for extended lengths of time. Boats in the water for extended periods of time are a risk, especially when zebra mussels are present in the body of water. The longer a boat is in the water, the more likely zebra mussels will colonize on the hull and in the motor. A boat encrusted with zebra mussels when could cause a new population if not properly decontaminated prior to transport to an uninfested body of water.

Table 4. Times Boat was "IN Water" for Given Period of Time Red denotes concerning responses.	None	1 - 3	4- 10	11 - 20	21 +
Times Boat was in Water for < 1 DAY	54	168	91	46	53
Times Boat was in Water for 2 TO 4 DAYS	309	74	24	3	2
Times Boat was in Water for 5 TO 14 DAYS	351	44	8	6	3
Times Boat was in Water for 15 TO 30 DAYS	372	30	3	4	3
Times Boat was in Water for > 30 DAYS	373	27	6	1	5

Similar to the "IN the water" question, respondents were asked how many times their boats were "OUT of the water" for each given time period. The recommendation is that in order for AIS hitchhikers to be killed, boats should stay out of the water and allowed to completely dry for at least five days before they are moved to another body of water. The numbers in Table 5 show that a considerable portion of boaters do not allow sufficient drying time.

Table 5. Times Boat was "OUT of Water" for Given Period of Time Yellow are favored responses. Red are concerning.	None	1 - 3	4- 10	11 - 20	21 +
Times Boat was out of Water for < 1 DAY	217	107	58	11	19
Times Boat was out of Water for 2 TO 4 DAYS	225	84	60	24	19
Times Boat was out of Water for 5 TO 14 DAYS	140	113	89	37	33
Times Boat was out of Water for 15 TO 30 DAYS	164	152	55	19	22
Times Boat was out of Water for > 30 DAYS	197	154	29	7	25

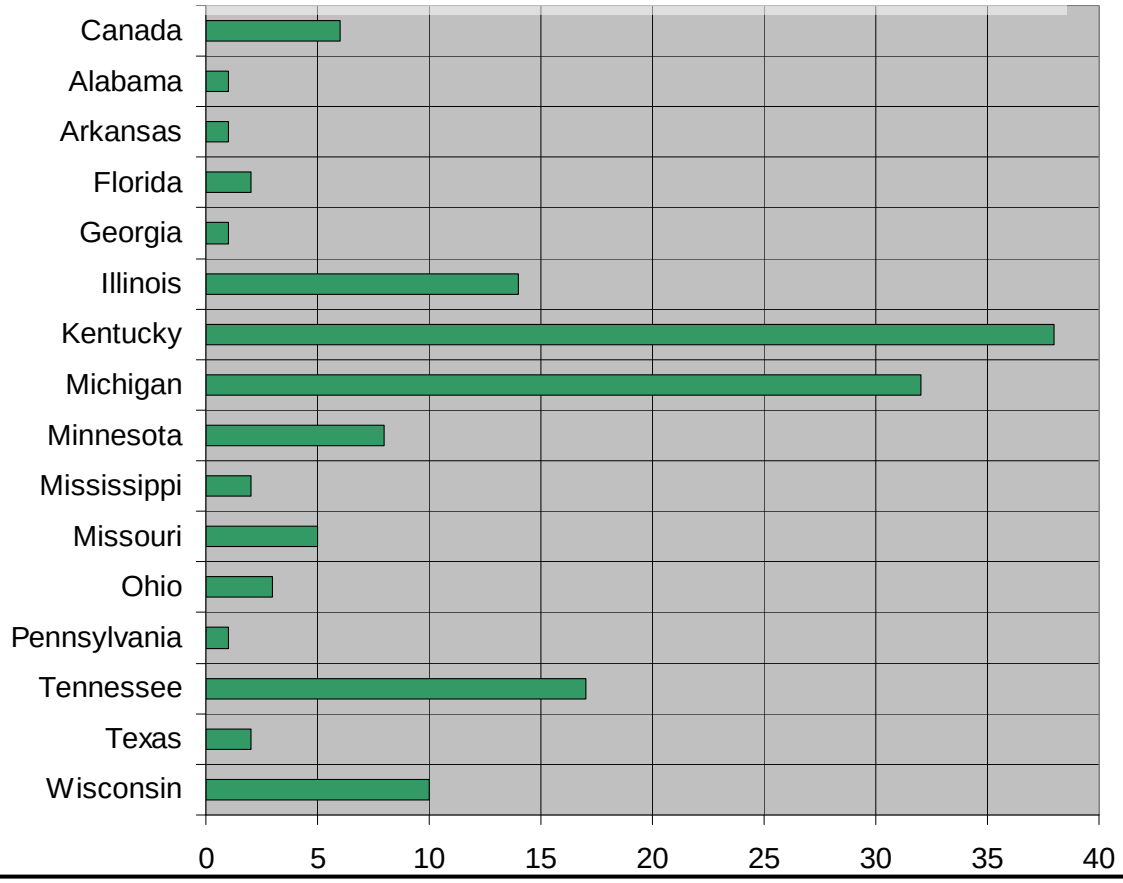
Respondents were asked to think about how far apart the bodies of water they traveled between were, and how many times they traveled those distances. Waters were ten miles or less apart 32% of the time, 41% were 11 to 50 miles apart, 22% were 51 to 150 miles, 4% were 151 to 500 miles, and only 1% moved more than 500 miles. Understanding this

can assist in predicting where AIS may be spread when they first get introduced into a region. Nearly three-fourths of the time boaters move 50 miles or less.

Respondents who moved boats were asked if they transported their boat to any bodies of water outside Indiana. Those who answered yes went on to answer a few more questions while those who stated they did not skipped ahead to other boating questions. Thirty-six percent of the respondents transported boats out-of-state, and they did so 613 times in 2007. Fifteen states outside of Indiana were visited as well as Canada (Figure 20). The four most visited states were Kentucky (38), Michigan (32), Tennessee (17), and Illinois (14). Since Illinois, Kentucky and Michigan all border Indiana, those numbers are fitting, and Tennessee is also within reasonable driving distance. Wisconsin received 10 responses as well, largely due to its reasonable distance from Indiana and strong fishing reputation.

FIGURE 20. STATES AND COUNTRIES VISITED

Numbers represent where individuals visited, not number of trips



Boating on Infested Waters and AIS Precautions

Survey participants who indicated they moved boats were asked whether they boated on infested waters in 2007. The responses to this question mirror the public's general lack of knowledge on AIS with 47% of respondents stating that they did not know if they boated on AIS infested waters (Figure 21). Responses of "yes" comprised 23% of the response and "no" made up the remaining 30%.

FIGURE 21. BOATING ON INFESTED WATERS

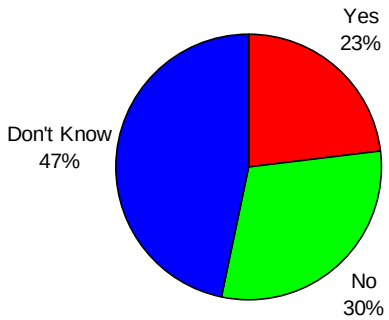
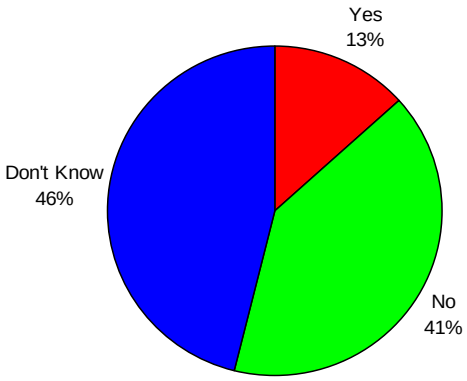


FIGURE 22. TRAVEL BETWEEN INFESTED AND UNINFESTED WATERS



Similar to boating on infested waters, 46% of the respondents did not know if they traveled between infested and uninfested bodies of water. Thirteen percent said they did travel between them and 41% said they did not (Figure 22). The "yes" responses are likely vastly underestimated because of the respondents' lack of knowledge of AIS. Many may not have been aware that they boated on infested waters especially those containing AIS plants which are quite abundant in Indiana.

Respondents were asked if they took any prevention steps to eliminate AIS before transporting their equipment to other bodies of water. Participants who took precautions comprised 56% of respondents, 44% did not. Those who said they took precautions were asked more questions on specific AIS prevention steps.

For those who indicated they did not take precautions when transporting equipment, a follow-up question was asked in hopes of finding out why AIS prevention steps were not taken. Those responses are listed in Table 6. The most concerning response, 208

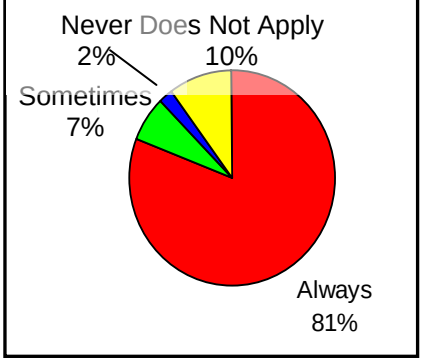
participants did not know what they could do to prevent the spread of AIS. This may be a reflection of the respondents' lack of knowledge of AIS. Other concerning responses included eight people who felt that precautions will not stop the spread of AIS, four said precautions are inconvenient, and two considered AIS as not being a problem.

Table 6. If You Don't Take Precautions, Why Not?	Totals
I Don't Believe it Will Stop the Eventual Spread of AIS	8
It's Inconvenient, I Don't Have Time to Take Precautions	4
I Don't Know Exactly What I Can Do to Prevent the Spread	208
I Didn't Boat on Infested Waters	61
I Don't Believe AIS are a Problem	2
Boat Washing Equipment was not Readily Available	46
Boat Stayed in Same Body of Water:	52
Other (includes rented boats)	20

Sixty-one participants indicated they did not take precautions because they did not boat on infested waters. While this seems like an acceptable reason, it is actually of concern. As demonstrated earlier, there is little awareness of many of the AIS, especially plants. Invasive plants are found in a large proportion of public lakes in Indiana. In addition, even if there is knowledge of particular species they may not be aware of precisely which waters are infested. Prevention steps are encouraged after equipment removal no matter whether a body of water is known to contain AIS or not.

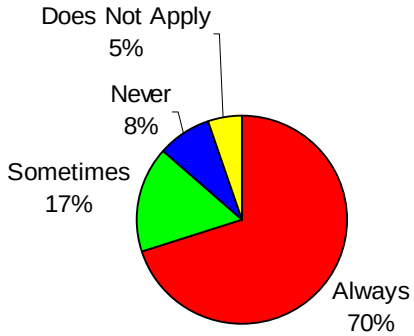
For those who indicated they did take precautions to prevent the spread of AIS, questions were asked to find out what steps they take and how often they take them. The prevention step that most participants (81%) indicated they always perform is draining of water from their boat (Figure 23). Draining water from the bilge, livewells, and other areas that hold water is critical since that water could potentially contain larval zebra mussels, other invasive invertebrates, or fish diseases like VHS.

FIGURE 23. DRAIN WATER FROM BOAT



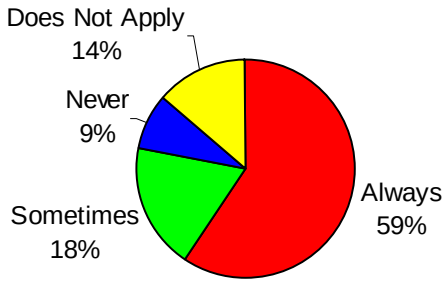
Visual inspection had the second highest responses of always at 70% when comparing the six precautions (Figure 24). Visual inspection combined with removal of AIS is probably the most important step to prevent the spread of aquatic plants. Inspection can also detect zebra mussels that may have colonized on a boat that sat in the water for a number of days.

FIGURE 24. VISUALLY INSPECTED BOAT



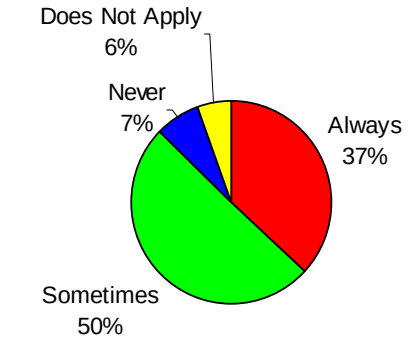
Avoiding the release of unwanted bait was performed by 59% of the survey participants (Figure 25). Bait should never be released into the water when an angler is finished fishing for a couple of reasons. First, AIS fish may be mixed with the minnows. If this is the case and a bait bucket is dumped into a body of water, a new population of invasive fish may become established. Second, bait not certified as disease free that is released could result in a new fish disease established in a body of water.

FIGURE 25. AVOID RELEASE OF BAIT



The most disappointing statistic in this group involved allowing a boat to dry for at least 5 days before launching into another body of water. Only 37% of respondents said they "always" allow sufficient drying time and 50% said they only do it "sometimes" (Figure 26). This is the simplest precaution to take and yet half of the respondents only did it "sometimes." Since many people do not rinse their boat or motor's cooling system, it is even more important that they allow their boat to dry for at least 5 days.

FIGURE 26. ALLOW BOAT TO DRY FOR 5 DAYS



Flushing the motor's cooling system and rinsing the boat with high pressure water were the least taken precautions with 44% never flushing their motor and 41% never rinsing their boats (Figures 27 and 28 respectively). Both prevention measures can effectively reduce the risk of moving zebra mussels and other AIS invertebrates. Pressure washing equipment can also remove hitchhiking plant fragments. These two were the least performed likely because they are the most time consuming, require the most physical effort, and some specialized equipment is necessary to perform the tasks. Both steps, however, are critical to prevent the spread of zebra mussels especially when proper drying time is not possible between trips to different waters.

FIGURE 27. FLUSH MOTOR'S COOLING SYSTEM

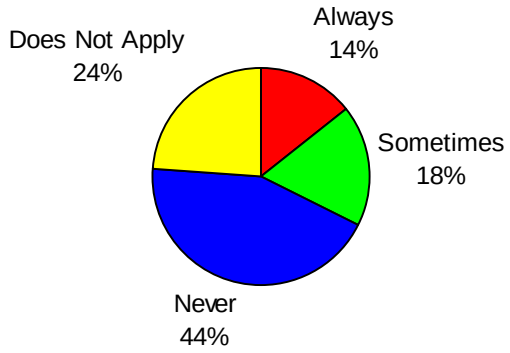
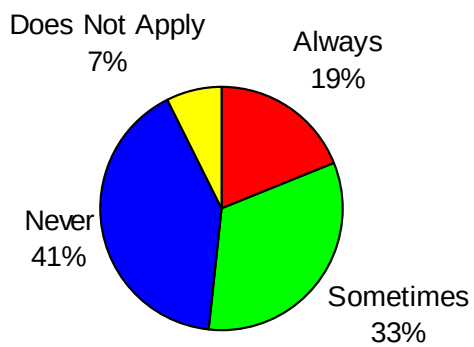


FIGURE 28. RINSE BOAT WITH HIGH PRESSURE WATER



After the results were gathered, analysis showed that only 3 respondents never took any of the six precautions, 92 performed only one, 143 took two steps, 194 did three preventions, 136 performed four, 56 did five, and 36 performed all six precaution steps.

After answering all of the questions related to taking precautions, respondents were asked how likely they were to take AIS prevention steps in the future. The vast majority (81%) said they would very likely take precautions, 15% indicated somewhat likely, 1% felt it would not be very likely, 1% said they would never perform prevention steps, and 2% said they never boat on infested waters.

Respondents who knew they boated on infested waters were asked how they knew the waters were infested. Signs at boat launches and marinas received the highest response

of 23% (Table 7). It is important to note that the AIS program has not made a big effort to make the public aware of each particular AIS in each of Indiana's waters through the use of signs. If users are conditioned to be told through signage when a threat is present in a body of water, when a sign is missing due to vandalism, the boaters are not likely to take precautions. Also, AIS may not be noticed at the initial stage of invasion so it is impossible to warn boaters of something not yet documented in a body of water. The main stress of the AIS program is that people must take steps to prevent the spread of AIS no matter whether something is known to occur in a body of water or not.

In relation to notification of an AIS being present in a body of water, for the last two editions of the Indiana Recreation and Fishing Guide, zebra mussel infested waters have been identified in the "Where to Fish" section. Nearly a quarter of the respondents said they received infestation information from signs at boat launches or marinas which are only occasionally posted, yet only 11% said they got the information from the fishing regulations publication. Zebra mussel positive waters are also shown at www.invasivespecies.in.gov yet only 5% of the participants said they got their information from web sites.

"Other" responses which participants were made aware of AIS included "personal visual identification" and "lake association meetings" and comprised 22% of the answers. People having heard about it from a friend or relative made up 18% of the responses.

Table 7. How Did You Know There Were AIS Present?	**Totals**
Sign or Poster at Boat Launch or Marina	23%
Brochure, Fact Sheet, or Flyer	8%
Fishing, Boating, or Waterfowl Regulation Pamphlet	11%
Internet Web Site	5%
Watercraft Educator/Inspector	1%
Media Sources (Newspaper, Radio, TV)	12%
Hot Line or Information Clearinghouse	<1%
Heard About it From a Friend or Relative	18%
Other (visual ID, lake meetings)	22%

AIS Problems Experienced

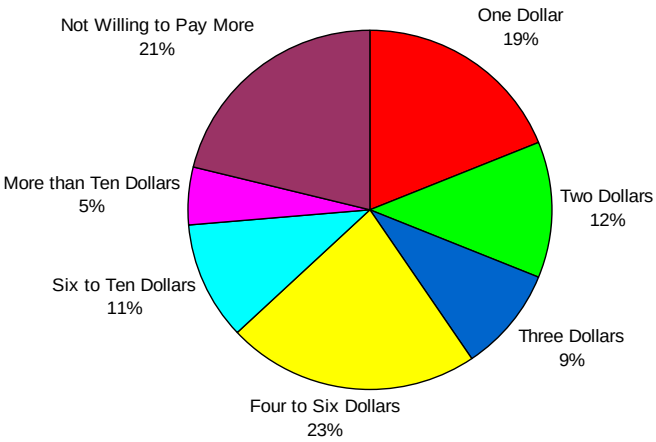
Those who did not use a boat in 2007 were taken from the "Did you use a boat in 2007" question ahead to this section, so the following were answered by all 1,015 respondents. When asked whether AIS caused them problems in 2007, only 84 respondents (8%) answered "yes". Though the responses were low, there are a few explanations that could contribute to the low affirmative responses to the question. It is quite feasible that since the general knowledge of AIS was low, especially toward plants, boaters and anglers may not have understood that dense weed growth, which lessened their recreation experiences, may have actually been an AIS plant. Eurasian watermilfoil is a nuisance in many Indiana lakes and in many instances impacts recreational use. Also, those people that experienced weedy waters in the past may have avoided those waters in 2007. Lastly, Indiana's Lake and River Enhancement Program (LARE) has assisted in the financing and planning of effective AIS weed control programs to keep them below a level that anglers and boaters would consider a nuisance.

Those 84 respondents who did have problems went on to answer how AIS caused them recreational loss, damages, and costs. Answers were grouped into categories and some respondents answered in multiple categories. There were 54 instances of recreational experiences that had been lessened because of the presence of AIS, 17 instances of damage or costs associated with broken or lost equipment, and 16 personal injuries.

Increased Fees to Assist in AIS Prevention and Control

All respondents were asked if they would be willing to pay more for their fishing license if that money went to help stop the spread of AIS. The numbers were surprising, as the highest number of responses (23%) indicated they would be willing to pay four to six

FIGURE 29. AIS FUNDING FROM FISHING LICENSE



dollars more to aid in AIS prevention and outreach (Figure 29). As expected, a considerable number of responses came from those who would not be willing to pay more (21%). Three times more people were willing to spend from one to six additional dollars for an annual fishing license than those who disagreed with paying more. Boat owners have been contributing $2 to $8 in recent years for AIS plant control projects to the Lake and River Enhancement Program (LARE) during watercraft registration. Non-boating anglers however have not assisted in funding AIS plant control efforts but yet have certainly benefited from LARE projects.

General Fishing Questions

Some general questions about fishing were asked in hopes of using the data to analyze AIS questions asked earlier in the survey. Respondents were asked how often they fished in 2007. The highest number of responses came from those who fished 1 to 5 times (27%), followed by 21 to 50 times (21%), and 6 to 10 times (20%) (Figure 30). Only 4% of respondents said they did not fish in 2007.

FIGURE 30. HOW OFTEN DID YOU FISH IN 2007?

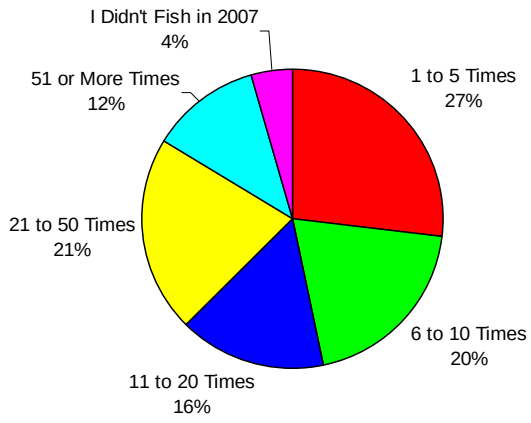
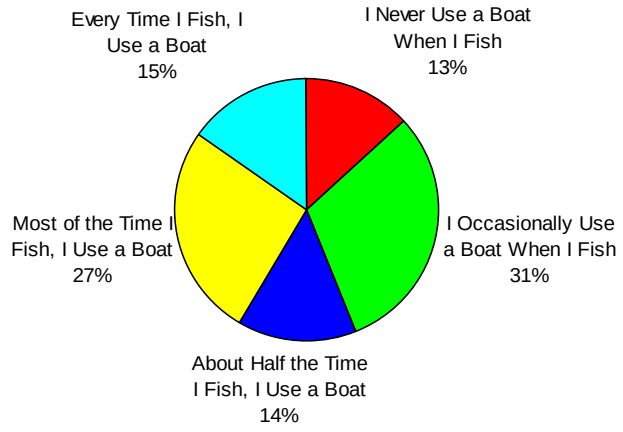


FIGURE 31. HOW OFTEN DO YOU USE A BOAT WHEN YOU FISH?



Respondents were also asked how often they use a boat when they fish. Those who occasionally use a boat when they fish (31%) had the highest number of responses (Figure 31). Those who never use a boat when they fish accounted for 13% of the responses, 27% of respondents said they use a boat most of the time, and 15% say they always use a boat.

Respondents were given categories of bodies of water in Indiana and were asked to estimate how many times they fished each of them. Natural lakes were the most popular destination and accounted for 34% of the total number of fishing trips estimated by respondents. Rivers and streams were used 21% of the time followed by farm and retention ponds (21%), impoundments (14%), gravel pits and coal strip pits (6%), and Lake Michigan (4%).

Bait use

Respondents were asked about the types of bait they used and how commonly they use each type. The most common baits used are artificial baits, earthworms or night crawlers, insects or larvae, and minnows purchased from bait shops (Table 8). Responses show that very few people collect bait minnows or crayfish from the wild, a good sign that the risk of AIS fish species spreading from untrained collectors is low. Also of concern with the collection of wild minnows is these fish may be carriers of diseases such as VHS. Most minnows purchased from bait shops are now screened for VHS prior to import into the state.

Table 8. Types of Baits Used	Almost Always	Sometimes	Never
Artificial Bait	49%	43%	8%
Minnows From Bait Shop	11%	51%	38%
Minnows Caught by Yourself	2%	15%	83%
Fresh Cut Bait	1%	20%	79%
Preserved or Processed Fish Parts	1%	10%	89%
Earth Worms or Night crawlers	34%	55%	11%
Insects or Larvae	15%	57%	28%
Leeches from Bait Shop	1%	15%	84%
Crayfish from Bait Shop	1%	12%	87%
Crayfish Caught by Yourself	<1%	12%	88%

Additional Comments

Respondents were given the opportunity to write additional comments at the end of the survey. A total of 286 respondents (28%) took advantage of the opportunity to provide comments, suggestions, appreciation, and ask questions. The responses were broken

down into categories and sub-categories. Twenty-five people commented on two categories, and 5 commented on three for a total of 312 comments. These comments are categorized in Table 9.

Table 9. Additional Comments	
General Comments	**Totals**
Had Not Heard of AIS	16
Thanking DNR for Their Service	5
Comments on Outreach	**Totals**
Who to Target	25
Need More Outreach	87
What/Where to Spread Outreach	62
Want to Know More About AIS	4
Encouragement on Efforts	18
Suggestions for Rules/Methods	54
Comments on How to Handle AIS	**Totals**
Comments on Fines/Laws (For, Against)	4,5
Comments on what Public Needs to Do	14
AIS Not a Problem	4
Comments on Raising License Fees (For, Against)	3,8
Comments on Survey	**Totals**
Comments for Improving Survey	3
Thanks for Sending the Survey	9

DATA ANALYSIS

After the information was gathered, converted into Microsoft Excel, and compiled into totals and percentages, data analysis was done using both SurveyGold and Excel. SurveyGold provided a feature that crossed two questions and provided instant results. Analysis was also performed in Excel to compare more than two questions. The

following is a more in depth look at the data through cross referencing questions and comparing groups of respondents based on their answers in the survey.

Top Sources of AIS Information and Taking Precautions

To find out if those who heard or read information about AIS were more likely to take precautions to prevent the spread of AIS, the top sources of AIS information were crossed with the question asking respondents if they took precautions before transporting their boat (Table 10).

Table 10. Top Media Sources and Taking Precautions

	Heard/Read about AIS In… Newspapers			
Do You Take Precautions?	**Don't Know**	**No**	**Yes**	**Total**
No	11	125	177	**313**
Yes	9	98	294	**401**

	Heard/Read about AIS In… Magazines			
Do You Take Precautions?	**Don't Know**	**No**	**Yes**	**Total**
No	17	129	167	**313**
Yes	5	75	321	**401**

	Heard/Read about AIS In… Sign/Info at Marina or Boat Launch			
Do You Take Precautions?	**Don't Know**	**No**	**Yes**	**Total**
No	21	185	107	**313**
Yes	18	119	264	**401**

	Heard/Read about AIS In… Internet			
Do You Take Precautions?	**Don't Know**	**No**	**Yes**	**Total**
No	22	180	111	**313**
Yes	14	153	234	**401**

	Heard/Read about AIS In… Fishing/Boating Regulation Pamphlets			
Do You Take Precautions?	**Don't Know**	**No**	**Yes**	**Total**
No	20	163	130	**313**
Yes	6	92	303	**401**

It was expected that those who heard or read information about AIS would be more likely to take precautions against its spread than those who received less information. The data

shows that the majority of those (67%) who heard or read of AIS also took precautions. Also, the majority of respondents (58%) who did not hear or read information on AIS failed to take precautions on spreading AIS. This proves that the more people know about AIS, the more likely they are to take precautions.

The expectation was those that did not take precautions were less likely to have heard or read information about AIS. However, 58% of those who failed to take precautions admitted they received AIS information from newspapers or magazines. Of those who didn't take precautions 40% said they received information from signs or information at a marina or boat launch, internet web sites, and fishing and boating regulation pamphlets.

It cannot be said that those who did not take precautions received no information on AIS, but as predicted, those who heard or read about AIS were more likely to take precautions. This data shows that AIS outreach and education have a vital role in getting people to take preventative steps to ensure that aquatic invasive species do not spread.

Knowledge of AIS and Boat Use

It was expected that boaters would have a greater knowledge of AIS than non-boaters. To test this, the questions concerning the respondents' knowledge of each AIS and if they boated in 2007 were compared. The majority (70%) of those who took the survey used a boat in 2007.

When all AIS were combined an average of 27% of those who boated in 2007 had a large or moderate amount of knowledge and 73% knew little to none (Table 11). Only 19% of those who did not boat had a moderate to large amount of knowledge and 81% knew a small amount or none. The survey shows that boaters are more aware of AIS than non-boaters, but the difference is not very significant. One reason the numbers are likely relatively close is because many non-boaters fished frequently. With such a low number of non-boaters who also did not fish in 2007, no reliable conclusions could be drawn about their level of knowledge.

Table 11. AIS Knowledge and Boat Use

	Did You Use a Boat in 2007?	
Zebra Mussel	**No**	**Yes**
Large Amount Moderate Amount	53%	69%
Small Amount None	47%	31%

Eurasian Watermilfoil	**No**	**Yes**
Large Amount Moderate Amount	8%	23%
Small Amount None	92%	77%

Purple Loosestrife	**No**	**Yes**
Large Amount Moderate Amount	11%	15%
Small Amount None	89%	85%

VHS	**No**	**Yes**
Large Amount Moderate Amount	5%	11%
Small Amount None	95%	89%

Asian Carp	**No**	**Yes**
Large Amount Moderate Amount	37%	48%
Small Amount None	63%	52%

Brazilian Elodea	**No**	**Yes**
Large Amount Moderate Amount	3%	3%
Small Amount None	97%	97%

Hydrilla	**No**	**Yes**
Large Amount Moderate Amount	14%	26%
Small Amount None	86%	74%

Round Goby	**No**	**Yes**
Large Amount Moderate Amount	12%	24%
Small Amount None	88%	76%

While the average of all AIS combined was relatively close, there were some species with a fair level of difference. Sixty-nine percent of boaters knew at least a moderate amount about zebra mussels while 53% of non-boaters had decent knowledge. In regards to Eurasian watermilfoil 23% of boaters had good awareness but just 8% of those who did not boat knew at least a moderate amount. Boaters also knew more about hydrilla, Asian carp, and round goby than non-boaters. The data shows that boaters are becoming aware of AIS, but again it shows that there is still more outreach needed for boaters and non-boaters alike.

Knowledge of AIS and Taking Precautions

To find out whether those who have a greater knowledge of AIS are more likely to take precautions against the spread of AIS, the questions concerning the respondents' knowledge of each AIS and if they took precautions before transporting their boats were compared. Since only 714 respondents were able to answer the question about taking precautions, only those respondents were analyzed in Table 12.

It was predicted that those who had good knowledge of AIS would be more likely to take precautions to prevent the spread of AIS. The numbers show that a majority of those who knew a large or moderate amount about each of the eight AIS listed also took precautions for an average of 72% across all species.

The presumption was that those who knew nothing about AIS would be more likely to fail in taking precautions. For those who knew nothing about the invasives in the survey only slightly fewer people (47%) took prevention measures than those who did not.

Table 12. AIS Knowledge and Taking Precautions

	Do You Take Precautions Before Moving Your Boat?		
Zebra Mussel	**No**	**Yes**	**Total**
Large Amount	56	165	221
Moderate Amount	107	166	273
Small Amount	79	49	128
None	71	21	92

Eurasian Watermilfoil	**No**	**Yes**	**Total**
Large Amount	11	40	51
Moderate Amount	26	90	116
Small Amount	51	91	142
None	225	180	405

Purple Loosestrife	**No**	**Yes**	**Total**
Large Amount	12	28	40
Moderate Amount	16	50	66
Small Amount	21	68	89
None	264	255	519

VHS	**No**	**Yes**	**Total**
Large Amount	2	22	24
Moderate Amount	13	39	52
Small Amount	30	83	113
None	268	257	525

Asian Carp	**No**	**Yes**	**Total**
Large Amount	28	98	126
Moderate Amount	83	133	216
Small Amount	106	110	216
None	96	60	156

Brazilian Elodea	**No**	**Yes**	**Total**
Large Amount	2	7	9
Moderate Amount	4	11	15
Small Amount	20	53	73
None	287	330	617

Hydrilla	**No**	**Yes**	**Total**
Large Amount	7	57	64
Moderate Amount	40	85	125
Small Amount	60	106	166
None	206	153	359

Round Goby	**No**	**Yes**	**Total**
Large Amount	12	58	70
Moderate Amount	26	75	101
Small Amount	42	86	128
None	233	182	415

Taking Precautions and Transporting Boats from Infested to Uninfested Waters

To find out if people who indicated they transported boats between infested and uninfested waters also took precautions, the results of these two questions were compared. This can also show what actions those people took when they were unsure whether they had moved boats between infested and uninfested waters (Table 13).

Table 13. Taking Precautions and Traveling Between Infested and Uninfested Waters

	Did Your Boat Move Between Infested and Uninfested Waters?			
Do You Take Precautions?	**Don't Know**	**No**	**Yes**	**Totals**
No	94	61	5	**160**
Yes	96	106	50	**252**
Total	**190**	**167**	**55**	**412**

It was expected that those who knew they transported boats between infested and uninfested waters would also take precautions against the spread of AIS. The numbers show that this is clearly true as 91% who boated between infested and uninfested waters did take prevention steps.

It is important to note that even though 167 respondents indicated they did not boat between infested and uninfested waters, a majority of those boaters (63%) still took precautions. This is encouraging since most people are not risking the spread of AIS even though they did not boat between infested and uninfested waters. This is a positive sign since many people appear to be unaware of Eurasian watermilfoil, certainly the most widespread invasive aquatic plant in Indiana, and they may not know that the waters they boat on actually contain this invasive plant.

For those who did not know if they transported their boats between infested and uninfested waters, the responses for those who did and did not take precautions were even. It is concerning that 46% of the boaters did not know if they boated between infested and uninfested waters and that only half of them took precautions. Informing the public of the ways they can help prevent the spread of AIS will be simpler than trying to

keep them informed of which waters are infested. This way, even if the public has no idea whether AIS are present, they will hopefully still take steps to prevent AIS spread.

Taking Precautions and How Often Respondents Fished

It is predicted that those respondents who fish more often would be more likely to take precautions. This was expected because these anglers are more likely to have seen the negative impacts of AIS due to the time they spend on the water than those who fish only occasionally. In order to prove this, responses from these two questions were analyzed.

As expected the amount of time an angler fishes is positively correlated to prevention steps taken (Table 14). Those who fished 5 times or less performed prevention steps only 36% of the time. Those fishing 6 to 10 times were equally split in whether or not they attempted to prevent the spread of AIS. Prevention by more frequent anglers increased steadily from 60% for those fishing between 11 and 20 times to 70% of those who fished greater than 50 times in 2007. Therefore, it can be said that the more experienced anglers are more likely to take precautions against the spread of AIS than those who fish relatively few times a year.

Table 14. Taking Precautions and How Often Respondents Fished

	Do You Take Precautions?	
How Often Did You Fish in 2007?	No	Yes
1 to 5 Times	93	53
6 to 10 Times	68	68
11 to 20 Times	50	75
21 to 50 Times	61	122
51 or More Times	32	75
I Didn't Fish in 2007	9	8

CONCLUSIONS AND RECOMMENDATIONS

The responses to this survey make one thing very clear, the public is unaware of most aquatic invasive species. Zebra mussel and Asian carp had relatively good awareness probably as a result of the national and regional media coverage that they have received. However, Indiana boaters and anglers seem to be woefully unaware of AIS plants and fish diseases. The responses to VHS, a fish disease in the Great Lakes basin that will likely arrive in Indiana waters in the very near future, is not too surprising since the impacts have not yet been felt by our anglers. Unfortunately, it may take a major fish mortality event before anglers start to take notice of the information on VHS that has been distributed and made available in a variety of sources. Many AIS plants such as Eurasian watermilfoil and purple loosestrife have each been present in the state for many decades and are present in many lakes and wetlands, yet there is little awareness. Many people probably feel that "a weed is a weed" and are not knowledgeable about which are desirable native aquatic plants and which are dangerous AIS. Aquatic recreational users must be made more aware of AIS fish, mussels and other invertebrates, plants, pathogens, and diseases through outreach. When people are knowledgeable about how AIS can negatively impact their recreational opportunities, they will be much more likely to understand why prevention methods being promoted are to be heeded.

Much was learned through the survey about where people get their AIS information and what means would be most effective at reaching the target audience. Those surveyed felt the best method to get information out about AIS and prevention steps included newspaper articles, magazine and newsletter articles, television news and programs, internet web sites, fishing or boating regulation pamphlets, and signs or information provided at a marina or boat launch. It was also learned that friends pass along AIS information to others. To improve information dissemination of AIS information, the following are recommended:

- Continue to utilize popular media sources to increase knowledge of AIS and prevention steps.

- Keep fresh, "newsy" items on the DNR invasives website and Division of Fish and Wildlife website. Websites with new information regularly added will encourage readers to visit frequently.
- AIS information in the DNR fishing guide should be eye-catching and found in a number of prime locations. Recently only a half page has been dedicated to AIS information and prevention steps
- Continue to use "Stop Aquatic Hitchhikers" campaign signs at DNR-owned boat ramps to remind users of the proper steps to prevent the spread of AIS. Also, other publicly-owned and private ramps should be encouraged to use the same message. When users become accustomed to the "Stop Aquatic Hitchhikers" logo and message, they will be reminded that they need to take action when they see these signs at boat ramps.
- Encourage those who heard or read about AIS to take precautions and then spread the word to inform their friends and relatives.
- Costs of some of the least preferred information sources should be carefully considered before investing in them. Billboards for instance were felt by the survey respondents to be one of the least effective strategies to encourage users to take action to prevent AIS spread.
- Angler creel surveys were not ranked high as a prime source of AIS information likely because the Division of Fish and Wildlife has not used the people conducting the surveys to disseminate information. If creel surveys are being done for other fish management purposes, this would be an inexpensive way to distribute AIS brochures to encourage education and promote prevention. Printing would be the only costs incurred by the AIS program.

There are many things that motivate people to prevent the spread of AIS. The top motivator was the desire to keep AIS out of lakes and streams. Aquatic recreational users sometimes observe the impacts AIS have had on Indiana waters and do not want the same unfortunate outcome to occur at other waters. Many respondents feel that it is their personal responsibility to prevent spreading invasives. Surprisingly, three of the top seven motivators survey participants selected as the most effective influences to prevent

AIS spread had to do with laws and regulations. They must feel that if there are not laws or regulations in place and enforcement and fines of such rules, boaters and anglers will not place much emphasis on proper prevention. To address this influence or motivator, the following is recommended:

- Investigate the adoption of rules aimed at the prevention and spread of AIS. Potential rules should focus on the movement of aquatic plants, water that could potentially contain zebra mussels, other invertebrates, diseases and pathogens, and movement of live fish that could either be invasive species or could be carriers of diseases and pathogens.

Most respondents were supportive of preventing AIS spread but unfortunately a large majority of those who fail to take precautions indicated that they do not know what they must do to avoid spreading AIS. The following are simple universal precautions that are aimed at stopping the spread of AIS:

- Drain all water immediately after equipment is removed from the lake or stream.
- Visually inspect all equipment after removal from the water and remove all plant fragments, animals, and mud.
- Dispose of unwanted bait in the trash. It should never be dumped in a body of water.
- Allow all equipment to completely dry for 5 days before launching into another body of water.
- If proper drying time is not possible or conditions are not suitable to complete drying, other steps should be taken to control AIS that may be present. A motor's cooling system should be flushed with hot water and the watercraft and trailer should be sprayed with high pressure hot water.

Another common response to why simple prevention steps were not taken was that survey participants indicated they did not boat on infested waters. It is likely that if people are not specifically told that a particular AIS is in a body of water they might consider it to be free of AIS. The mindset of boaters and anglers needs to change so that prevention is performed each time they visit a body of water. All waters should be

treated as if there are AIS present and precautions taken everywhere. Keeping up with signage as AIS populations are discovered would be very difficult as well as extremely expensive. Also, many populations are not even detectable until a considerable population has established which may take a few years.

The survey was able to give a clue as to how far AIS may be spread from an initial infestation in the state. Boaters reported that 32% of waters they traveled between were ten or less miles apart and 41% were 11 to 50 miles. Therefore, three-fourths of the trips were within 50 miles. If a new AIS becomes established in the state the search area for early detection at other waters should focus on waters within a 50 mile radius of the initial infestation although popular waters outside of this range may be important to search as well.

Respondents to the survey indicated they were willing to spend more for their fishing license if that money went to stopping the spread of AIS. Seventy-nine percent indicated they would support a $1 to greater than $10 increase for a fishing license to combat AIS. The median license increase of those that supported additional funding amounted to $3. Only 21% were not willing to pay more. Even a modest increase of just $1 for an annual fishing license could amount to over $400,000 in funding for additional AIS prevention and control.

The spread of AIS through the use of live bait has always been a concern but much more so now that VHS is present in the Great Lakes region. Live bait could have AIS fish and invertebrates mixed in with the fish. While minnows supplied to bait shops occasionally contain AIS fish, for the most part the suppliers do a pretty good job of providing clean shipments containing only the intended species. Many bait suppliers are now testing their minnows for VHS prior to shipment. Minnows and crayfish captured from the wild and used as bait have no such control when it comes to the presence of invasive species or pathogens. From the survey, 83% of the anglers never use wild caught minnows and 88% never use wild caught crayfish for bait. This is important to know if Indiana wishes

to pursue regulations restricting the use of wild caught bait. This shows that very few anglers would be impacted by the implementation of wild caught bait regulations.

The 2008 Indiana AIS Survey is very important in order to provide a baseline of knowledge and prevention steps by anglers since the AIS program is relatively new. As a result of this survey outreach and education strategies will be adjusted to improve effectiveness. A similar survey should be conducted in 2013 to determine if user knowledge and prevention improves as a result of improved outreach and education.

Recreational boaters and anglers are just one of many vectors responsible for the introduction and spread of AIS. Often times a new AIS is introduced into a region through ballast water discharge, aquaculture escape, or releases of aquarium and watergarden fish and plants. Once an AIS becomes established in an area, the movement of anglers and recreational equipment without proper prevention procedures can allow AIS to spread to other waters. All Hoosier anglers and boaters must do their part to Stop Aquatic Hitchhikers.

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Date: January 22, 2009

Approved By: William D. James
Chief of Fisheries

Approval Date: March 13, 2009

STOP AQUATIC HITCHHIKERS!™

Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

APPENDICES

Appendix 1. Indiana Aquatic Invasive Species Survey

Instructions

The following survey is being conducted to further efforts against the spread of AQUATIC INVASIVE SPECIES (AIS) by finding out how much the public knows about/does to prevent their spread. Your answers will help provide us with critical information that we can use to help educate the public about the dangers and problems associated with AIS. ALL INDIVIDUAL RESPONSES WILL BE KEPT CONFIDENTIAL. Please indicate the answer that is closest to your opinion or situation. For the purpose of this survey, BOATS are defined as canoes, kayaks, duck boats, sailboats, personal watercraft, fishing boats, and recreational watercraft.

How much information have you heard/read about Aquatic Invasive Species?

AQUATIC INVASIVE SPECIES (AIS) are plants, animals, or pathogens that enter places where they have NOT always lived. They can be harmful to fish and aquatic wildlife and to commercial and recreational water uses. How much information have you heard or read about each of the following AQUATIC INVASIVE SPECIES (AIS)?

1. Zebra mussels

(Select only one.)
- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

2. Eurasian watermilfoil

(Select only one.)
- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

3. Purple loosestrife

(Select only one.)
- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

4. Viral Hemorrhagic Septicemia (VHS)

(Select only one.)
- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

5. Asian carp (bighead carp, silver carp, & black carp)

(Select only one.)
- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

6. Brazilian elodea

(Select only one.)
- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

7. Hydrilla

(Select only one.)

- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

8. Round goby

(Select only one.)

- ☐ A Large Amount
- ☐ A Moderate Amount
- ☐ A Small Amount
- ☐ None

Taking precautions to prevent the spread of AIS.

In your opinion, how important is it that boaters and anglers take precautions to prevent the spread of each of the following AIS?

9. Zebra mussels

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

10. Eurasian watermilfoil

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

11. Purple loosestrife

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

12. VHS virus

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

13. Asian carp

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

14. Brazilian elodea

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

15. Hydrilla

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

16. Round goby

(Select only one.)

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Not Very Important
- ☐ Not at All Important
- ☐ Don't Know

Where have you heard/read about AIS?

Have you heard of or read about aquatic invasive species from any of the following sources?

17. A. Newspaper articles

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

18. B. Magazine or newsletter articles

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

19. C. Television news or programs

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

20. D. Radio news or programs

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

21. E. Television public service announcements

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

22. F. Radio public service announcements

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

23. G. Billboards

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

24. H. Internet web sites

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

25. I. Conferences, presentations, or meetings

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

26. J. An educational exhibit or display

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

27. K. Fishing contests, fishing derbys or boating events

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

28. L. A booth at a sport show, fishing show, or similar event

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

29. M. Fishing or boating regulation pamphlets

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

30. N. Boat registration materials

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

31. O. Angler surveys at boat launches

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

32. P. Signs or information provided at a marina or boat launch

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

33. Q. Signs or information provided at a bait shop

(Select only one.)

☐ Yes
☐ No
☐ Don't Know

34. R. Fishing, boating, sporting, or environmental organization

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

35. S. Brochures, species identification cards, fact sheets, or other printed materials

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

36. T. Books

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

37. U. Educational videos

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

38. V. Hot line or information clearinghouse

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't Know

Best sources of information on AIS.

39. Consider the questions you answered in the previous section. Choose UP TO FOUR of the following answers that you think were the BEST sources of information on AIS.

(Select all that apply.)

- ☐ A. Newspaper articles
- ☐ B. Magazine or newsletter articles
- ☐ C. Television news or programs
- ☐ D. Radio news or programs
- ☐ E. Television public service announcements
- ☐ F. Radio public service announcements
- ☐ G. Billboards
- ☐ H. Internet web sites
- ☐ I. Conferences, presentations, or meetings
- ☐ J. An educational exhibit or display
- ☐ K. Fishing contests, fishing derbys or boating events
- ☐ L. A booth at a sport show, fishing show, or similar event
- ☐ M. Fishing or boating regulation pamphlets
- ☐ N. Boat registration materials
- ☐ O. Angler surveys at boat launches
- ☐ P. Signs or information provided at a marina or boat launch
- ☐ Q. Signs of information provided at a bait shop
- ☐ R. Fishing, boating, sporting, or environmental organization
- ☐ S. Brochures, species identification cards, fact sheets, or other printed materials
- ☐ T. Books
- ☐ U. Educational videos
- ☐ V. Hot line or information clearinghouse

40. Are there any other sources of information that you learned about AIS from?

(Provide one response only.)

Motivation for preventing the spread of AIS.

How effective would each of the following be at getting YOU to take steps to prevent the spread of AIS?

41. A. Talking with friends or acquaintances

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

42. B. A sense of personal responsibility

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

43. C. A desire to keep AIS out of our lakes or streams

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

44. D. A desire to prevent damage to your boat or equipment

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

45. E. Laws or regulations to prevent the transport of AIS

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

46. F. Enforcement checks on the road or at boat launches to catch violators

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

47. G. Fines that must be paid by violators

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

48. H. Media sources (newspapers and radio and TV news/programs)

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

49. I. Television or radio public service announcements

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

50. J. Billboards

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

51. K. Magazine or newsletter articles

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

52. L. Internet web sites

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

53. M. Fishing or boating regulation pamphlets

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

54. N. Conferences or workshops for boaters and anglers

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

55. O. Brochures, species identification cards, fact sheets, or other printed materials

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

56. P. Signs at marinas or boat launches

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

57. Q. Creel surveys or inspection-education programs on roads or at boat launches

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

58. R. Videos or other presentations to boating, lake, and sporting associations

(Select only one.)

- ☐ Has already led you to take action
- ☐ Would be very effective
- ☐ Would be somewhat effective
- ☐ Would not be very effective
- ☐ Don't know/No opinion

Most effective motivation for taking preventative steps.

59. Consider the questions you answered in the previous section. Choose UP TO FOUR of the following answers that would be BEST at motivating you to prevent the spread of AIS.

(Select all that apply.)

- ☐ A. Talking with friends or acquaintances
- ☐ B. A sense of personal responsibility
- ☐ C. A desire to keep AIS out of our lakes and streams
- ☐ D. A desire to prevent damage to your boat or equipment
- ☐ E. Laws or regulations to prevent the transport of AIS
- ☐ F. Enforcement checks on the road or at boat launches to catch violators
- ☐ G. Fines that must be paid by violators
- ☐ H. Media sources (newspapers and radio and TV news/programs)
- ☐ I. Television or radio public service announcements
- ☐ J. Billboards
- ☐ K. Magazine or newsletter articles
- ☐ L. Internet web sites
- ☐ M. Fishing or boating regulation pamphlets
- ☐ N. Conferences or workshops for boaters and anglers
- ☐ O. Brochures, species identification cards, fact sheets, or other printed materials
- ☐ P. Signs at marinas or boat launches
- ☐ Q. Creel surveys or inspection-education programs on roads or at boat launches
- ☐ R. Videos or other presentations to boating, lake, and sporting associations

Did you boat in 2007?

The next questions are about your recreational use of ALL boats during the 2007 boating season. Your answers will help us determine the movement of boats between waterbodies.

60. Did you use a boat or boats during the 2007 boating season?

(Select only one.)

- ☐ Yes
- ☐ No

Types of boats you used in 2007.

61. What type of boat(s) did you use during 2007?

(Select all that apply.)

- ☐ Small sailboat (less than 20 feet)
- ☐ Large sailboat (20 feet or longer)
- ☐ Personal watercraft (jet ski)
- ☐ Duckboat
- ☐ Small powerboat (less than 20 feet)
- ☐ Large powerboat (20 feet or longer)
- ☐ Canoe or kayak
- ☐ Driftboat or raft
- ☐ Other:

62. Did your boat move from one body of water to a different body of water in 2007?

(Select only one.)

- ☐ Yes
- ☐ No

Moving your "IN water" boat from one body to another.

Think about all the boats you used in 2007, and about how long the boat(s) was "IN" the water before being moved to a different body of water. Select the option from the drop down box that best reflects the number of times your boat moved to another body of water during each "IN water" time period. Do NOT include time on a boat lift.

63. _____ times my boat was in the water ONE DAY OR LESS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

64. _____ times my boat was in the water 2 TO 4 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

65. _____ times my boat was in the water 5 TO 14 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

66. _____ times my boat was in the water 15 TO 30 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

67. _____ times my boat was in the water MORE THAN 30 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

Moving your "OUT of water" boat to another body of water.

Think about how long the boat(s) was "OUT" of the water before you put it in a DIFFERENT body of water than it had PREVIOUSLY been. Select the option from the drop down box that best reflects the number of times your boat moved from one body of water to another during each "OUT of water" time period. Include the boat's time on a trailer, on a rack, or transported by a truck.

68. _____ times my boat was out of the water ONE DAY OR LESS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

69. _____ times my boat was out of the water 2 TO 4 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

70. _____ times my boat was out of the water 5 TO 14 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

71. _____ times my boat was out of the water 15 TO 30 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

72. _____ times my boat was out of the water MORE THAN 30 DAYS before I moved it to a different body of water.

(Select only one.)

- ☐ None
- ☐ 1-3
- ☐ 4-10
- ☐ 11-20
- ☐ 21 or more

Distance between bodies of water.

Think about how far apart the different bodies of water in which you boated were. For each distance, state how many times in 2007 you moved your boat from one body of water to another.

73. Ten miles or less

(Provide one response only.)

74. 11 to 50 miles

(Provide one response only.)

75. 51 to 150 miles

(Provide one response only.)

76. 151 to 500 miles

(Provide one response only.)

77. More than 500 miles

(Provide one response only.)

Out of state boating.

78. During the 2007 boating season, did you TRANSPORT (by truck, trailer, car top, etc.) any boat(s) to waters OUTSIDE of Indiana?

(Select only one.)

- ☐ Yes
- ☐ No

How often and where did you boat OUTSIDE Indiana?

79. If you went out of state, how many times did you do so?

(Provide one response only.)

80. Please list each state or country that you transported boat(s) to in 2007.

(Select all that apply.)

- ☐ Canada
- ☐ Alabama
- ☐ Alaska
- ☐ Arizona
- ☐ Arkansas
- ☐ California
- ☐ Colorado
- ☐ Connecticut
- ☐ Delaware
- ☐ Florida
- ☐ Georgia
- ☐ Hawaii
- ☐ Idaho
- ☐ Illinois
- ☐ Indiana
- ☐ Iowa
- ☐ Kansas
- ☐ Kentucky
- ☐ Louisiana
- ☐ Maine
- ☐ Maryland
- ☐ Massachusetts
- ☐ Michigan
- ☐ Minnesota
- ☐ Mississippi
- ☐ Missouri
- ☐ Montana
- ☐ Nebraska
- ☐ Nevada
- ☐ New Hampshire
- ☐ New Jersey
- ☐ New Mexico
- ☐ New York
- ☐ North Carolina
- ☐ North Dakota
- ☐ Ohio

- ☐ Oklahoma
- ☐ Oregon
- ☐ Pennsylvania
- ☐ Rhode Island
- ☐ South Carolina
- ☐ South Dakota
- ☐ Tennessee
- ☐ Texas
- ☐ Utah
- ☐ Vermont
- ☐ Virginia
- ☐ Washington
- ☐ West Virginia
- ☐ Wisconsin
- ☐ Wyoming

Moving boats between infested waters and uninfested waters.

Your input is valuable. The rest of the survey should not take much longer.

81. During the 2007 boating season, did you move any boat(s) FROM waters that you knew were infested with any aquatic invasive species (AIS) into uninfested waters? (AIS include Zebra mussels, Eurasian watermilfoil, Viral Hemorrhagic Septicemia, Asian carp, Brazilian elodea, Hydrilla, and Round goby.)

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't know

What infested waters did you boat on?

82. If you moved between infested and uninfested bodies of water, please list the names of the waterways that you went to and from in your boat(s) and also the known AIS in those waterways.

(Provide one response only.)

Do you take prevention steps?

83. Before you transport your boat(s), do you take any special steps to prevent the transport of AIS from one body of water to another?

(Select only one.)

- ☐ Yes
- ☐ No

If you do not take special precautions.

84. If you did not take any special precautions, why not?

(Select all that apply.)

- ☐ I don't believe it will prevent the eventual spread of AIS
- ☐ It's inconvenient, I don't have time to take precautions
- ☐ I don't know exactly what I can do to prevent the spread
- ☐ I didn't boat in infested waters
- ☐ I don't believe AIS are a problem
- ☐ Boat washing equipment was not readily available
- ☐ Other:

Steps taken after removing boat from water.

After removing boat(s) from the water, how often do you do the following?

85. Visually inspect and remove aquatic plants and animals from boats and equipment

(Select only one.)

- ☐ Always
- ☐ Sometimes
- ☐ Never
- ☐ Does not apply

86. Drain water from boats, including live wells, bilge, and bait buckets

(Select only one.)

- ☐ Always
- ☐ Sometimes
- ☐ Never
- ☐ Does not apply

87. Avoid release of unwanted live bait into the water

(Select only one.)

- ☐ Always
- ☐ Sometimes
- ☐ Never
- ☐ Does not apply

88. Flush motor's cooling system with tap water

(Select only one.)

- ☐ Always
- ☐ Sometimes
- ☐ Never
- ☐ Does not apply

89. Rinse boat with high pressure and/or hot water

(Select only one.)

- ☐ Always
- ☐ Sometimes
- ☐ Never
- ☐ Does not apply

90. Allow boat to dry for at least five days

(Select only one.)

- ☐ Always
- ☐ Sometimes
- ☐ Never
- ☐ Does not apply

Boating on infested waters.

91. During 2007, did you boat on waters that you knew were infested with any aquatic invasive species?

(Select only one.)

- ☐ Yes
- ☐ No
- ☐ Don't know

How did you know the waters you boated on were infested?

92. If you boated on infested waters, how did you know that the waters you boated on were infested with an AIS?

(Select all that apply.)

- ☐ Sign or poster at boat launch or marina
- ☐ Brochure, fact sheet, or flyer
- ☐ Fishing, boating, or waterfowl regulation pamphlet
- ☐ Internet web site
- ☐ Watercraft educator/inspector
- ☐ Media sources (newspapers, radio, TV)
- ☐ Hot line or information clearinghouse
- ☐ Heard about it from a friend or relative
- ☐ Other:

If you boat on infested waters in the future.

93. If you do boat on infested waters in the future, how likely is it the YOU will take precautions to prevent the spread of AIS between bodies of water?

(Select only one.)

- ☐ Very likely
- ☐ Somewhat likely
- ☐ Not very likely
- ☐ Never
- ☐ I never boat on infested waters

Have AIS caused you problems?

94. Did AIS cause problems for you or affect your recreational experience in 2007?

(Select only one.)

- ☐ Yes
- ☐ No

What problems have AIS caused you?

95. If AIS have caused problems for you or affected your recreational experience in 2007, please list all impacts, the specific AIS involved, and any associated costs you have experienced.

(Provide one response only.)

Funding for AIS prevention.

96. How much MORE would you be willing to spend for a boating or fishing license if the additional money was used to fund activities to prevent the spread of AIS and to reduce their harmful effects?

(Select only one.)

- ☐ $1
- ☐ $2
- ☐ $3
- ☐ $4 to $5
- ☐ $6 to $10
- ☐ More than $10
- ☐ Not willing to pay more

Additional Fishing Questions

Thanks for your time. The following are a few additional questions we would like to ask. Please answer the following questions about your 2007 fishing experiences.

97. How often did you fish in 2007?

(Select only one.)

- ☐ 1 to 5 times
- ☐ 6 to 10 times
- ☐ 11 to 20 times
- ☐ 21 to 50 times
- ☐ 51 or more times
- ☐ I didn't fish in 2007

98. Please indicate the most appropriate response concerning your amount of boat use when you fish.

(Select only one.)

- ☐ I never use a boat when I fish
- ☐ I occasionally use a boat when I fish
- ☐ About half the time I fish, I use a boat
- ☐ Most of the time I fish, I use a boat
- ☐ Every time I fish, I use a boat

Where did you fish?

For the following, please indicate the number of times you fished in each particular type of water in Indiana during 2007.

99. Natural lakes

(Provide one response only.)

100. Impoundments

(Provide one response only.)

101. Lake Michigan

(Provide one response only.)

102. Rivers and streams

(Provide one response only.)

103. Gravel pits or coal strip pits

(Provide one response only.)

104. Farm ponds or retention ponds

(Provide one response only.)

Types of bait used.

Please think about the types of bait you used when fishing in 2007.

105. Artificial bait

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

106. Minnows purchased from bait shops

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

107. Minnows caught by yourself

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

108. Fresh cut bait

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

109. Preserved or processed fish parts

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

110. Earth worms or night crawlers

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

111. Insects (e.g. crickets) or larvae (e.g. wax worms or spikes)

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

112. Leeches purchased from a bait shop

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

113. Crayfish purchased from a bait shop

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

114. Crayfish caught by yourself

(Select only one.)
- ☐ Almost always
- ☐ Sometimes
- ☐ Never

Final Questions.

115. What is your zip code?

(Provide one response only.)

116. What types of radio stations do you listen to?

(Select all that apply.)

- ☐ Classical music
- ☐ Country music
- ☐ Public radio
- ☐ New/alternative rock music
- ☐ Oldies/classic rock music
- ☐ Talk radio
- ☐ Other:

Thank You for Your Time

Thank you for completing this survey. Your input will help guide the Indiana Aquatic Invasive Species Program's outreach and education efforts. We hope that in the future, Hoosiers will be more aware of Aquatic Invasive Species and take the proper steps to prevent their spread.

For more information on Aquatic Invasive Species, go to www.invasivespecies.in.gov. Thanks!

117. What recommendations or other comments would you like to make about the spread of aquatic invasive species in Indiana waters?

(Provide one response only.)

Appendix 2. E-mail sent encouraging participation in the Indiana Aquatic Invasive Species Survey

The Indiana Department of Natural Resources, Division of Fish and Wildlife is conducting a survey to help determine the level of awareness the public has about Aquatic Invasive Species (AIS), their spread, and prevention methods. With the results of this survey, we will be able to improve our efforts to more effectively educate the public on the dangers, problems, and ways that aquatic recreational users can personally prevent the spread of AIS. Please take approximately 15 minutes to answer some questions concerning Indiana's AIS. The survey can be found at http://www.in.gov/dnr/surveys/IndianaAquaticInvasiveSpeciesSurvey.htm. Thanks on behalf of Indiana Aquatic Invasive Species staff, the Division of Fish and Wildlife, and the DNR.

Doug Keller
Aquatic Invasive Species Coordinator
Indiana Department of Natural Resources
Division of Fish and Wildlife
www.invasivespecies.in.gov

Appendix 3. "Stop Aquatic Hitchhiker" sign posted at all DNR-owned boat ramps