

# AQUATIC INVASIVE SPECIES SURVEY: 2014

## STOP AQUATIC INVASIVE SPECIES

**HELP PROTECT OUR WATERS**



**CHECK**

and remove mud, weeds  
and aquatic life



**DRAIN**

water from bilges, pumps,  
coolers and buckets



**CLEAN**

boat and gear by freezing,  
drying or power washing

*Don't move water, fish, plants or aquatic life  
from one waterbody to another*

Report possible invaders to  
1-800-661-0408 ext 5721 or [fisheries@gov.yk.ca](mailto:fisheries@gov.yk.ca)

**Yukon**  
Environment

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Environment

November 2014

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# AQUATIC INVASIVE SPECIES SURVEY: 2014

## Yukon Department of Environment Fish and Wildlife Branch SR-14-04

### Acknowledgements

Thank you to the individuals that filled out a survey and the Environment Yukon staff that supported the delivery of the survey. Nathan Millar and Jen Edwards provided advice on survey design. Martin Jahr, Geoff Cramond, and Meghan Blay coordinated the delivery of signage and questionnaires in campgrounds. Joe Mewett, Daniela Martinson, Caitlen Brewster, Telek Rogan, Kendra Sallis, and Rita Liczner encouraged public to fill out a survey at Environment Yukon's main office. Tyler Kuhn, Nathan Millar, Todd Powell, and Karen Clyde reviewed the report.

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## Key Findings

- Eighty-five percent (85%) of survey respondents had heard of aquatic invasive species (AIS).
- Just-over half of respondents were very likely to drain their boats and gear and check for aquatic life to prevent the spread of AIS when they moved from one body of water to another.
- Respondents that were “very concerned” about the spread of AIS to Yukon waters were more likely than those that were “neutral” and “not concerned” to undertake the following desired behaviours to prevent AIS:
  - Check for aquatic life
  - Drain boats and gear
  - Clean boats and gear
- Respondents thought that education would foster desired behaviours to prevent the spread of AIS. They also showed a preference for signage at boat and fishing access points and advertising in newspapers and radio.
- Respondents showed diverse patterns of how often and where they used their fishing gear and boat. Most respondents that used their equipment more than once within a 48 hour to one week period—a critical period for the spread of AIS—were using several water bodies within the same drainage (e.g., the Yukon River headwaters).

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## Introduction

In 2014, I carried out a survey on aquatic invasive species (AIS) in Yukon. The survey collected information about the public's level of awareness of AIS and their behaviours that prevent the spread of AIS.

The survey was conducted to inform the development of our AIS management program (Environment Yukon *in prep*). The survey followed a heightening of Environment Yukon's AIS educational campaign with the development of website information and the installation of signage at boat access points. The survey had the following goals:

1. Raise the level of awareness of AIS among Yukon anglers and boat operators
2. Identify the barriers among Yukon anglers and boat operators to the desired preventative behaviours (those that prevent the spread and introduction of AIS)
3. Identify if signage at boat access points increases the awareness of AIS and fosters the desired preventative behaviours
4. Identify angler and boat operator activity patterns in Yukon to better understand the likelihood of the spread and introduction of AIS

## Methods

The survey was conducted by Environment Yukon from May 19<sup>th</sup> to September 15<sup>th</sup>, 2014 (Figure 1). Participation was encouraged by the offer of a draw prize for all participants who filled out a survey. The survey

was made available at Environment Yukon's main office in Whitehorse and at select Yukon Parks campgrounds (Fox Lake, Lake Laberge, Pine Lake, Nunatuk, Snafu Lake, Squanga Lake, Tarfu Lake, Teslin Lake, and Watson Lake).

At the main Environment Yukon office, licence clerks and posters encouraged people purchasing fishing and hunting licenses to fill out the survey and enter the draw. In the campgrounds, posted posters encouraged people to fill out the survey at the registration vault. First and second prizes were a personal floatation device and an annual campground permit, respectively. Several AIS playing cards were also given away as consolation prizes.

As a pilot project, several signs were installed (see cover page) at boat access points to gauge public response. Surveys were available at locations with and without signs at boat access points to identify if signage increased the awareness of AIS.

To understand the likelihood of spread and introduction of AIS, I looked at the frequency at which respondents typically used their equipment in combination with the list of water bodies they most often visit. Specifically, I examined the percentage of respondents that typically used their boat and fishing gear more than once within a 48 hour to one week period. I also examined the percentage of respondents that used their fishing gear and boat in several water bodies. The survey asked respondents to list the water bodies they used most often. I then determined from that list if the respondents used only one water body, several water bodies in the same

drainage within Yukon, waterbodies from several drainages within Yukon, or outside Yukon. Drainages were defined based on the minor drainage

areas of Yukon map produced by Environment Yukon (Appendix 1). I tabulated survey responses and reported on percentages of responses.

**TAKE THIS QUESTIONNAIRE ABOUT  
AQUATIC INVASIVE SPECIES**

**ENTER A DRAW  
TO WIN A PRIZE!**

Have you heard about aquatic invasive species?

Yes  No

How concerned are you about the spread of aquatic invasive species to Yukon waters?

Very Concerned  Somewhat Concerned  
 Neutral  Not Concerned

Which activities will you do this summer in Yukon waters?

Fishing  Motorized Boating  
 Canoeing  Kayaking

Other: \_\_\_\_\_


List the bodies of water where you use your boat or fishing gear most often.

\_\_\_\_\_

\_\_\_\_\_

For what length of time is your boat or fishing gear typically out of the water before you use it again? (check all that apply). Within:

48 Hours  A Week  
 A Month  A Season  
 Not Applicable



Quiz continues on other side

How likely are you to take these steps when you move from one body of water to another?

	Very Likely	Somewhat Likely	Unlikely	Not Applicable
CHECK and remove mud, weeds and aquatic life from boat and gear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRAIN water from bilge, pumps and buckets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CLEAN boat and gear with a power washer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FREEZE small items like footwear, waders and reels overnight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRY boat and gear in sun for five days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What do you think would encourage others to take the steps listed above to prevent the spread of aquatic invasive species?

\_\_\_\_\_

\_\_\_\_\_

Where are you from?

Yukon  Other part of Canada  
 USA  Other

To be eligible to win a prize, please provide:

Name: \_\_\_\_\_

Ph: \_\_\_\_\_

Email: \_\_\_\_\_

Contact information will be used solely for the purpose of this contest.

Figure 1. Aquatic Invasive Species Survey.

## Results

Five-hundred and seven (507) people filled out a survey. The survey successfully targeted anglers (88% of respondents) and boat operators (56% of respondents). Most of the surveys (313) were filled out at the Environment Yukon main office in Whitehorse. See Appendix 2 for a summary of results from each survey question.

### *Goal 1: Raise the level of awareness of AIS among Yukon anglers and boat operators*

The survey first asked respondents whether they were aware of AIS. Eighty-five percent (85%) of respondents had heard of AIS. This level of awareness is higher than previous surveys. In a 2010 survey of recreational anglers in Yukon, 72% of anglers had heard of AIS (Fisheries and Oceans Canada 2012). In an separate 2013 survey of angler harvest

at Dezadeash, Fox, and Twin Lakes, 55% of respondents indicated they were aware of the potential threat of AIS to Yukon waters (n = 51; Environment Yukon unpublished data).

*Goal 2: Identify the barriers among Yukon anglers and boat operators to the desired preventative behaviours*

The survey asked respondents how likely they themselves were to carry out certain behaviours that help prevent the introduction and spread of AIS—namely, drain, check, dry, clean, or freeze (Table 1). Just over half of survey respondents indicated they were very likely to drain their boats and gear and check for aquatic life when they moved from one body of water to another. Fewer respondents indicated they were likely to dry, clean and freeze their equipment.

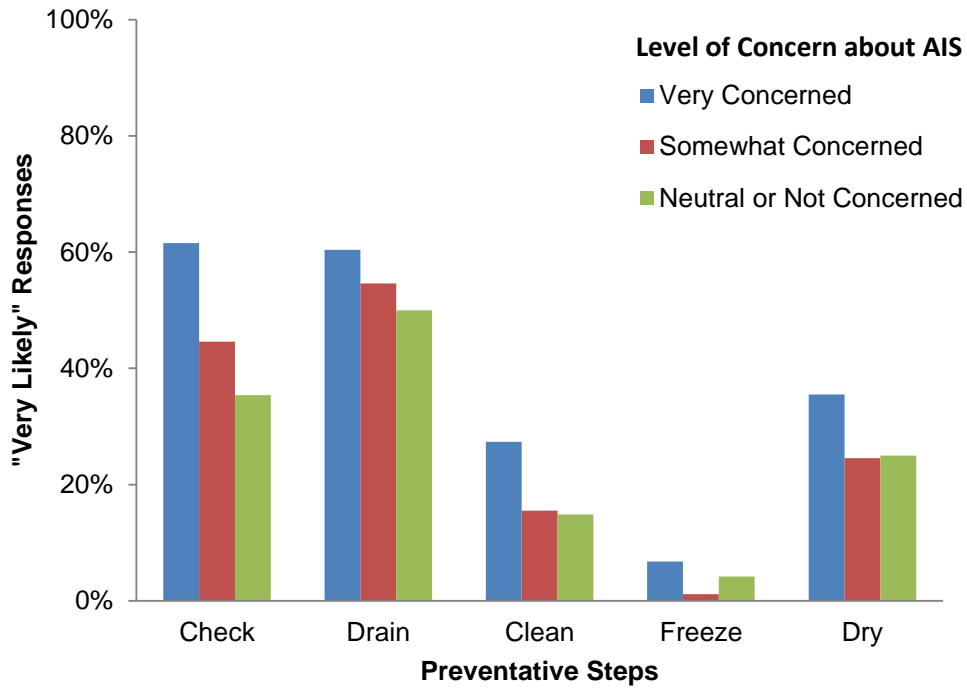
The likelihood that survey respondents would do the desired behaviours increased with their level of concern of the spread of AIS (Figure

2). Respondents that were “very concerned” were more likely than those that were “neutral” and “not concerned” to check, drain, and clean. There was very little change in the likelihood of dry and freeze behaviours with higher levels of concern.

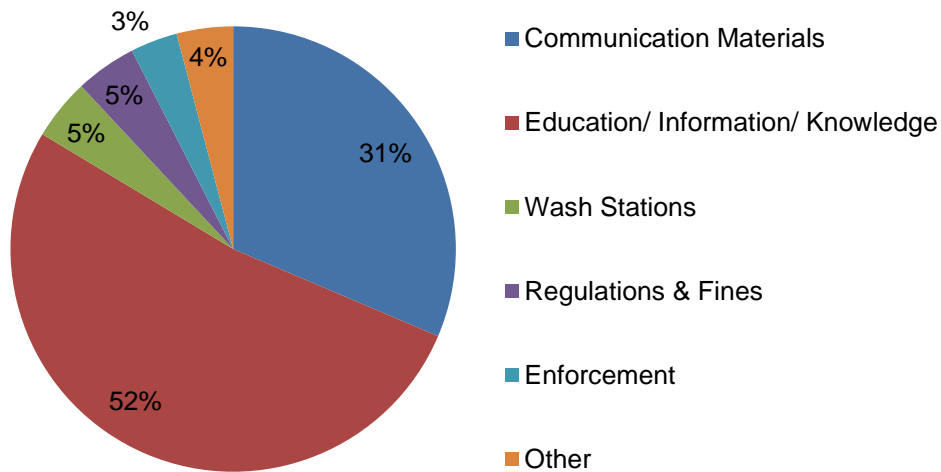
The survey asked respondents what would encourage others to prevent the spread of AIS. Most respondents thought education and information would encourage the desired preventative behaviours (Figure 3). Respondents thought that educational information should focus on the impacts of AIS introductions, followed by information on the locations and AIS species of concern. Respondents also indicated that the communication materials that would be the most effective at encouraging the desired behaviours are signage at boat and fishing access points, followed by advertising in newspapers and radio, promotional give-aways, and the use of media.

**Table 1.** The percentage of respondents that were “very likely” to take the steps listed when they moved from one body of water to another.

Percent	Step	Description
58	Drain	Drain water from bilge, pumps and buckets
52	Check	Check and remove mud, weeds and aquatic life from boat and gear
30	Dry	Dry boat and gear in sun for five days
22	Clean	Clean boat and gear with a power washer
5	Freeze	Freeze small items like footwear, waders and reels overnight



**Figure 2.** The percentage of survey respondents that were very likely to take these preventative steps based on their level of concern about the spread of AIS to Yukon waters.



**Figure 3.** Response to the survey question “what do you think would encourage others to take the steps listed above to prevent the spread of AIS?”

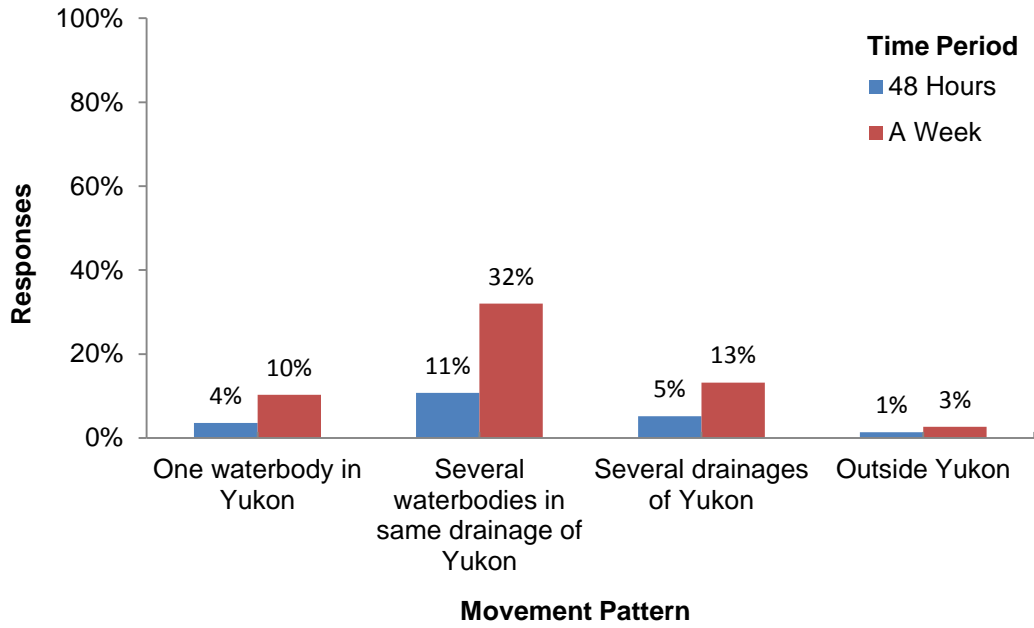
*Goal 3. Identify if signage at boat access points increases the awareness of AIS and fosters the desired preventative behaviours*

I compared responses of respondents that filled out a survey at a location that had (n = 123) and did not have (n = 380) AIS signs at the boat launch. I found that the presence of signs did not make a difference. The percentage of people that had heard of AIS was similar at locations with and without signs (85% in each case); results did not show that signs increased the awareness of AIS. When respondents were asked what would encourage others to prevent the spread of AIS, they showed a preference for signage (and information and education in general) as the primary communication tool reminding people how to help prevent the spread of AIS.

*Goal 4. Identify angler and boat operator activity patterns in Yukon to better understand the likelihood of the spread and introduction of AIS*

The survey asked respondents to describe how long of a period their boat or gear was typically out of the water before they used it again. In the analysis, I focused on those respondents that used their boat or gear more than once within a 48 hour to one week period because use within these time periods has a much higher likelihood of spreading AIS.

The survey also asked them to provide a list of the main water bodies that they visit. From this information, I determined if these waterbodies were in the same or different drainages. I found that there was a wide array of use patterns, from respondents that only used their boat in one water body to those that used their boat inside and outside the Yukon, some within a 48 hour period (Figure 4). Most respondents either used their boat or gear in several waterbodies in the same drainage or in different drainages within Yukon. Respondents primarily listed using water bodies in the Yukon River headwaters drainage, followed by the Alsek drainage.



**Figure 4.** Percentage of survey respondents that kept their boat or fishing gear out of the water for 48 hours or one week before using it again and their movement patterns among water bodies.

## Recommendations

*Continue periodic surveys of Yukoners' knowledge and behaviour related to AIS prevention.*

Continued surveys will allow Environment Yukon to evaluate how the AIS program affects the level of awareness over time.

Based on the high number of responses at Environment Yukon's main office, I recommend that this method of survey administration is likely to lead to high participation and good information. An online survey would also complement e-licencing.

Continued use of AIS questions in the survey of recreational fishing in Canada will also provide a good baseline on some aspects of AIS management. This survey is carried out every five years.

*Continue to use educational programs to increase awareness and foster good preventative behaviours in Yukoners and visitors.*

This can be done through the continued installation of AIS signage at popular fishing locations and boat access points. Priority locations include water bodies in Yukon River

headwater and Alsek River drainages—locations that were frequently listed in this survey.

This can also be done through the continuation of development of communication materials that focus on CHECK, DRAIN, and CLEAN behaviours to prevent the spread of AIS.

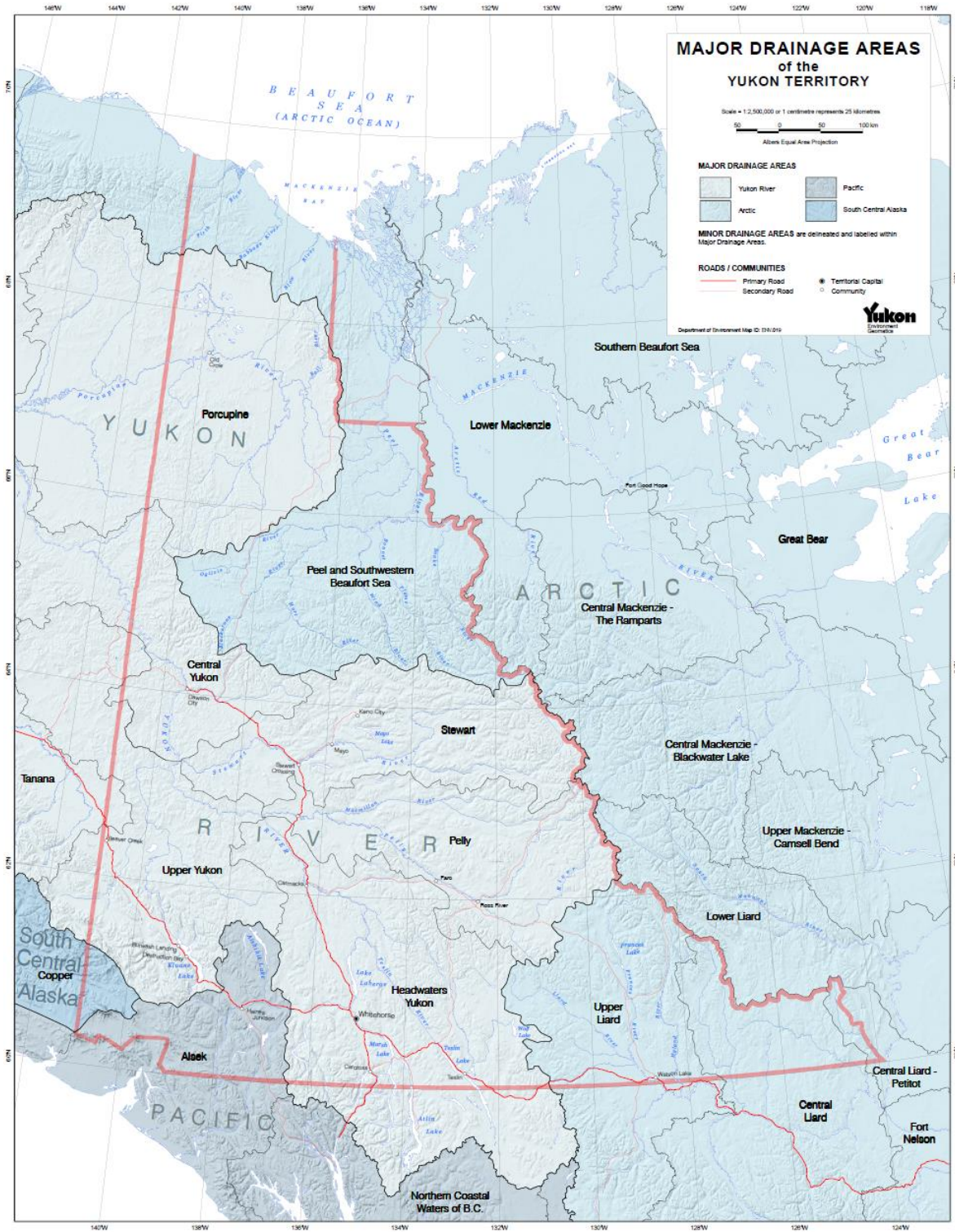
Public outreach can be done via websites, advertisements in the newspaper, and other means. Messages can focus on the impacts of AIS and images of AIS on the watch list.

## References

- FISHERIES AND OCEANS CANADA. 2012. Survey of recreational fishing in Canada 2010. Fisheries and Oceans Canada Fs42-1/2010E
- ENVIRONMENT YUKON. *In prep.* Development of a framework for management of aquatic invasive species of concern for Yukon: Literature review, risk assessment and recommendations. Yukon Fish and Wildlife Branch Report MR-14-01, Whitehorse, Yukon, Canada



# APPENDIX 1 MINOR DRAINAGES OF YUKON

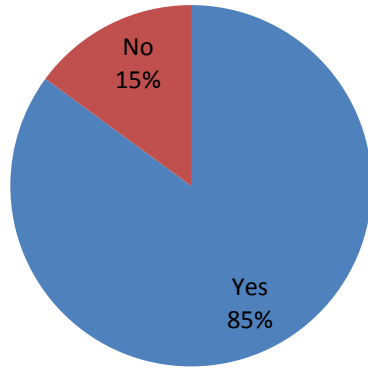


**Figure S1.** Minor drainages of Yukon used for analyses, which include headwaters Yukon, upper Yukon, central Yukon, Stewart, Pelly, Peel and Southwestern Beaufort Sea, Alsek, and Copper.



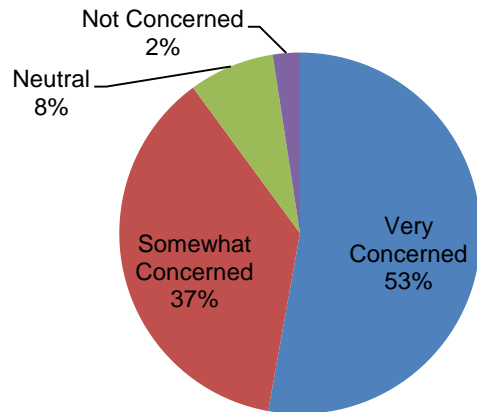
## APPENDIX 2 SURVEY RESPONSES

**Have you heard about aquatic invasive species?** (# Responses = 503)



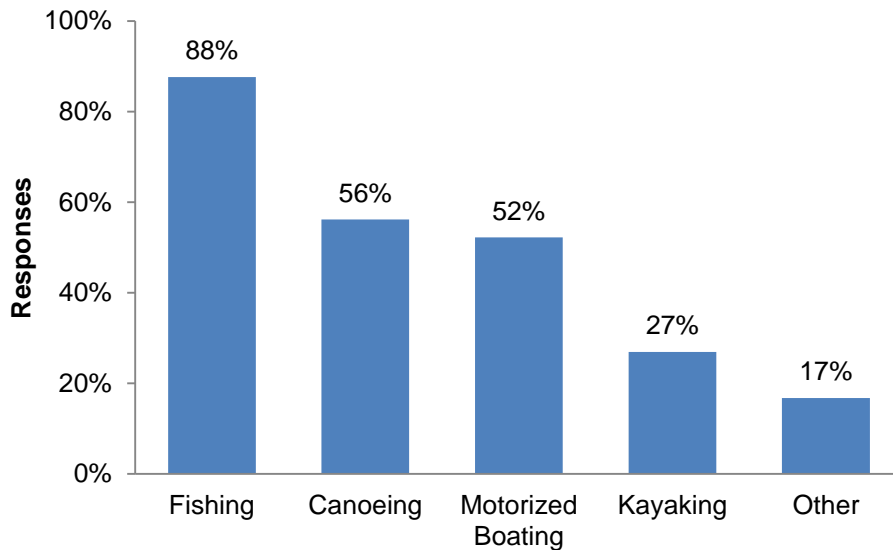
**Figure S2.** The percentage of respondents who had heard of AIS.

**How concerned are you about the spread of aquatic invasive species to Yukon waters?** (# Responses = 496)



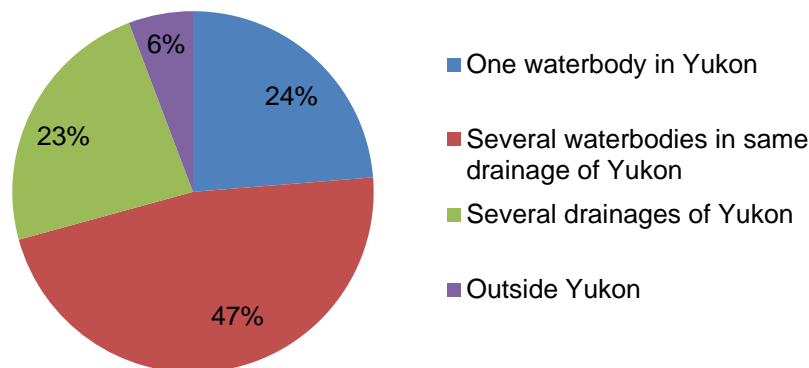
**Figure S3.** The level of concern of respondents to the spread of AIS to Yukon waters.

**Which activities will you do this summer in Yukon waters? (# Responses = 502)**



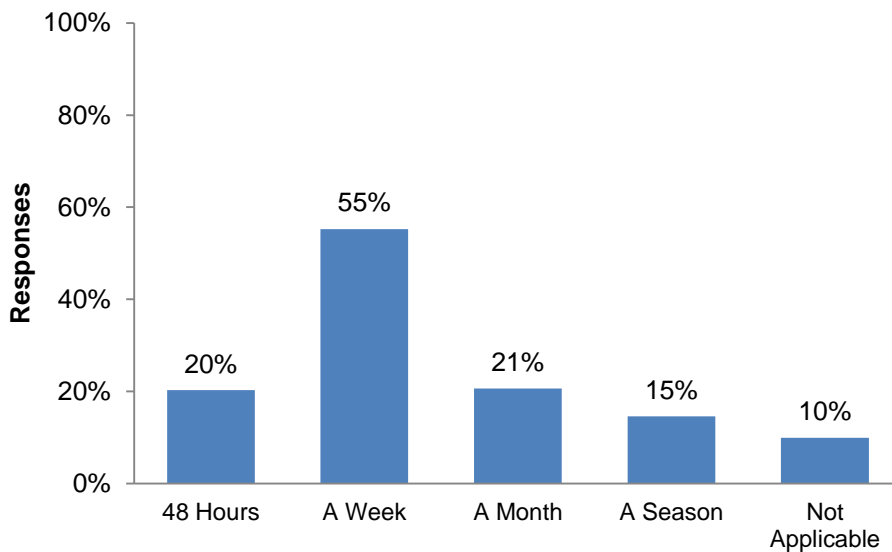
**Figure S4.** The percentage of respondents that planned to participate in fishing, canoeing, motorized boating, kayaking, and other activities in Yukon waters in the summer of 2014.

**List the bodies of water where you use your boat or fishing gear most often. (# Responses = 451)**



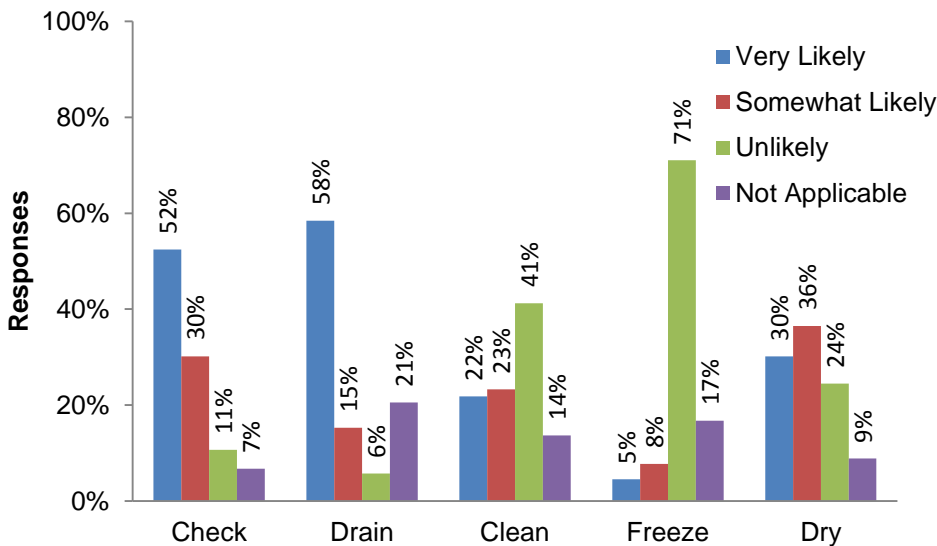
**Figure S5.** The percentage of respondents that use their boat or fishing gear most often in one waterbody, several waterbodies in the same drainage, several drainages, and outside of Yukon. Movement patterns among waterbodies and drainages were determined from individual responses. The top 10 responses were Yukon River, Kusawa Lake, Fox Lake, Marsh Lake, Lake Laberge, Tagish Lake, Snafu Lake, Little Atlin Lake, Fish Lake, and Teslin Lake.

**For what length of time is your boat or fishing gear typically out of the water before you use it again? (check all that apply). Within: (# Responses = 494)**



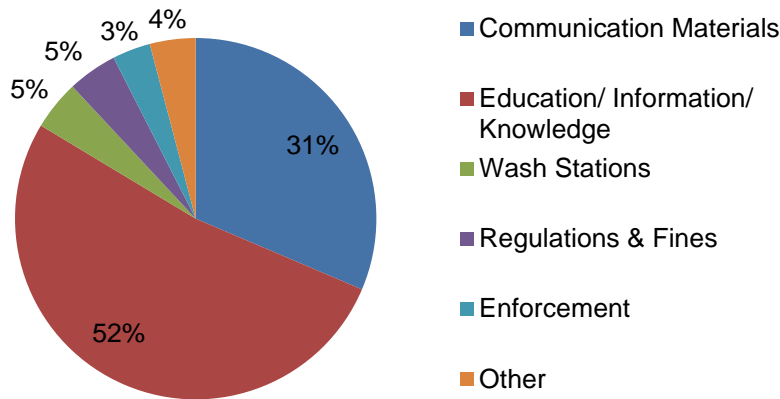
**Figure S6.** The length of time that respondents typically had their boat or fishing gear out of the water before using it again.

**How likely are you to take these steps when you move from one body of water to another? (# Responses = between 466-477 for each step)**

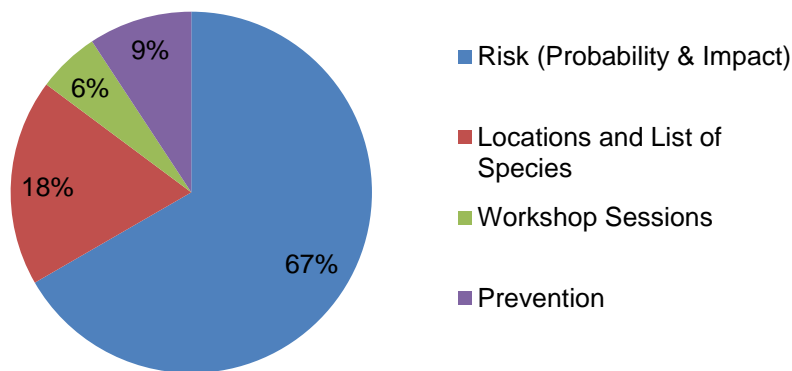


**Figure S7.** The likelihood that respondents will take the following steps when they move from one body of water to another: CHECK and remove mud, weeds and aquatic life from boat and gear, DRAIN water from bilge and buckets, CLEAN boat and gear with a power washer, FREEZE small items like footwear, waders and reels overnight, DRY boat and gear in sun for five days.

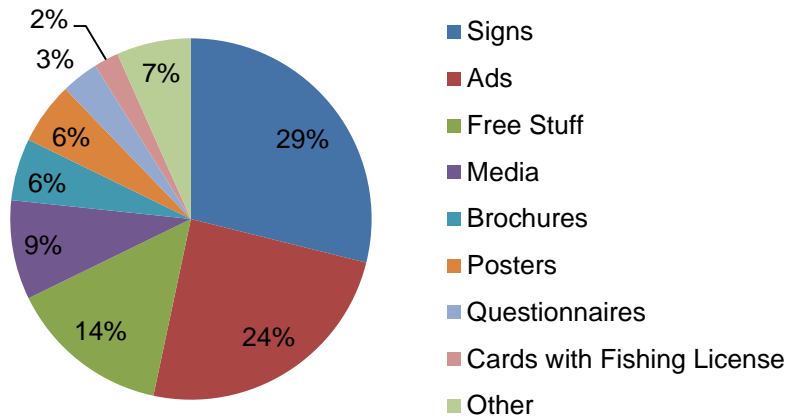
**What do you think would encourage others to take the steps listed above to prevent the spread of aquatic invasive species? (# Responses = 285)**



**Figure S8.** The ideas that respondents listed to encourage others to prevent the spread of AIS.

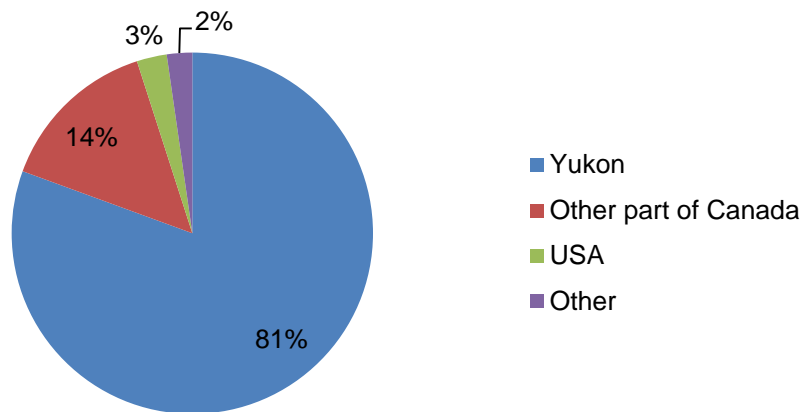


**Figure S9.** The types of education, information and knowledge listed by 54 respondents to encourage others to prevent the spread of AIS. In general terms, responses included probability, impacts, a list of waterbodies of concern, a list of species of concern, workshop sessions, and a focus on prevention.



**Figure S10.** The types of communication materials listed by 87 respondents to encourage others to prevent the spread of AIS. Over half of those respondents included signage at boat and fishing access points and advertising from radio and newspapers.

**Where are you from?** (# Responses = 484)



**Figure S11.** The origin of respondents.