
Citizen Perceptions and Reactions to Aquatic Invasive Species

Mark Eiswerth¹, Tim Kane², Robert Korth³, and Julia Solomon⁴

¹University of Wisconsin – Whitewater

²University of Wisconsin – Extension/Bayfield County

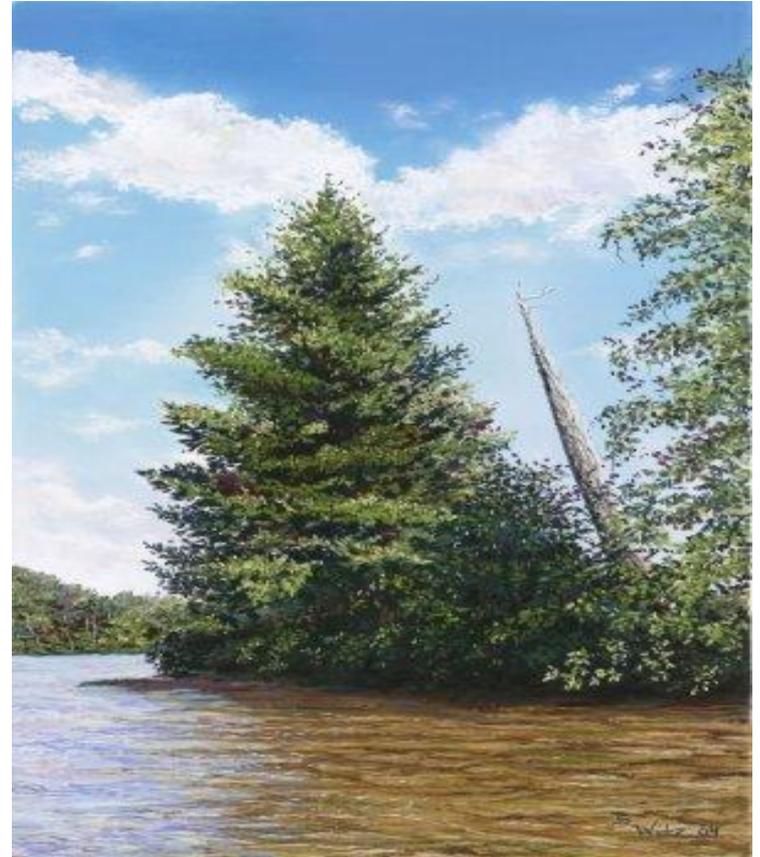
³University of Wisconsin – Stevens Point

⁴University of Wisconsin – Madison and Wisconsin DNR

Wisconsin Association of Lakes, Green Bay, WI, April 17-19, 2008

Lakes of Interest in this Study

- Lakes in the Bayfield County Towns of Iron River and Delta
- Includes Pike Lake Chain of Lakes



**“Poison Ivy Island – Lake Millicent”
by Sally Witz**

How Did We Obtain Data for the Study?

- We conducted a mail-out survey of property owners in the towns of Iron River and Delta
- Surveys were mailed to all residential property owners
- A total of 1,451 surveys were mailed

The Property Owner Survey: Content

- What are various characteristics of property owners?
- What are their history and experiences with property in the Town of Iron River or Delta?
- What are their history and experiences with lakes outside of this area?
- What are property owners' attitudes and opinions on various lake issues and potential threats to lake quality?
- What is the level of awareness of aquatic invasive species?
- How would property owners change their lifestyle if the state of infestation of aquatic invasive species were to change?
- How much money does the typical property owner spend in the area?

The Property Owner Survey: Response Rate

- Surveys were mailed to all 1,451 property owners
- 49 undeliverables (returned with no forwarding address)
- 666 surveys were completed and returned to the team
- $666 / (1451 - 49) = 48\%$ response rate

How Many are Year-round Residents?

<i>Occupancy Category</i>	<i>Owns Waterfront Property</i>	<i>Does Not Own Waterfront Property</i>	<i>Total</i>
Year-round residents	130 (29.2%)	87 (49.4%)	217 (34.9%)
Not year-round residents	315 (70.8%)	89 (50.6%)	404 (65.1%)
Total	445 (100%)	176 (100%)	621 (100%)

What is the Average Number of Days “In Residence”?

- The average number of days the property is utilized by respondent's family: 195 days per year (53% of year)

Proximity of Respondent's Property to Nearest Lake (for non-Waterfront Owners)

<i>Proximity</i> (n=181)	<i>% of Respondents</i>
Less than ¼ mile	34.2%
Between ¼ and ½ mile	17.7%
Between ½ and 1 mile	17.7%
Between 1 and 2 miles	14.9%
More than 2 miles	15.5%

Got Boat?

<i>Keep a Boat on a Lake in Iron River or Delta?</i>	<i>Owns Waterfront Property</i>	<i>Does Not Own Waterfront Property</i>	<i>Total</i>
Yes, keep boat	373 (83.1%)	14 (7.9%)	387 (61.8%)
No, do not keep boat	76 (16.9%)	163 (92.1%)	239 (38.2%)
Total	449 (100%)	177 (100%)	626 (100%)

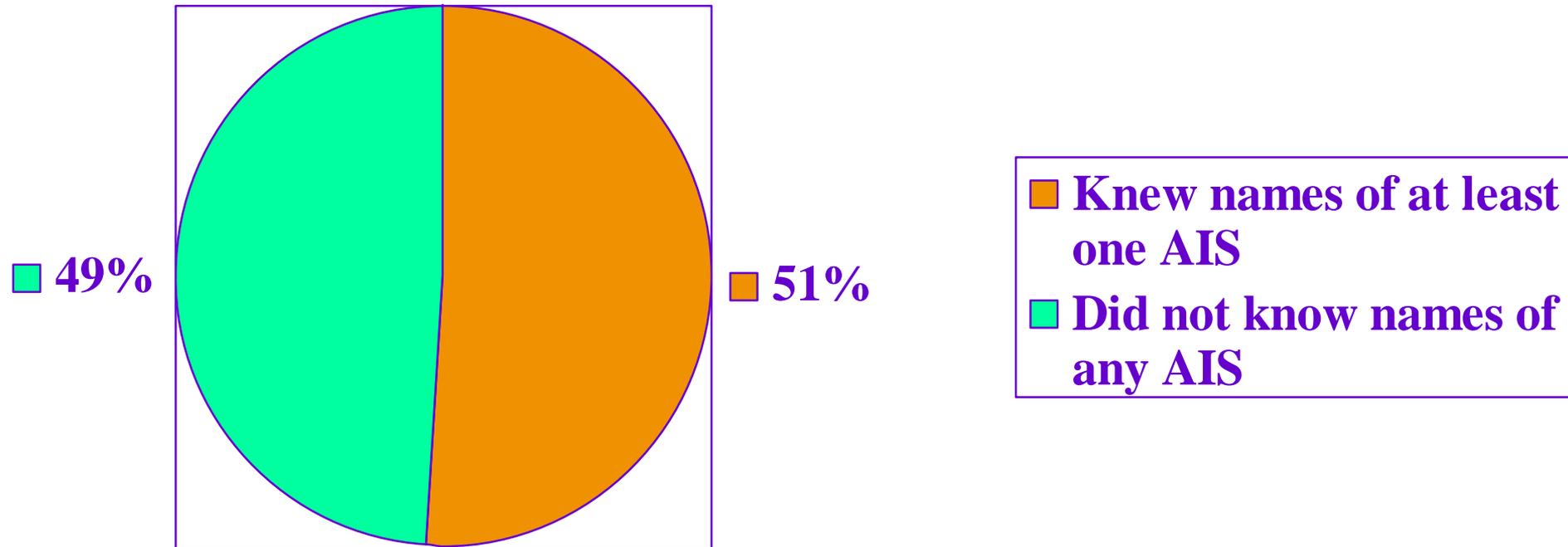
Do You Recreate Here?

<i>Recreational Activity</i>	<i>Percent who engage in this activity on area lakes</i>	<i>Mean no. of days spent on this activity (excludes zeroes)</i>
Fishing	72.1%	19.8
Swimming/wading	67.4%	28.6
Motor boating	45.7%	28.4

What is the Level of Awareness Regarding AIS?

- We wanted to see if respondents could think of the names of any aquatic invasive species that they believe could be a problem for the lakes in the towns of Iron River and Delta

Awareness: Can a Respondent Think of the Names of ANY Aquatic Invasive Species That Could be a Problem in These Lakes?



Respondent Awareness of Specific AIS that Could be a Problem in These Lakes

<i>Species</i>	<i>No. of "Aware" Respondents (Total = 291/574)</i>
Eurasian watermilfoil (some version)	244
Zebra mussels	62
Rusty crayfish / crayfish	61
Spiny water flea / water flea	26
VHS / fish virus / virus	23
Round goby	7
Other miscellaneous AIS names	33

Perceptions Regarding AIS

<i>For lakes in general:</i>	<i>Strongly disagree / somewhat disagree / neutral</i>	<i>Strongly agree / somewhat agree</i>	<i>Don't know</i>
AIS can interfere with water-based recreation (n=616)	8.3%	87.3%	4.4%
AIS are easily transferred from one lake to another (n=617)	6.5%	89.1%	4.4%
AIS can negatively impact the health of a lake (n=618)	5.5%	90.0%	4.5%

Perceptions Regarding AIS Specifically for These Lakes

<i>For lakes in Iron River and Delta:</i>	<i>Strongly disagree / somewhat disagree / neutral</i>	<i>Strongly agree / somewhat agree</i>	<i>Don't know</i>
AIS are interfering with water-based recreation (n=612)	31.7%	41.8%	26.5%
AIS are lowering the values of some lakefront property (n=609)	37.4%	33.7%	28.9%
Watercraft inspectors play an important role in preventing AIS (n=612)	19.6%	65.9%	14.5%

What if These Lakes Were Invaded by Aquatic Invasive Species?

- To examine this question, we asked respondents how they would change their behavior (if at all) if a particular aquatic invasive species (AIS) scenario were to occur
- This is called contingent behavior analysis
- Other applications: water quantity issues

The Scenario: Part 1 (*Background*)

A Possible Future Scenario for the Lakes in the Towns of Iron River and Delta

14) Recognizing that Lake Superior contains over 80 aquatic invasive species and that significant boating traffic occurs between Lake Superior and nearby inland lakes, it is possible that species such as invasive aquatic plants, invertebrates, fish and others could enter area lakes in the future.

The Scenario: Part 2 (*Actual Scenario*)

Suppose the following: aquatic invasive plants were spread into all the lakes in the towns of Iron River and Delta. And suppose that these aquatic plants would limit boating and swimming in half of the lakes' surface area, and that this condition was expected to persist over the foreseeable future.

The Scenario: Part 3 (*The Question*)

IF this kind of change were to happen on the lakes in the towns of Iron River and Delta, AND these changes were not occurring in other lakes in northwest Wisconsin, how do you think you/your family might change your activities or lifestyle, if at all? (*Please check ANY that apply, and fill in blanks as appropriate.*)

Possible Responses to Scenario

- Respondent would sell their property
- Would keep property, but likely spend ___ fewer days/yr there, *on average*
- Would probably go boating on these lakes ___ fewer days/yr
- Would probably go swimming/wading in these lakes ___ fewer days/yr
- Would probably go fishing on these lakes ___ fewer days/yr
- Respondent would **NOT CHANGE ANY ASPECTS** of their activities or lifestyles with regard to these lakes

Responses to Contingent Behavior Scenario

<i>Responses</i>	<i>Owns Waterfront Property</i>	<i>Does Not Own Waterfront Property</i>	<i>Total</i>
Sell property	116 (20.1%)	10 (5.6%)	126 (16.6%)
Fewer days/yr at property	48 (8.3%)	15 (8.4%)	63 (8.3%)
Boating fewer days/yr	73 (12.6%)	12 (6.7%)	85 (11.2%)
Swimming fewer days/yr	97 (16.8%)	29 (16.3%)	126 (16.7%)
Fishing fewer days/yr	89 (15.4%)	27 (15.2%)	116 (15.3%)
No changes in activities	155 (26.8%)	85 (47.8%)	240 (31.7%)
Total	578 (100%)	178 (100%)	756 (100%)

How Many Fewer Days Spent at Property in Response to Scenario?

- Among those respondents who indicated they would spend less time at their property in response to the AIS scenario, the **mean number of fewer days was 34 days/yr**
- This represents a **17% decrease** in number of days in residence below the mean baseline of 195 days/yr
- For **whole sample**: mean is 3.3 fewer days

How Much does a Typical Property Owner Spend?

- The average household spends about \$6,800 per year (conservative estimate) *in the Towns of Iron River and Delta*
- Total spending in these Towns by all property owners is estimated to be about \$9.86 million per year (conservative estimate)

AIS Scenario's Impacts on Spending via Reduced Residence Time

- Reduction in number of days spent at properties would reduce annual spending by about \$187/HH, on average
- The aggregate reduction in primary spending in these two towns would be about \$272,000 per year
- A decrease of about 3% below baseline aggregate spending of these residents
- These numbers may seem small, but...

How Many Fewer Fishing Days in Response to AIS Scenario?

- Among those who fish, the average number of days/yr spent fishing is 19.8
- Among respondents (15%) who would fish less in response to AIS scenario: 18.7 fewer days/yr fishing on these lakes, on average

How Many Fewer Fishing Days in Response to AIS Scenario?

- Among ALL respondents (including non-anglers), the average number of days/yr spent fishing is about 13
- For ALL respondents: the mean response to the AIS scenario is 3.3 fewer fishing days per yr (a 25% decrease)
- Aggregating this to the population: we estimate 4,817 fewer fishing days per yr

Decreased Net Economic Benefits from Recreational Angling

- Value recreational angling at \$52/day (Walsh et al. meta-analysis median value updated to 2007 dollars)
- $(4,817 \text{ lost angling days/yr}) * (\$52/\text{day}) =$
about \$250,000 lost net economic benefits per yr due to AIS scenario
- ***→ A decrease of about 24% below the baseline net economic benefits from recreational angling (\$1.1 million/yr)***

Angling: Omissions and Uncertainties

- Recreators will substitute to other lakes → not all of this net economic value will be lost
- However, property owners will now incur higher travel costs to get to recreation
- Also, the expenditures associated with this recreation may leave the area
- Remember: none of this analysis incorporates losses due to **reduced numbers of recreational visitors from outside the area**
- Can certainly conduct the analysis for other recreational activities...

General Conclusions

- The survey data provide an interesting portrait of how the property owners in one area of our state feel about, live with, and play on their own neighborhood lakes
- There is probably room for improvement in the level of awareness and knowledge about AIS
- However, people do appear to be concerned about various threats posed by aquatic invasive species

(Some) Emerging Conclusions

- The contingent behavior analysis reveals that some property owners indicate they would adjust either their residency patterns or recreational activities in response to an AIS invasion
 - ☞ 17% indicate they would sell their property
 - ☞ 8% indicate they would stay, but spend less time there
 - ☞ Roughly 10-20% would recreate less on these lakes
- Therefore, potential AIS invasions have implications not only for quality of life but also for various economic factors.....

(Some More Emerging) Conclusions

- An AIS invasion may yield several types of negative economic effects
- Even in small towns such as these, each individual effect may by itself lie in the range of at least several hundred thousand dollars per yr
- Note that not all of these types of economic effects can (should) be added together, but.....
- Finally, some of these effects appear to be sizeable in percentage terms, while others may be more modest

Looking Ahead

- Results simply add to the existing body of knowledge about the behavior and attitudes of those who live near lakes
- Interesting to collect similar data at future points in time at same place. How do awareness, opinions, and behavior change as environmental & social conditions evolve?
- Interesting to look at causality. What factors are associated with attitudes/behaviors?

Citizen Perceptions and Reactions to Aquatic Invasive Species

Mark Eiswerth¹, Tim Kane², Robert Korth³, and Julia Solomon⁴

¹University of Wisconsin – Whitewater

²University of Wisconsin – Stevens Point

³University of Wisconsin – Madison

⁴University of Wisconsin – Extension/Bayfield County

Wisconsin Association of Lakes, Green Bay, WI, April 17-19, 2008