



# Testing the Waters: Illinois Recreational Boater Survey on Aquatic Invasive Species and Pathogens

Mae A. Davenport<sup>1</sup>, Darren Bundy<sup>1</sup>, Jesse T. Trushenski<sup>2</sup>, Gregory Whitledge<sup>2</sup>

<sup>1</sup>Department of Forest Resources, University of Minnesota; <sup>2</sup>Fisheries and Illinois Aquaculture Center, Southern Illinois University Carbondale

Mississippi River Basin Panel on Aquatic Nuisance Species  
Little Rock, Arkansas, May 3<sup>rd</sup>, 2011

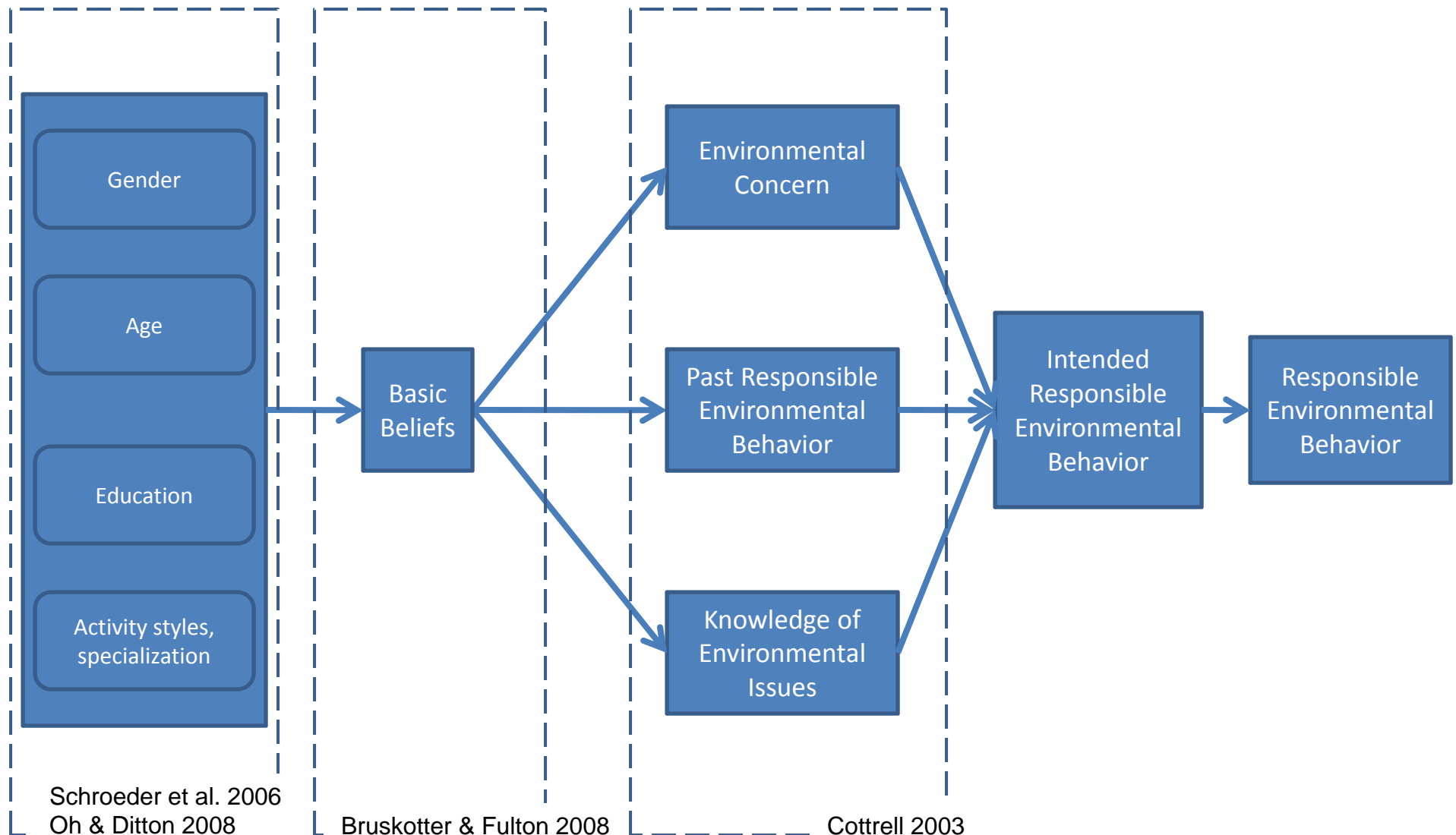


# Recreational Boaters are Key Vectors in the Spread of AIS and Fish Diseases

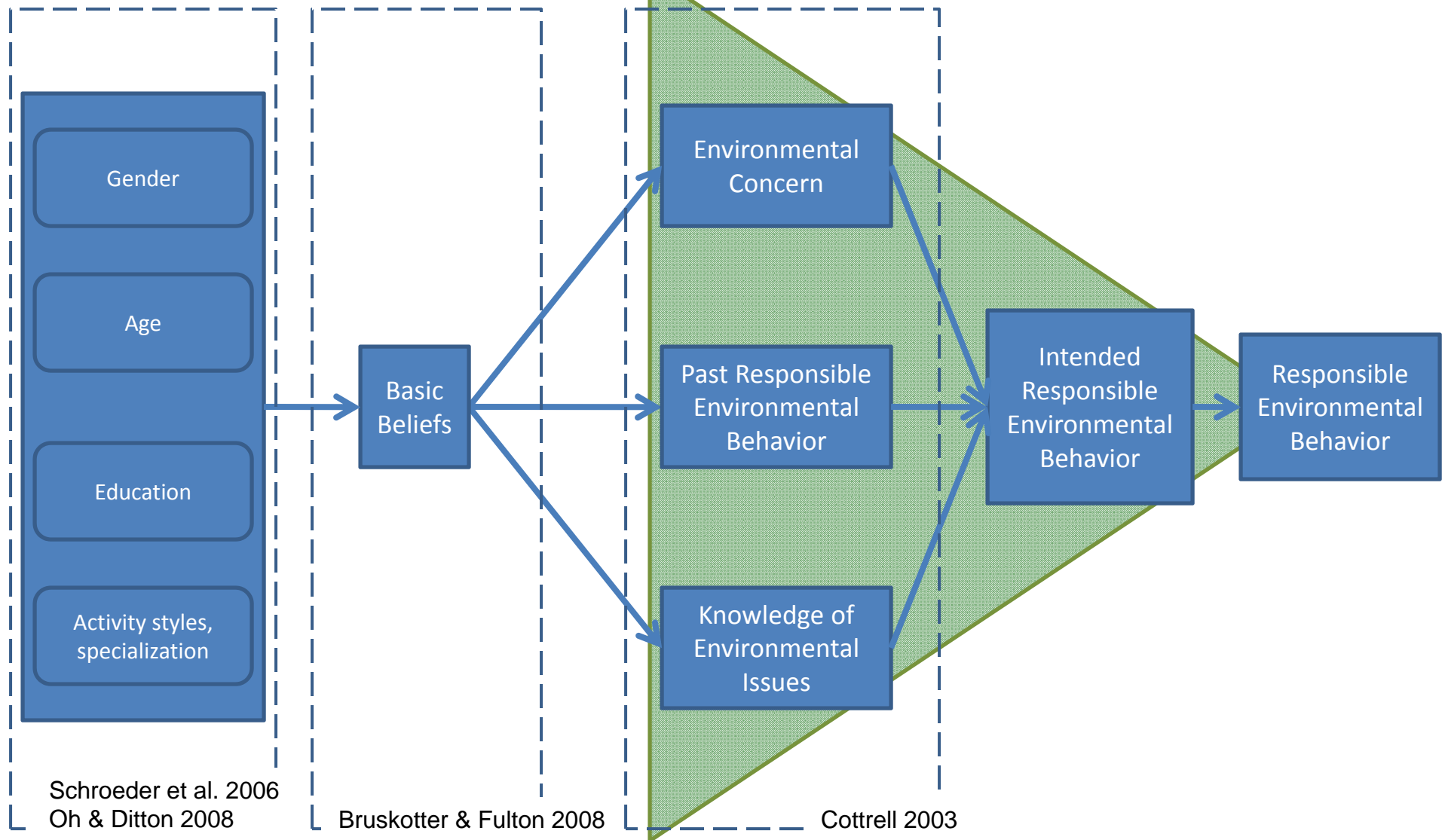


Johnson, Ricciardi & Carlton, 2001

# Responsible Environmental Behaviors Among Recreational Boaters



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# Research Questions

- Who are Illinois recreational boaters?
- In what responsible environmental behaviors (i.e., best boating practices) do they engage?
- What is the relationship between knowledge and concern about AIS/VHS and behaviors?
- How can resource managers influence future behaviors to prevent the spread of AIS/VHS?



# Research Design

## 2009:

- Registered boater survey conducted in 11 southernmost Illinois counties (mail only), n=255, 27% RR

## 2010:

- Registered boater survey in remaining 91 counties (mail only), n=760, 38% RR
- Survey and intervention
  - Boat show attendees (onsite and mail), n=538, 45% RR
  - Tournament anglers (onsite and mail), n=68, 32% RR
  - State fair attendees (onsite only), n=250



# ILLINOIS REGISTERED BOATER SURVEY (N=1,015)





# Methods

## Data collection:

- Self-administered, mail survey
- IL-DNR registered boat database
- Random sample stratified by county
- 4-wave mailing (Dillman, 2000)
- 34% RR overall

## Data analysis:

- SPSS 17.0
- Descriptive statistics
- Cluster analysis (K-means cluster)
- One-way ANOVA
- Paired samples t-test



# Research Findings

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# Respondent Profile

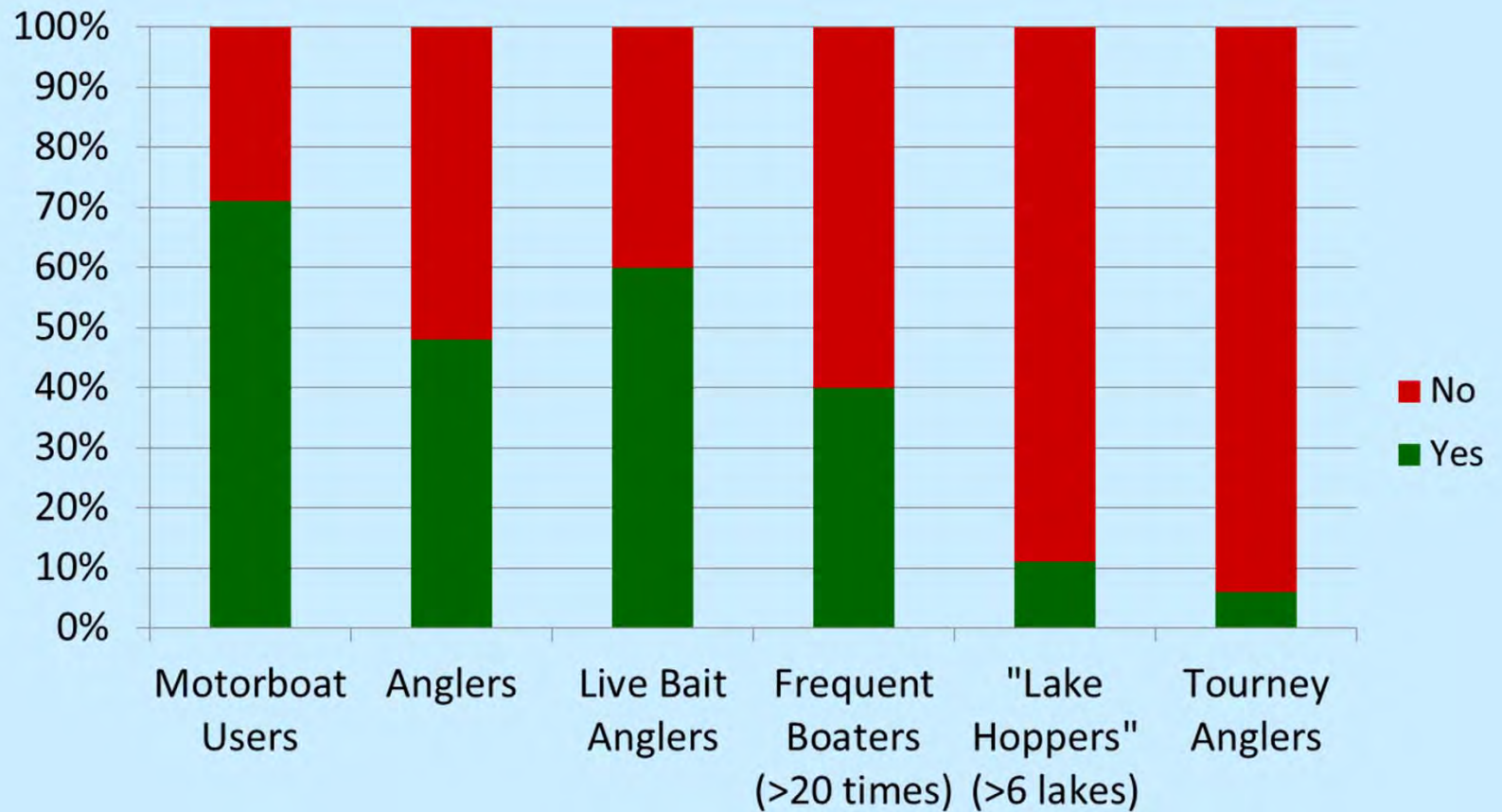
Gender	N	Percent
Male	920	92.2
Female	78	7.8
Total	998	100.0

Age group	N	Percent
18-30	27	2.7
31-45	146	14.8
46-60	453	45.9
61-75	318	32.2
76 or older	43	4.4
Total	987	100.0

Education level	N	Percent
9 <sup>th</sup> grade or less	9	0.9
Some high school, but no diploma or GED	15	1.5
High school graduate or GED	212	21.4
Some college, but no degree	277	28.0
Associate degree	97	9.8
4-year degree	164	16.5
Some graduate school	59	6.0
Master's, doctoral, or professional degree	158	15.9
Total	991	100.0



# Boating Activity & Styles



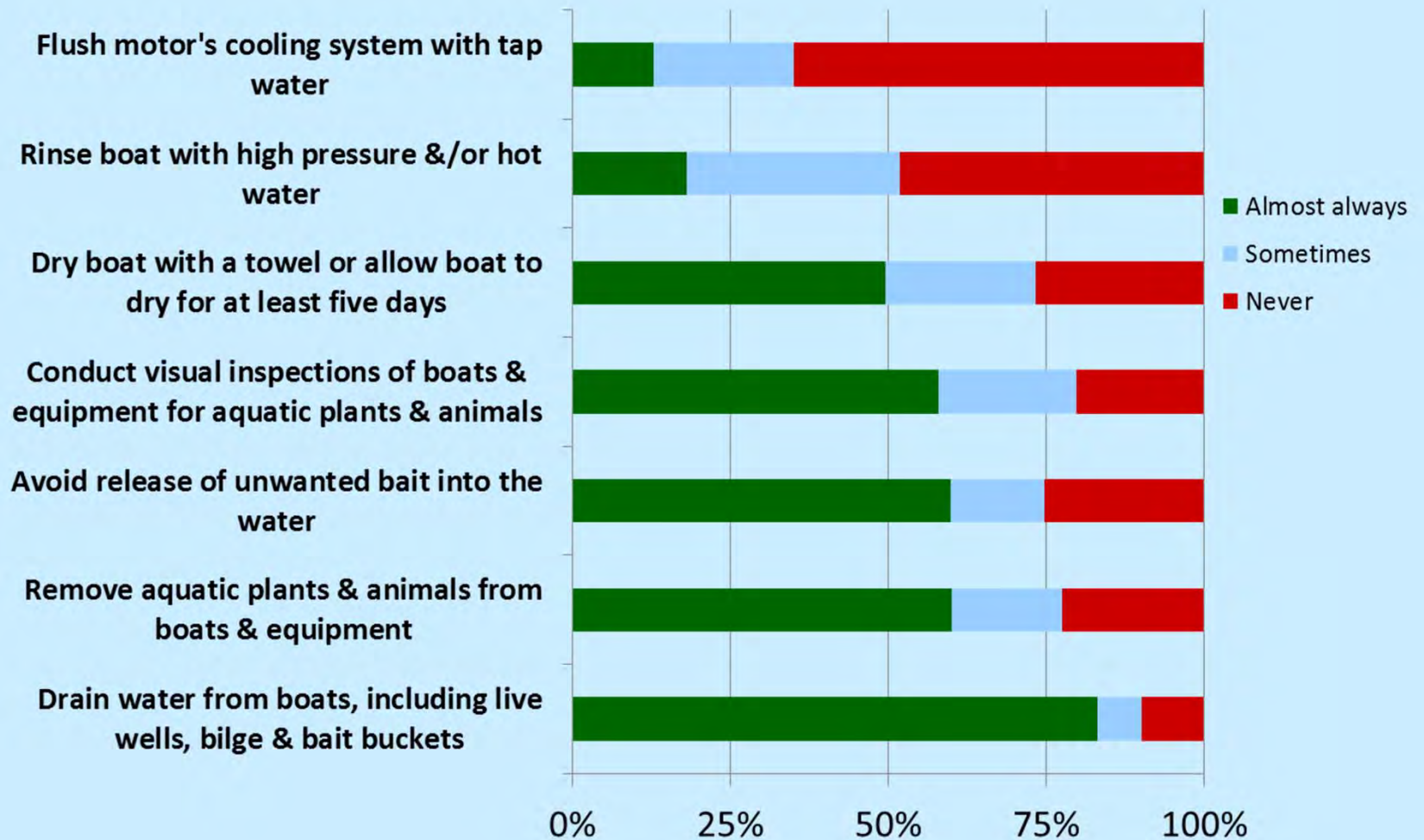


# Research Findings

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# Engagement in REBs in the past





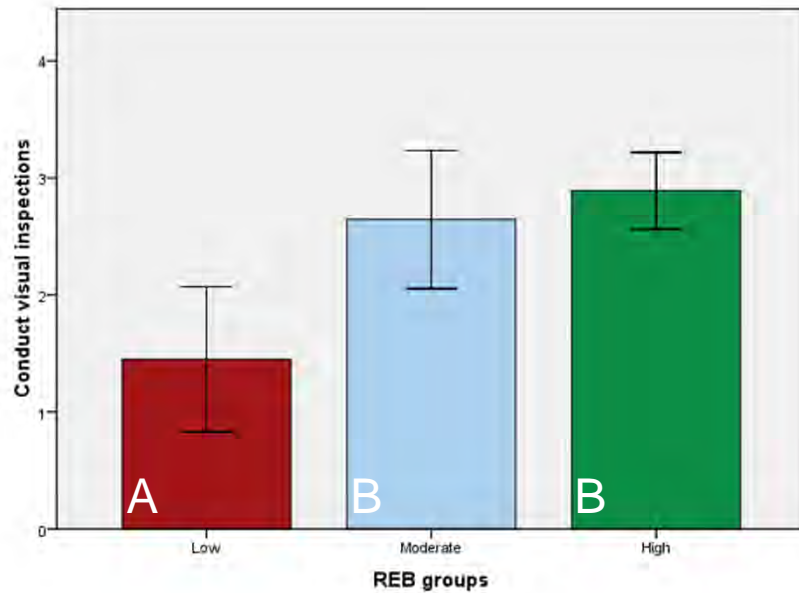
# REB Groups

- High REB engagement (30%)
  - “The Faithful”
- Moderate REB engagement (42%)
  - “The Fickle”
- Low REB engagement (28%)
  - “The Frivolous”

1= never  
2= sometimes  
3= almost always

Final Cluster Centers			
	REB Cluster		
	High	Mod	Low
drain water from boats	3	3	2
conduct visual inspections	3	3	1
avoid release of unwanted bait	3	3	1
remove plants and animals from boats and equipment	3	3	1
allow boat to dry for at least five days	3	2	2
rinse boat with high pressure and/or hot water	3	1	1
flush motor's cooling system with tap water	2	1	1

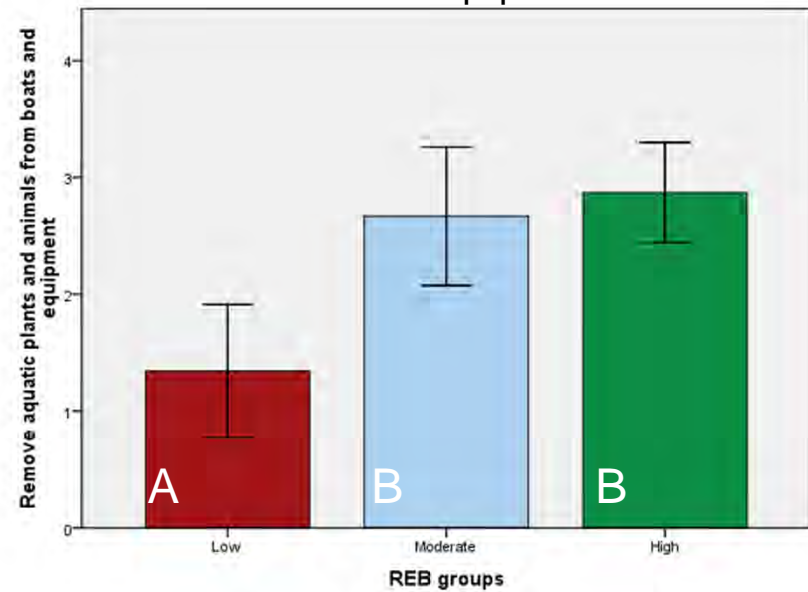
## Conduct visual inspections



Error Bars:  $\pm 1$  SD



## Remove aquatic plants & animals from boats & equipment



Error Bars:  $\pm 1$  SD

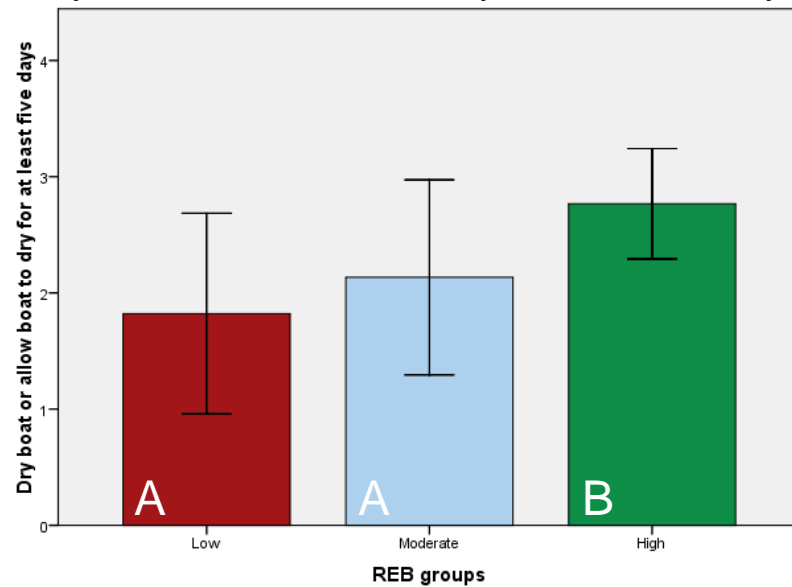
**REBs** ( $p < .001$ )

1= never

2= sometimes

3= almost always

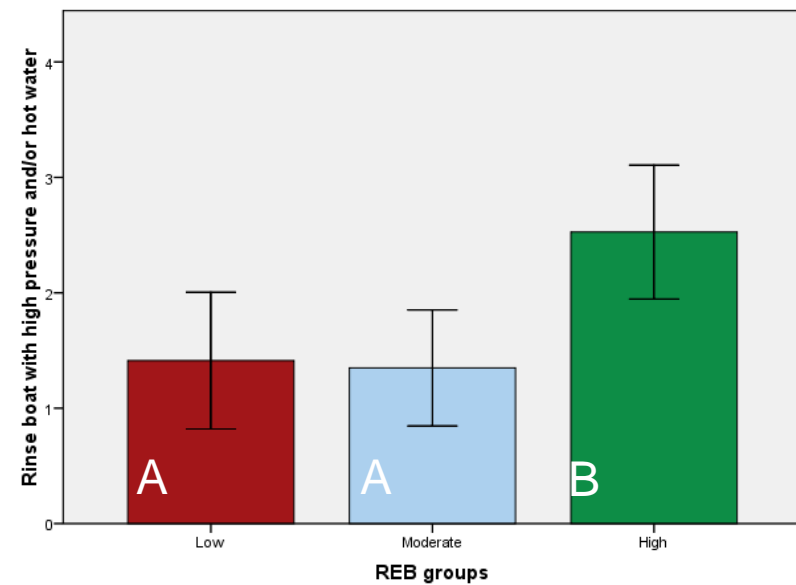
Dry boat or allow boat to dry for at least 5 days



Error Bars: +/- 1 SD



Rinse boat with high pressure &/or hot water



Error Bars: +/- 1 SD

**Responsible  
Environmental  
Behaviors**  
( $p < .001$ )

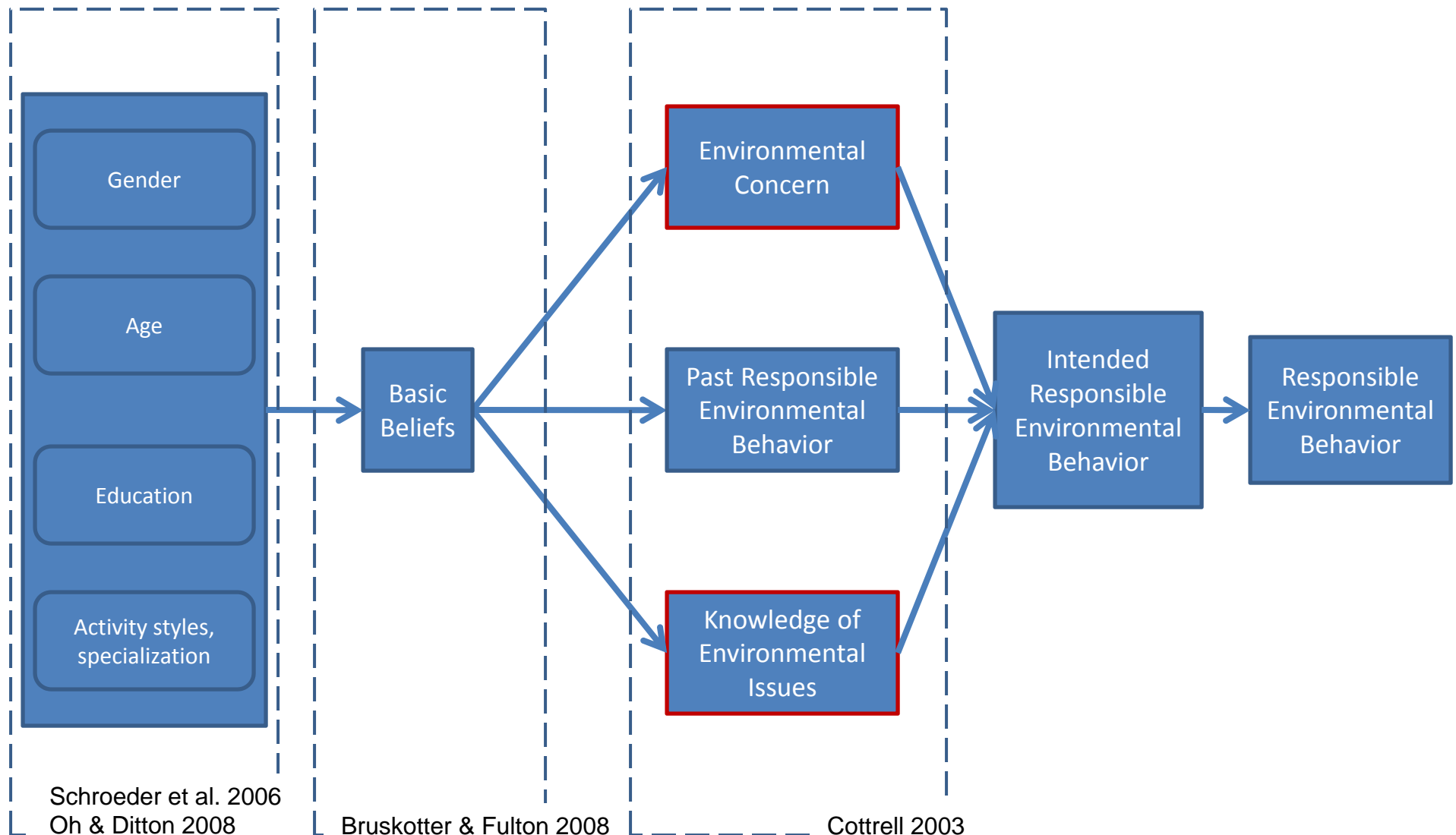
1= never  
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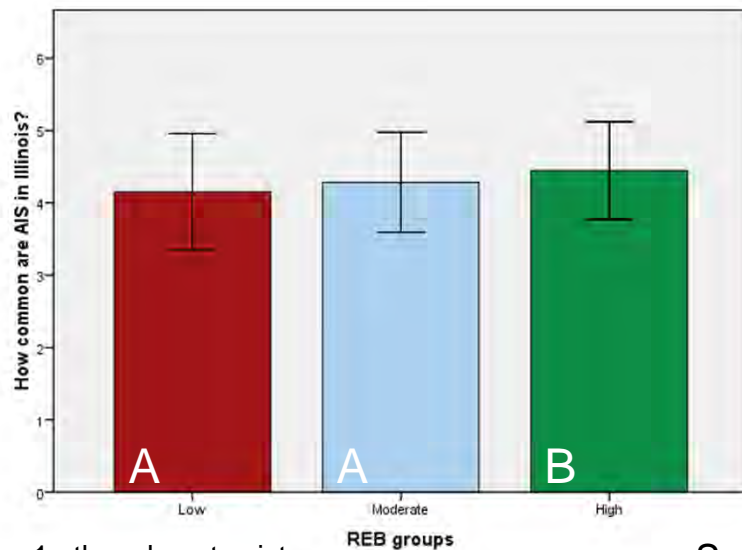
# Research Findings

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# Responsible Environmental Behaviors Among Recreational Boaters



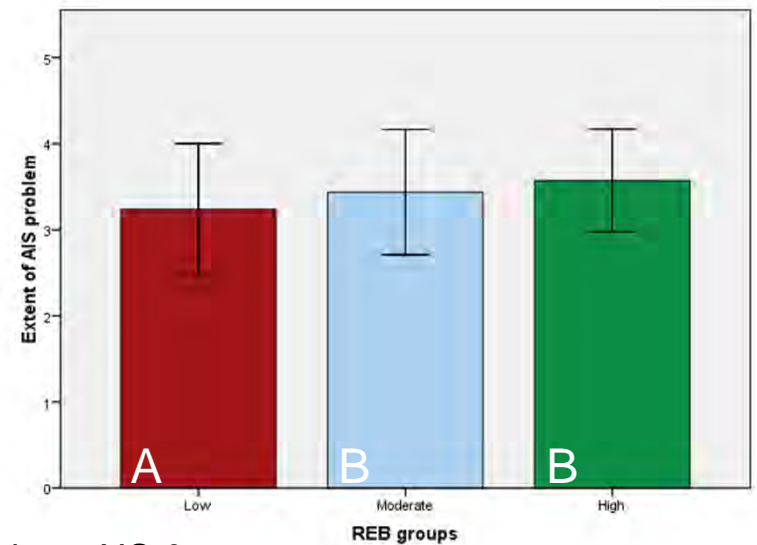
Prevalence of AIS in Illinois



- 1= they do not exist  
 2= very rare  
 3= somewhat rare  
 4= somewhat common  
 5= very common

Error Bars: +/- 1 SD

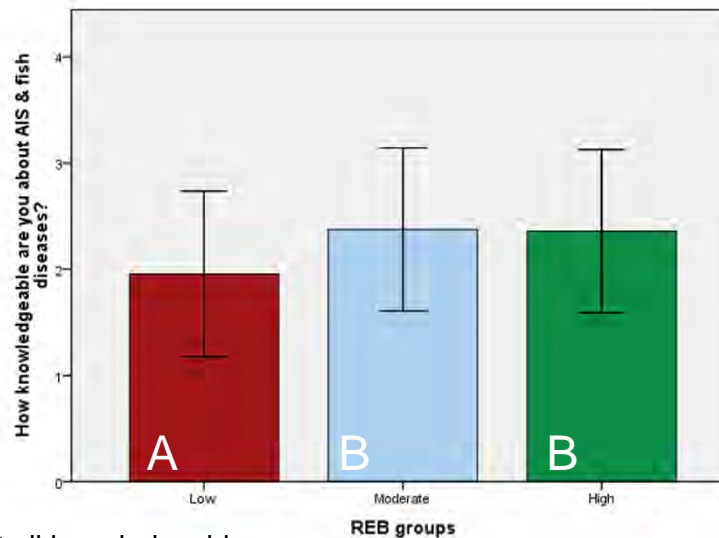
Extent that AIS is a problem in Illinois



- 1= not a problem  
 2= slight problem  
 3= moderate problem  
 4= serious problem

Error Bars: +/- 1 SD

Self-reported knowledge about AIS & fish diseases



- 1= not at all knowledgeable  
 2= slightly knowledgeable  
 3= moderately knowledgeable  
 4= very knowledgeable  
 5= extremely knowledgeable

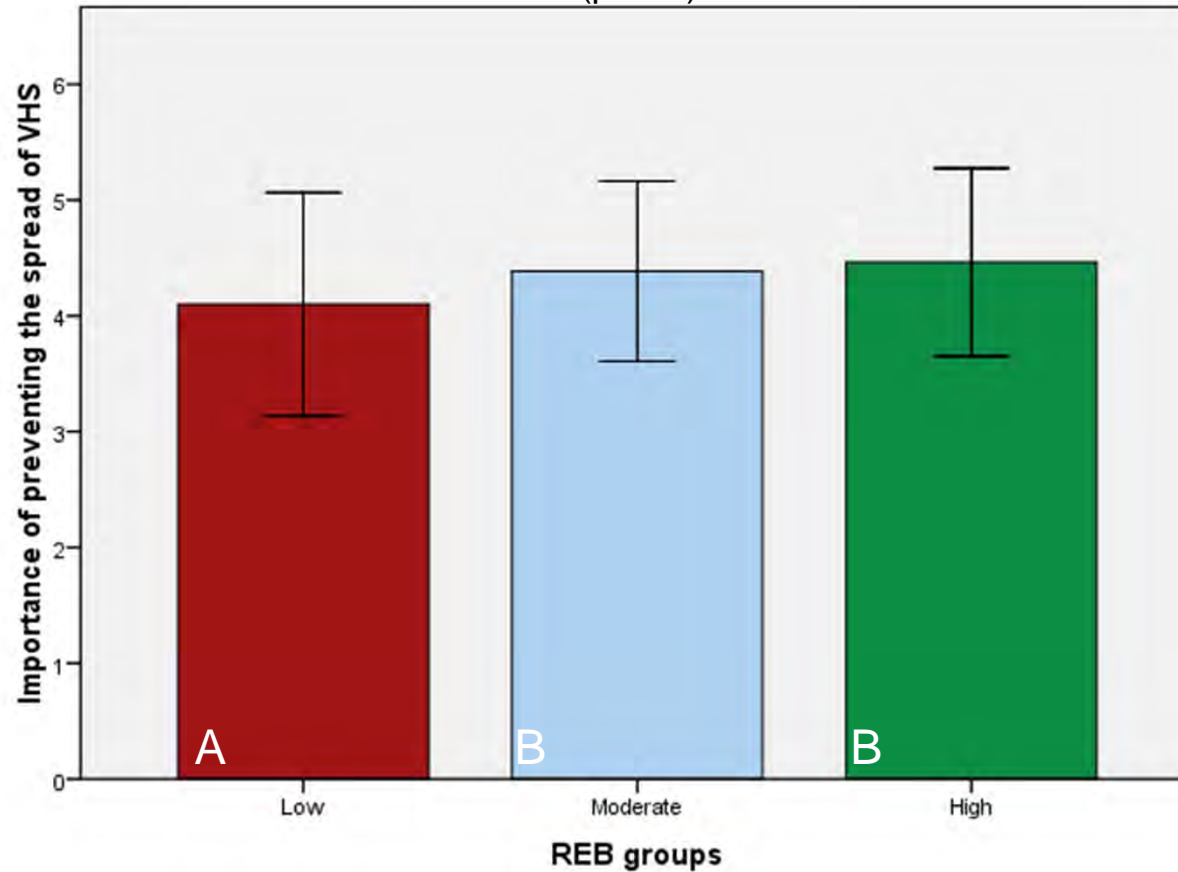
Error Bars: +/- 1 SD

**Knowledge and Awareness**  
 (p<.01)

## Environmental Concern

The importance of preventing the spread of VHS

( $p < .05$ )



- 1= not at all important
- 2= slightly important
- 3= moderately important
- 4= very important
- 5= extremely important

Error Bars:  $\pm 1$  SD



# Research Findings

- Who are Illinois recreational boaters?
- In what responsible environmental behaviors (i.e., best boating practices) do they engage?
- What is the relationship between knowledge and concern about AIS/VHS and past behaviors?
- How can resource managers influence future behaviors to prevent the spread of AIS/VHS?



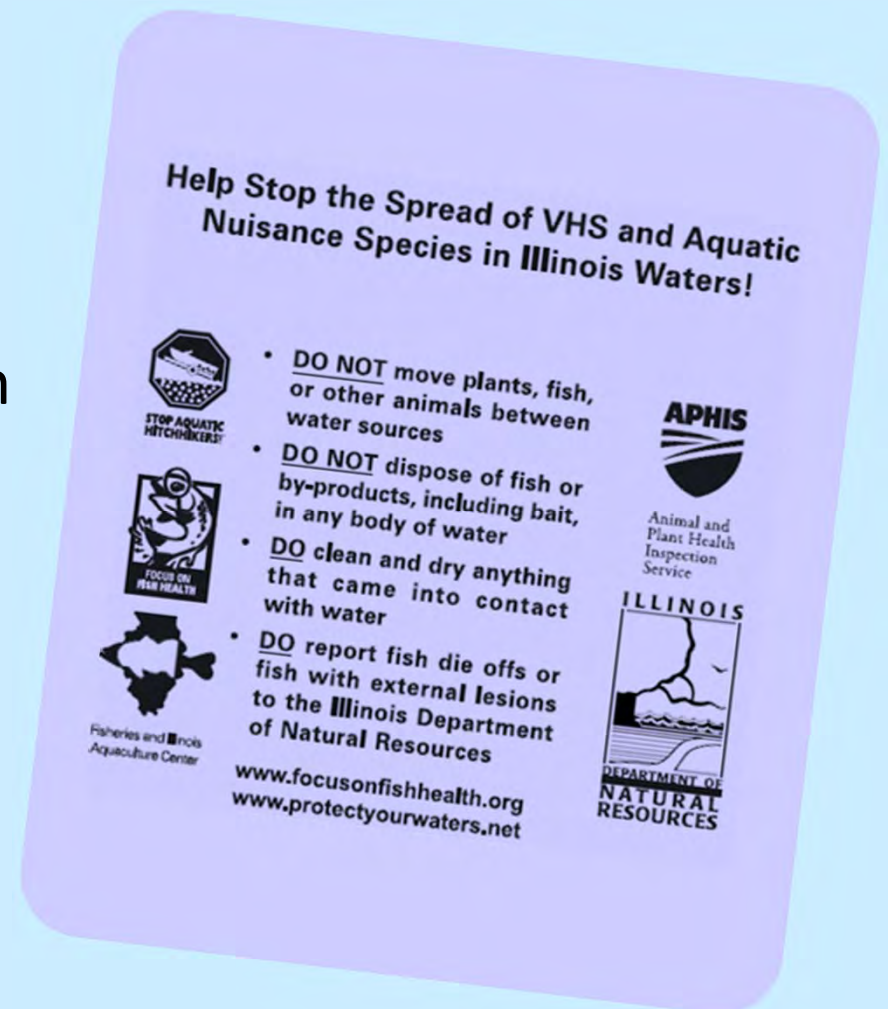
# **SURVEY OF BOAT SHOW ATTENDEES IN ILLINOIS/MISSOURI (N=399)**



# Influencing Behavior

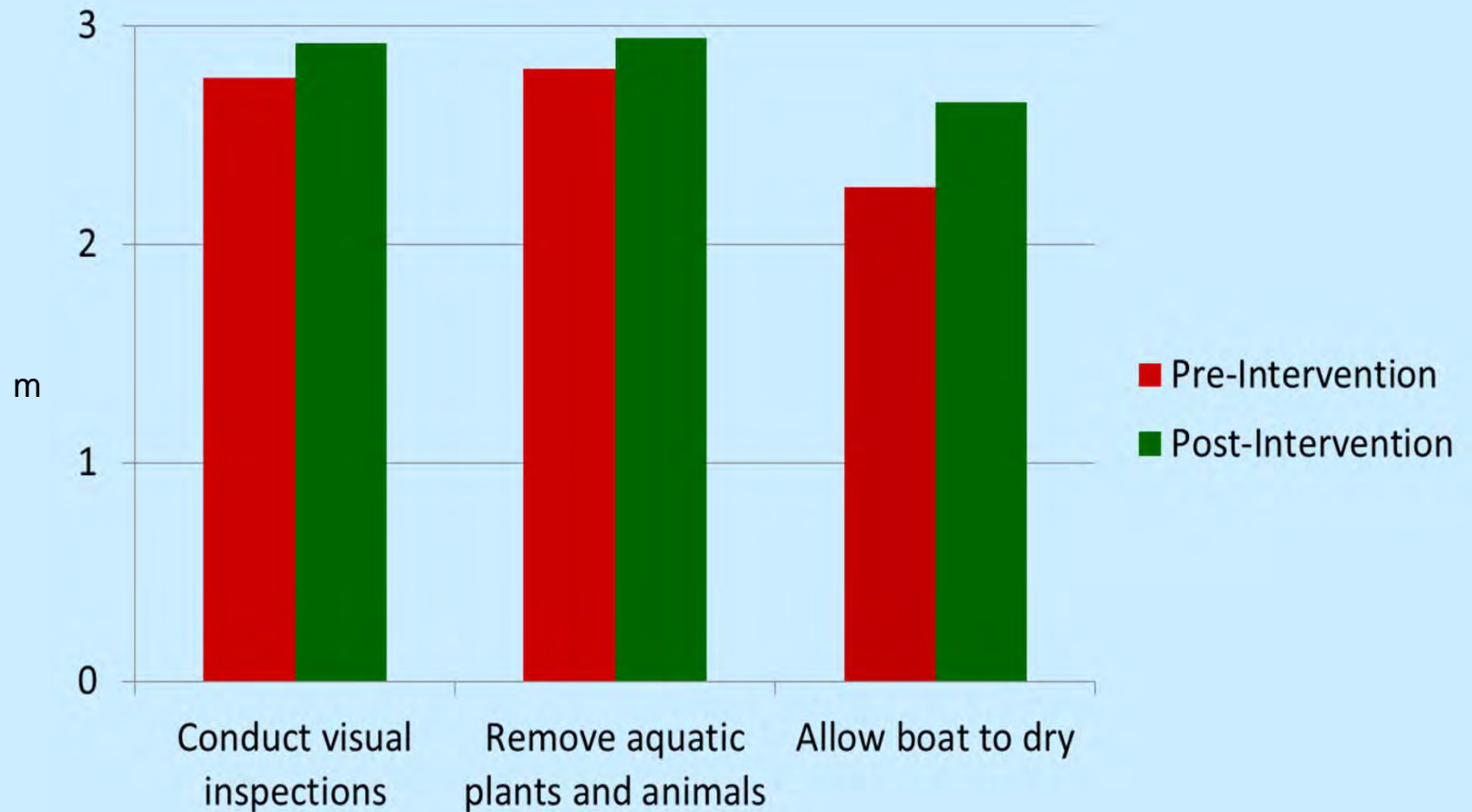
**Increase concern about problems and knowledge about REBs!!**

- Education intervention (chamois towels) at boat shows
- Respondents were significantly more likely to engage in all REBs following the intervention ( $p < .01$ )





## Likelihood of Future Behaviors



1= not at all likely  
2= somewhat likely  
3= very likely



# Influencing Behavior

## Increase awareness of invasions!

- Awareness of infestations significantly increased likelihood of future REB behaviors in all registered boater groups ( $p < .001$ )





# Influencing Behavior

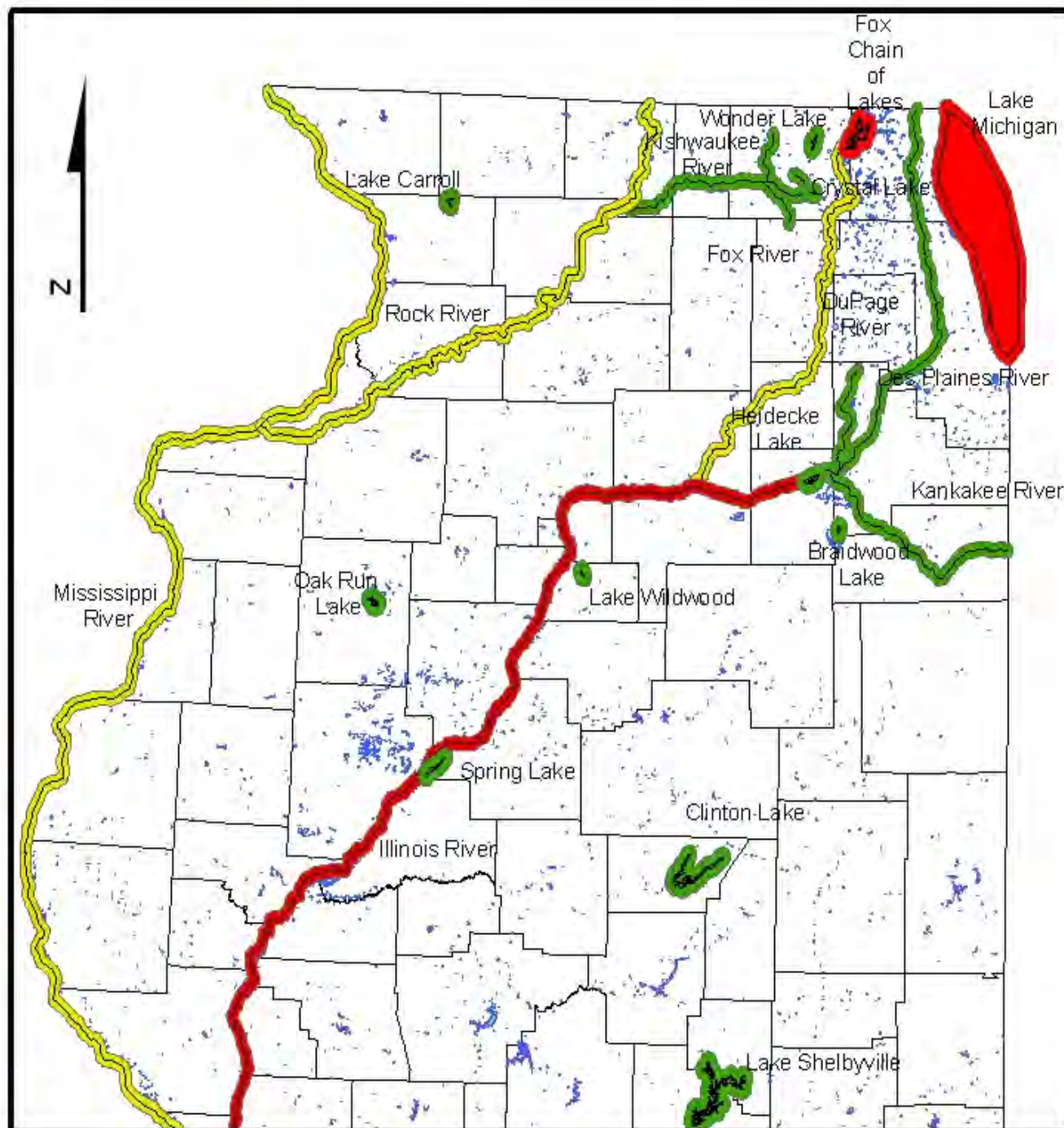
**Identify boat use and invasion hotspots!**



# Water Body Use Intensity: North



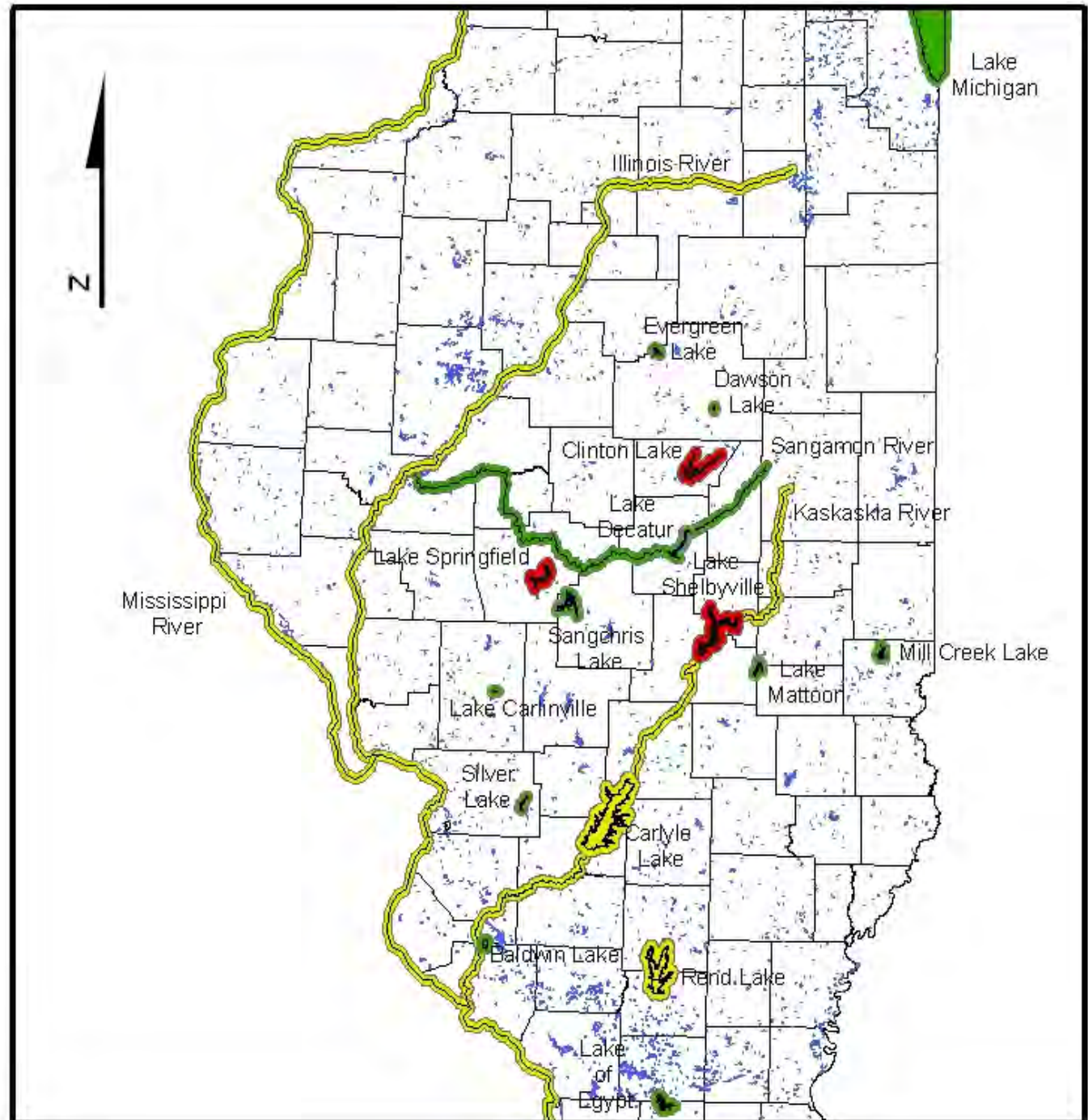
0 10 20 40 60 80 Miles



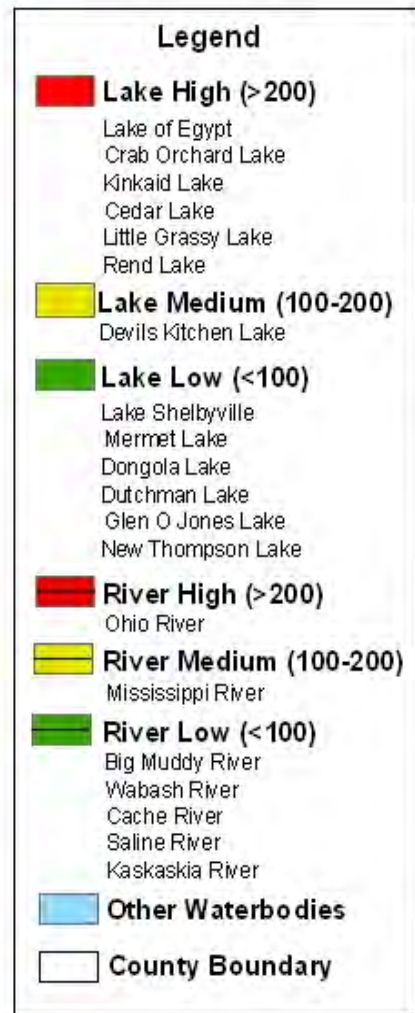
# Water Body Use Intensity: Central



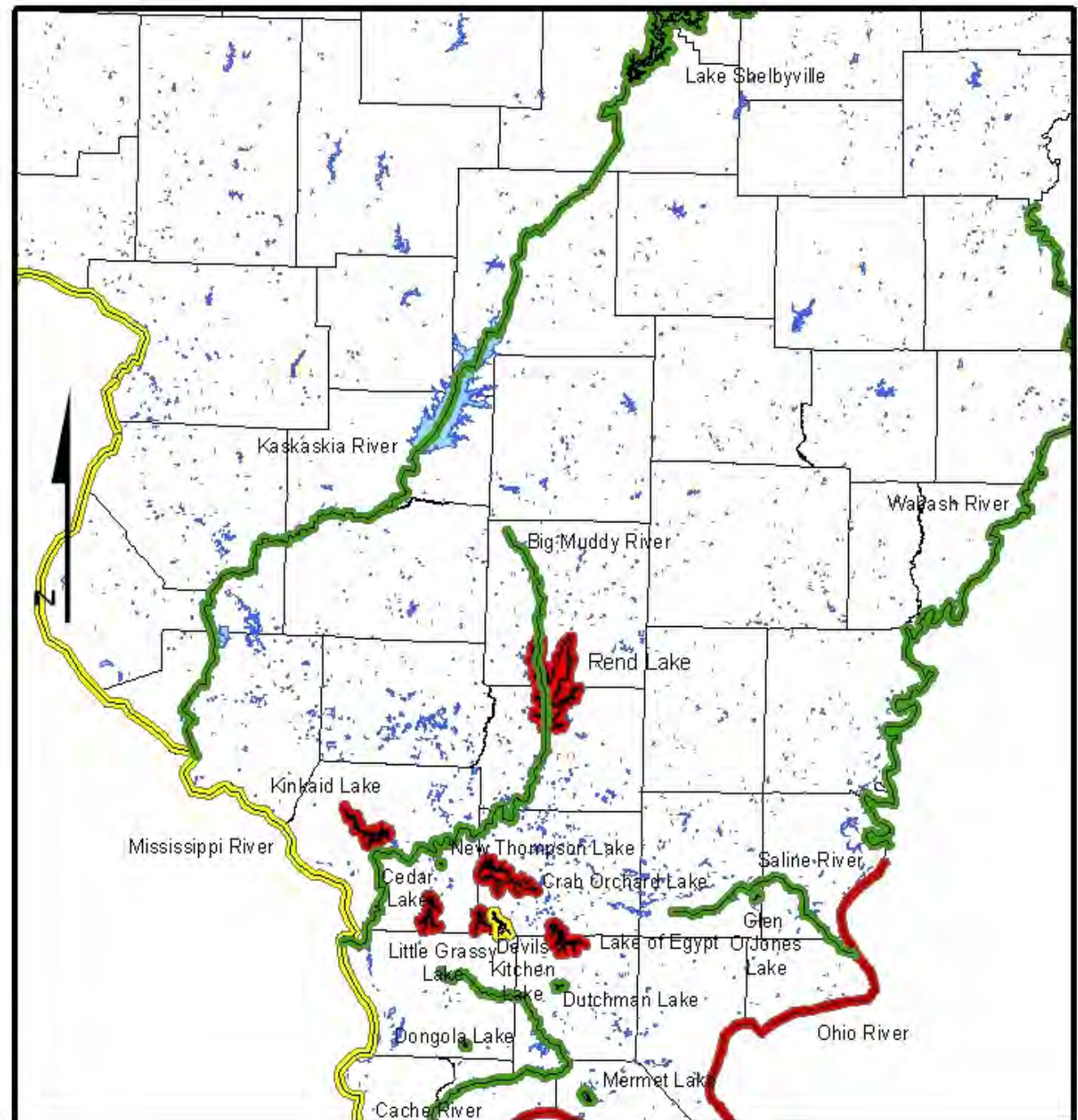
0 12.5 25 50 75 100  
Miles



# Water Body Use Intensity: South



0 4 8 16 24 32  
Miles





# Influencing Behavior

**Are Illinoisans willing to pay for these initiatives?**



The brochure features a collage of fishing-related images: a white utility truck, a person fishing from a boat, a young girl holding a fish, a man holding a large fish, a man holding a crappie, a close-up of a catfish, and people fishing in a stream. It also includes two fishing lures: a yellow and red 'Creek Darter' and a yellow 'Pikie Minnow'. The text on the brochure includes the Illinois Department of Natural Resources logo, the year '2011', the title 'Illinois Fishing Information', the effective dates 'Effective: April 1, 2011 thru March 31, 2012', the 'Division of Fisheries' name, the website 'www.dnr.illinois.gov', and the slogan 'Building the Future of Fishing in Illinois'.

State of Illinois  
Illinois Department  
of Natural Resources

**2011**  
**Illinois Fishing Information**  
Effective: April 1, 2011 thru March 31, 2012

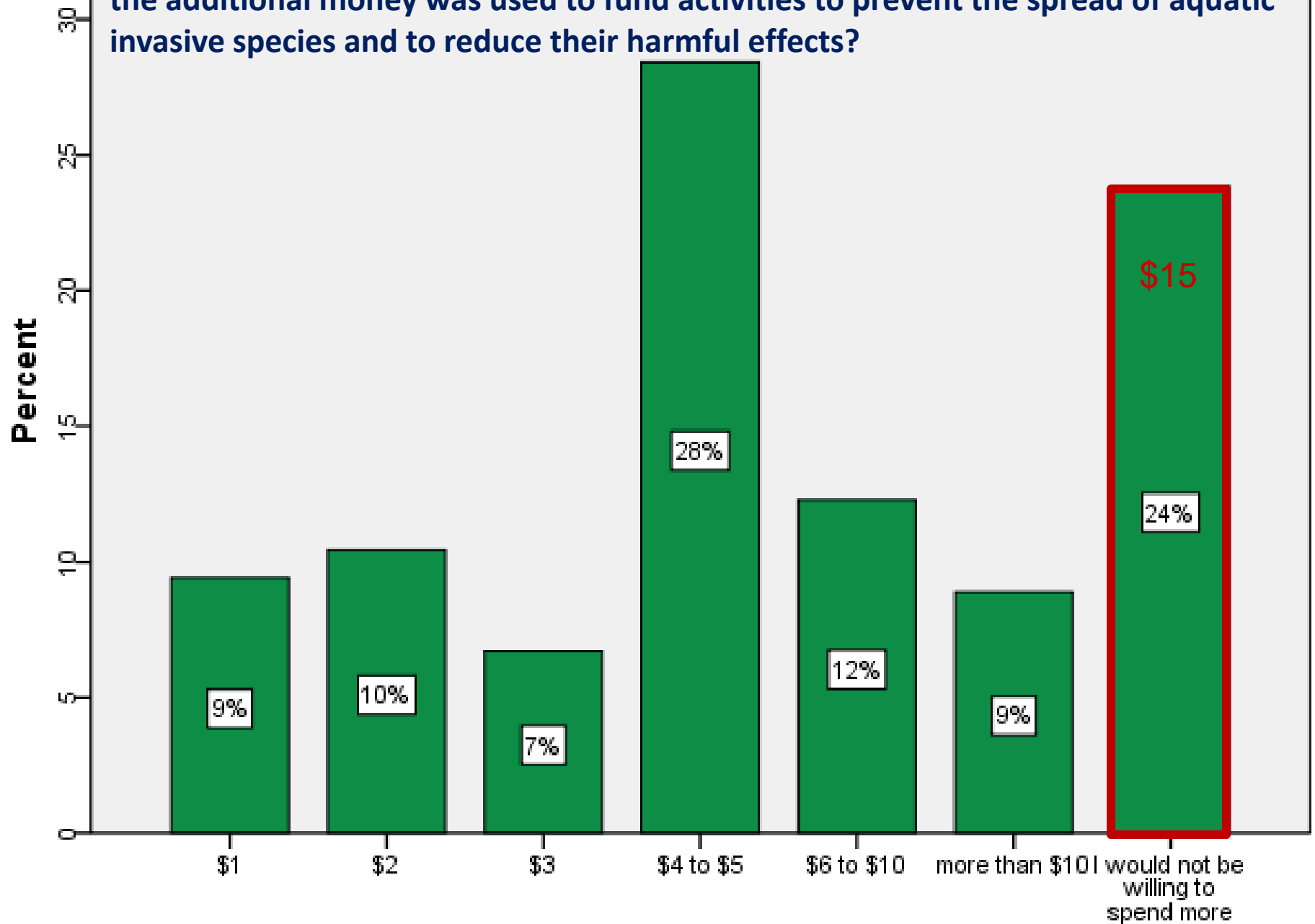
ILLINOIS  
DEPARTMENT OF  
NATURAL RESOURCES

Pikie Minnow  
Creek Chub Bait Company, 1920-1938  
with LED

Creek Darter  
Creek Chub Bait Company, 1924  
with LED

**Division of Fisheries**  
[www.dnr.illinois.gov](http://www.dnr.illinois.gov)  
Building the Future of  
Fishing in Illinois

**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 aquatic invasive species and to reduce their harmful effects?**





# Key Lessons Learned

- Majority of respondents engaged in 4 of 7 REBs “almost always”
  - Drain water from boats
  - Remove plants/animals from boats & trailers
- One-third of respondents engage in most REBs only “sometimes”
- REB groups vary significantly in engagement in visual inspections of boats and drying boats
- Low REB group less aware, knowledgeable and concerned about AIS/VHS as a problem (Cottrell 2003)



# Key Lessons Learned

- All groups more likely to engage in REBs if they knew the water bodies they boat in are infested
- The chamois towel had a significant positive effect on REB intentions, especially likelihood of drying boat
- 75% of respondents were willing to pay more for licenses to prevent the spread of AIS and fish diseases



- Boaters are on the front lines of prevention
- Success depends on increasing boater awareness of infestations (e.g., reg books & signage)
- Education programs should target desired behaviors (e.g., pledge signing at bait shops)
- Key target audience is low REB group (Who are they? What constraints exist?)

This map of Illinois displays county boundaries and names. Major rivers shown include the Mississippi, Illinois, Missouri, Sangamon, Kaskaskia, and others. Significant lakes and reservoirs such as Lake Michigan, Lake Springfield, Lake Monona, and Lake Mendota are labeled. The map also shows the locations of major cities and towns. A scale bar at the bottom indicates distances of 100 KM and 100 Miles. The source '© geology.com' is noted in the bottom right corner.



# Acknowledgements

## **Survey participants**

### **Funding support:**

- Animal and Plant Health Inspection Service (APHIS), U.S. Department of Agriculture
- Mississippi River Basin Panel on Aquatic Nuisance Species
- Southern Illinois University Carbondale
- University of Minnesota

### **Data collection and management assistance:**

- Illinois Department of Natural Resources, especially Steve Shults
- Seth Turner, Justin Dewey, Christine Yaeger, Bonnie Mulligan, Amanda Sames, Erin Seekamp



# Questions and Comments?

- Please contact me at:
  - [mdaven@umn.edu](mailto:mdaven@umn.edu)
  - 612-624-2721