



Improving Wisconsin's Aquatic Invasive Species Monitoring

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Aquatic Invasive Species Monitoring Lead

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Wisconsin Lakes Partnership Convention

Thursday, March 31, 2016

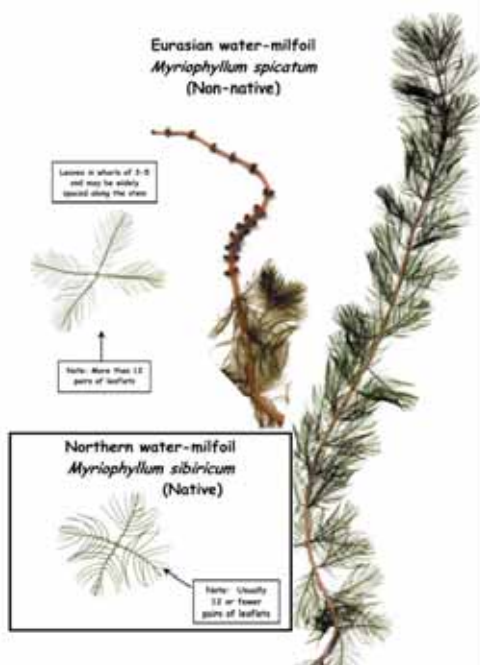
A decorative header image showing a stylized landscape with green hills, a blue sky, and a line of green trees. The title 'AIS Monitoring' is centered over this image in a green font.

AIS Monitoring

- Background
- 5-year lake project
- Stream pilot project
- Lessons learned
- Next steps

Current Efforts

- Prevent, Contain, Control
- Annually ~\$7 M AIS; \$4 M AIS grants





Current Efforts

- GLRI Partnership in 2010 for prevention, education, and **monitoring.**



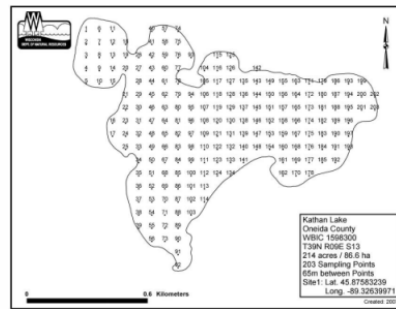
Great Lakes
RESTORATION



"We're committed to creating a new standard of care that will leave the Great Lakes better for the next generation."

Background

- Citizen Scientists
- Staff
- Partners





5-Year Lake Project

Objective

1. Rate of AIS spread
2. Baseline data
3. Early detection



**PREVENT THE SPREAD OF
INVASIVE SPECIES
IT'S THE LAW**

PENALTIES MAY EXCEED \$2000

Before *launching* and before *leaving* ***YOU MUST:***

- ✓ **INSPECT** boats, trailers, and equipment.
- ✓ **REMOVE** all attached aquatic plants and animals.
- ✓ **DRAIN** all water from boats, vehicles, and equipment.
- ✓ **NEVER MOVE** plants or live fish away from a waterbody.*

STOP AQUATIC HITCHHIKERS!
Prevent the spread of invasive species, it's the law

 *Limited exceptions apply. Visit WWW.DNR.WI.GOV and search for "BAIT LAWS."



Design

- Monitor 200 public access lakes each year for 5 years



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- Snorkeling, dip nets & visual at:
 - Boat landings (30 min)
 - 5 target sites (10 min)
 - Shoreline meander



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A decorative header image showing a stylized landscape with green hills, blue mountains, and a line of green trees under a blue sky. The word "Design" is centered in green text over the image.

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- Veliger and plankton tows
- Voucher collection

A decorative header image showing a stylized landscape with green hills, blue mountains, and a line of green trees under a light sky.

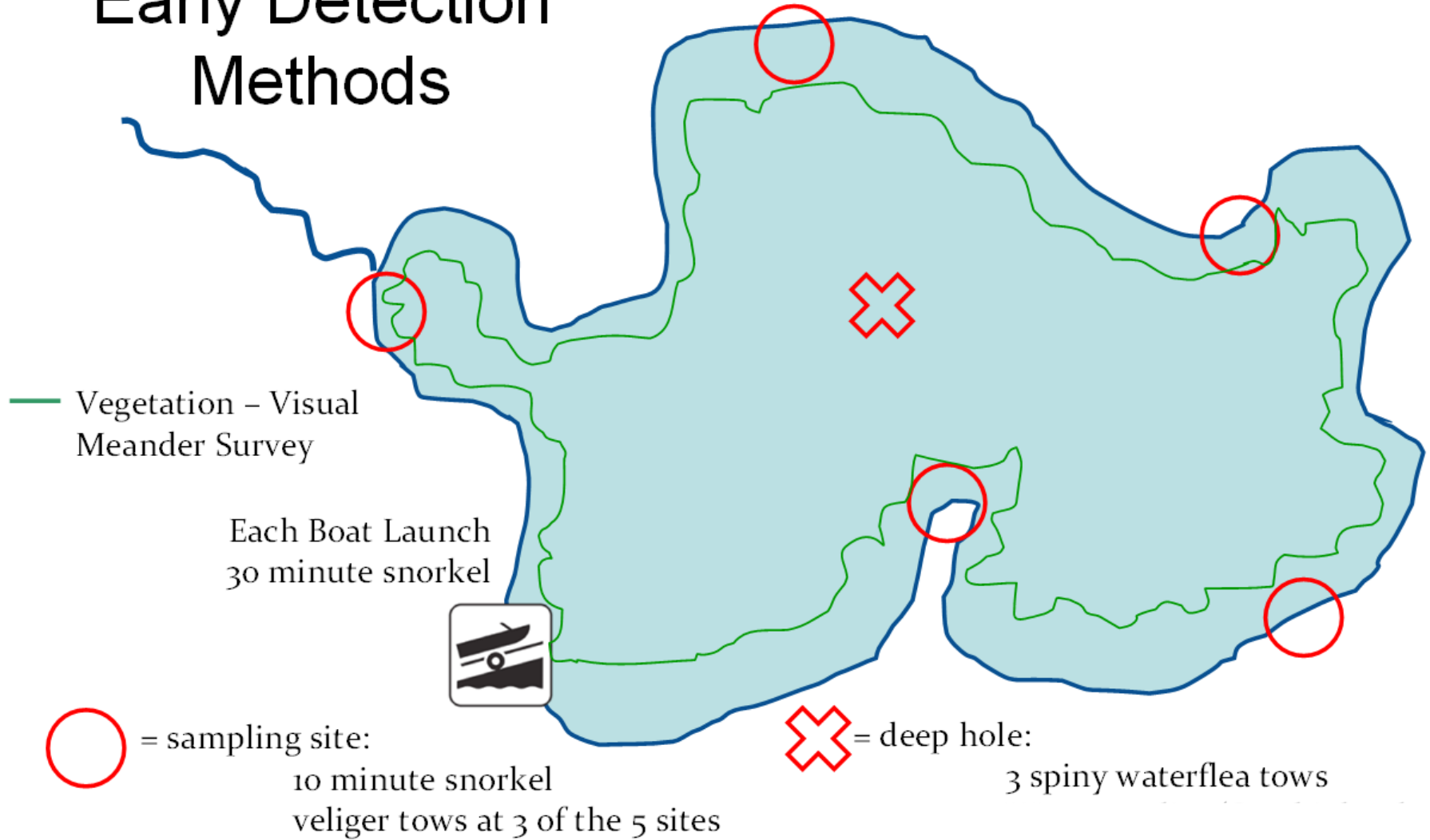
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- Voucher collection
- Decontamination



Early Detection Methods

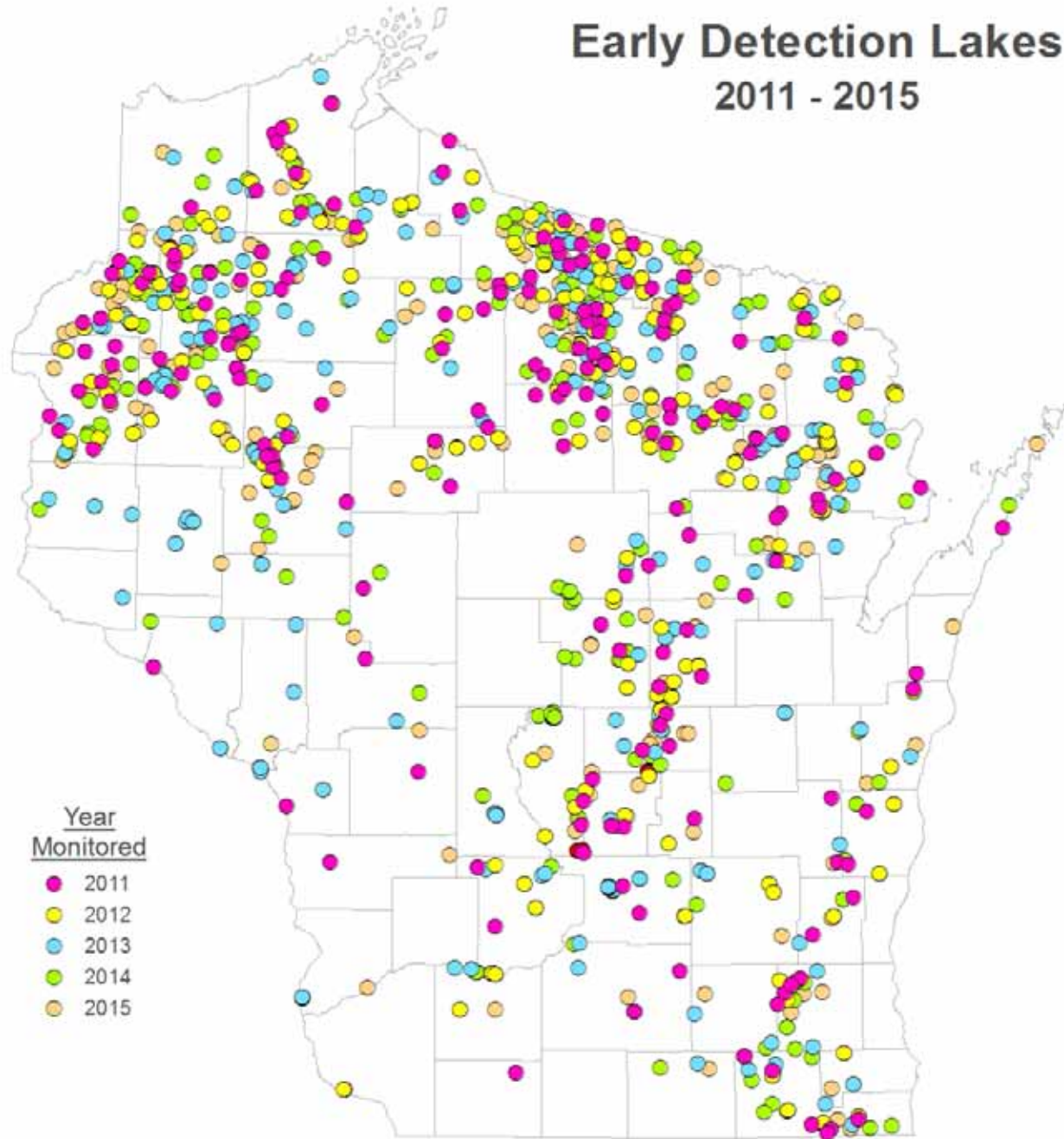
Any new species found will be counted as a "detect."





Early Detection Lakes

2011 - 2015





5-Year Lake Crews

Corey Adams	Susan Eichelkraut	Therese Hubacher	Alex Latzka
Michelle Balk	Amy Eliot	Matthew Jacobson	Jodi Lepsch
Samuel Betterley	Dillon Epping	Jason Knutson	Jake Linder
Mike Backus	Chris Ester	Christopher Kolasinski	Evan Lunda
Donald Barrette	Reesa Evans	Frank Koshere	Cordell Manz
Jeremy Bates	Robert Ferris	Amy Kretlow	Alison Mikulyuk
Stephanie Boismenu	Maureen Ferry	Krista Kamke	Ryan Motiff
Derek Brehm	Mary Gansberg	Paul Klein	Stephanie Mueller
Kelsey Brown	Kevin Gauthier	Steve Klock	Kristy Maki
Lisa Burns	Katrina Gilbank	Ty Krajewski	Anna Mares
Jason Cotter	Mary Jo Gingras	Brad Krause	Parker Matzinger
James Carlson	Philip Grgic	James Kreitlow	Sara Mills
Scott Caven	Jason Hayes	Courtney Kruger	Emily Moravec
Dane Christenson	Elizabeth Hess	Rodney Lange	Jon Motquin
Bryce Crago	Matthew Hager	Nancy Larson	Anna Moyer
Terry Daulton	Christopher Hamerla	Clifford LaVigne	Samantha Neary
Diane Daulton	James Hansen	Chad Leanna	Andrew Notbohm
Donalea Dinsmore	Emily Hilts	Garrett Lyon	Michelle Nault
Chuck Drukery	Katelin Holm	Kris Larsen	Jared Neibauer



5-Year Lake Crews

Brenda Nordin
Glen Nordin
Florence Olson
Thomas Oster
Victor Pappas
Kendall Patrie
Rachel Peacher
Mark Pallardy
Heather Palmquist
Ryan Parchim
Amanda Perdzock
Timothy Plude
John Preuss
Lilly Quetschke
Mycal Raleigh
Kurt Rasmussen
Justin Riebe
Jacob Ring

Cody Rebishke
Robert Ruleau
Adam Schunemann
Brandon Selner
Stephen Surendonk
Michele Saduskas
Carrie Sanda
Nancy Sattler
Jeanne Scherer
Matthew Schultz
Deborah Seiler
Marquita Sheehan
Paul Skawinski
Alex Smith
Bradley Stekart
Jennifer Steltenpohl
Amanda Strick
Jacob Sturzl

Kaycie Stushek
Matt Styka
Mark Sundeen
Lisa Thetreau
Joshua Turensky
Pamela Toshner
William Tuck
Scott VanEgeren
Peter Van Kampen
Lauren Vanderport
Erin Vennie-Vollrath
Todd Verboomen
Karen Vermillion
Kelly Wagner
Ryan Wallace
Jeanette Wendler
Courtney Winter
Alan Wirt

Jim Wallen
Michael Wampfler
Cara Wanserki Spatz
Tom Ward
Carol Warden
Angier Wenninger
Jeremy Williamson
Farrah Wirtz
Cody Wittman
Christina Wolbers
Matt Wood
Hnue Yang
David Lepczyk
Samantha Zommers



5-Year Results

- 949 lakes
- 706 lakes with AIS (~75%)
- 545 new discoveries



5-Year Results

Number of new populations each year

	2011	2012	2013	2014	2015
#Lakes	182	183	199	193	191
EWM	3	8	9	5	5
CLP	15	12	18	9	11
PL	28	29	19	26	19
BMS	28	28	19	15	23
CMS	53	24	39	18	27
ZM	1	2	2	4	1
SWF	0	0	1	0	0

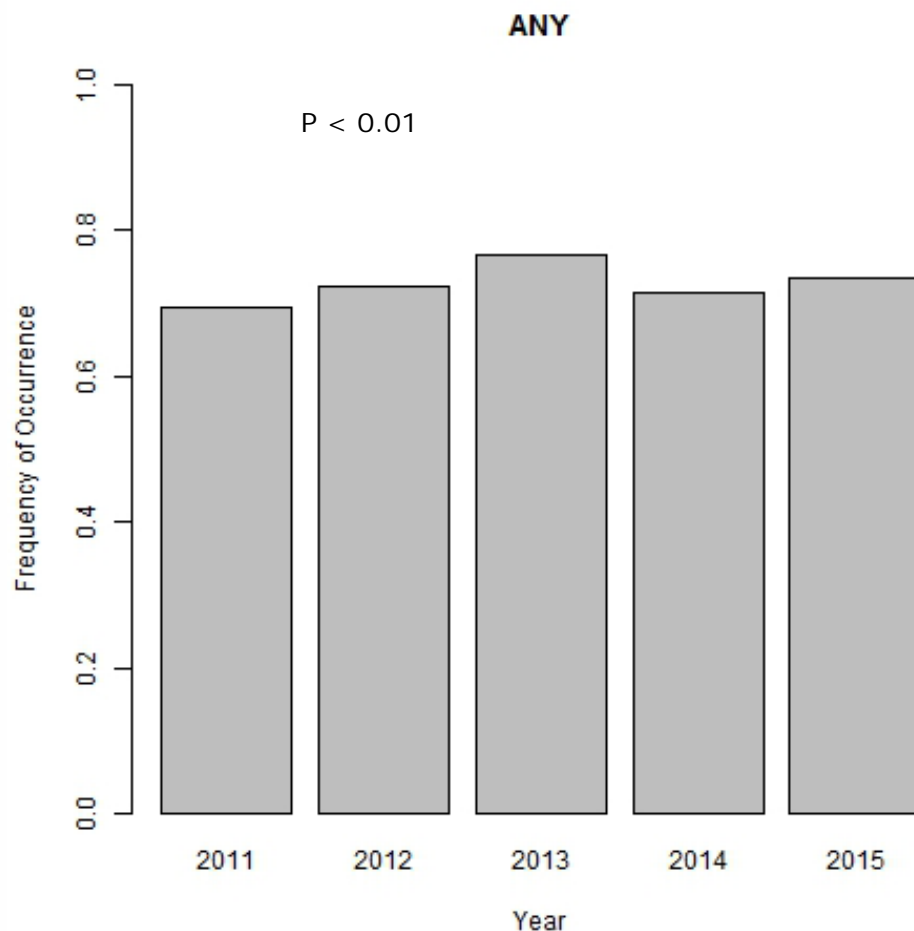


5-Year Results

- Also found:



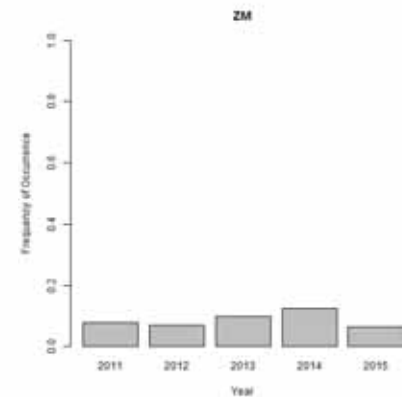
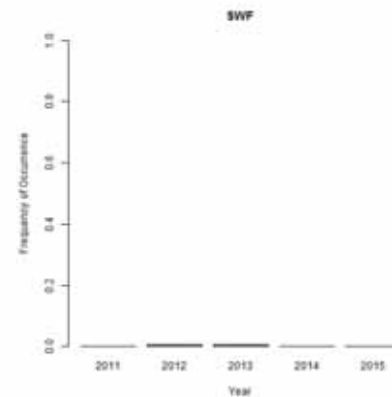
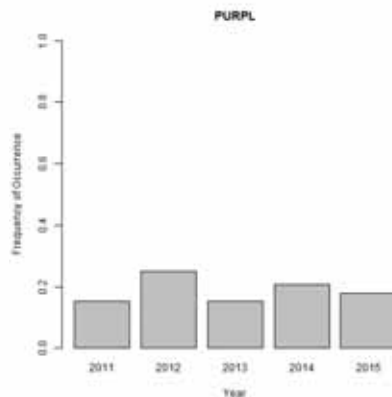
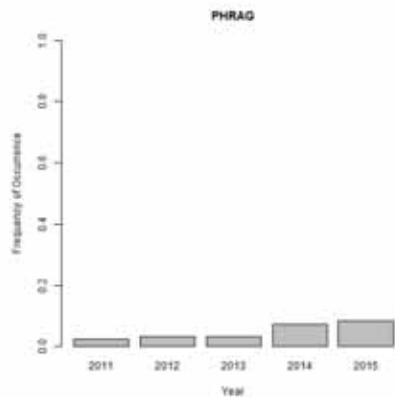
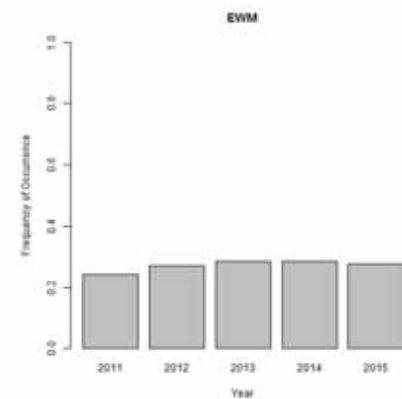
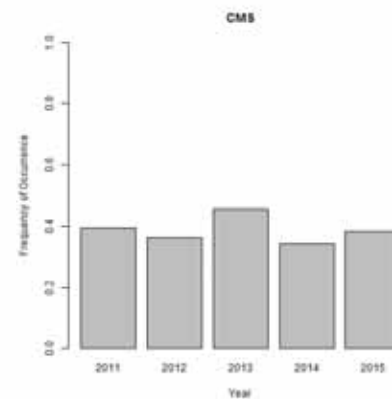
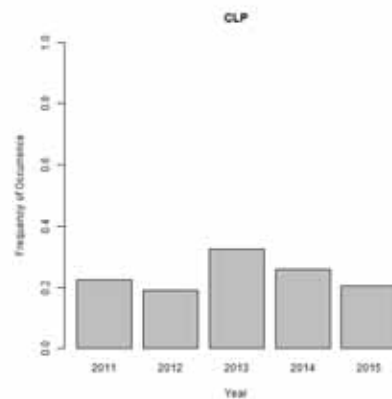
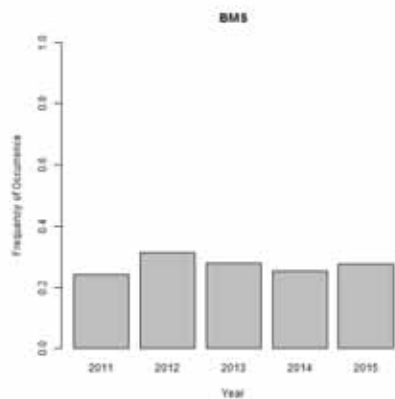
5-Year Results



- Logistic regression
- No change in the rate of spread ($p < 0.001$)

5-Year Results

- No change for species (all $p < 0.001$)





5-Year Results

- Boat landing vs target vs meander?



5-Year Results

- Boat landing vs target vs meander?
- Boat landing and overall ($p < 0.001$)



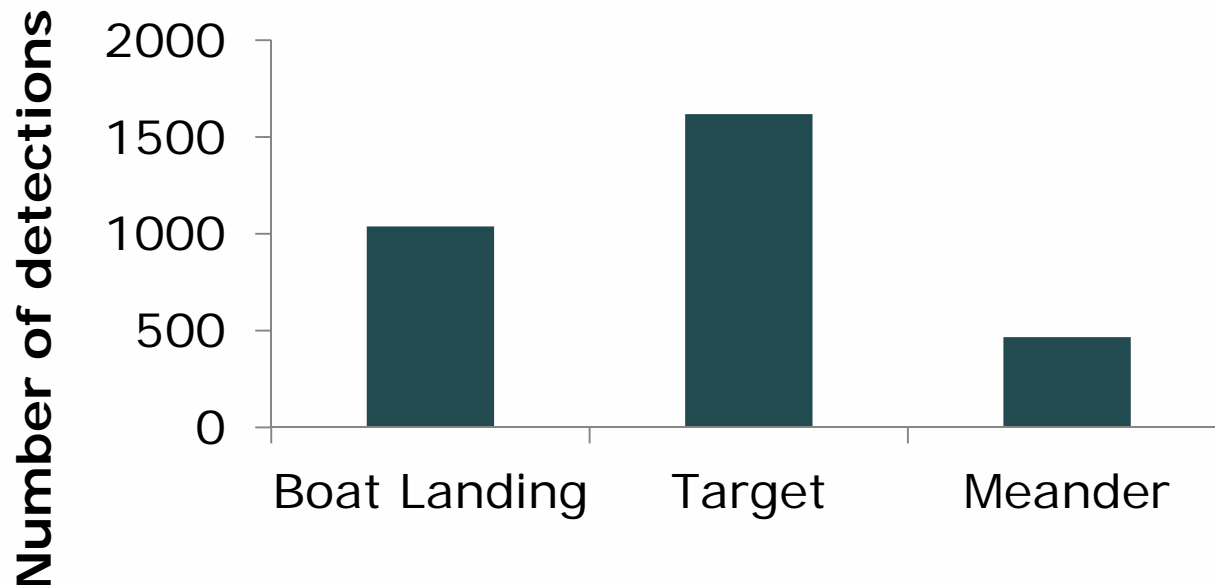
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- Boat landing vs target vs meander?
- Boat landing and overall ($p < 0.001$)
- Methods different ($p < 0.001$)



5-Year Results

- Boat landing vs target vs meander?
- Boat landing and overall ($p < 0.001$)
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Which species would be missed without the meander survey?

Lakes where each species was found

Species	# Lakes Meander Only	# Lakes All Methods	% Lakes Meander Only
Asiatic Clam (Corbicula)	0	7	0
Banded Mystery Snail	2	162	1.234568
Brittle Waternymph	0	4	0
Chinese Mystery Snail	7	201	3.482587
Curly-Leaf Pondweed	20	156	12.82051
Eurasian Water-Milfoil	7	175	4
Faucet Snail	1	2	50
Flowering Rush	2	4	50
Freshwater Jellyfish	2	3	66.66667
Hybrid EWM	3	19	15.78947
Japanese Knotweed	18	23	78.26087
Japanese Mystery Snail	0		
Native Phragmites	-		
Other	-		
Phragmites (non-native)	25	40	62.5
Purple Loosestrife	49	147	33.33333
Rainbow Smelt	0		
Reed Canary Grass	1	2	50
Rusty Crayfish	4	78	5.128205
Unknown Species			
Yellow Floating Heart	0?		
Yellow Iris	10	21	47.61905
Zebra Mussel	0	55	0



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Lessons Learned

- Many public lakes surveyed have AIS
- Priority species not widespread
- Target, then boat landing have greatest detection
- Eliminating meander from lakes increases efficiency, but lose riparian

Next Steps

- Integrate AIS protocols into routine water quality sampling and CLMN and improve targeted monitoring





Stream Pilot

Objective

1. Land use and recreation
2. Baseline data
3. Early detection



Design

- 100 road crossings in Lake Michigan basin
- Stratified by land use and recreation

Number of Targeted Samples in Each Category

	High Urban	Low Urban
High Recreation	25	25
Low Recreation	25	25

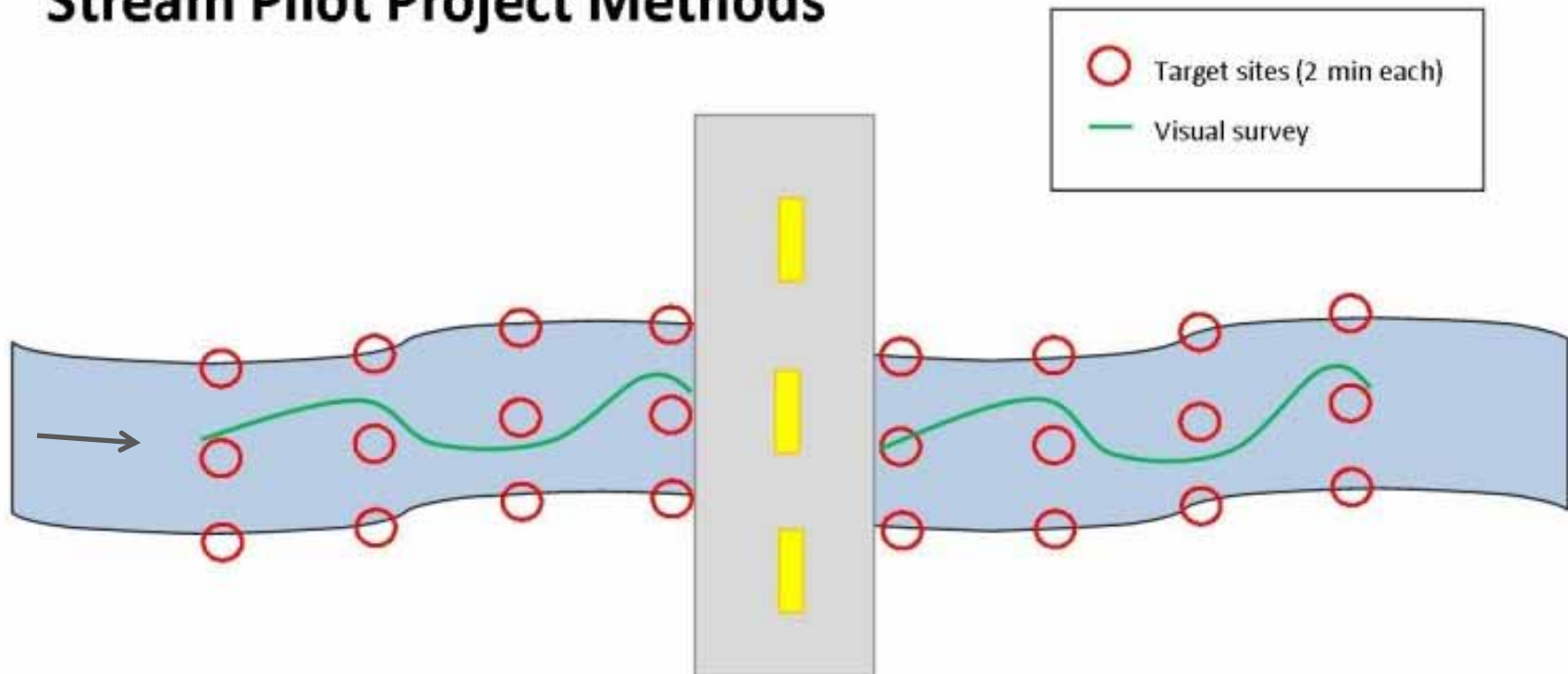


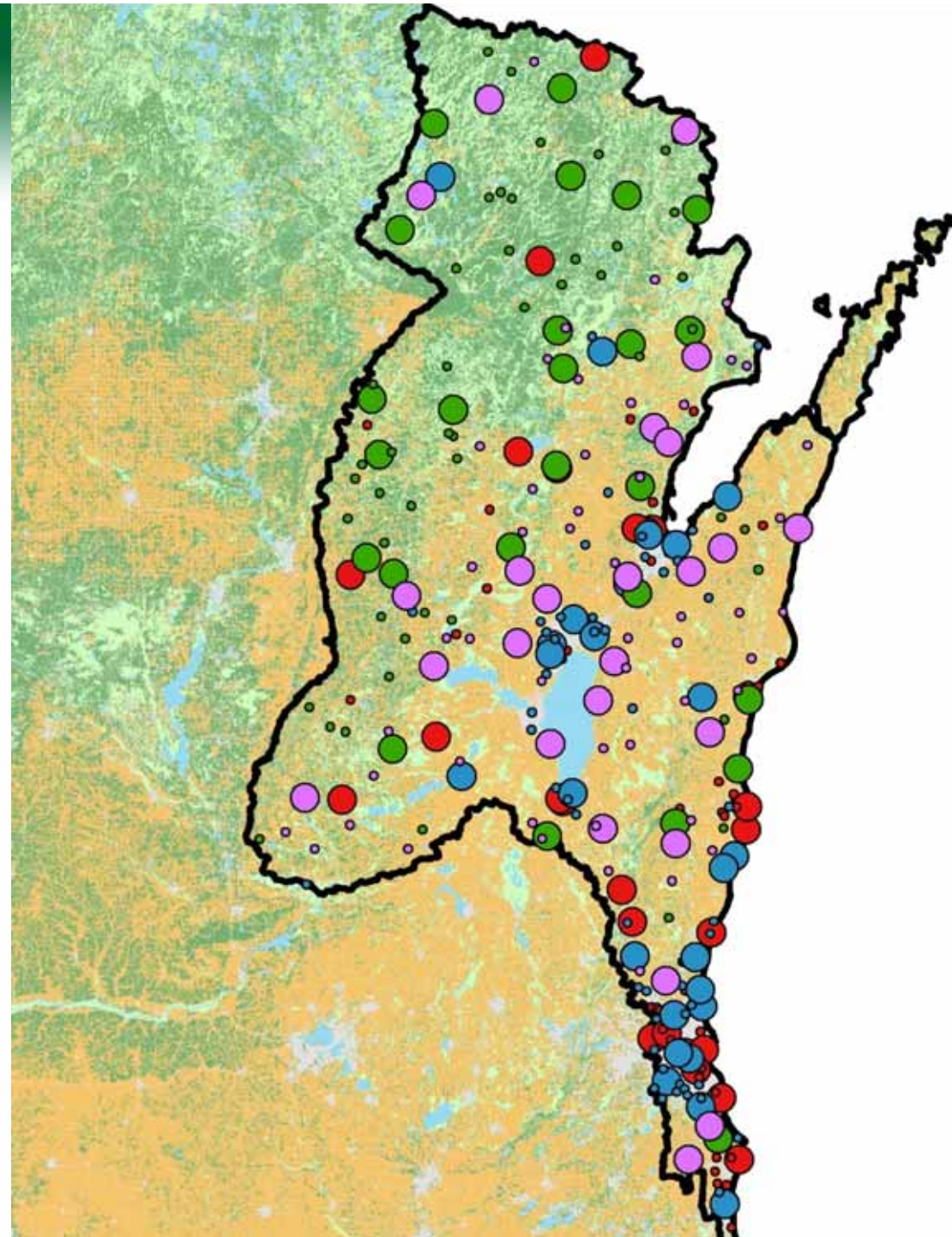
Methods

- Survey up and downstream
- Dip net and visual along transects
- Visual between transects
- Voucher collection
- Decontamination

Methods

Aquatic Invasive Species Early Detection Stream Pilot Project Methods





Legend

Sample2

HighUrbHighRec

● 1

● 2

HighUrbLowRec

● 1

● 2

LowUrbHighRec

● 1

● 2

LowUrbLowrec

● 1

● 2



Crew

- Amy Kretlow



- Josh Turensky





Stream Pilot Results

- Out of 100 sites, 93 had ≥ 1 AIS



Stream Pilot Results

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	BMS	CMS	CLP	EWM	JK	Other	PHG	PL	RCG	RC	ZM
# sites	4	4	10	8	3	25	11	23	85	39	8



Stream Pilot Results

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- Removing RCG, 70 sites had ≥ 1 AIS
- 92 new discoveries



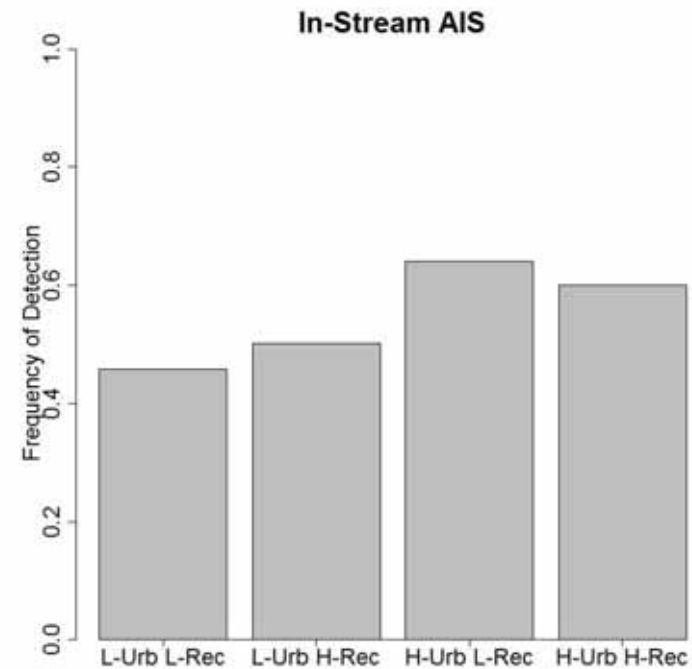
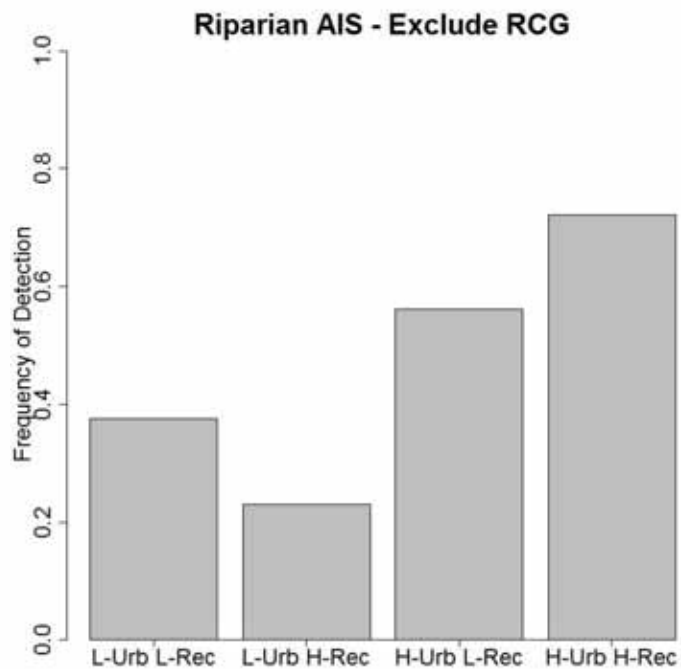
- Also found:





Stream Pilot Results

- Riparian more frequent with high land use and high recreation
- In-stream no relationship





Stream Pilot Results

- Found sooner down, but no difference

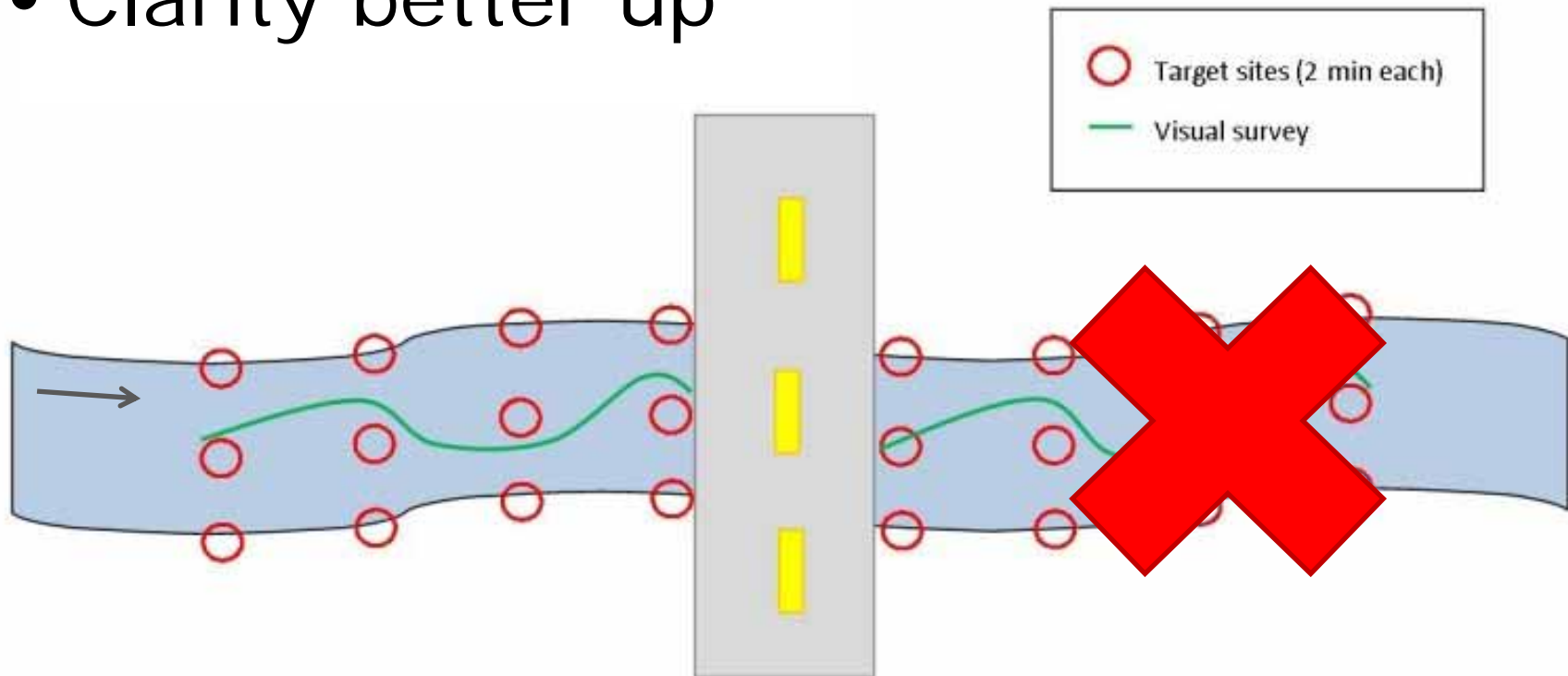


Stream Pilot Results

- Found sooner down, but no difference
- Clarity better up

Stream Pilot Results

- Found sooner down, but no difference
- Clarity better up





Lessons Learned

- Many streams surveyed have AIS
- Priority species not widespread
- Land use & recreation relate to riparian, but not in-stream
- Upstream sufficient



Next Steps

- Integrate with routine sampling, Snapshot Day, and Water Action Volunteers
- Identify gaps



Vouchering

- QAQC
- Moving toward photo verification
- Developing guidance for how to collect photo vouchers
- Saves time and \$\$!
- Train and certify regional staff to be verifiers
- Test 2016, implement 2017



Moving Forward

- Integration
- Simplifying reporting for others
- Improve targeted monitoring
- Explore CBCW 'where boaters have been' data
- Expand response monitoring
- Evaluate success of early detection

LIFE IS EASIER WHEN YOU'VE GOT A POSSE.





Thank you!

Questions?

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