Wisconsin Department of Natural Resources

Improving Wisconsin's Aquatic Invasive Species Monitoring

Maureen Ferry
Aquatic Invasive Species Monitoring Lead

Co-authors:
Scott Van Egeren, Alex Latzka,
Mike Shupryt, and Katie Hein

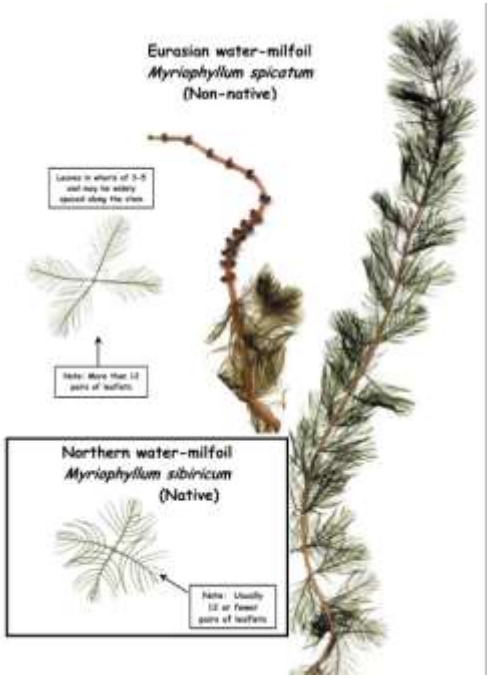
International Conference on Aquatic Invasive Species
Monday, April 11, 2016

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

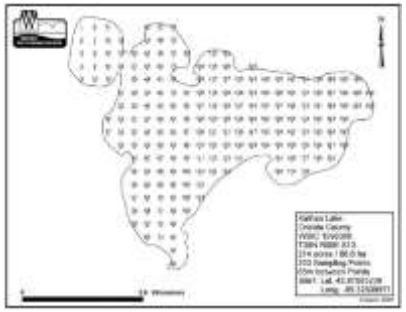


Current Efforts

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

Background

- Citizen Scientists
- Staff
- Partners



5-Year Lake Project

Objective

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

Design

- Monitor 200 public access lakes each year for 5 years

Design

- Monitor 200 public access lakes each year for 5 years
- Snorkeling, dip nets & visual at:
  - Boat landings (30 min)
  - 5 target sites (10 min)
  - Shoreline meander

Design

- Monitor 200 public access lakes each year for 5 years
- Snorkeling, dip nets & visual at:
  - Boat landings (30 min)
  - 5 target sites (10 min)
  - Shoreline meander
- Veliger and plankton tows

Design

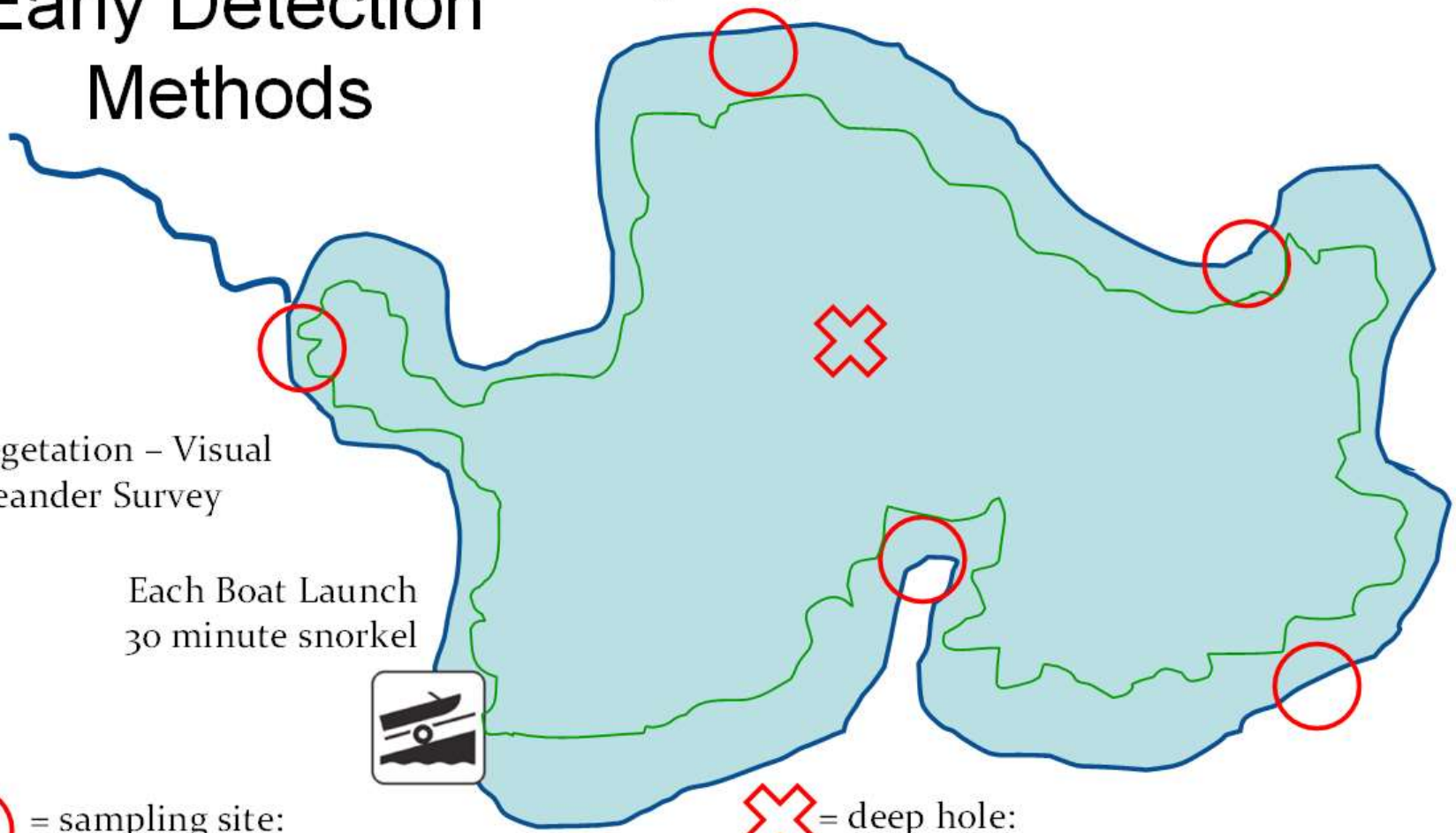
- Monitor 200 public access lakes each year for 5 years
- Snorkeling, dip nets & visual at:
  - Boat landings (30 min)
  - 5 target sites (10 min)
  - Shoreline meander
- Veliger and plankton tows
- Voucher collection

Design

- Monitor 200 public access lakes each year for 5 years
- Snorkeling, dip nets & visual at:
  - Boat landings (30 min)
  - 5 target sites (10 min)
  - Shoreline meander
- Veliger and plankton tows
- Voucher collection
- Decontamination

Early Detection Methods

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



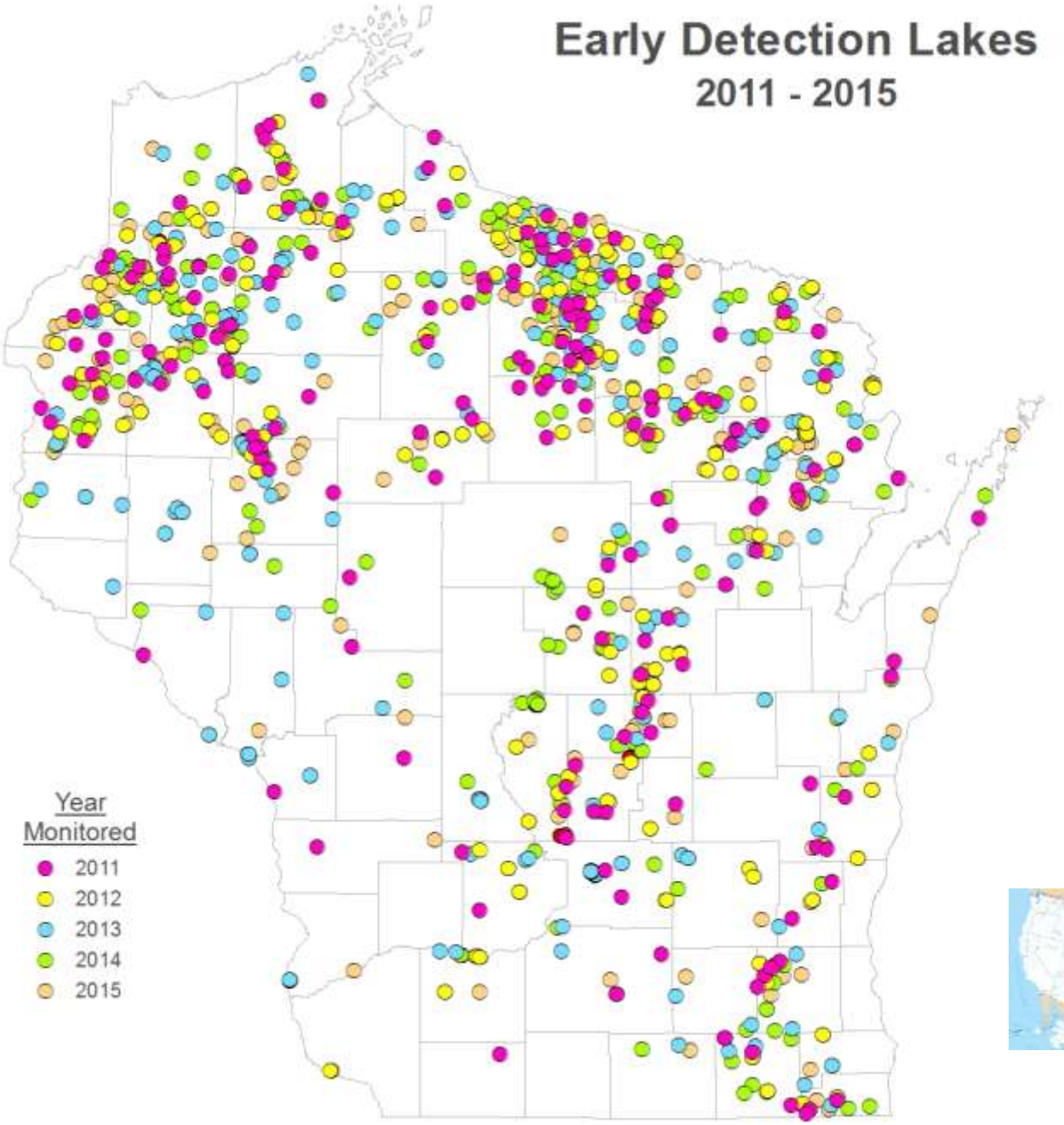
Vegetation – Visual Meander Survey

Each Boat Launch
30 minute snorkel

= sampling site:
10 minute snorkel
veliger tows at 3 of the 5 sites

= deep hole:
3 spiny waterflea tows

Early Detection Lakes
2011 - 2015



5-Year Lake Crews

Corey Adams
Michelle Balk
Samuel Betterley
Mike Backus
Donald Barrette
Jeremy Bates
Stephanie Boismenue
Derek Brehm
Kelsey Brown
Lisa Burns
Jason Cotter
James Carlson
Scott Caven
Dane Christenson
Bryce Crago
Terry Daulton
Diane Daulton
Donalea Dinsmore
Chuck Drukery

Susan Eichelkraut
Amy Eliot
Dillon Epping
Chris Ester
Reesa Evans
Robert Ferris
Maureen Ferry
Mary Gansberg
Kevin Gauthier
Katrina Gilbank
Mary Jo Gingras
Philip Grgic
Jason Hayes
Elizabeth Hess
Matthew Hager
Christopher Hamerla
James Hansen
Emily Hilts
Katelin Holm

Therese Hubacher
Matthew Jacobson
Jason Knutson
Christopher Kolasinski
Frank Koshere
Amy Kretlow
Krista Kamke
Paul Klein
Steve Klock
Ty Krajewski
Brad Krause
James Kreitlow
Courtney Kruger
Rodney Lange
Nancy Larson
Clifford LaVigne
Chad Leanna
Garrett Lyon
Kris Larsen

Alex Latzka
Jodi Lepsch
Jake Linder
Evan Lunda
Cordell Manz
Alison Mikulyuk
Ryan Motiff
Stephanie Mueller
Kristy Maki
Anna Mares
Parker Matzinger
Sara Mills
Emily Moravec
Jon Motquin
Anna Moyer
Samantha Neary
Andrew Notbohm
Michelle Nault
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

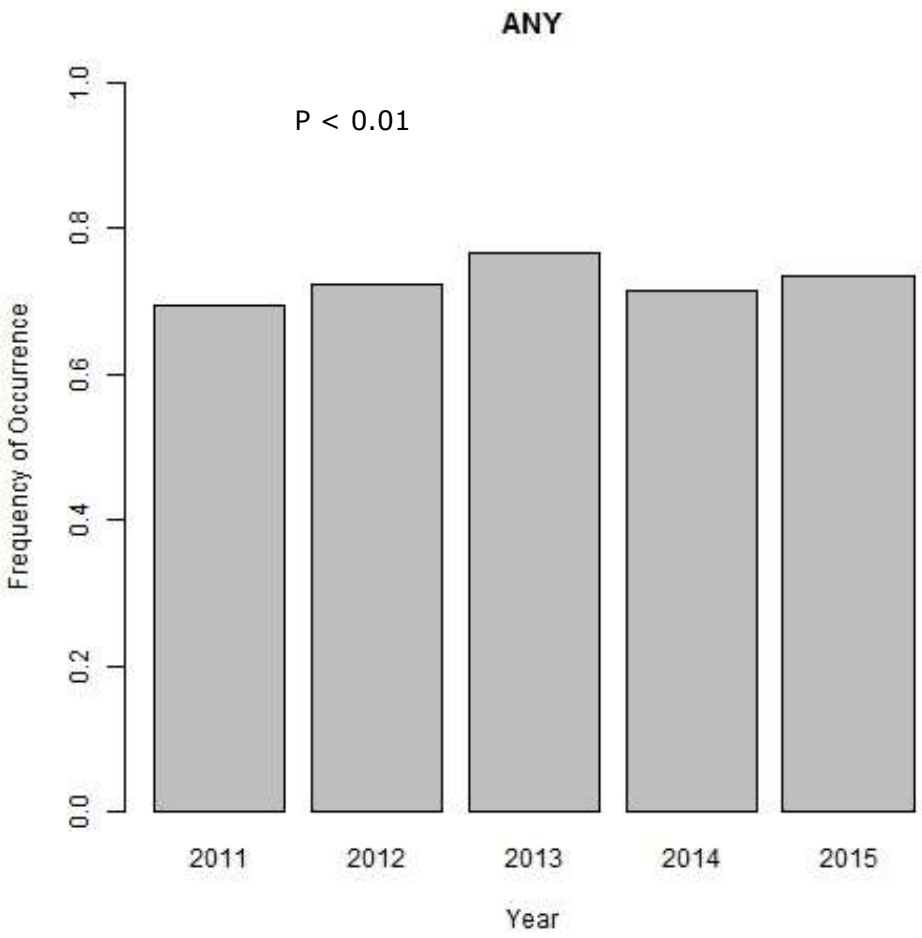
- 949 lakes
- 706 lakes with AIS (~75%)
- 545 new discoveries

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

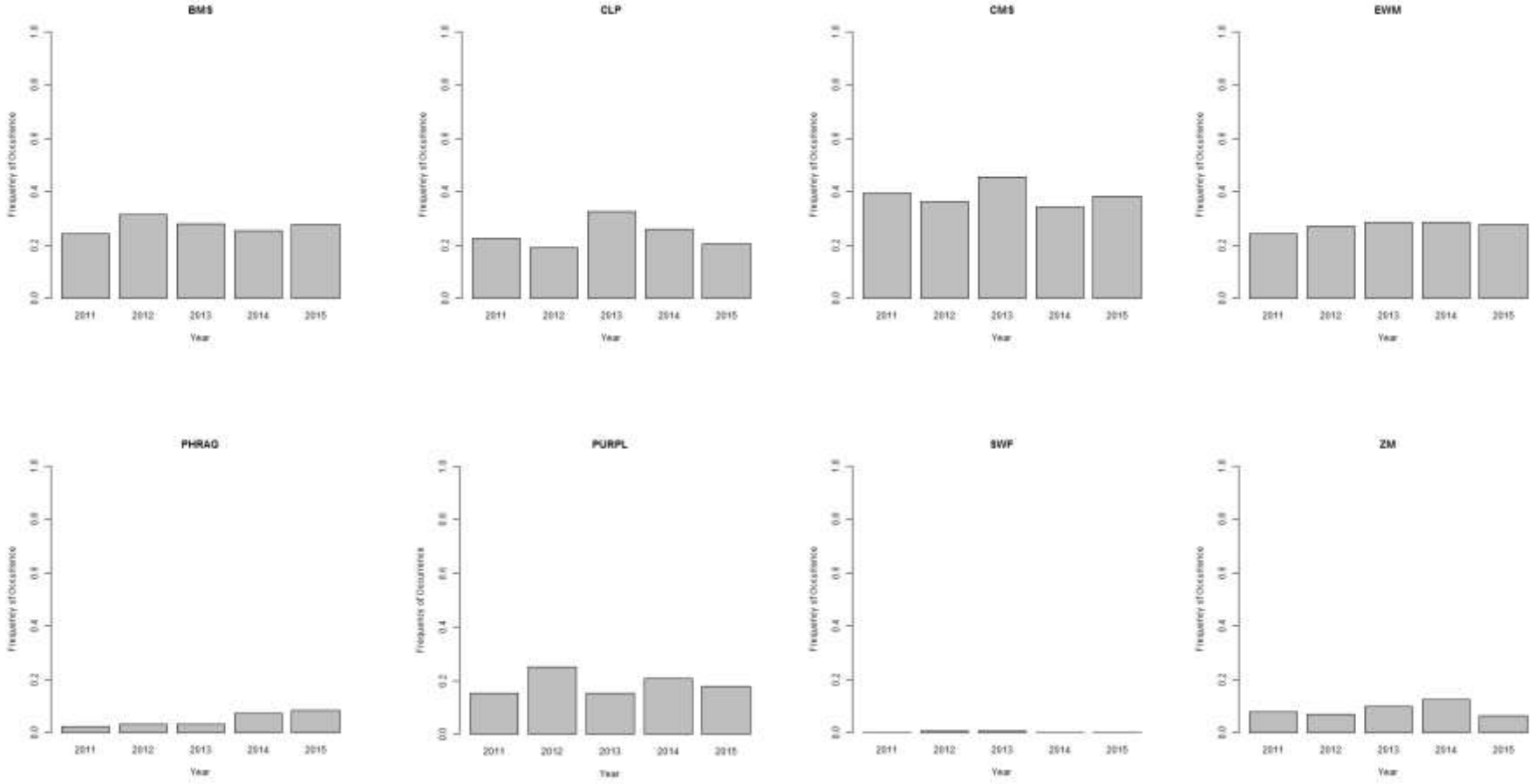
5-Year Results



- 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

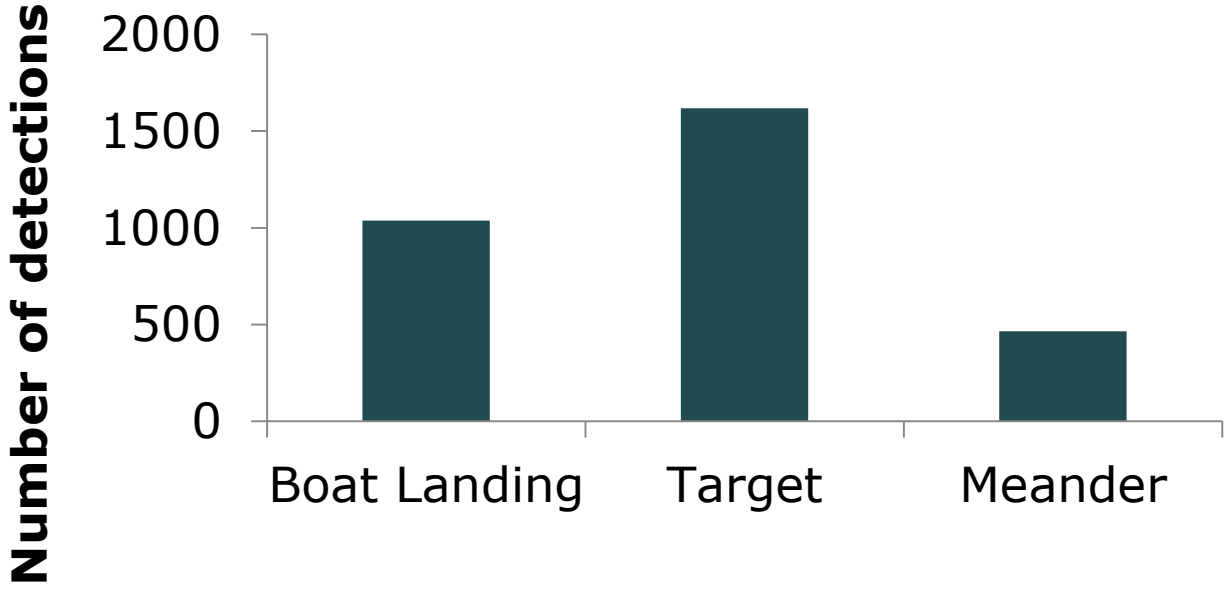
- Boat landing vs target vs meander?
- Boat landing and overall ($p<0.001$)

5-Year Results

- 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 ($p<0.001$)
- Methods different ($p<0.001$)



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

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

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 staff and volunteer water quality sampling
- 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

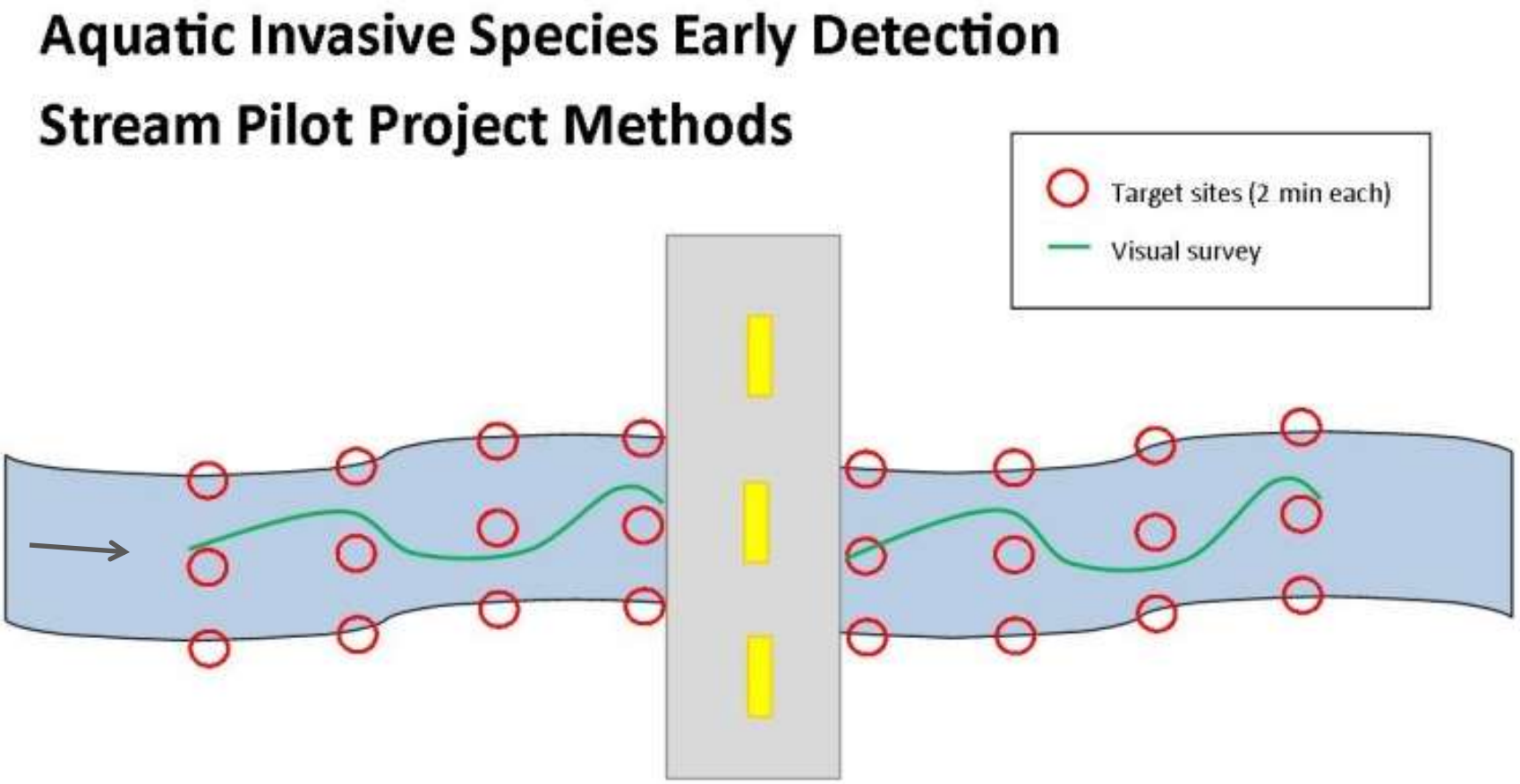
Number of Targeted Samples in Each Category

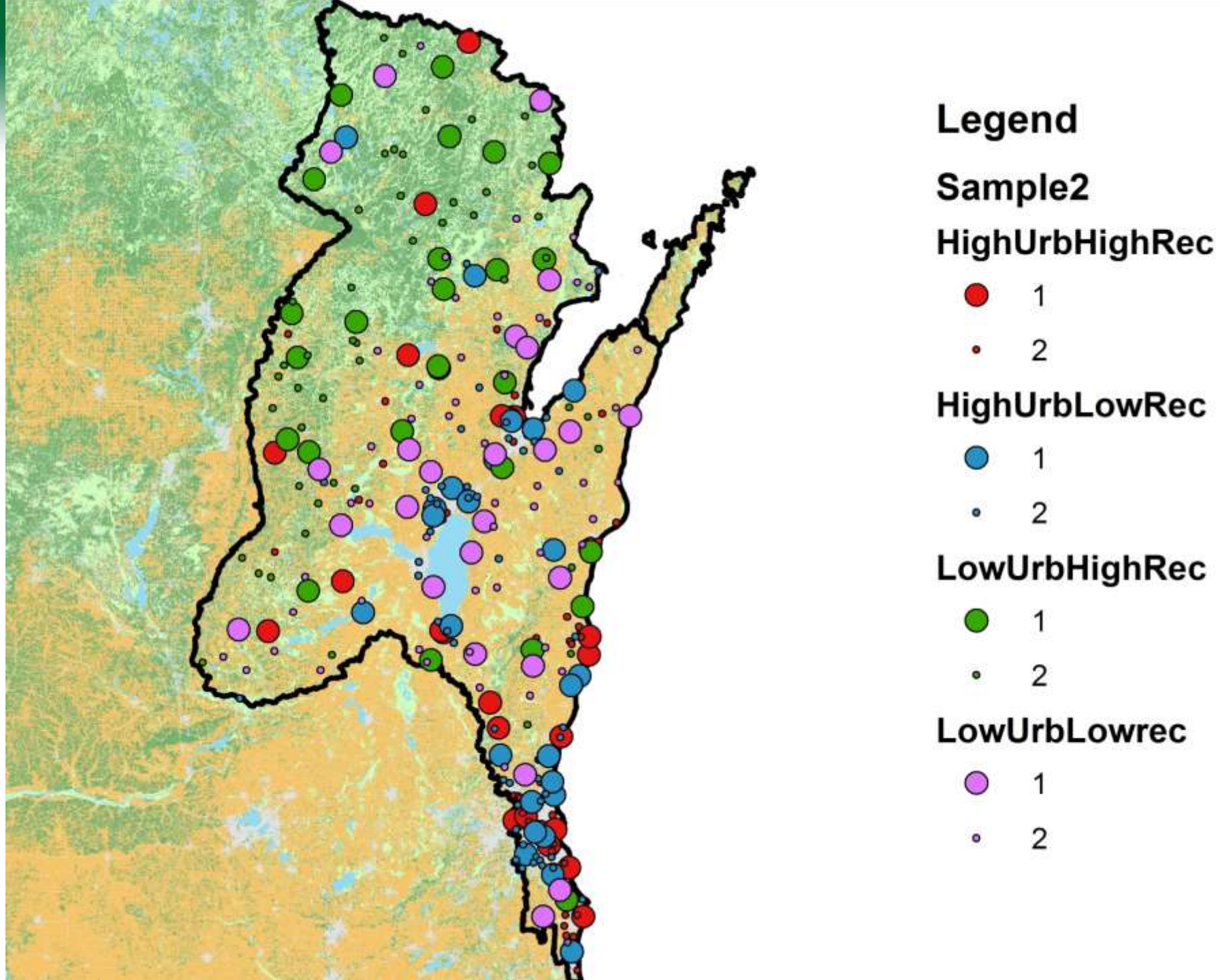
	High Urban	Low Urban
High Recreation	25	25
Low Recreation	25	25

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
Target sites (2 min each)
Visual survey


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 $\geq$ 1 AIS

Stream Pilot Results

- Out of 100 sites, 93 had ≥ 1 AIS

	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

- Out of 100 sites, 93 had $\geq$ 1 AIS

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

- RCG, RC and "other" most common

Stream Pilot Results

- Out of 100 sites, 93 had ≥ 1 AIS

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

- RCG, RC and "other" most common
- Removing RCG, 70 sites had ≥ 1 AIS

Stream Pilot Results

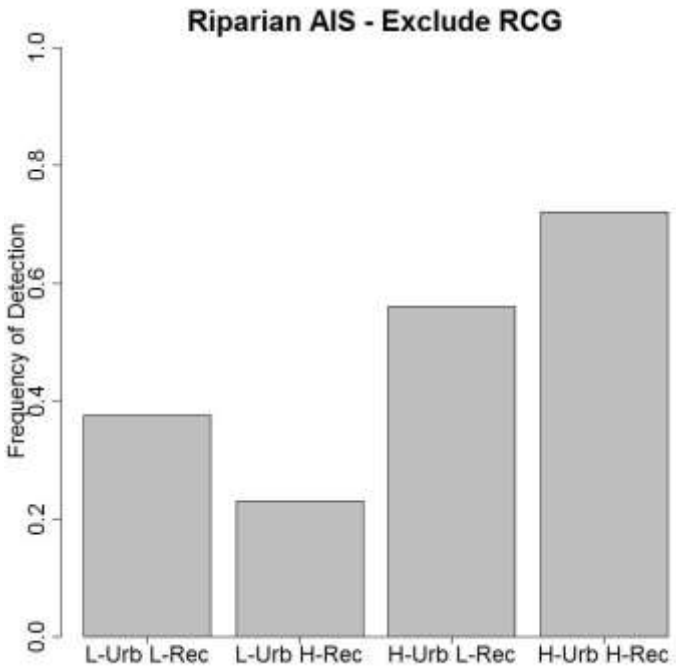
- Out of 100 sites, 93 had ≥ 1 AIS

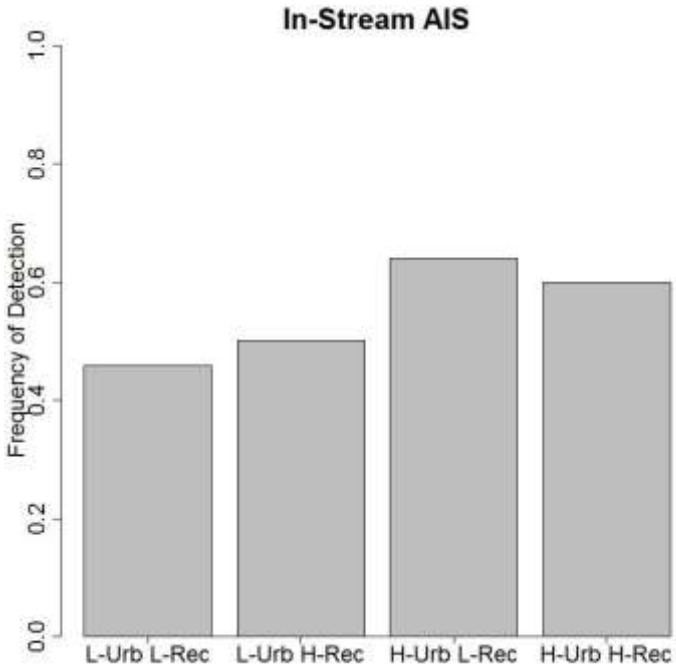
	BMS	CMS	CLP	EWM	JK	Other	PHG	PL	RCG	RC	ZM
# sites	4	4	10	8	3	25	11	23	85	39	8

- RCG, RC and "other" most common
- Removing RCG, 70 sites had ≥ 1 AIS
- 92 new discoveries

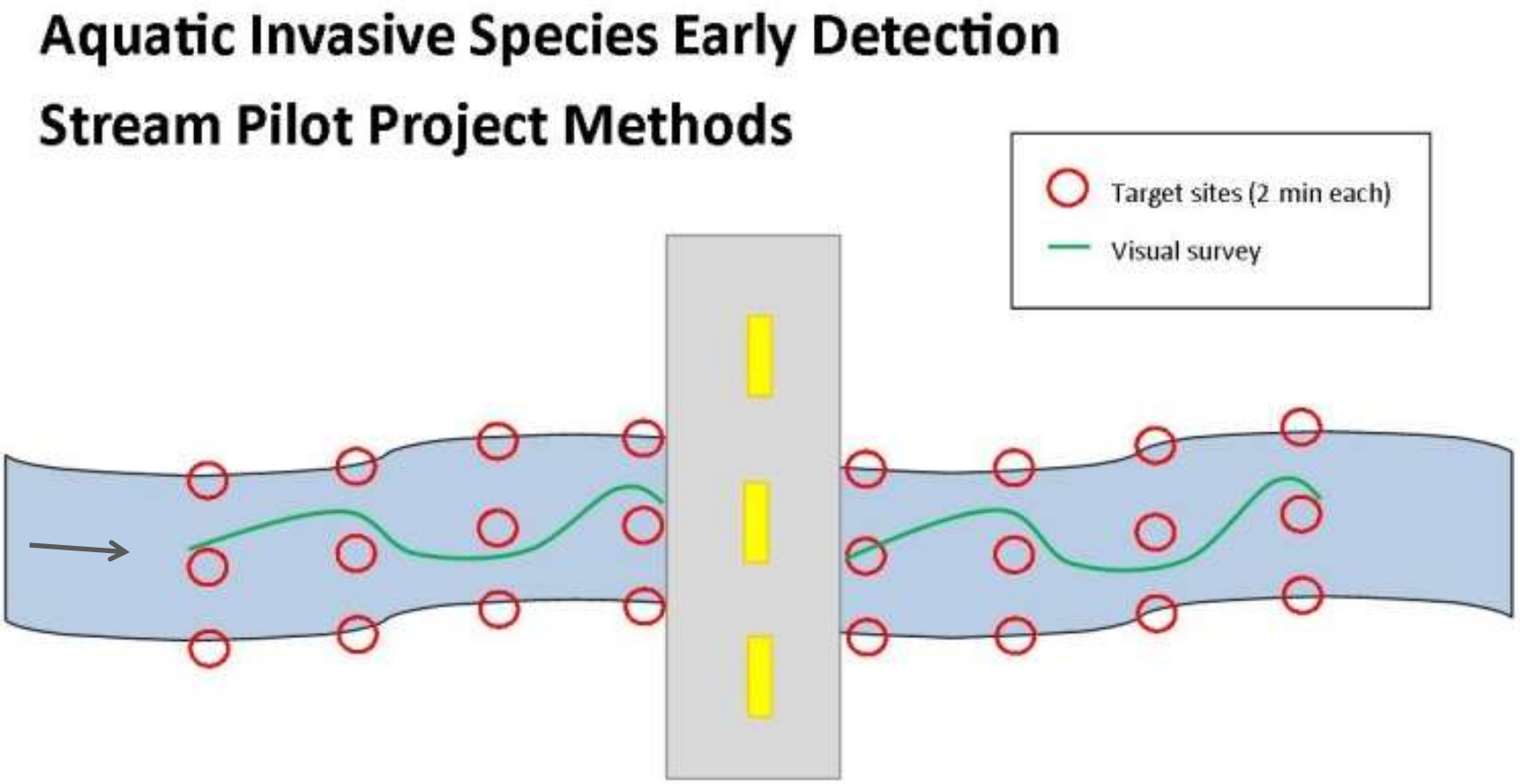
Stream Pilot Results

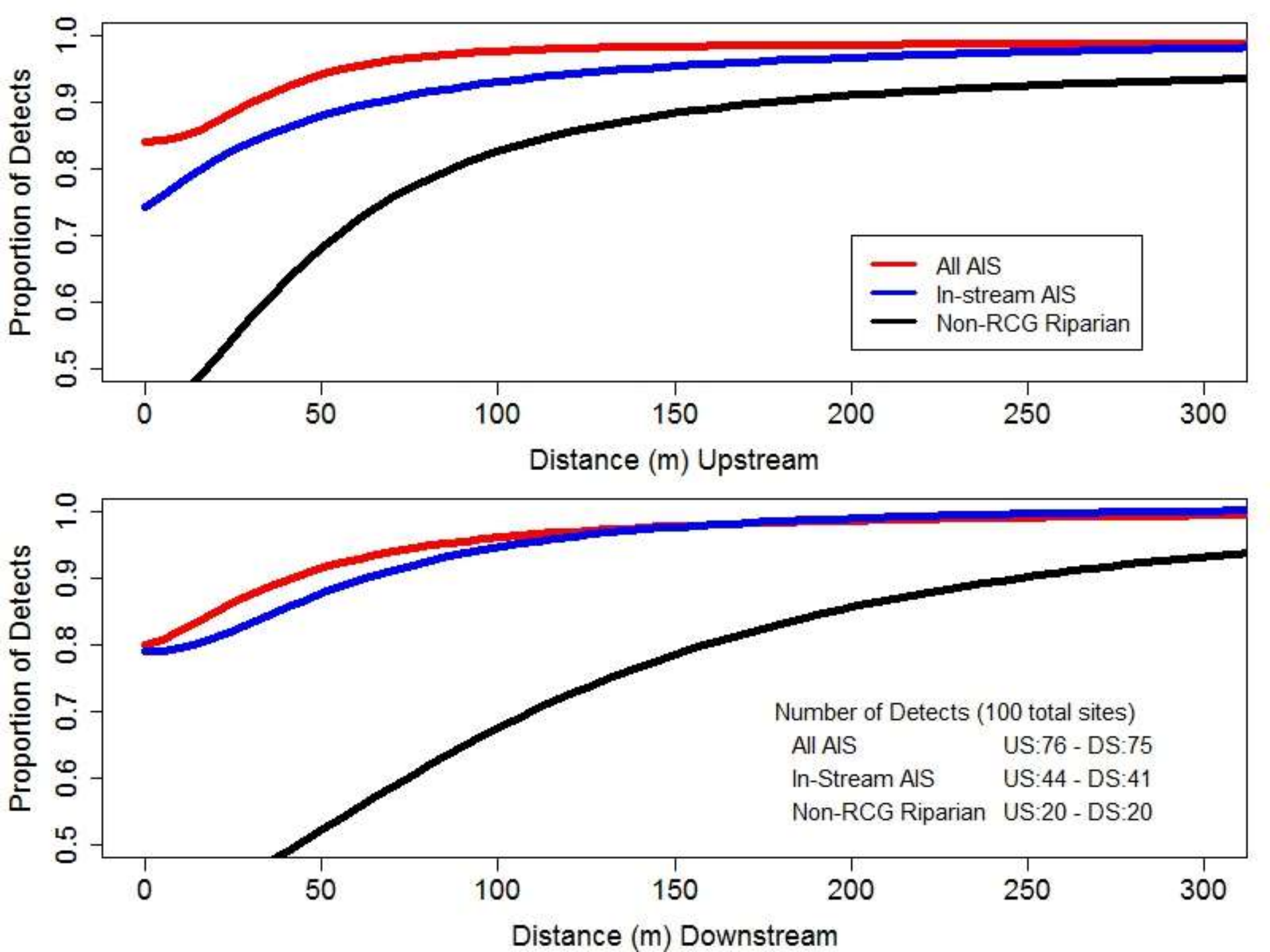
- Riparian more frequent with high land use and high recreation
- In-stream no relationship





Methods


Aquatic Invasive Species Early Detection
Stream Pilot Project Methods
Target sites (2 min each)
Visual survey


Proportion of Detects
1.0
0.9
0.8
0.7
0.6
0.5
0
50
100
150
200
250
300
Distance (m) Upstream
All AIS
In-stream AIS
Non-RCG Riparian
Proportion of Detects
Number of Detects (100 total sites)
All AIS US:76 - DS:75
In-Stream AIS US:44 - DS:41
Non-RCG Riparian US:20 - DS:20
Distance (m) Downstream

Stream Pilot Results

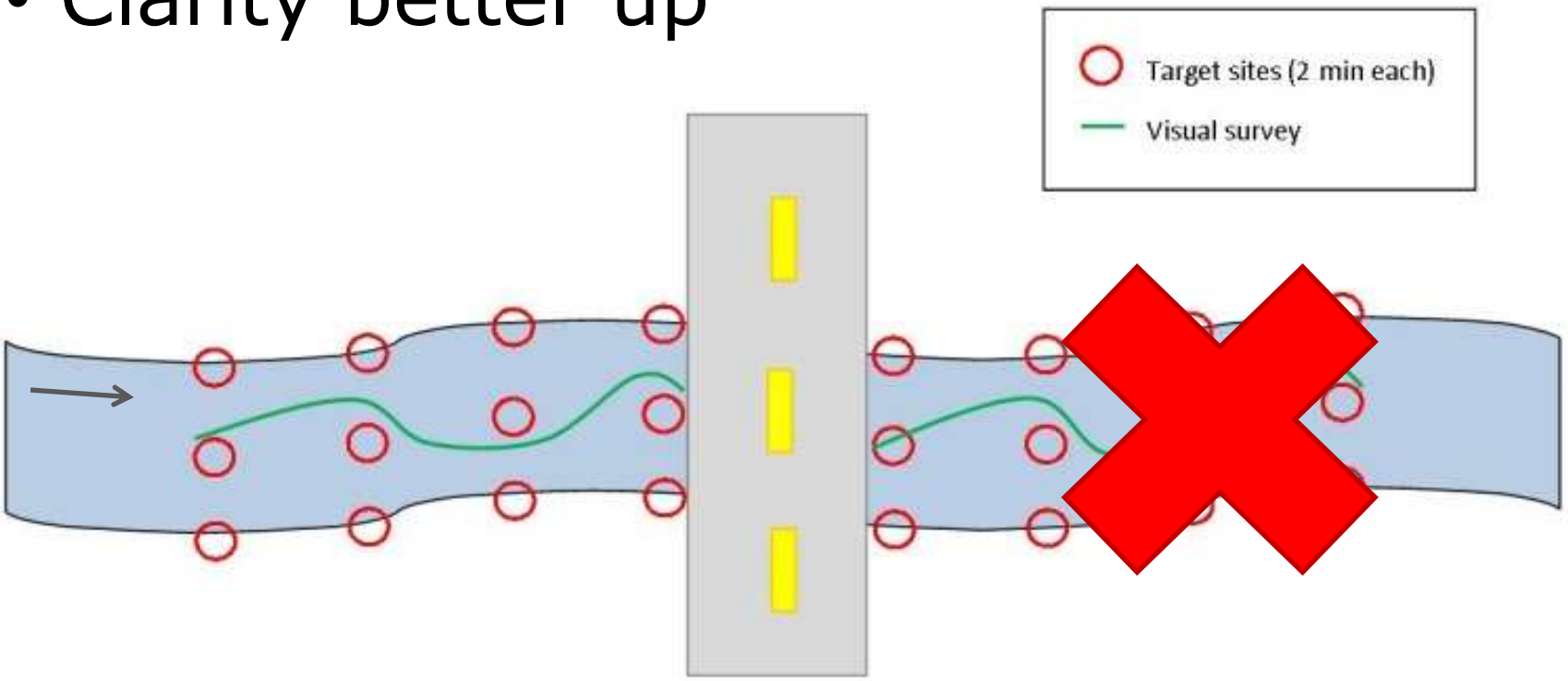
- Found sooner down, but no difference

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
- One direction sufficient

Next Steps

- Integrate with routine staff and volunteer sampling
- Identify gaps

Vouchering

- QAQC
- Moving toward photo verification
- Saves time and $$!
- Train and certify regional staff to be verifiers

Moving Forward

- Improve targeted monitoring
- Expand response monitoring
- Evaluate success of early detection

LIFE IS EASIER WHEN YOU'VE GOT A POSSE.

Thank you!

Questions?

Maureen Ferry
(608) 261-6450
maureen.ferry@wisconsin.gov