Modifying Devices to Harvest Zebra Mussels in Small-Scale Applications

Upper Midwest Invasive Species Conference

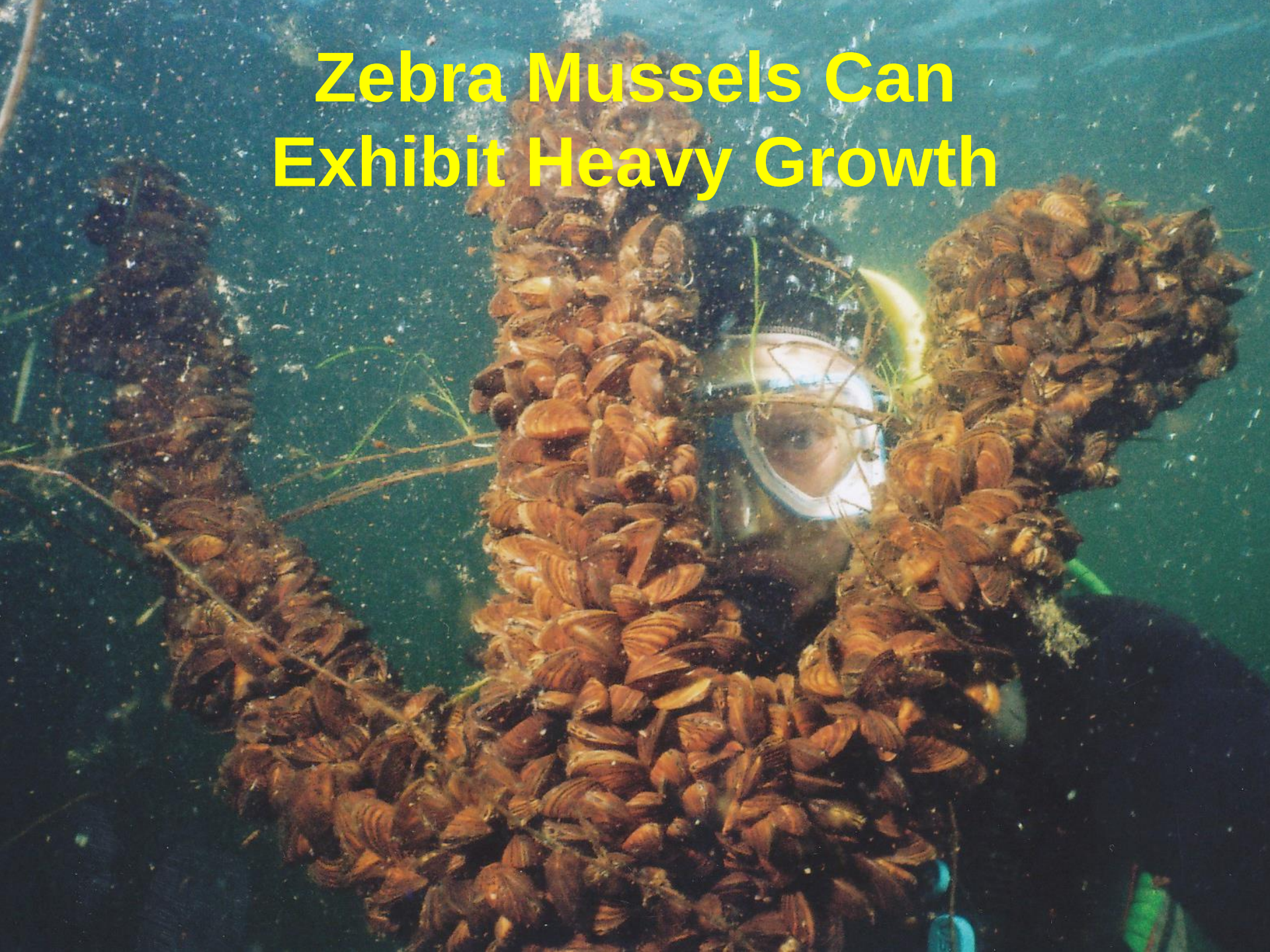
Steve McComas, Jo Stuckert, and Connor McComas

Blue Water Science

October 20, 2014

Zebra Mussels Do Not Take Over Every Lake They Invade

Zebra Mussels Can Exhibit Light Growth


Zebra Mussels Can
Exhibit Heavy Growth


Zebra Mussels Can
Exhibit Moderate Growth

Shell Formation Variables

Calcium

(optimal: 30 mg/l +)

pH

Alkalinity

Source: Mackie and Claudi 2010

Food Supply Variables

Chlorophyll

(optimal: 3-8 ug/l)

Secchi disc

(optimal: 2-4 m)

Total phosphorus

(optimal: 25-35 ug/l)

Source: Mackie and Claudi 2010

Habitat Variables

Rock surfaces and woody structure

Silt/Sand

Muck

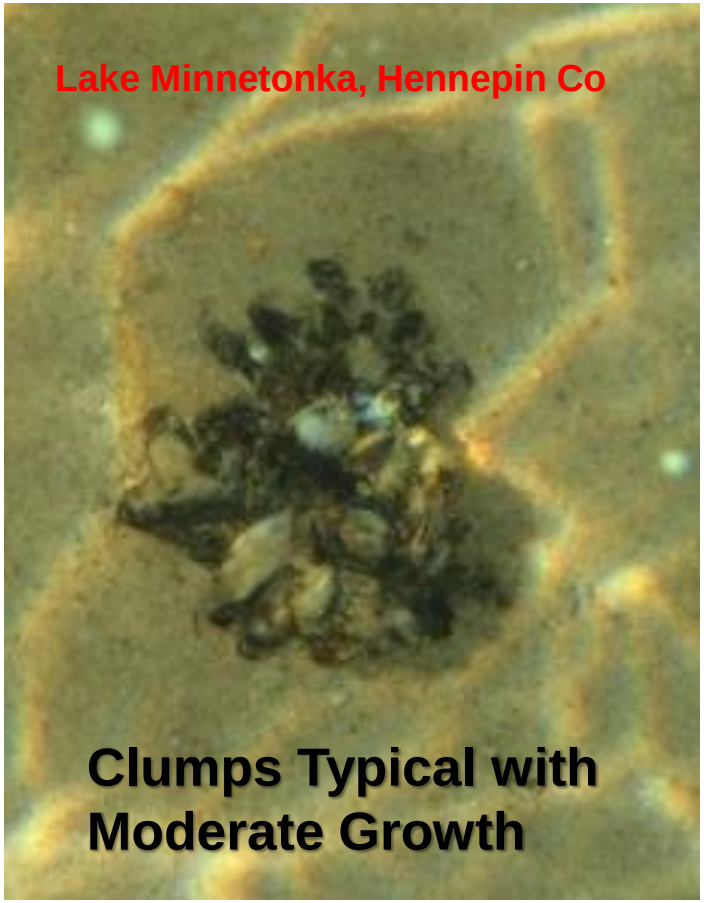
Dissolved oxygen

(optimal: 8+ mg/l)

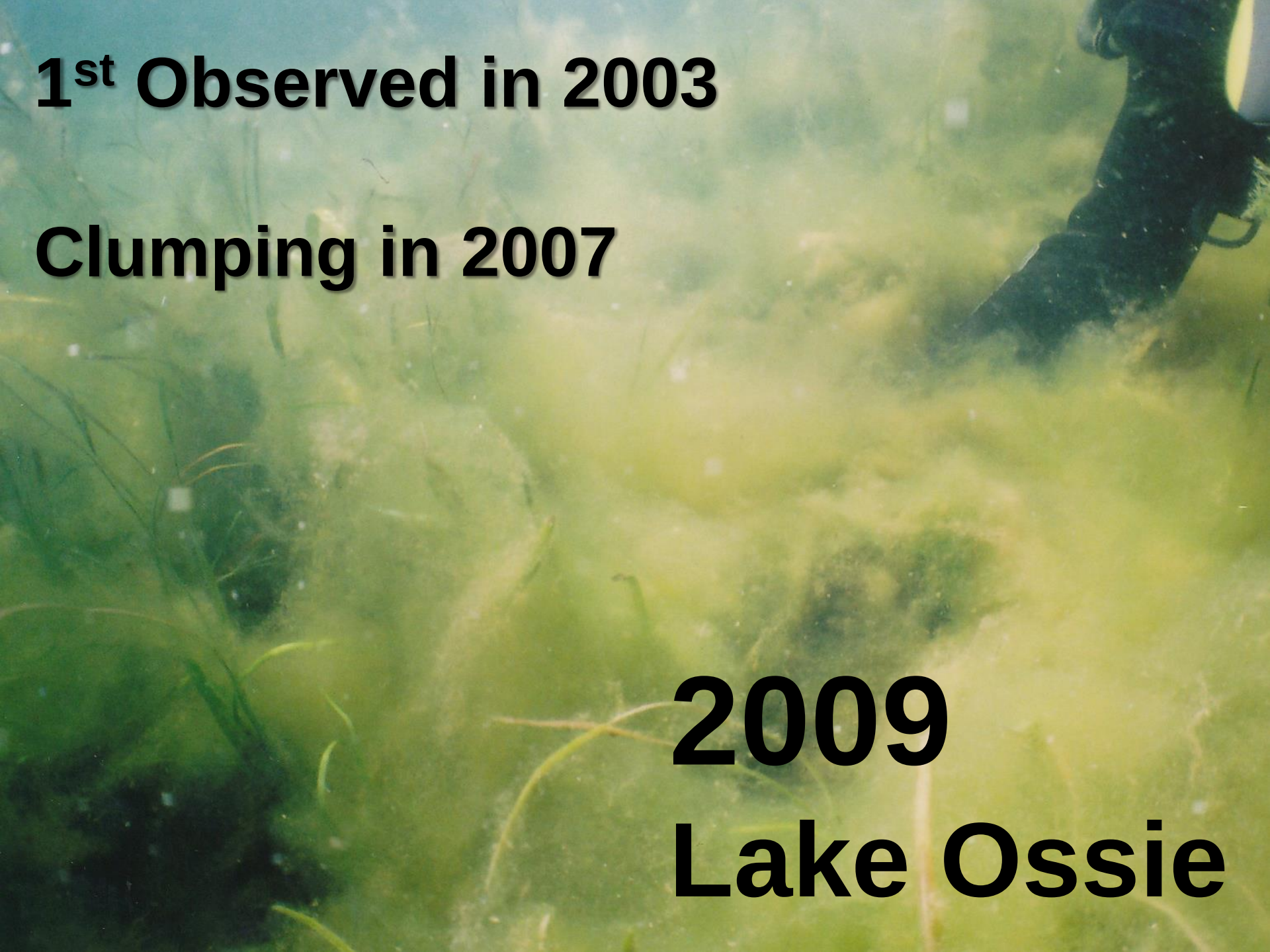
Round Lake, Price Co

Optimal Habitat, but Low Calcium

Zebra Mussel Suitability in Two Minnesota Lakes

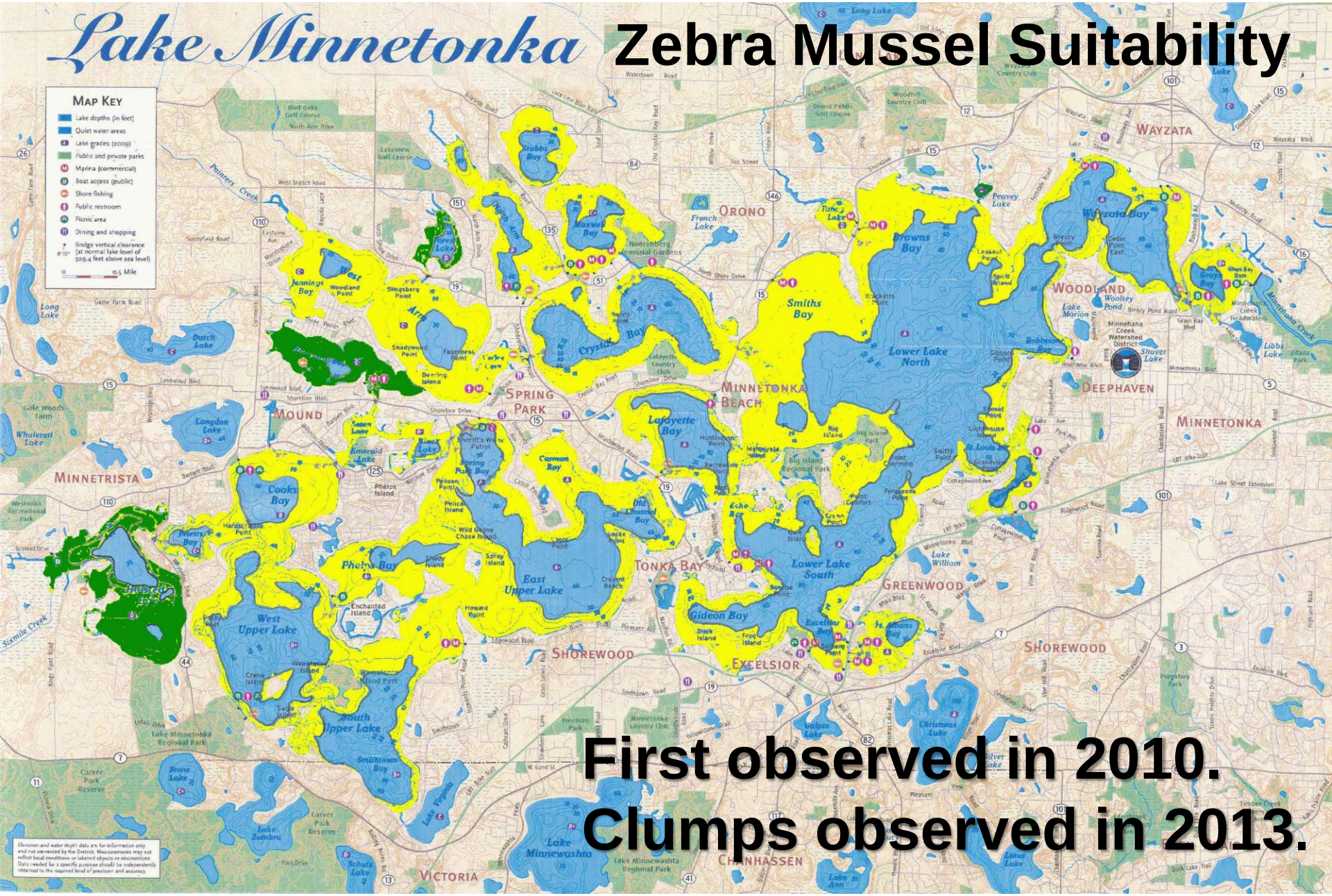


	Shell Formation	Food (Chl a)	Habitat	Overall Growth Potential
Ossie 2003	Optimal	Optimal to Sub-optimal	Mostly Sub-optimal	Moderate
Minnetonka 2010	Optimal	Sub-optimal	Mostly Sub-optimal	Moderate

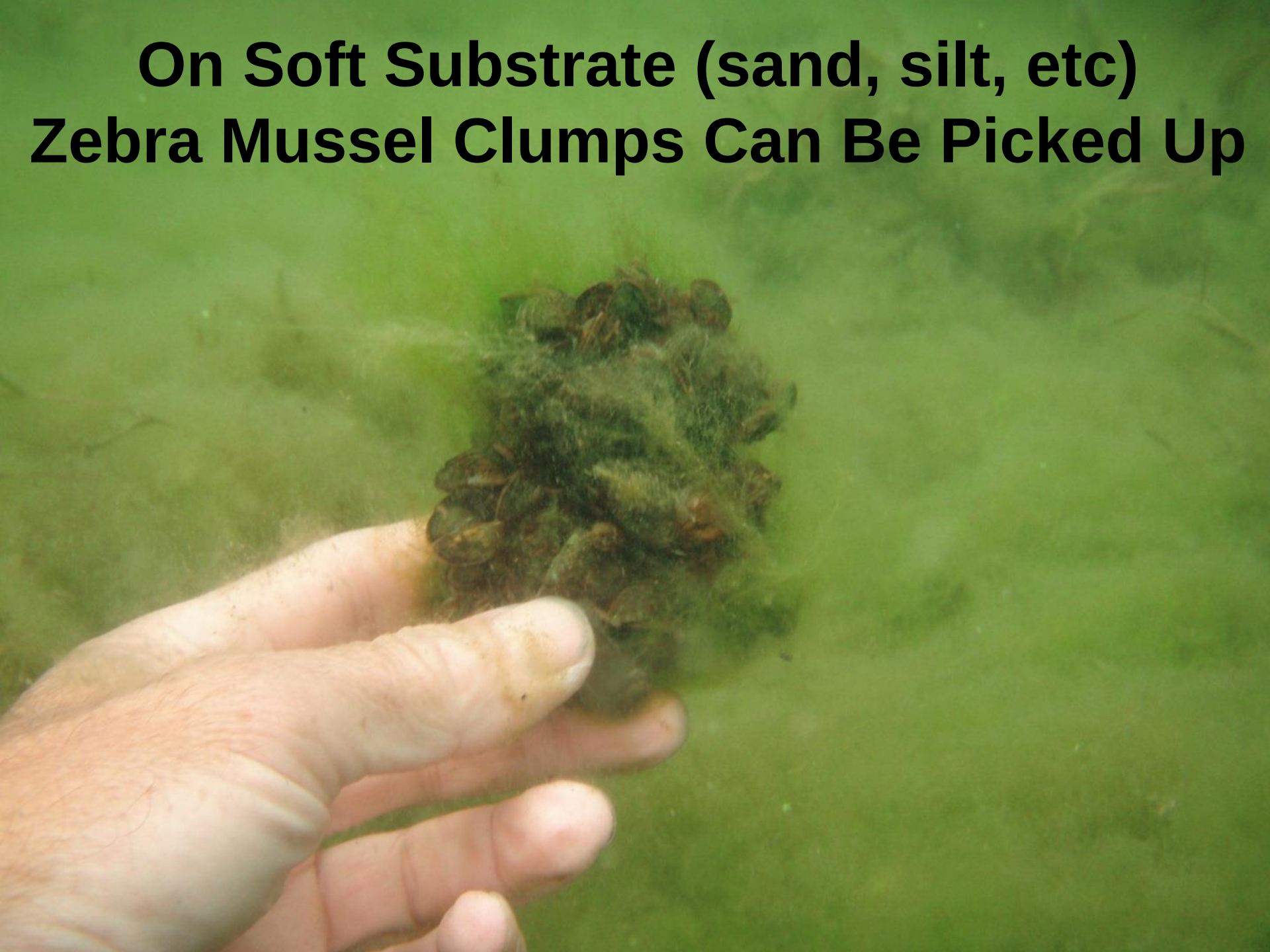

1st Observed in 2003
Clumping in 2007
2009
Lake Ossie


2010
Lake Ossie

Lake Ossie


Lake Minnetonka
Zebra Mussel Suitability
Map Key
Lake depths (in feet)
Quiet water areas
Lake grades (2009)
Public and private parks
Marina (commercial)
Boat access (public)
Shore fishing
Public restroom
Picnic area
Dining and shopping
Bridge vertical clearance (at normal lake level of 929.4 feet above sea level)
0 0.5 Mile
First observed in 2010.
Clumps observed in 2013.

On Soft Substrate (sand, silt, etc) Zebra Mussel Clumps Can Be Picked Up



Zebra Mussels Attach to Each Other with Byssal Threads

Photo courtesy of Ohio Sea Grant


Clam Rakes Pick Up Clumps
10 inches wide

Single Rake OK, But Slow

Double Rake Is Faster.
Fasten Two Rakes Together

Another Way to Pick Up Clumps

Golf Ball Collector


First Zebra
Mussel
Collector

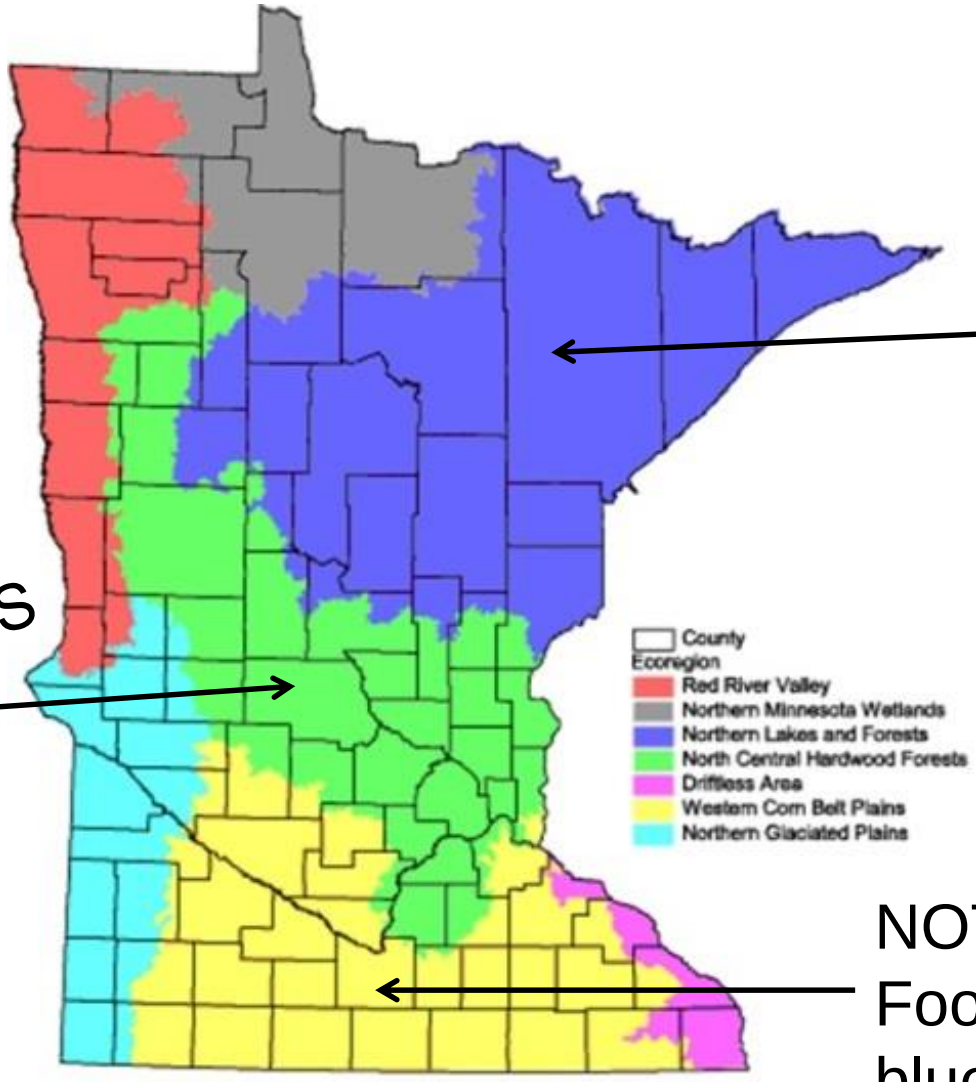

18 inches wide


Collector can hold more than the clam rake


2nd Zebra Mussel Collector
Has Wider Collection System (24 in)

Removing Clumps Can Improve Swimming Experience

Zebra Mussels Most Apt to Form Clumps in Moderately Fertile Lakes



NOT HERE:
Ca limited
Food limited

JUST RIGHT
FOR CLUMPS

NOT HERE:
Food limited due to
blue-greens

Small-Scale Control

Bonus: Can Pick Up Chinese Mystery Snails as Well.

Options for Small-Scale Control