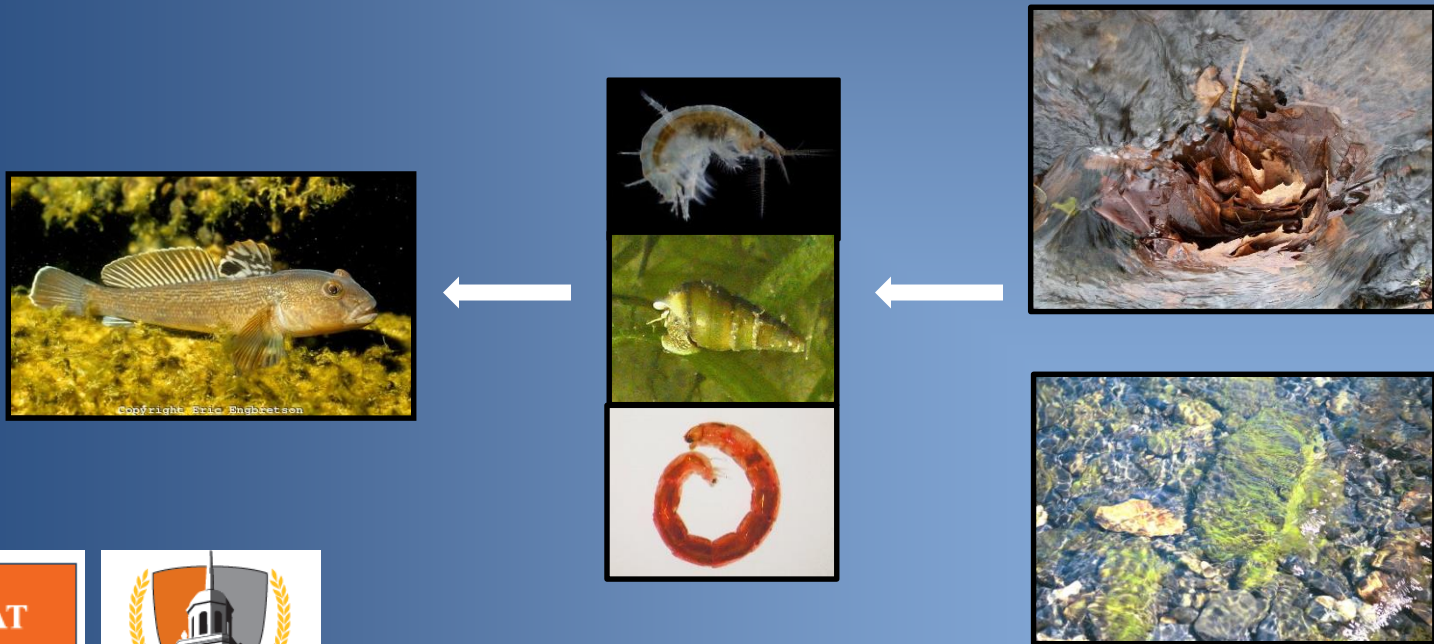


Patterns in round goby invasions, the Great Lakes experience, and thoughts on ecosystem responses

Dr. Chris Pennuto

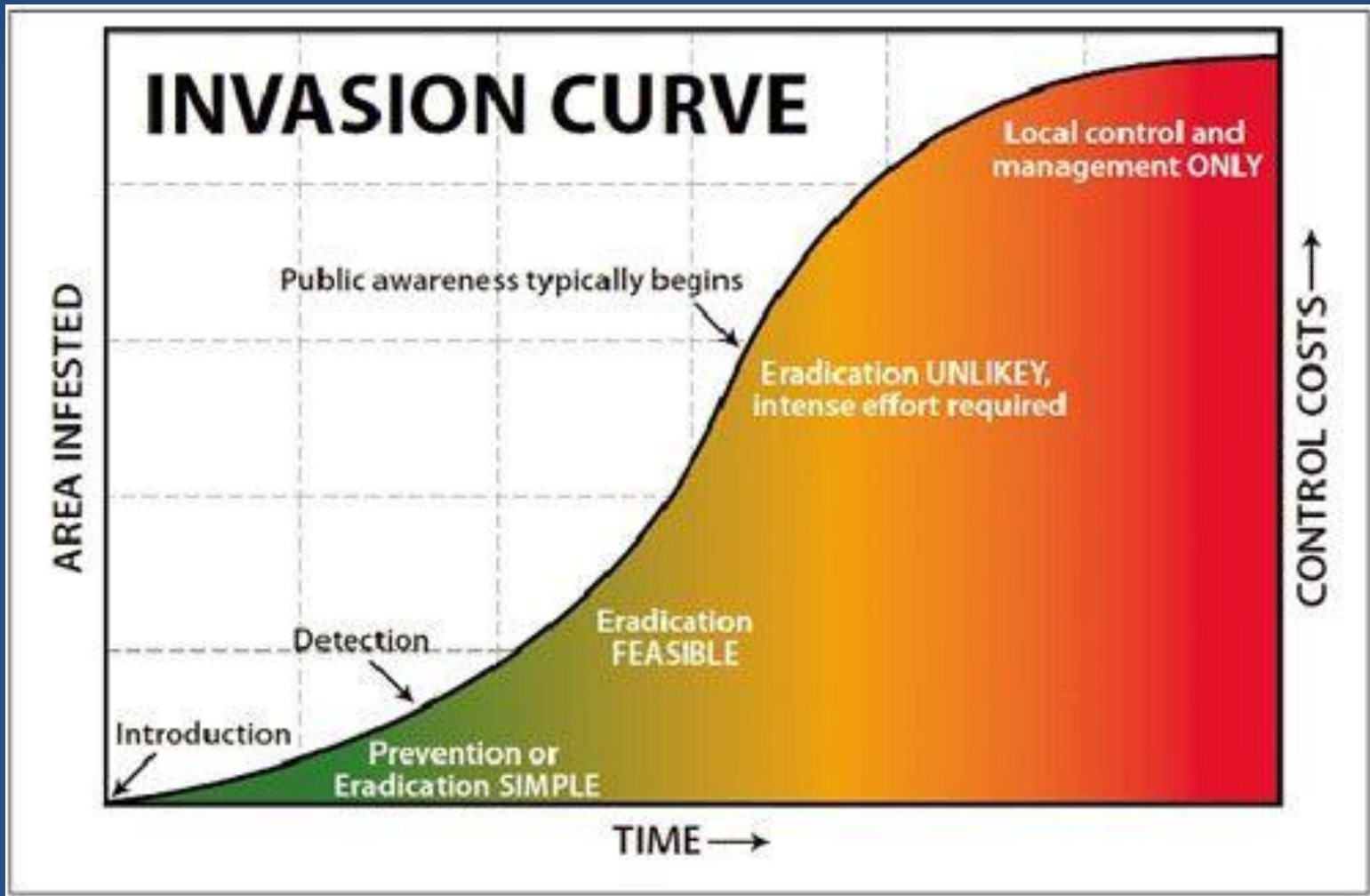
Great Lakes Center & Biology Department, Buffalo State College

Director, WNY PRISM



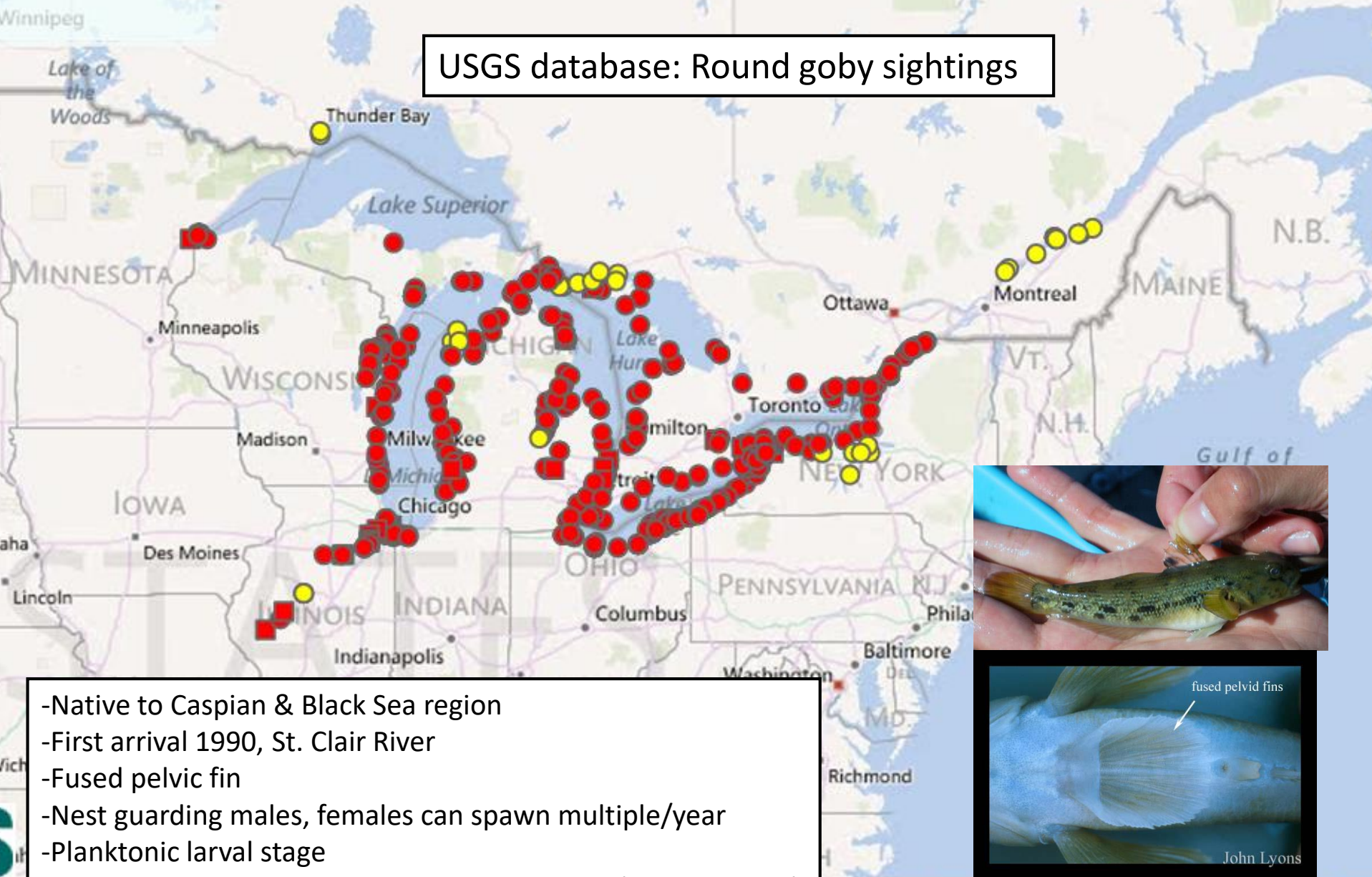
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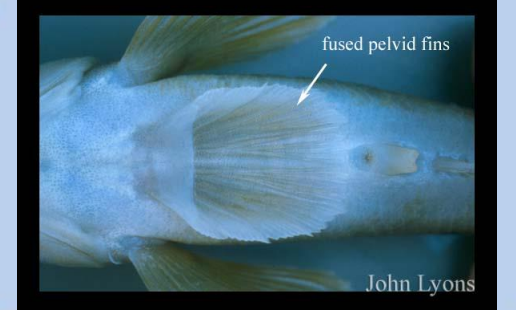


Prevention/education the least cost approach for controlling invasive species....

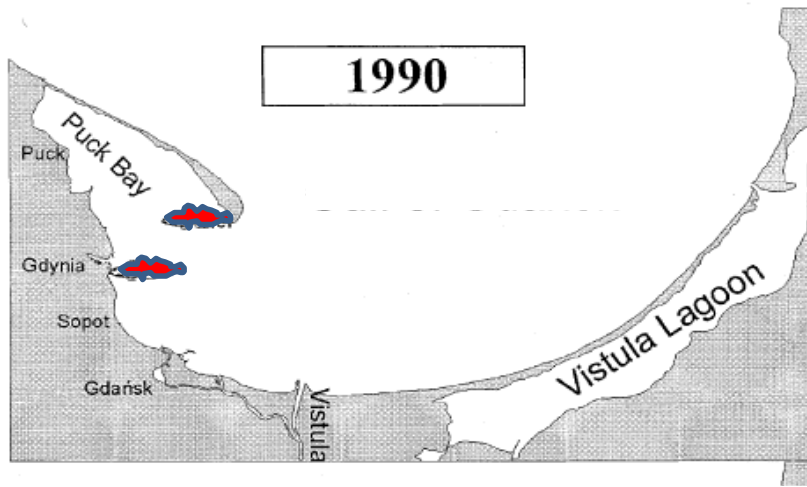
USGS database: Round goby sightings



- Native to Caspian & Black Sea region
- First arrival 1990, St. Clair River
- Fused pelvic fin
- Nest guarding males, females can spawn multiple/year
- Planktonic larval stage
- Invertivore as juvenile, molluscivore as adults (*Dreissena* sp.)



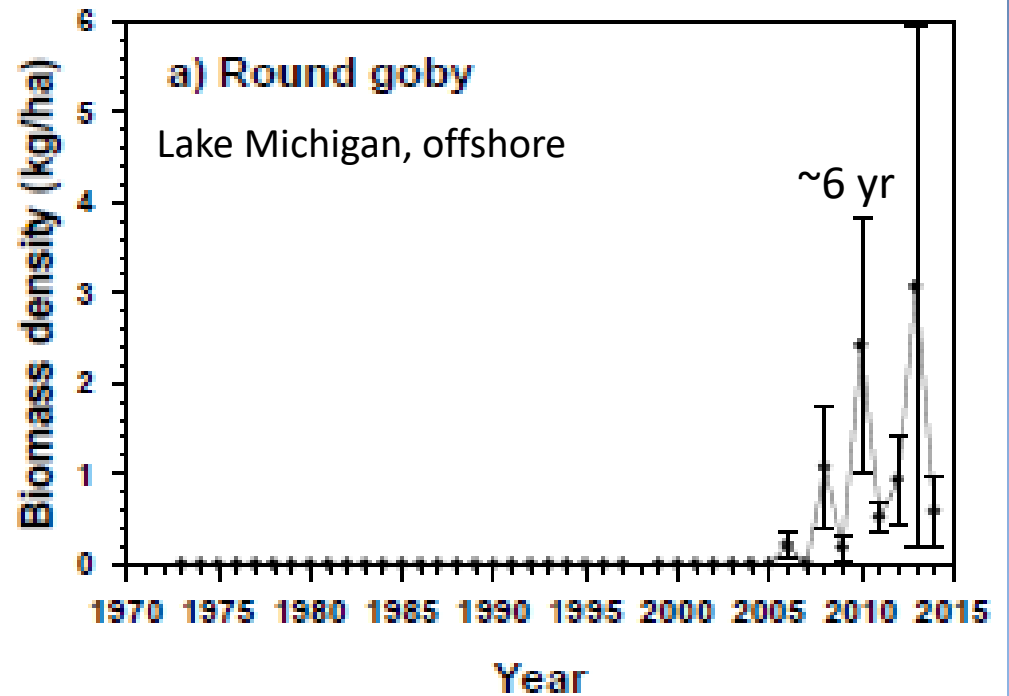
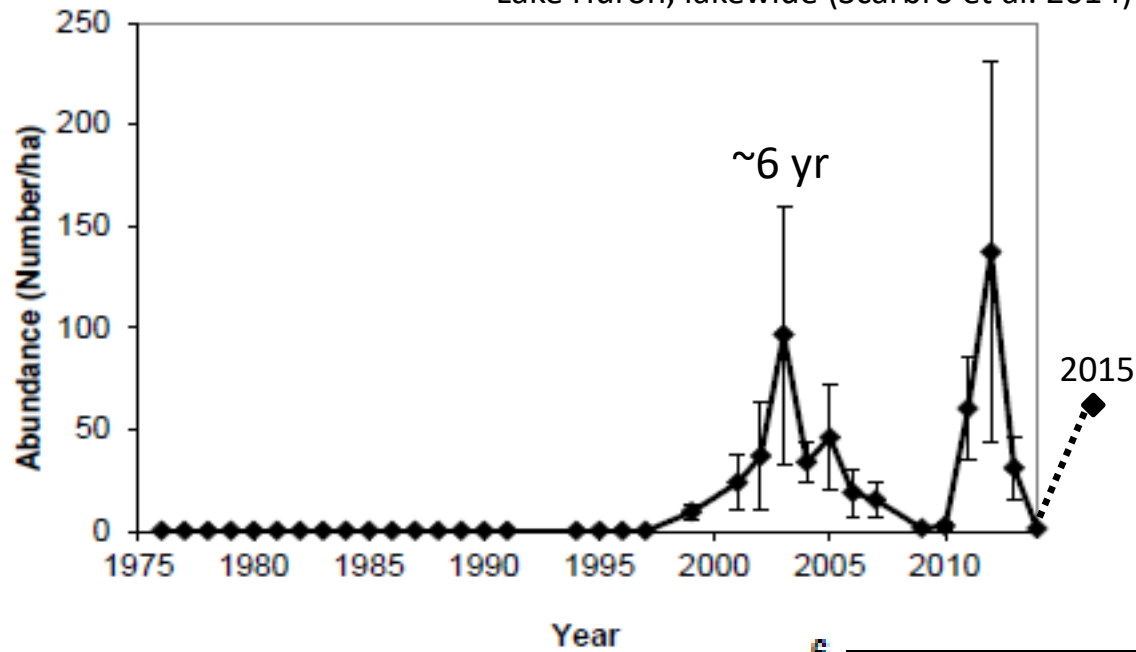
Map updated : Tue Mar 13 2012



Gulf of Gdansk expansion (Sapota 2004)

Figure 2. Sequence of the round goby invasion in the Gulf of Gdansk.

Lake Huron, lakewide (Scarbro et al. 2014)



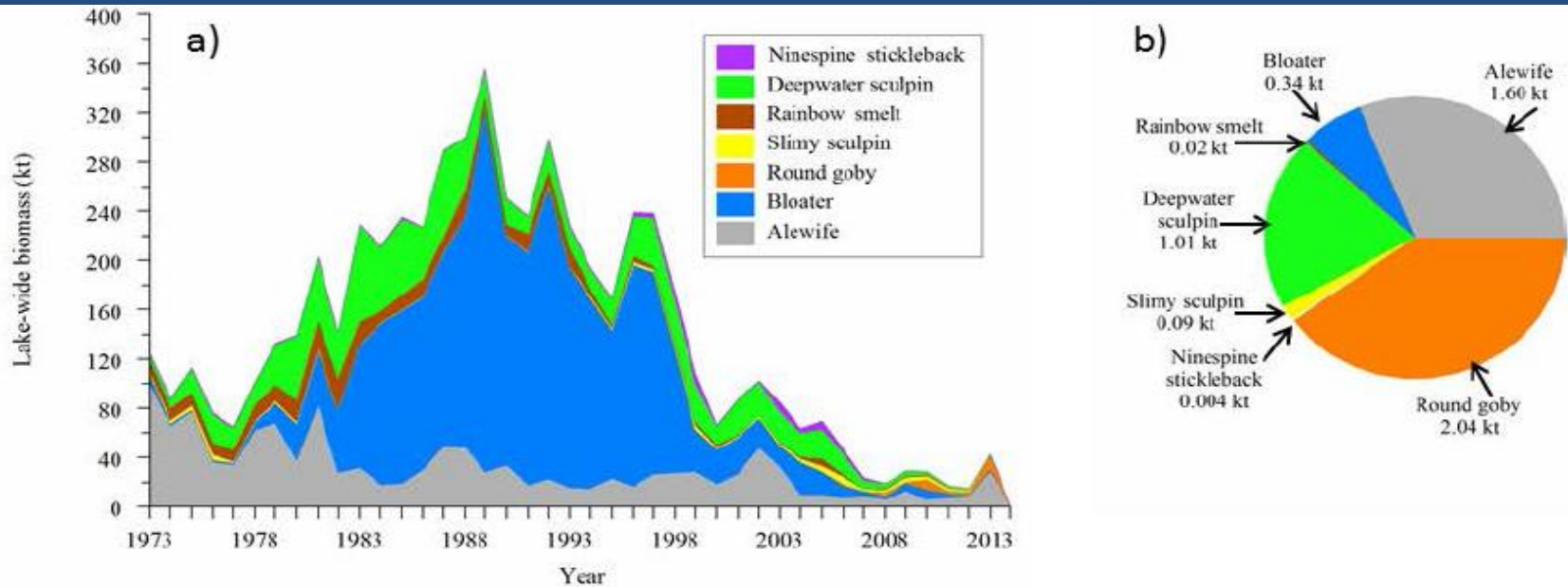

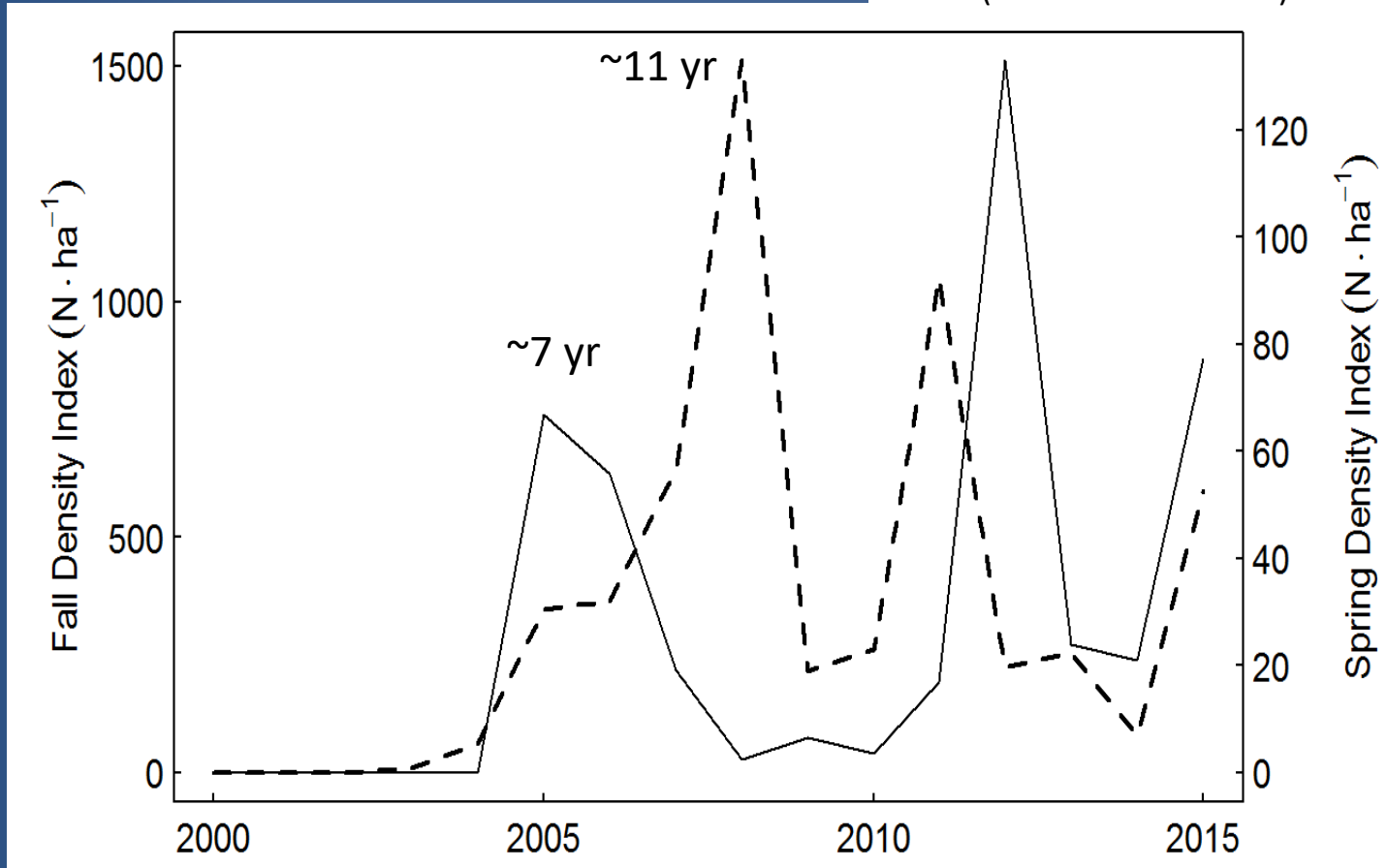


Figure 8. Estimated lake-wide (i.e., 5-114 m depth region) biomass of prey fishes in Lake Michigan, 1973-2014 (a) and species composition in 2014 (b).

Round goby now the most abundant prey fish in Lake Michigan in terms of biomass....

Lake Ontario...round goby abundance index since arrival in 1998, lakewide average in 2015, otherwise just S shore
(Weidel et al. 2015, USGS annual trawl summary)

 Nearshore est = 46,000/ha
(Pennuto et al. 2012)



Imposter Lures Round Goby



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Your savings 5%

Through 04/27/16

walleye and smallies love em

✓ **I'd recommend this!**

April 04, 2010

Pros: Easy To Handle, Looks Realistic, Good For Variety Of Fish, Strong, Irresistible to Fish, Easy To Store

Best Uses: Fresh Water, Shore Casting, Jigging

Comments: I have caught alot of nice walleye and smallmouth up here along the st.lawrence river and feeder rivers.

Dimebag

Massena,, NY

great bait

✓ **I'd recommend this!**

July 02, 2012

Pros: Fresh and salt, Good For Variety Of Fish

Best Uses: Jigging

Comments: From pond to bay slaying bass

cnr

montauk ny

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Original Article

Trends in body condition of native piscivores following invasion of Lakes Erie and Ontario by the round goby

Derek P. Crane [✉](#), John M. Farrell, Donald W. Einhouse, Jana R. Lantry, James L. Markham



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DOI: 10.1111/fwb.12473 [View/save citation](#)

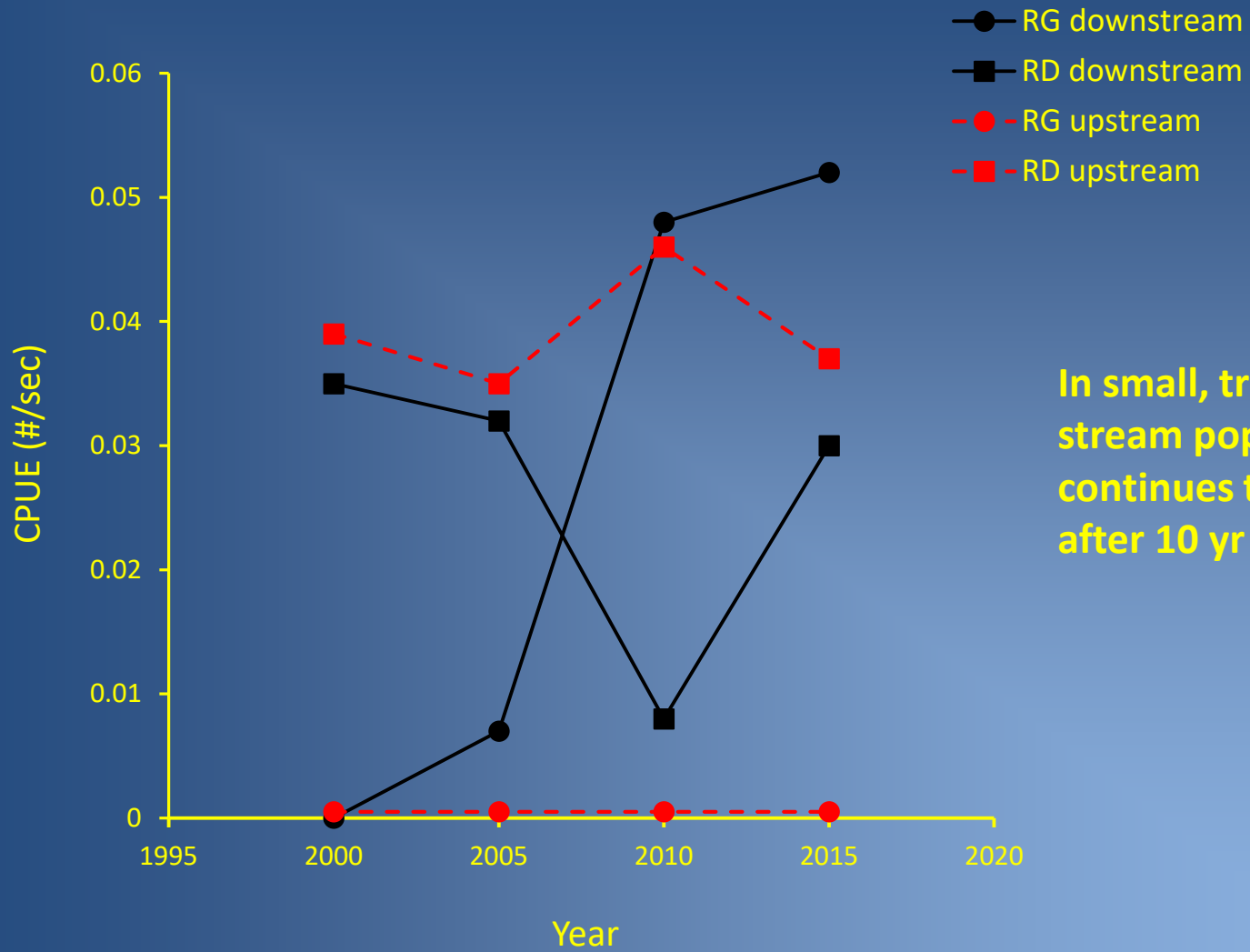
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Summary

1. Biological invaders can provide a highly abundant novel prey, yet the effect this has on the body condition of native predators is unknown.
2. Since invading the Laurentian Great Lakes over two decades ago, the round goby (*Neogobius melanostomus*) has become an important food source for many native species.
3. We used long-term data from Lakes Erie and Ontario (1993–2012) to create quantile regression models of mass–length relationships for populations of four native predators: smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca flavescens*), walleye (*Sander vitreus*) and burbot (*Lota lota*). Model-based estimates of changes in mass-at-length following the invasion were used to compare the effects of round goby on relative trends in body condition. Water temperature data were also included in the models, to investigate its effects on body condition.
4. The condition of smallmouth bass increased after the invasion, varying in

- Round gobies account for ~75% of SMB diets.
- Body condition of SMB and YP improved since RG
- Larger walleye better in Lake Ontario, Erie unchanged
- Small burbot better in Erie, larger burbot unchanged



In small, tributary stream population continues to grow after 10 yr

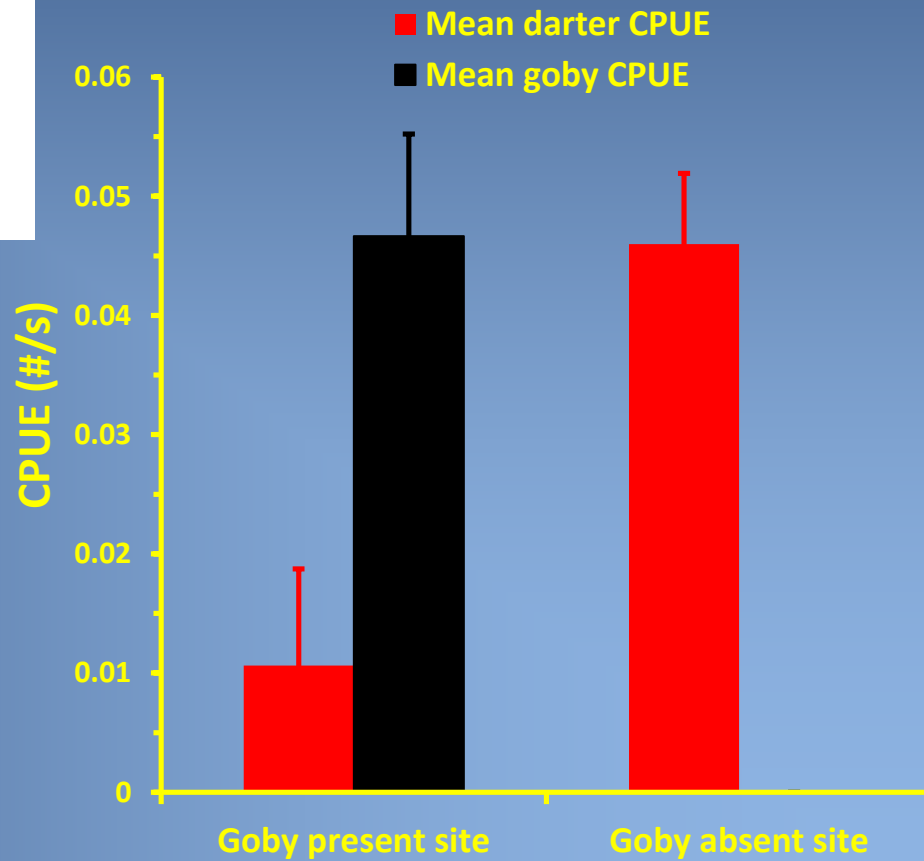
Mesocosm studies



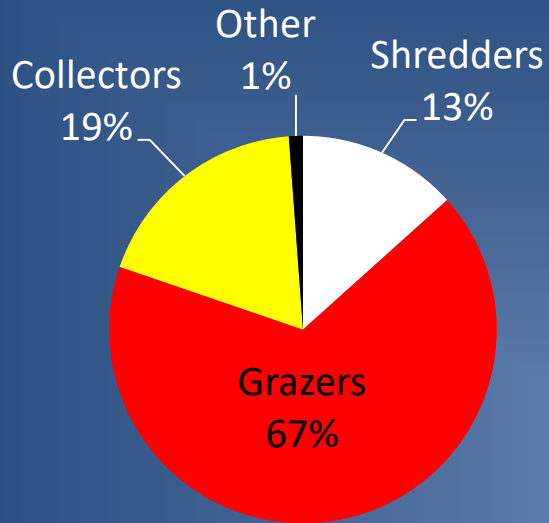
Field studies



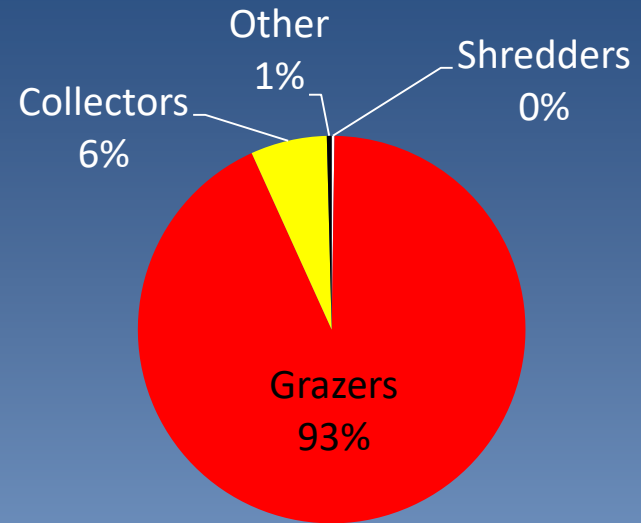
Ellicott Creek watershed



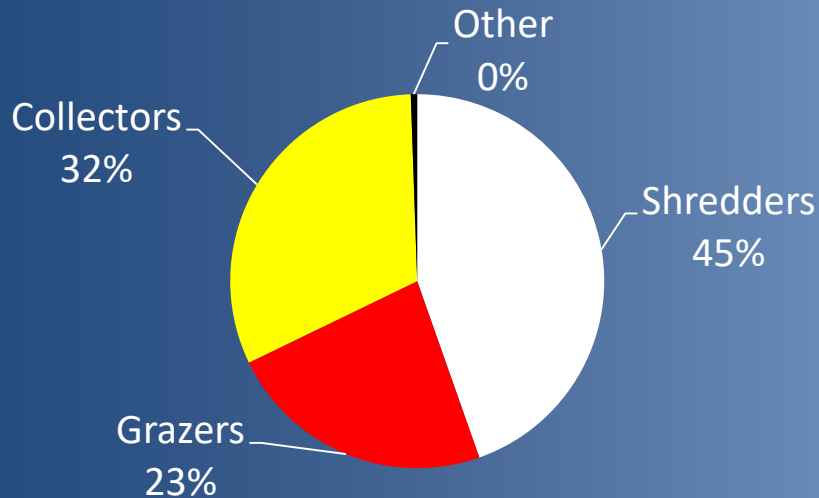
Results 2010, Ellicott Creek



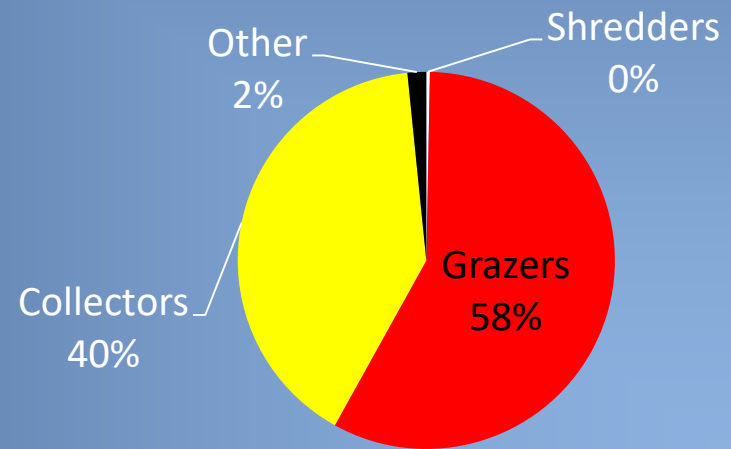
September, RG absent



September, RG present

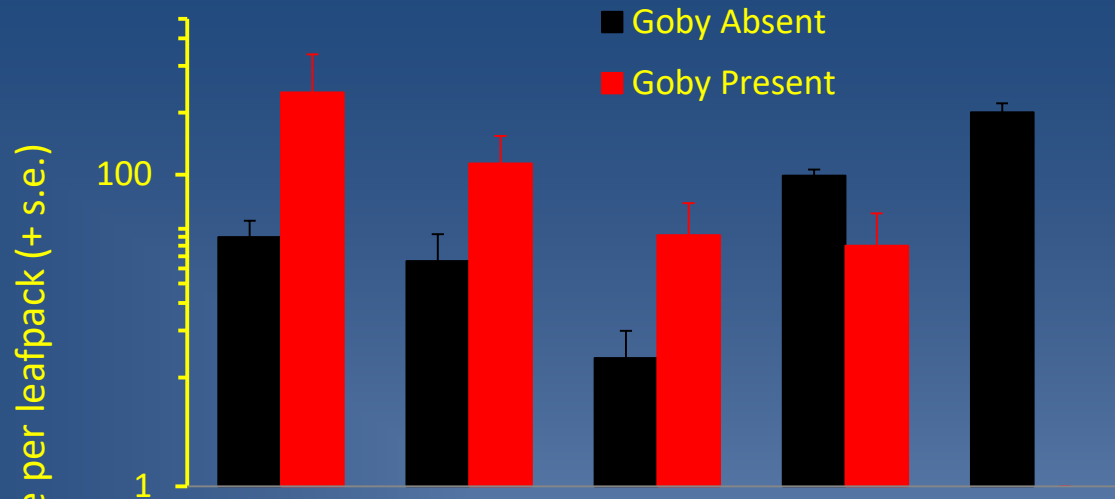


October, RG absent

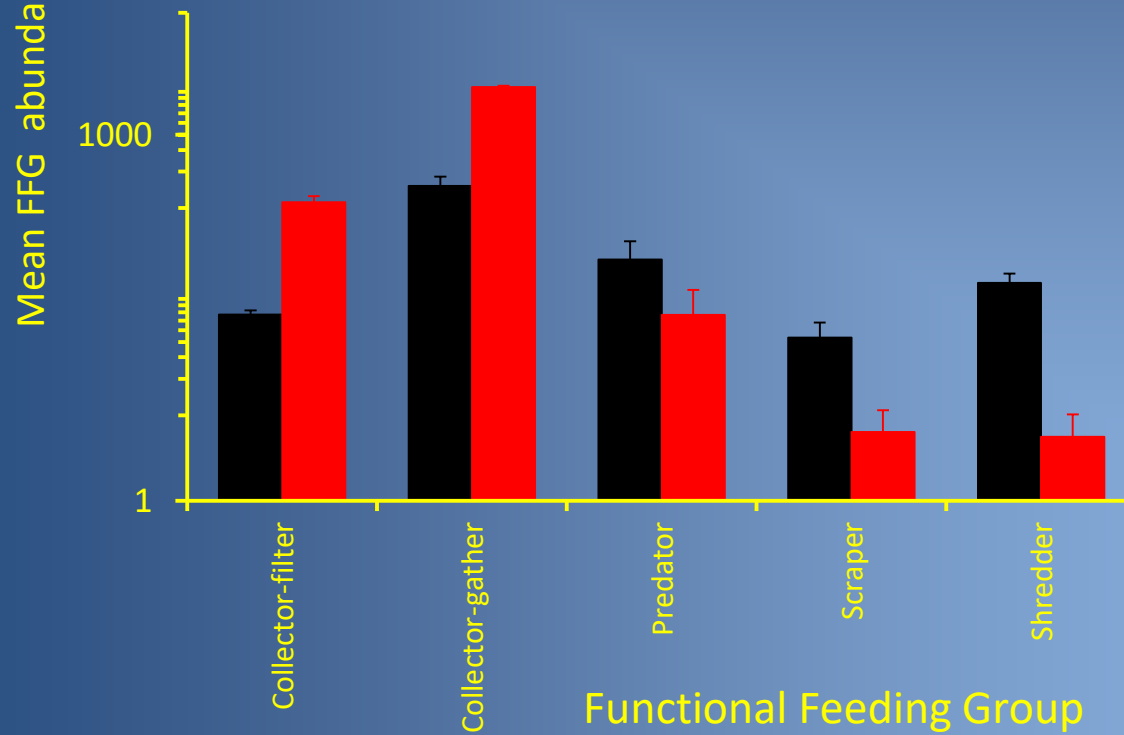


October, RG present

2013 spring and fall trials



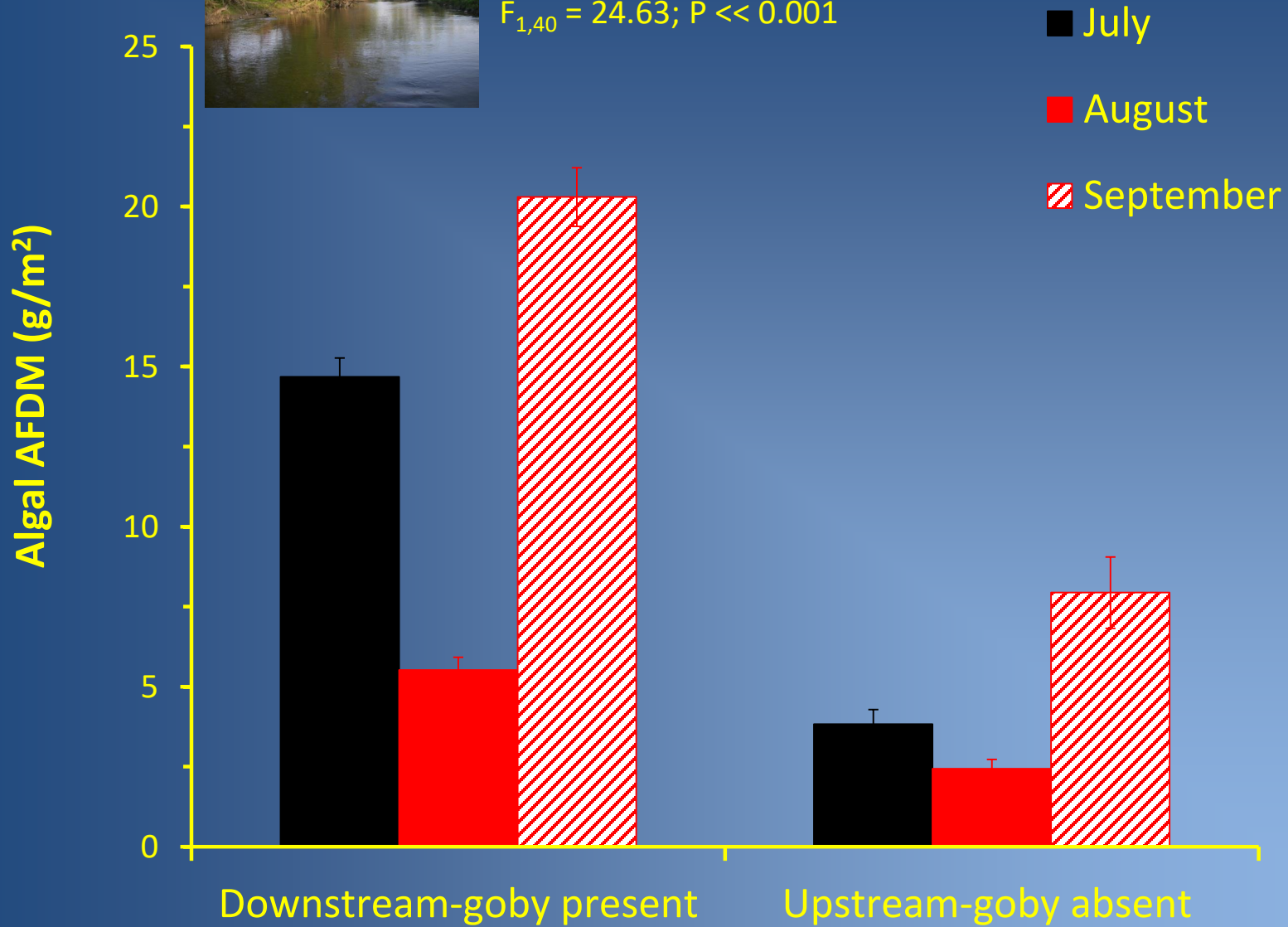
$G_{adj} = 711.6, df = 4, P < 0.001$

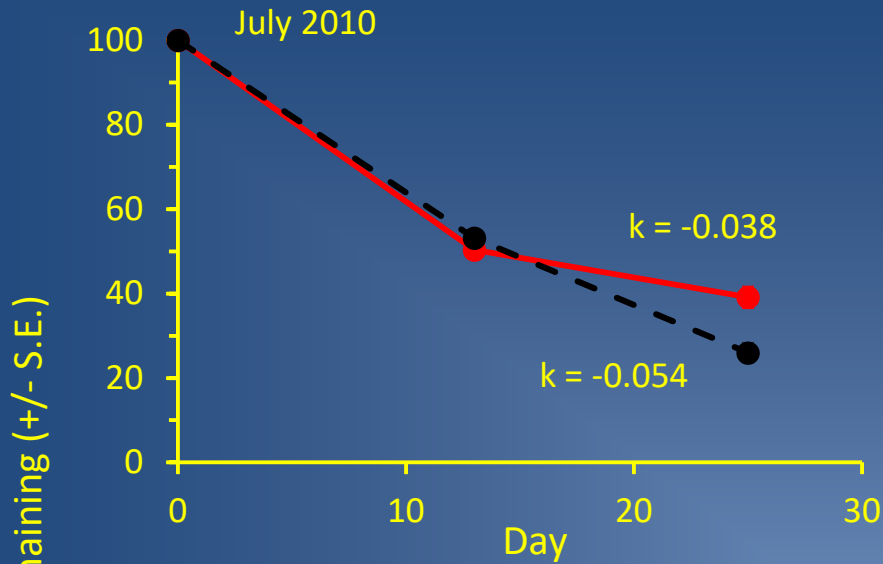


$G_{adj} = 486.6, df = 4, P < 0.001$

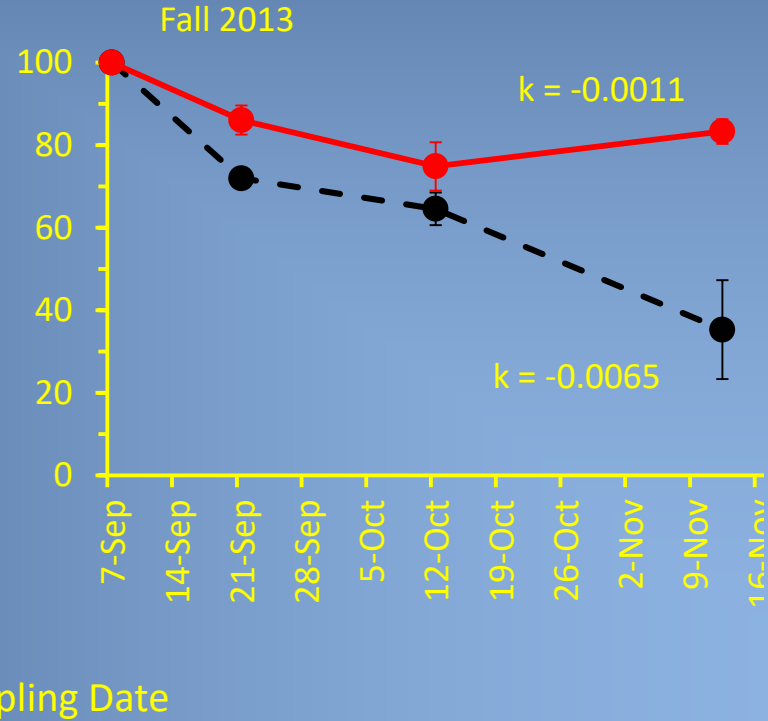
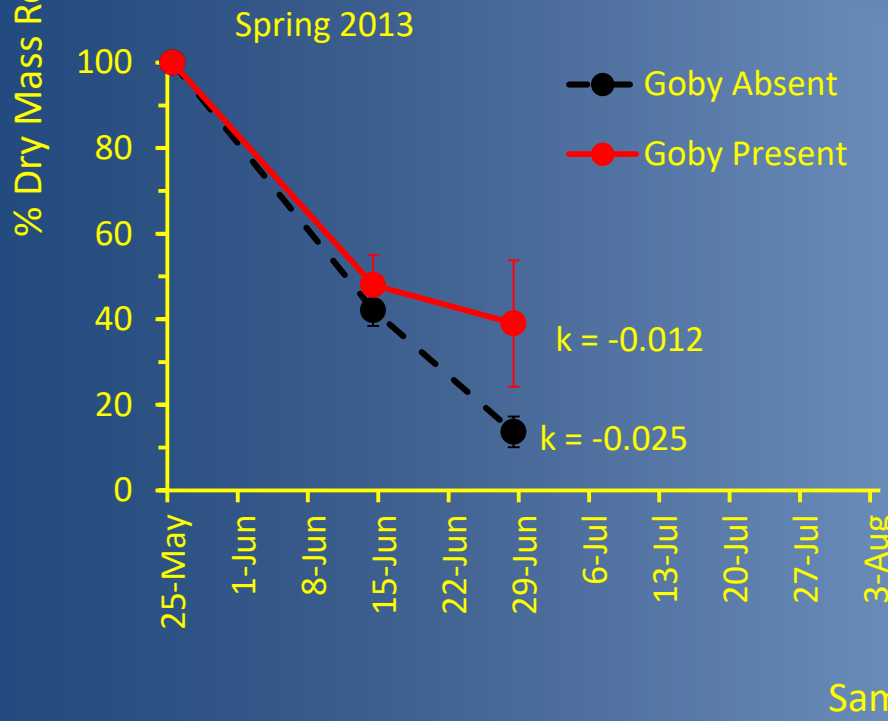


$F_{1,40} = 24.63; P << 0.001$





Leaf decay 2010 and 2013: significantly more rapid when round gobies absent



Summary and conclusions

- Round goby has not been eradicated in any location after its arrival
- Peak abundance in most lakes about 6-7 yr after arrival, maybe longer in streams
- Resident piscivores in all of the Great Lakes are feeding heavily on gobies, many with condition factors better than before round goby arrival
- In streams, shredders eliminated from leaf packs when gobies present, scrapers reduced too
- Periphyton abundance (g/m^2) increased
- Leaf breakdown rates reduced when round gobies present
- This invasive benthic invertivore exhibited strong effects on organic matter loss and primary production

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Stephen Tentinger



