Cost-effective monitoring of lakes newly infested with zebra mussels: 16 months in 5 minutes

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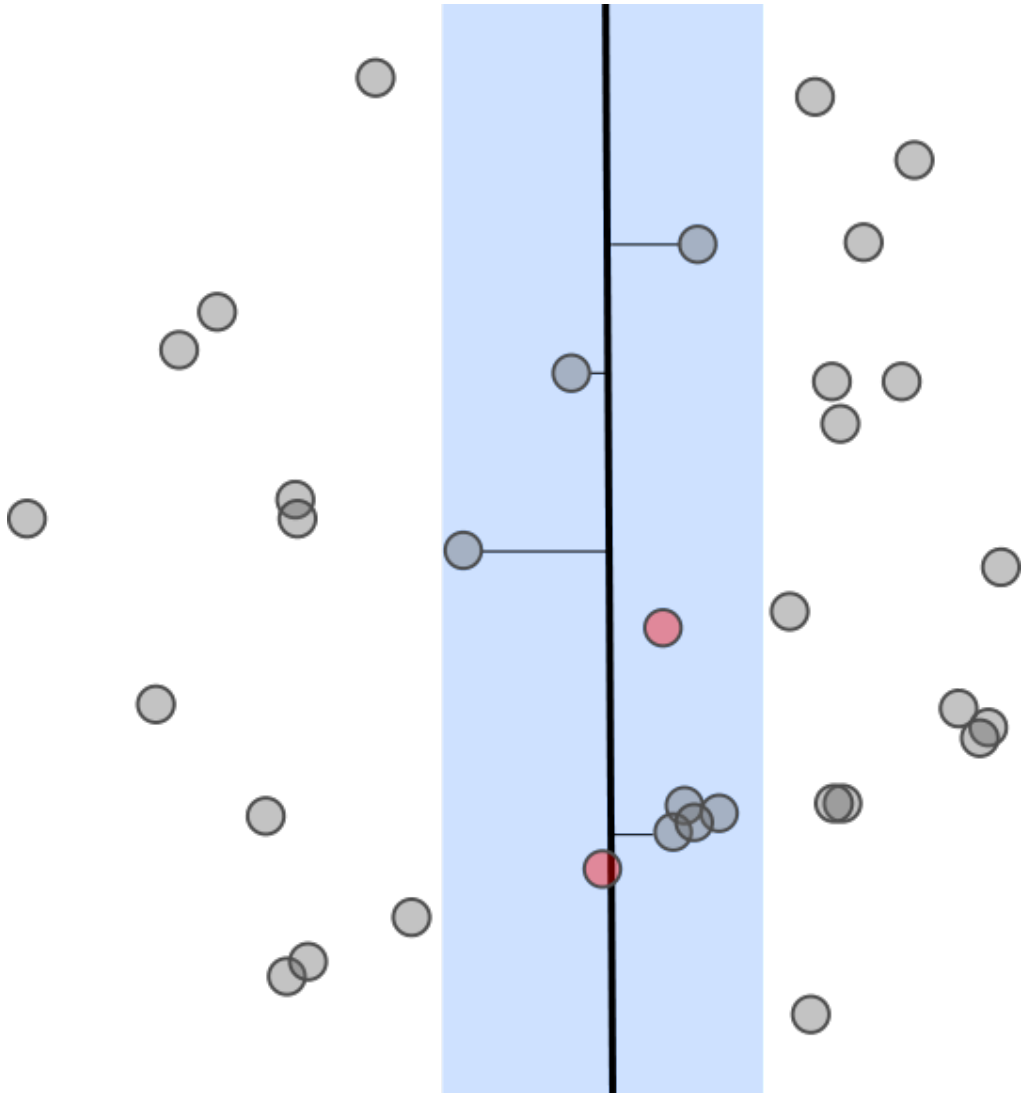
How do we reliably count zebra mussels at low densities?

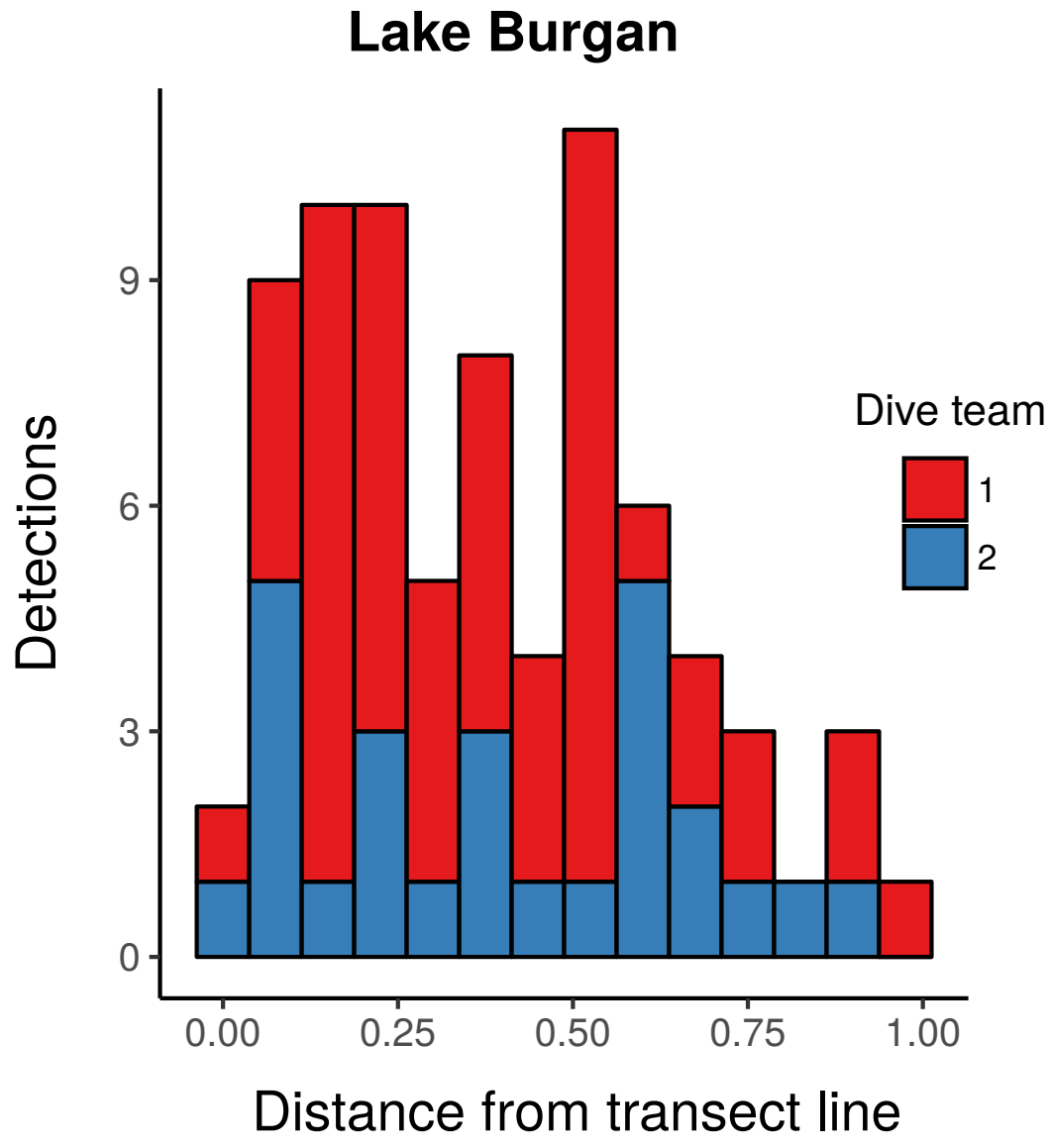
photo: Naomi Blinick

- Assess control efficacy
- Determine conditions that promote growth

Distance sampling: an approach for low densities



Distance and detectability



The payoff

X: is the number of zebra mussels detected

A: is the amount of are surveyed

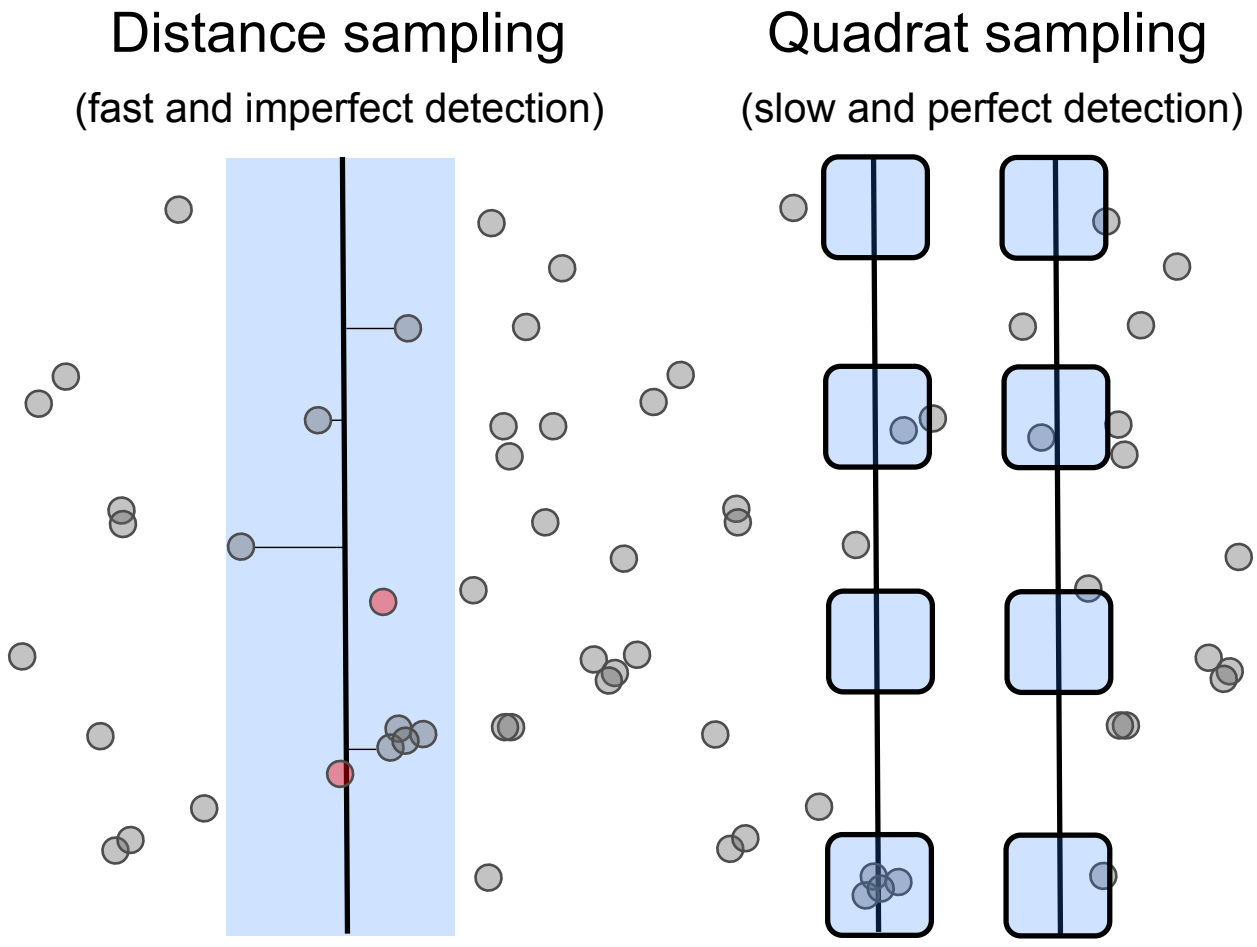
P: is the detection probability of detecting a zebra mussel ($P = 0.60$)

- Observed density: $\frac{X}{A} = 0.08$ (SE =0.01)
- Estimated density: $\frac{X}{P\,A} = 0.25$ (SE =0.09)

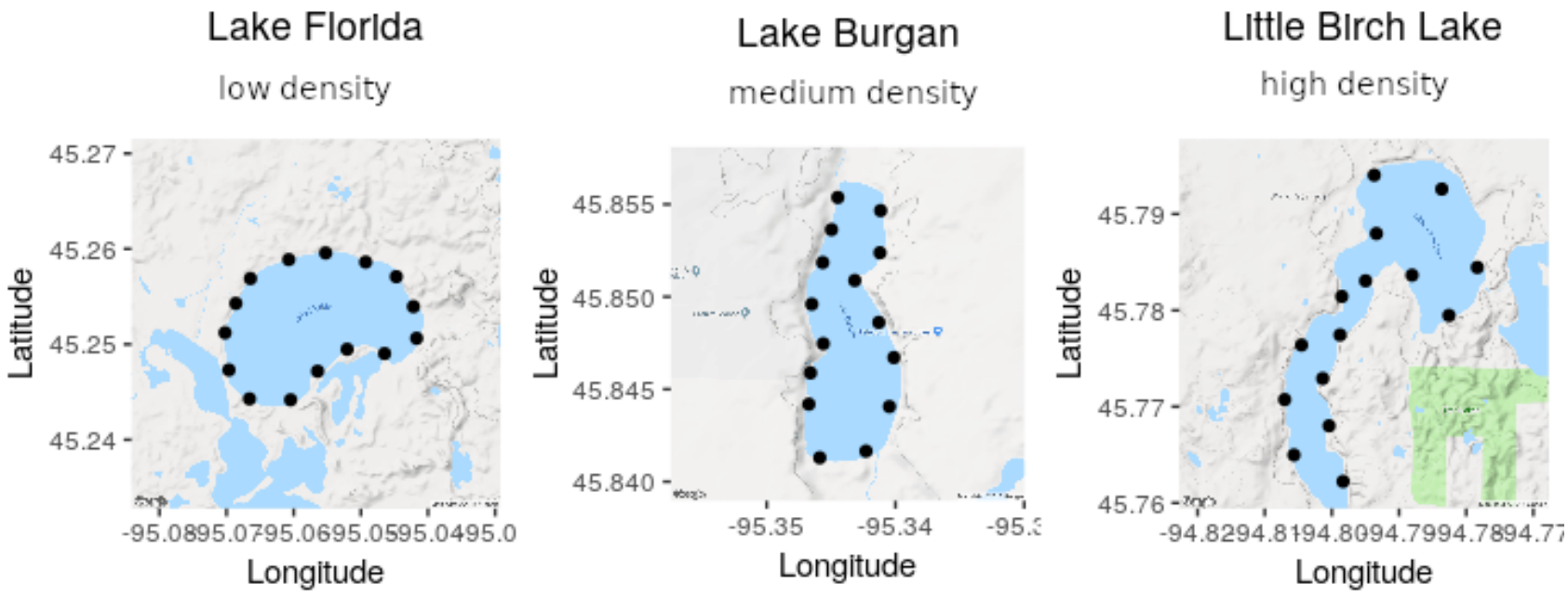
What we have learned from season 1

- Zebra mussels are tougher to count than we expected
  - Detection varies between observers
- Spent alot of time searching for candidate lakes
- Double-observer surveys are required

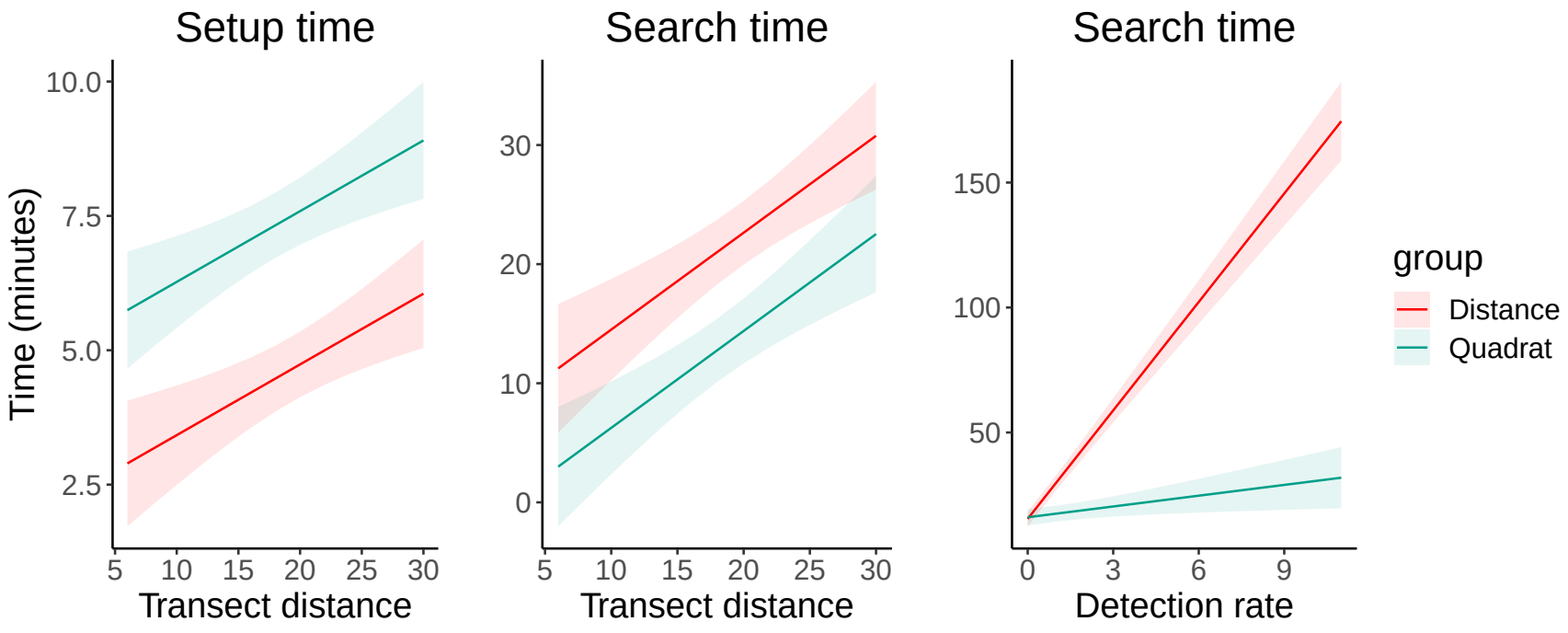
Should we survey fast and reckless or slow and deliberate?



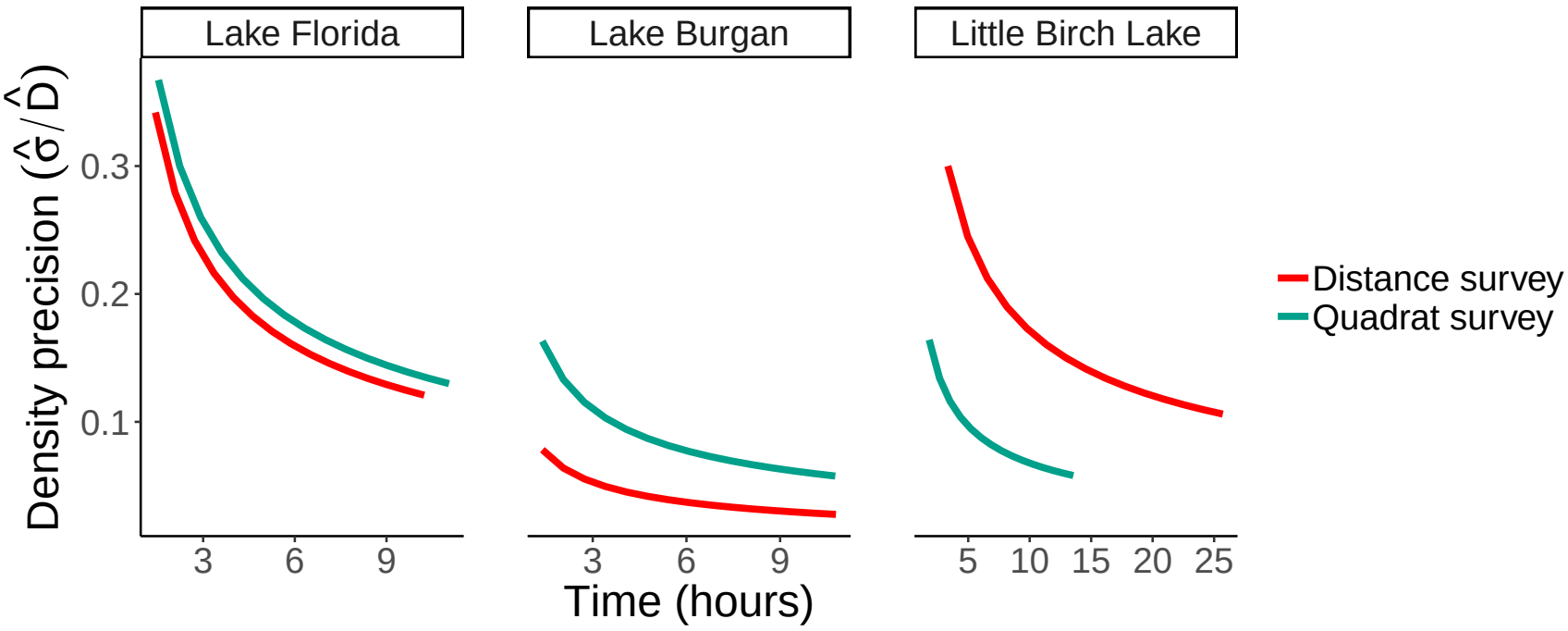
Lake surveys: summer 2018



Time to perform transect setup & search



Impact of the time budget on estimates



What we have learned from season 2

- At lower densities **distance sampling** is an attractive approach
  - At higher densities **quadrat surveys** are more efficient
- Still working on exploring how survey area and efficiency trade off more generally

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