



Food availability in the Little Colorado River over space and time

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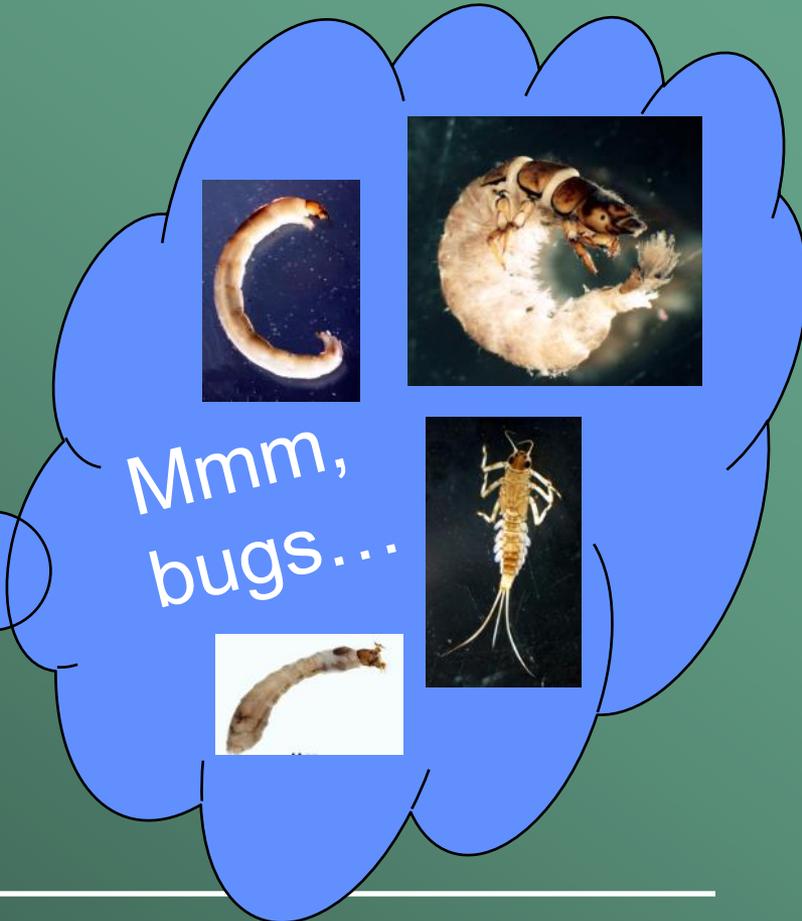
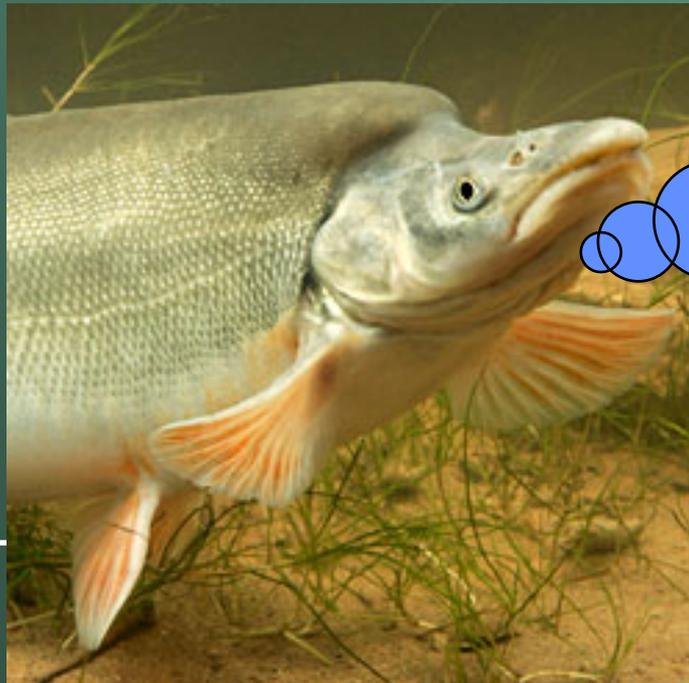
Why you should care

- Little Colorado River (LCR): Home to endangered humpback chub



Why you should care

- LCR: Home to chub
- Chub eat bugs
“drift-feeding fish”

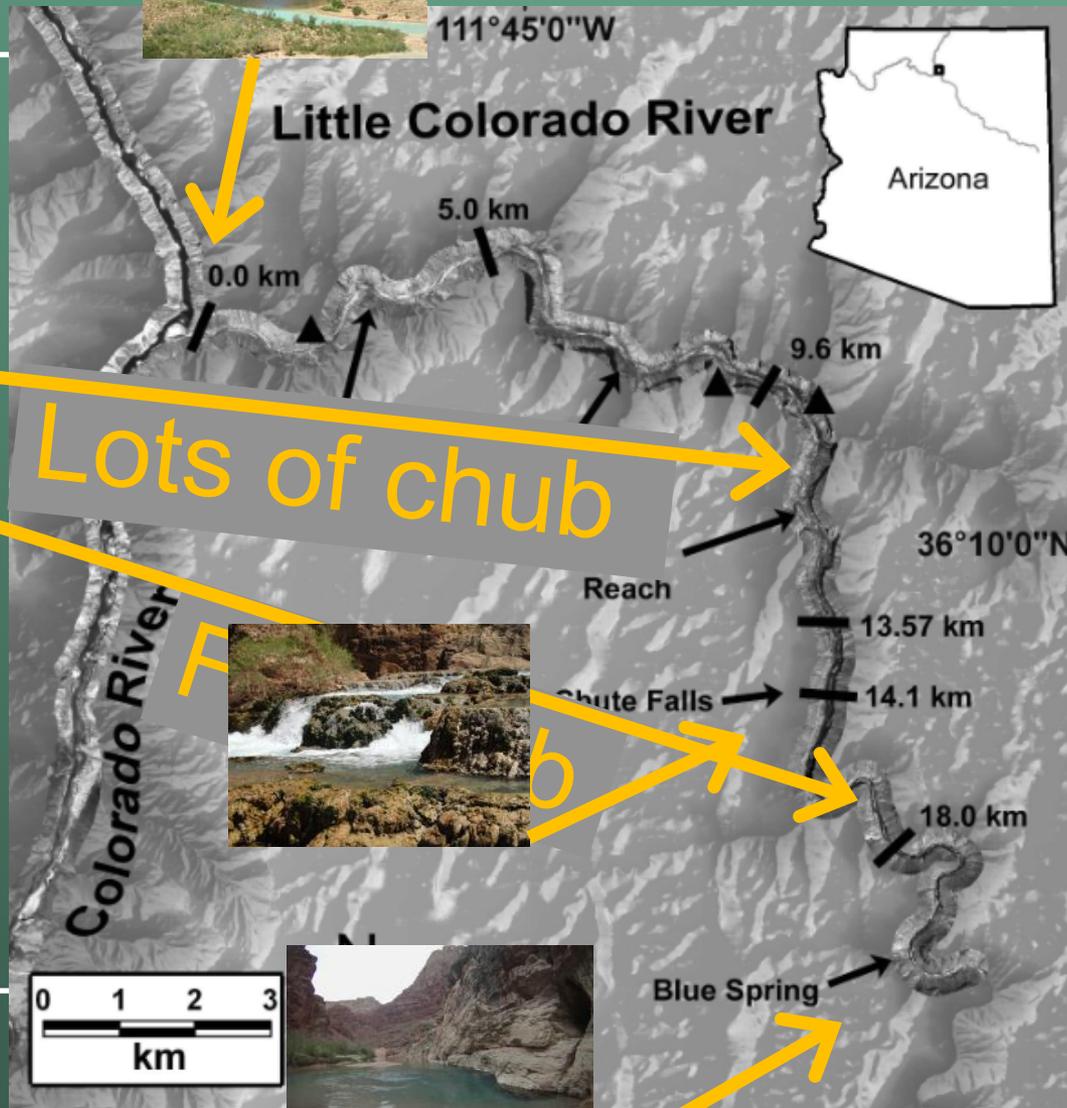


Why you should care

- LCR: Home to chub
- Chub eat bugs
- More bugs = More/fat chub?



Chub hang outs



- But why?
(possibly food?)



Map from Van Haverbeke et al 2013. J. Fish Wild Mgmt



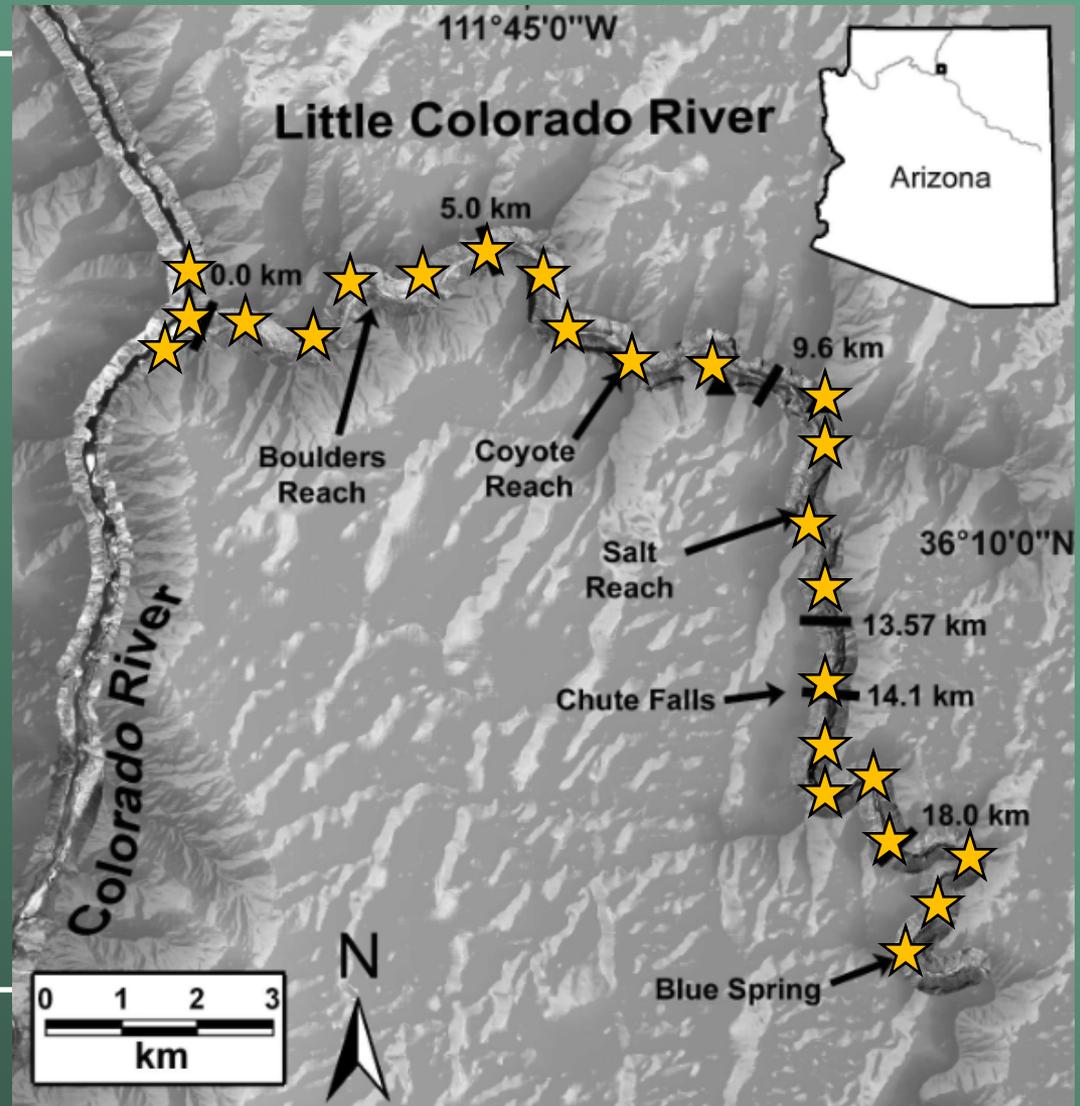
Insect sampling

- Sticky traps
 - Surrogate for in-water densities



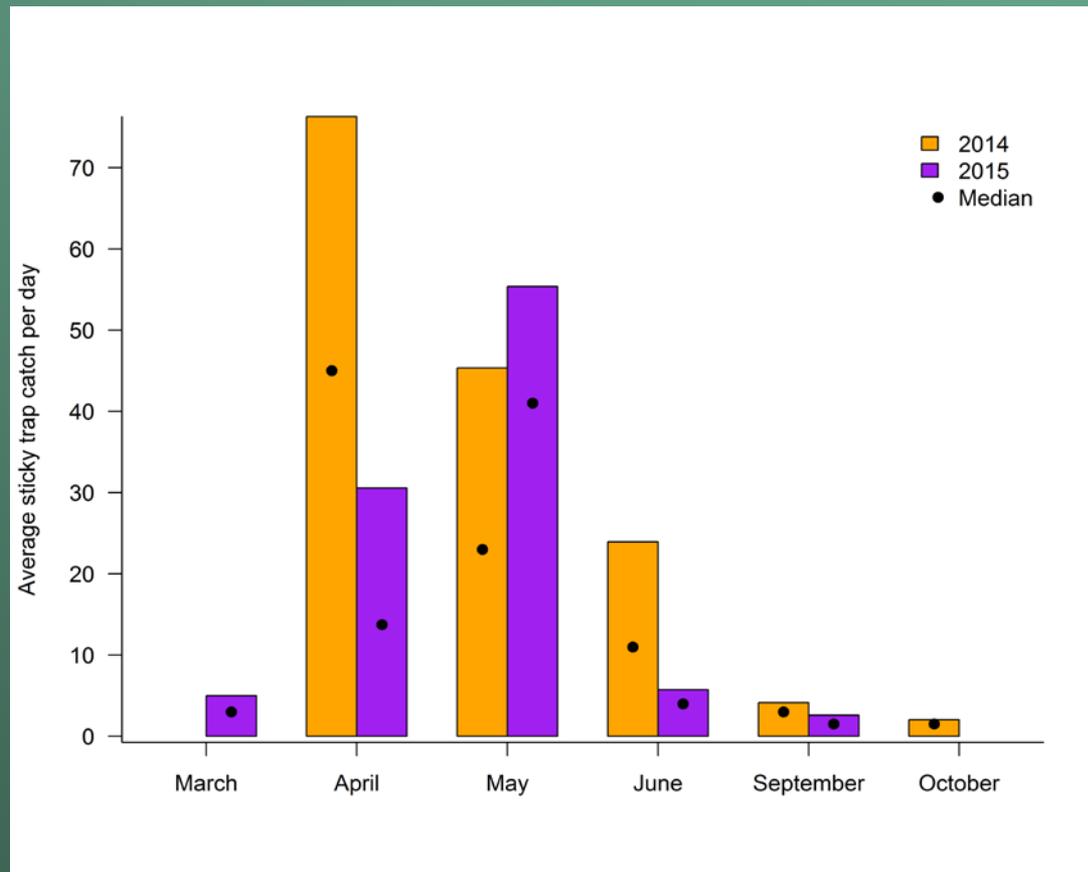
Insect sampling

- Sticky traps
 - Surrogate for in-water densities
 - Every river km, 5x per year



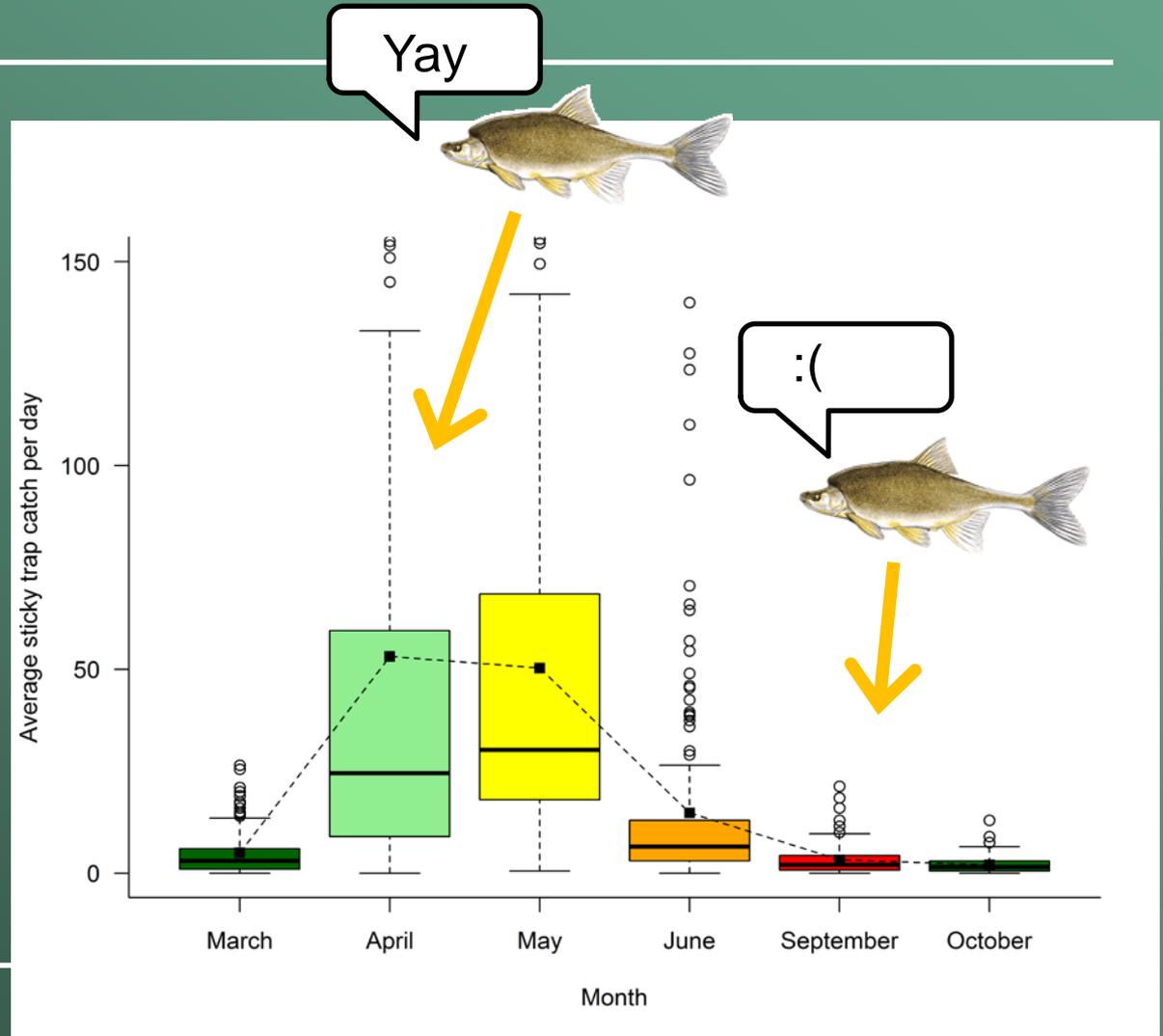
Insect sampling

- Sticky traps
 - Surrogate for benthic densities
 - Every river km, 5x per year
 - Prodigious catch rates



Results: Seasonal feast or famine

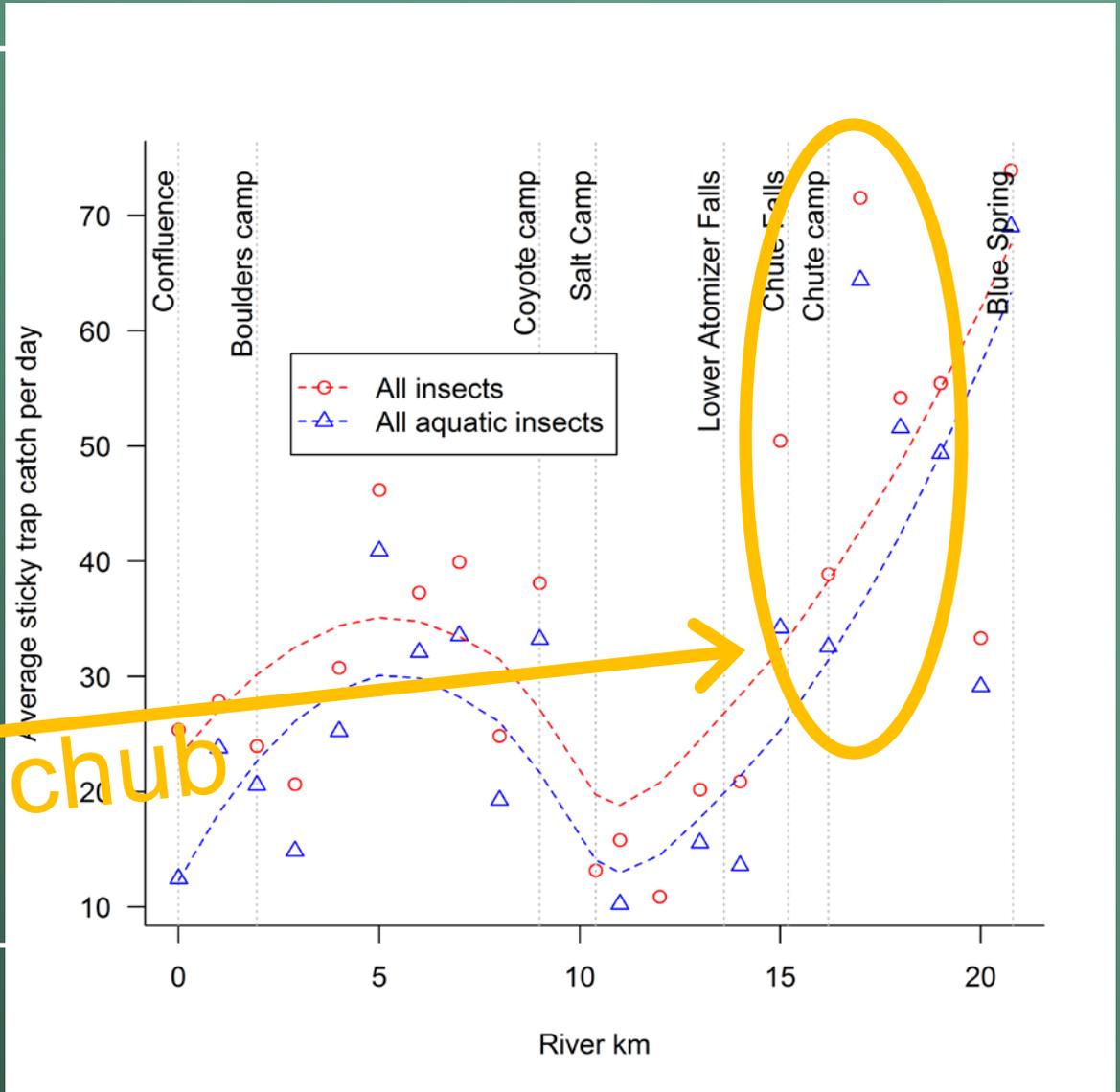
- Slim pickings outside of April/May



Longitudinal patterns: All bugs



Fat chub



Longitudinal patterns: Fat, juicy bugs

■ (AKA EPT)

E:



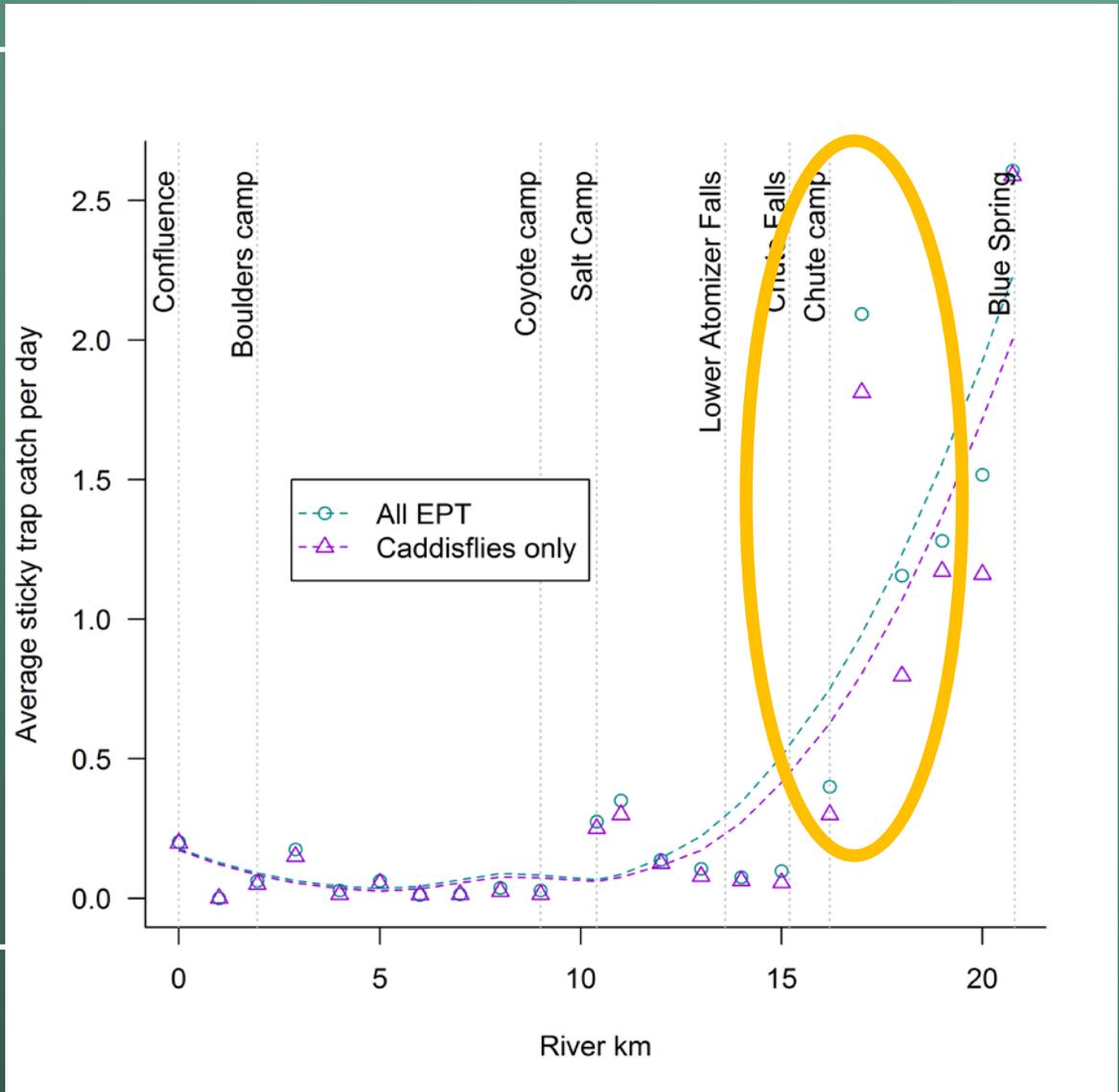
Mayflies

~~P: Stoneflies~~

T:

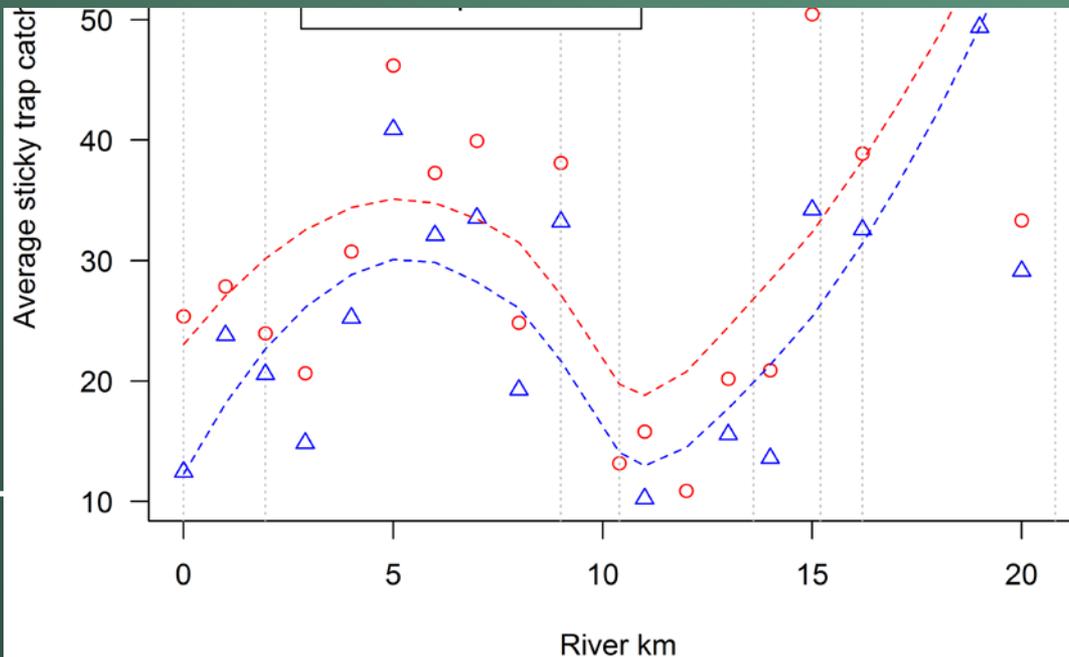


Caddisflies



Digging (diving?) deeper

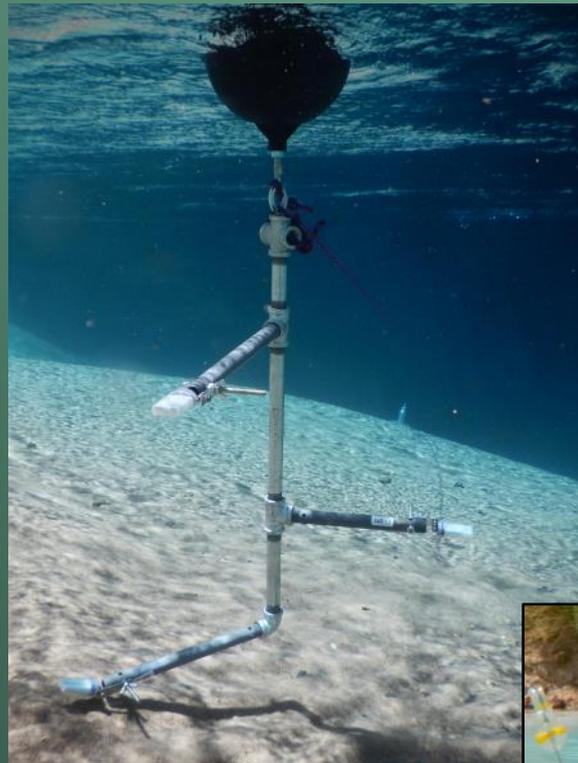
- So we've got a bug pattern...
- It may (partly) explain the chub...
- But what explains the bugs?



A travertine stream

- Crystal-clear at spring
- Increasingly turbid downstream

Spring



Midway



Mouth

Light penetration

River flow direction 



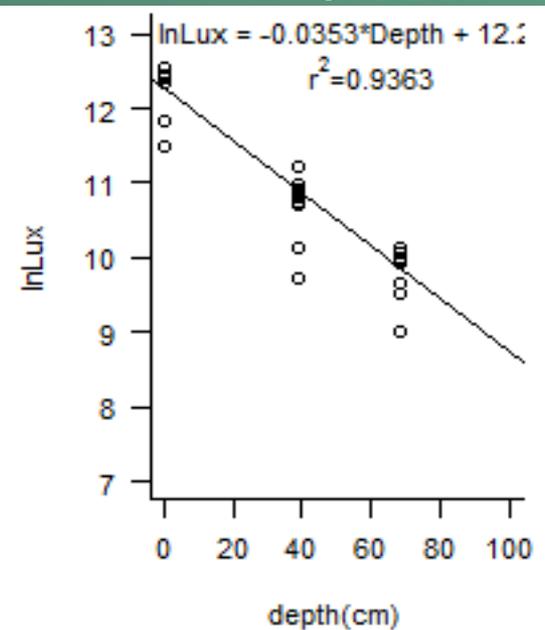
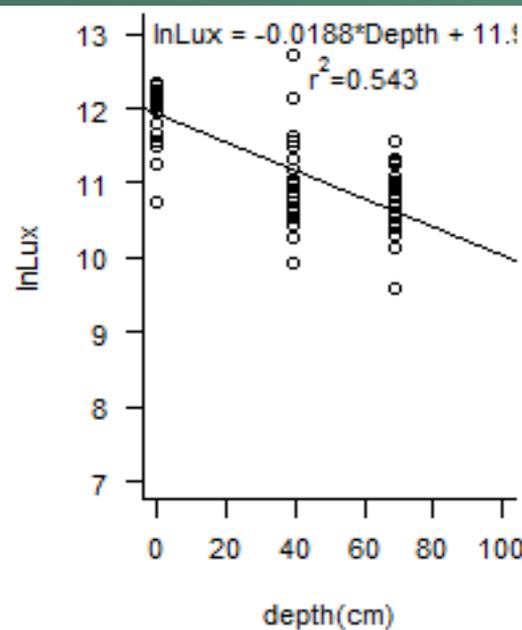
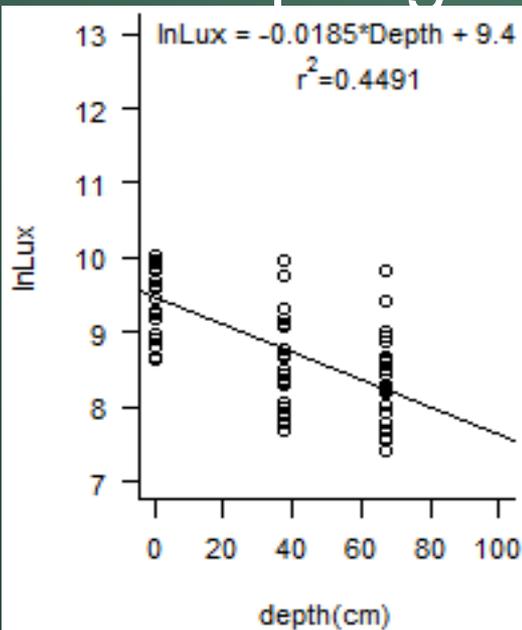
Spring



+ 4 km

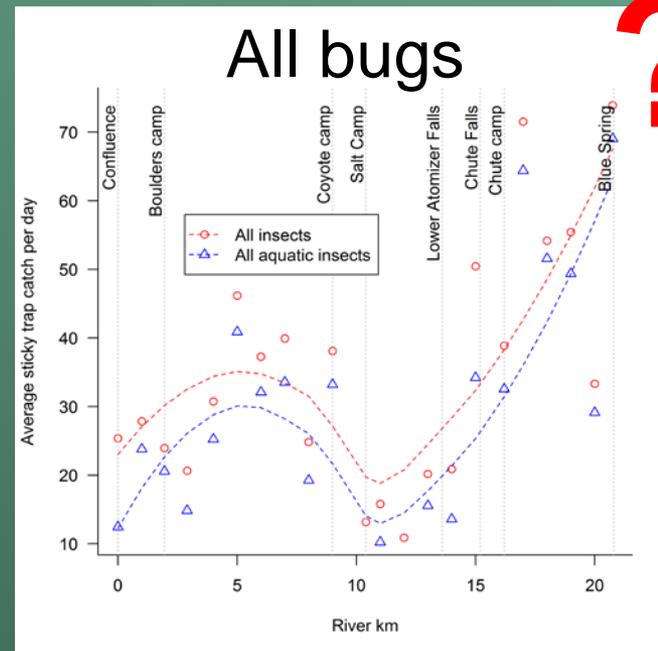


+ 10 km



Turbidity influences

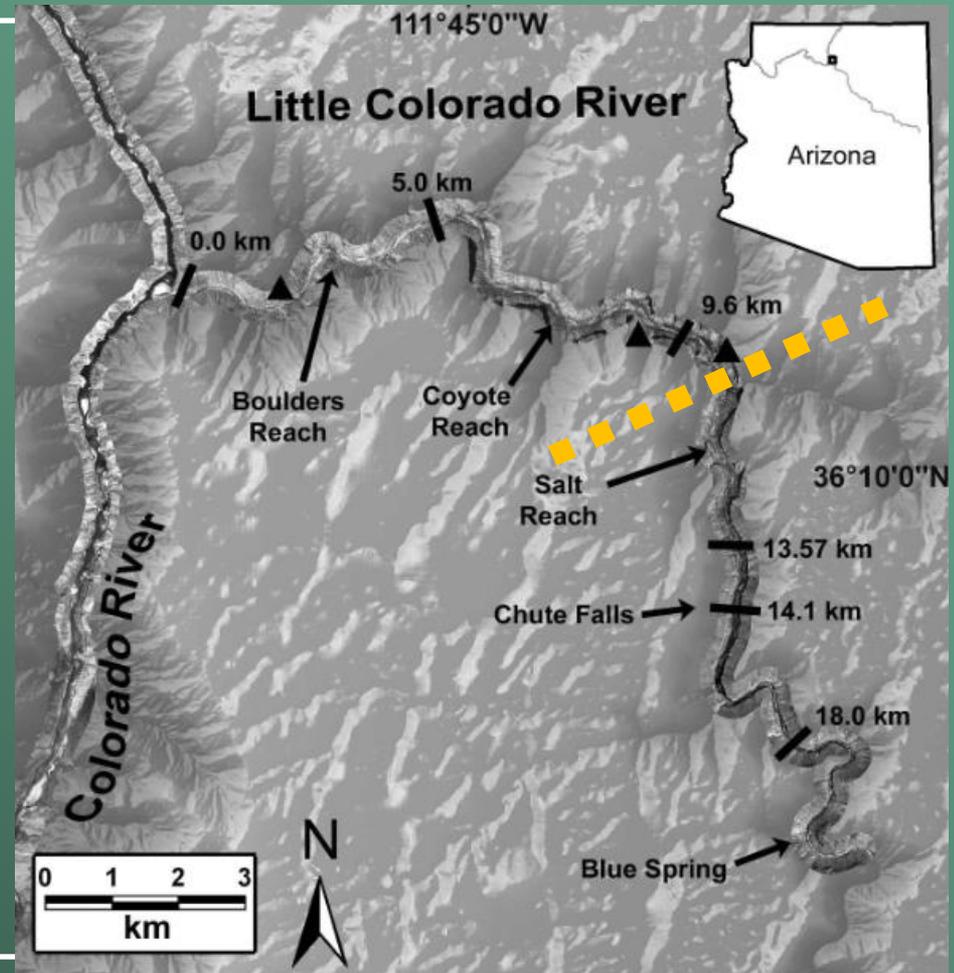
- So we'd expect fewer bugs downstream...



- But what about the rest of the pattern?

Canyon geography

- Narrow upstream, widens downstream
- N/S upper half, E/W lower half



(Un)Made in the shade

Upper river

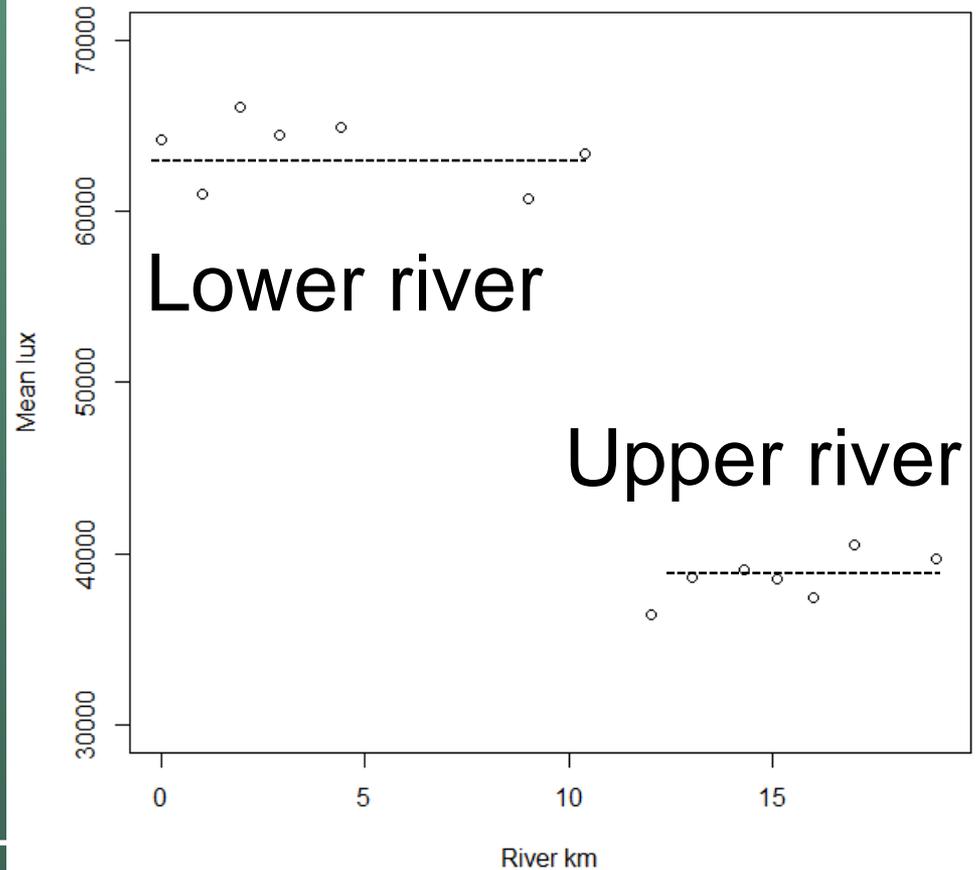
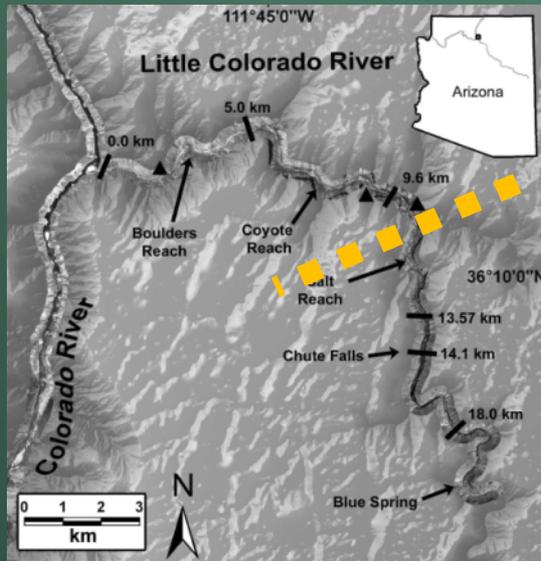


Lower river



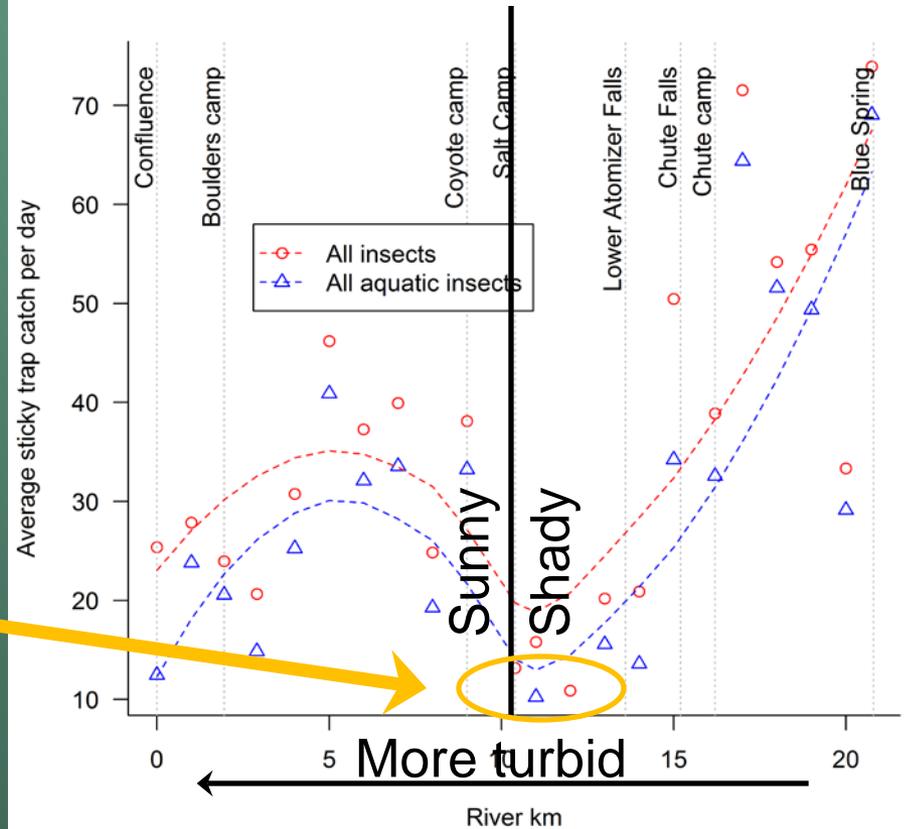
Above-water lux

- 1.5x more light downstream than upstream



A light double-whammy

- Upstream:
 - Clear water, but shady
- Downstream:
 - Sunny, but turbid



Conclusion

- Dual controls on bug densities
- Both light-related: shading vs. turbidity
- Can be contrasting or complementary
- 2016: Resolving patterns



Thanks. Questions?

- All samples painstakingly (yet cheerfully!) picked by student intern David Goodenough

