Crayfish N:P in Disturbed and Reference Streams

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Introduction

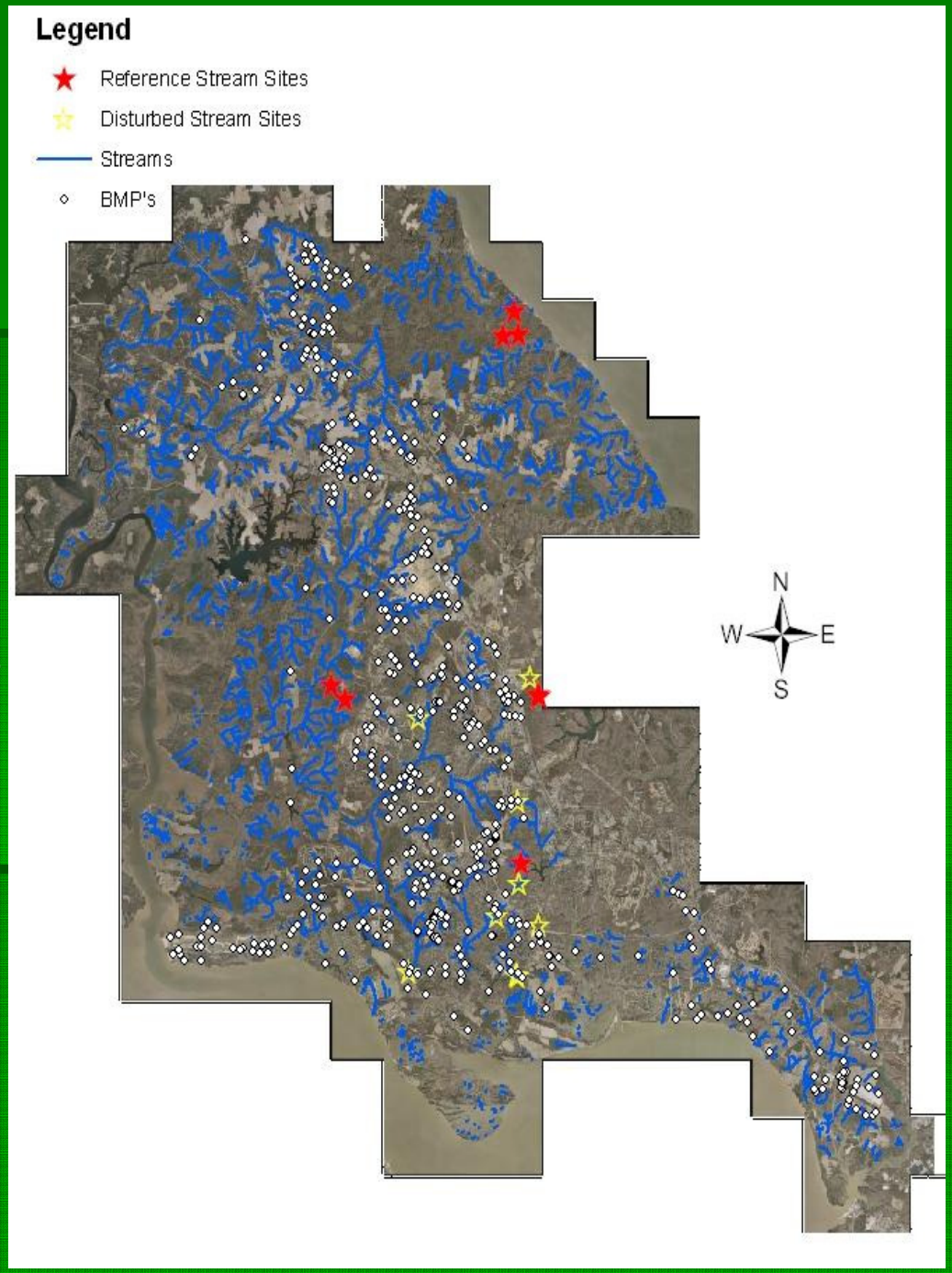
- ↑ impervious surface= ↑ nutrient runoff
- Retention pond algae released into streams
- Periphyton

Significance

- Crayfish N:P as an indicator of stream health and retention pond function
- Elemental ratios of the water are reflected in crayfish stoichiometry (Liess and Hillebrand 2005; Walve and Larsson 1999; Wetzel 1975)

Sites

- Disturbed:
  - Strawberry Creek
  - Waller Mill Industrial Park
  - Pointe at Jamestown
  - Ironbound Village
  - Holly Hills Carriage Homes
  - King's Way
  - Kensington Woods
- Reference:
  - Waller Mill (2)
  - Pagonia
  - Freedom Park (2)
  - York River State Park (3)



Hypothesis

- Crayfish N:P will differ between reference streams and disturbed streams
  - Body N:P ratio=18

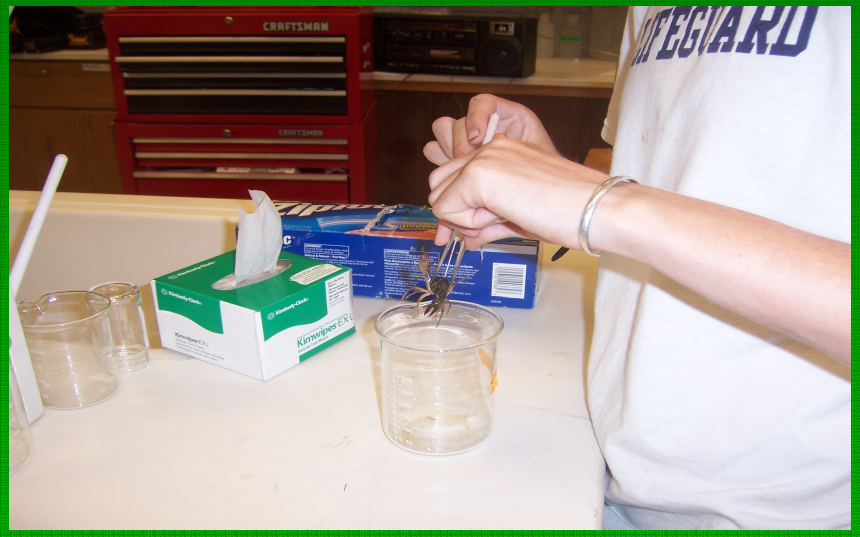
    (Evans-White and Lamberti 2005, 2006)

- Higher N:P in disturbed streams

Methods

- Sampling:
  - By hand
  - Dip net
  - Minnow pots

Methods



- Tail freeze dried and tail meat crushed
- Analyzed for N and P

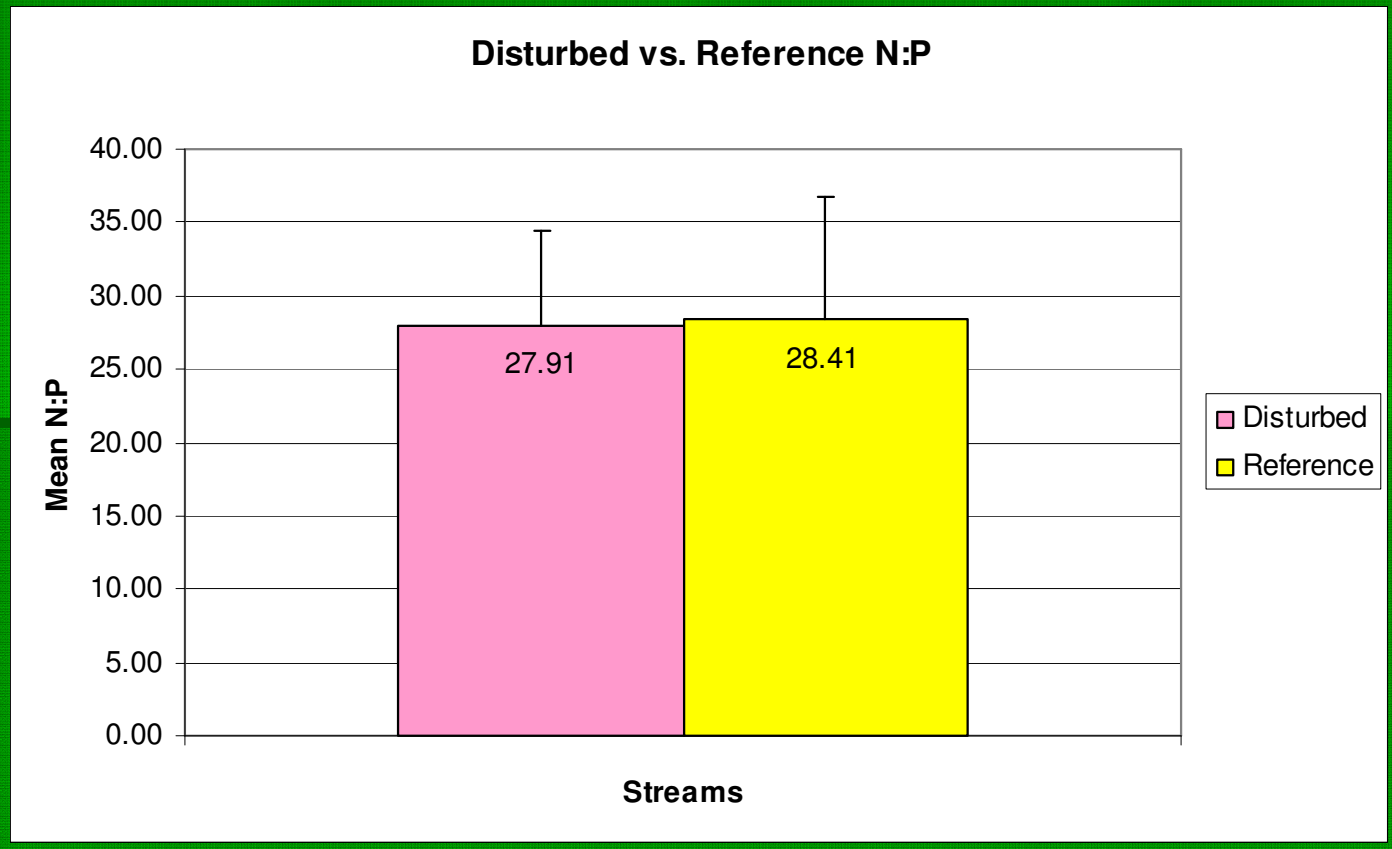
Results

- High levels of nitrogen
- No significant difference between dist. and ref. N levels
- Variation for N:P caused by phosphorus levels

Species	Mean %N in muscle
Lobster	2.7
Rat (male)	5.17
Fish (halibut)	2.98
Chicken	3.09
Human	3.15
Crayfish (this experiment)	13.29

Results

Difference between reference and disturbed streams not significant (p=0.826)



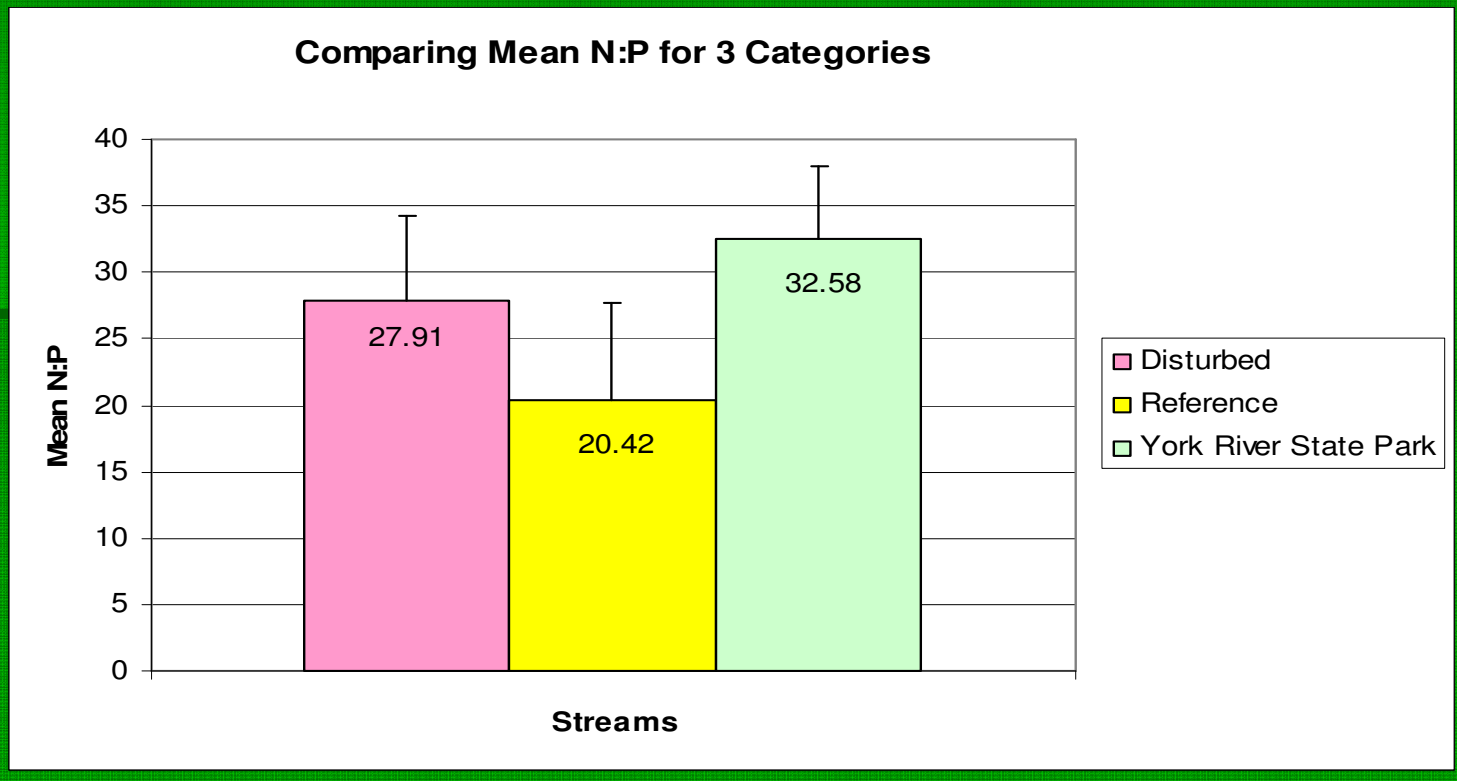
3 Categories

- Disturbed
- Reference
- York River State Park

Test	P Value
Disturbed vs. York River State Park	.032
Reference vs. York River State Park	.000

3 Categories

- Between groups p=.000
- Between disturbed and reference p=.003



Conclusion

- Difference from expected 18
  - Only N:P of tail meat was analyzed
  - Abdominal muscle N:P between 35 and 40 (Faerovig and Hessen 2003)
- Differences in ratios due to differences in
  - Size class (Liess and Hillebrad 2005)
  - Developmental stages (Carillo et al. 2001; Main et al. 1997; Liess and Hillebrand 2005; Walve and Larsson 1999)
  - Plant litter (Palmer et al. 200)
  - Diet (Elser et al. 1996)
- York River State Park is impacted based on irregularly high N:P ratios

Questions Raised

- What is the disturbance associated with York River State Park?
- How will N:P differ if whole bodies are analyzed?
- Does the N:P of crayfish in the Williamsburg/JCC area differ between species?
- What is causing the high level of N within the crayfish muscle tissue?

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