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Moving bugs to urban streams can **help** restore biodiversity

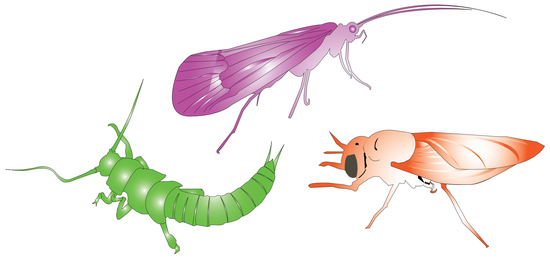
Can relocating bugs to urban streams improve diversity and integrity scores?

INTRODUCTION:

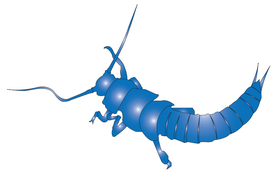
- Macroinvertebrate diversity in urban streams is often low, even after restoration.
- One reason may be that urban streams are far from sources of sensitive taxa, and thus natural recolonization is slow or impossible.
- To test the isolation hypothesis and jump start recovery, we collected and moved macroinvertebrate communities from healthy streams to degraded streams and checked to see if they persisted.

METHODS:

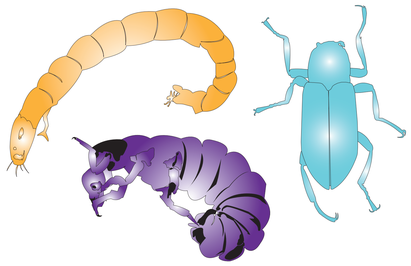
- In summer 2018, we placed colonization baskets in 2 healthy "donor" streams.
- After six weeks, baskets were collected and moved to 4 streams with low diversity and low Benthic Index of Biotic Integrity (B-IBI) scores.
- We estimate we added ~46,000 macroinvertebrates to each recipient stream, including on average 15 new mayfly taxa, 9 new stonefly taxa and 13 new caddisfly taxa.
- Recipient streams were re-sampled in summer 2019.



SCORES WENT UP!
New for sure: a stonefly *(Pteronarcys princeps)*, and likely new: a caddisfly *(Wormaldia)* and a fly *(Glutops)*

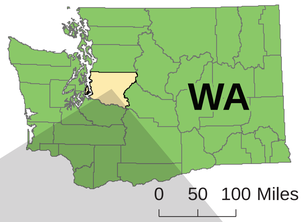


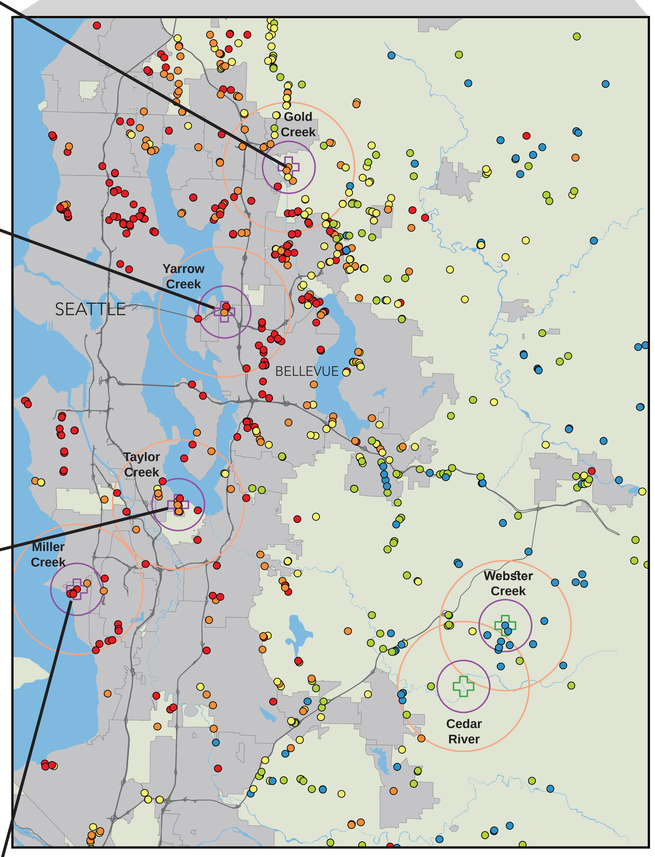
SCORES DID NOT IMPROVE
New for sure: a stonefly *(Pteronarcys princeps)* (whole sample)

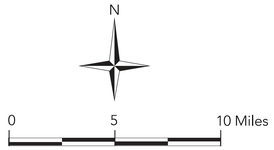


SCORES WENT UP!
Likely new: a beetle *(Zaitzevia)*, a midge *(Krenopelopia)*, and a caddisfly *(Glossosoma)* (whole sample)

SCORES DID NOT IMPROVE
New for sure: a mayfly *(Diphetor hageni)*, and likely new: a stonefly (Leuctridae) and a crane fly







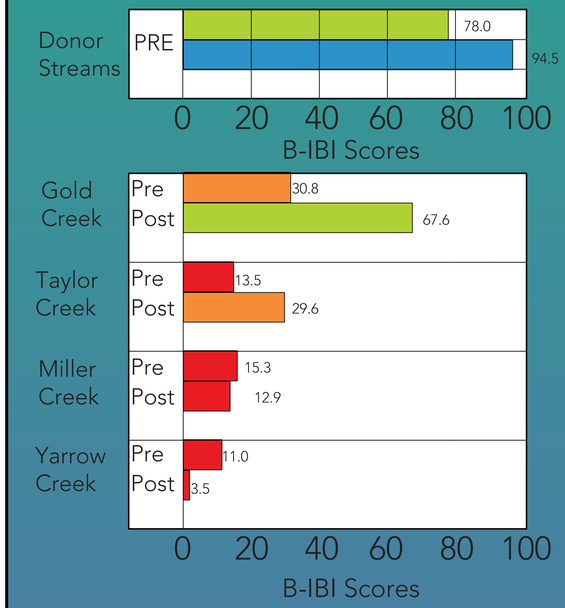
B-IBI Scores & Seeding Sites

2016-2017
- Excellent
- Good
- Fair
- Poor
- Very Poor

- Recipient Sites
- Donor Sites
- 2 km radius
- 5 km radius

RESULTS:

- Most of the new taxa were not found in the recipient streams a year later.
- However, in each stream, there were 1 to 3 new or likely new taxa.
- Other rare taxa were found in some streams, but we cannot be certain that their presence is due to the experiment.
- B-IBI scores increased in two streams, and remained low in the other two.



CONCLUSION:

- Relocation efforts should be done with caution. Care needs to be taken to ensure invasive species and diseases are not spread.
- Where appropriate and safe, moving sensitive macroinvertebrate communities to urban streams may help jump start recovery.
- If added taxa do not become established, current conditions – and not a lack of colonists – may be limiting recovery.
- Several years of monitoring will be needed to determine true, sustained success.

DISCLAIMER: This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement PC01J18101 to the Washington Department of Ecology. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.