

Response of biological communities to environmental stressors in Midwestern streams

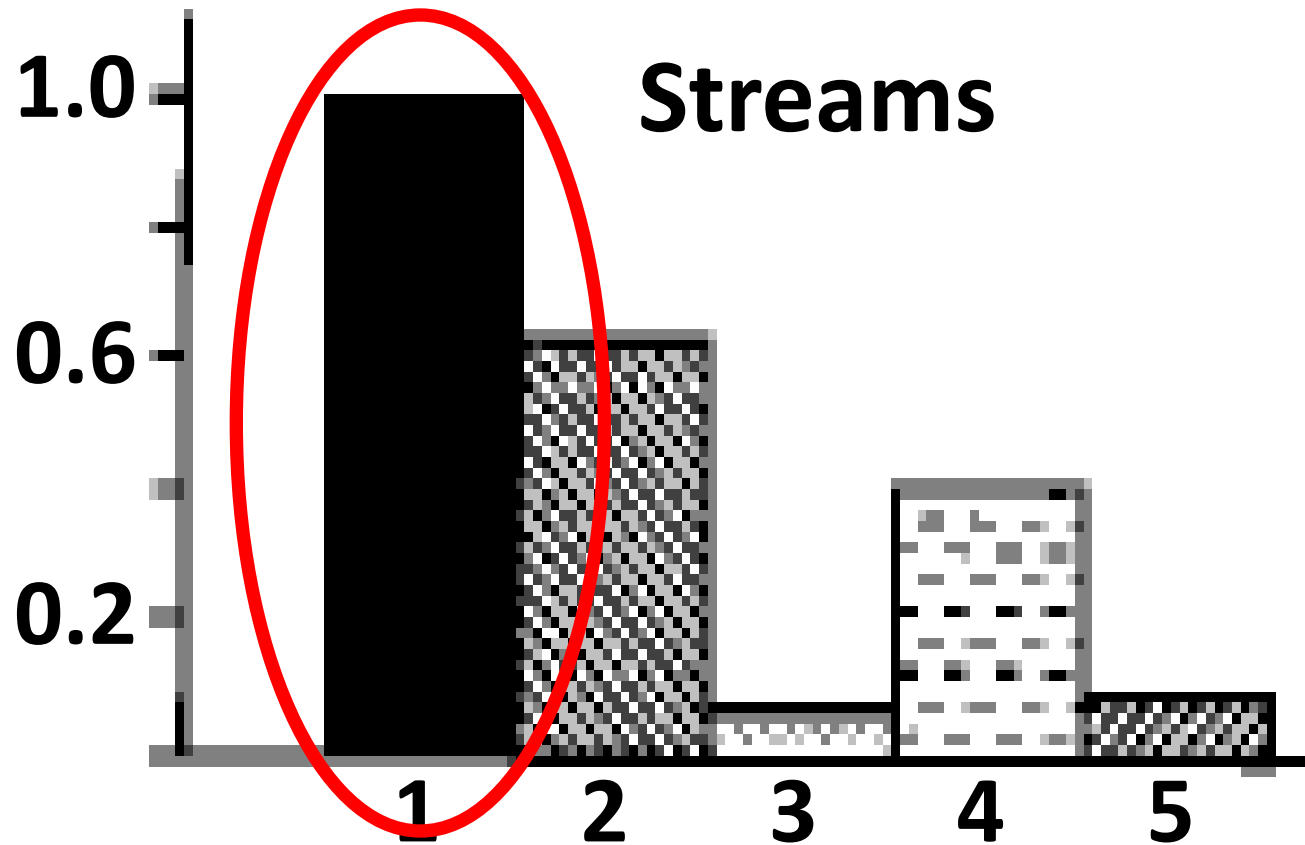
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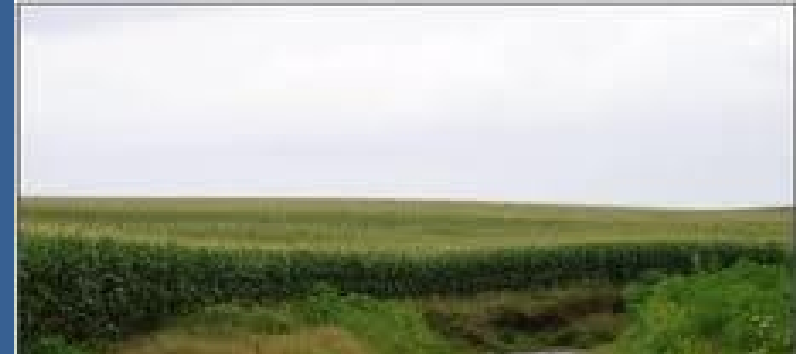
²ND Department of Health



What drives biodiversity?



Impact of land use



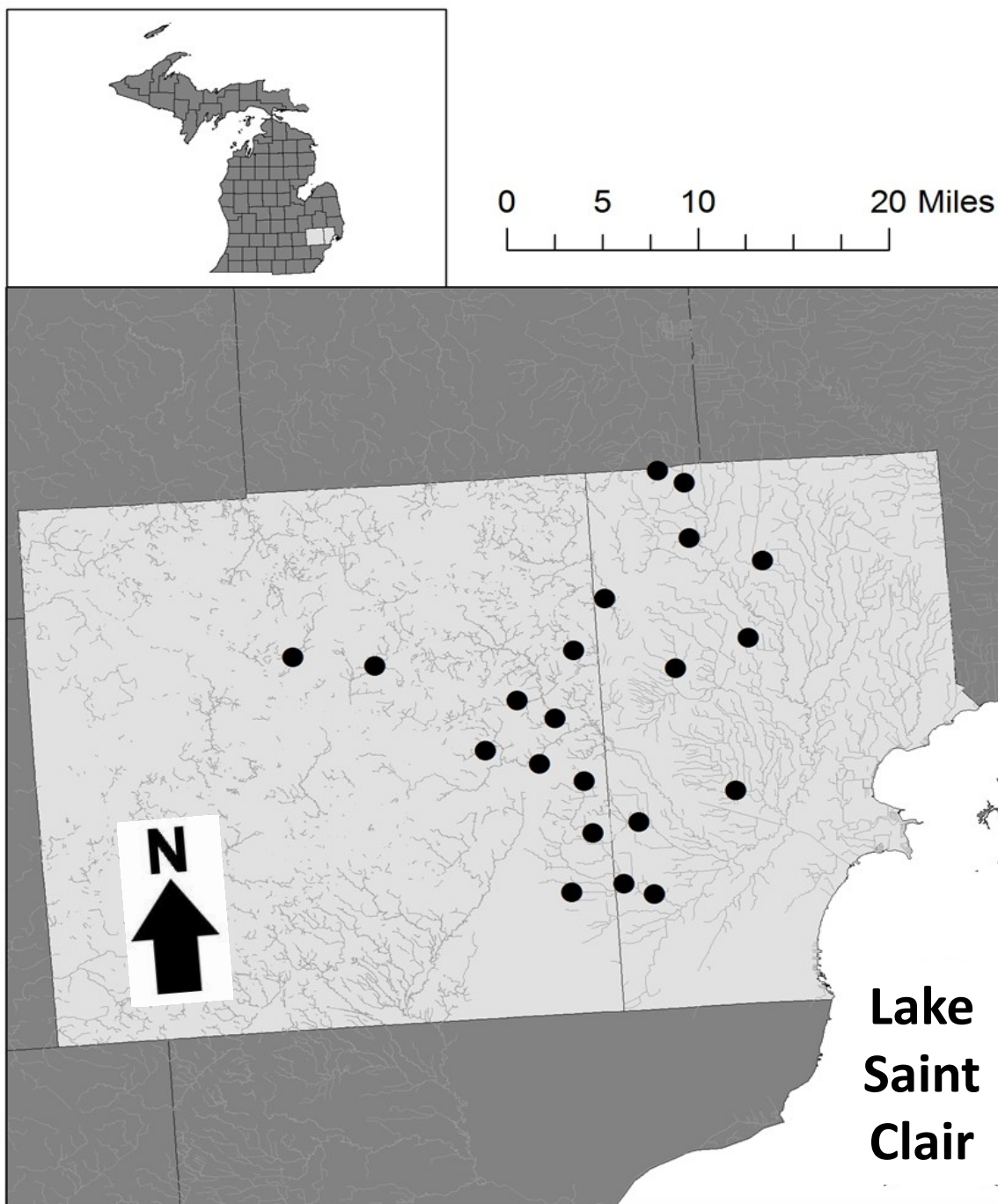
- How does land use affect biological communities?



Clinton River Watershed

- Popular fishery (rainbow [steelhead] and brown trout)
- No live fish as recent as the 1960s
- Great Lakes' Area of Concern
- Decrease in agriculture, increase in urbanization

Study Sites



- 20 Sites
- GIS-determined land use
- Forest, Agriculture, Urban

Fish sampling

- Triple-pass backpack electrofishing
- Fishes identified, measured, and enumerated



Invertebrate Sampling



- 3 Hess samples per site (riffles)
- Large rocks scrubbed, removed
- Substrate agitated for 3-4 minutes

Post-sampling activities

- Fish biomass estimated
- Invertebrates identified to lowest feasible taxa
 - > 1000 hours!
- FFGs
- Partial correlations & CCA



What did we catch?

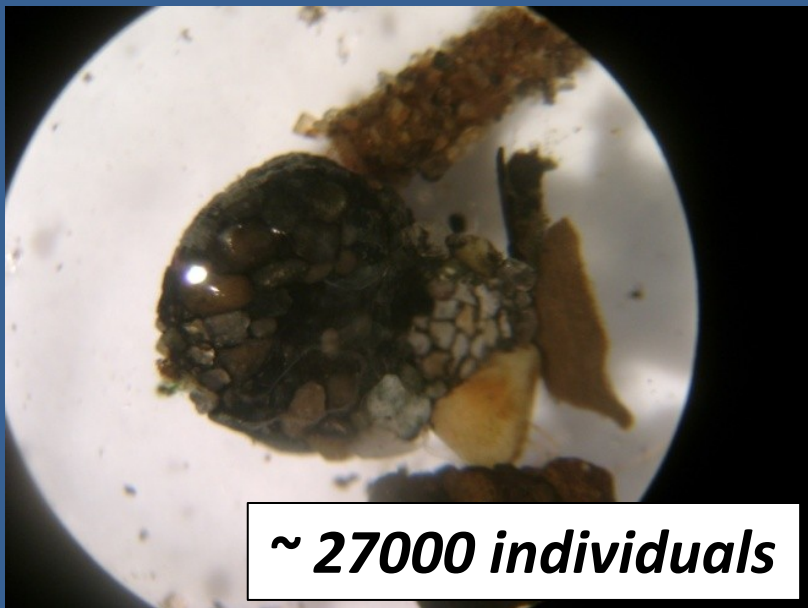
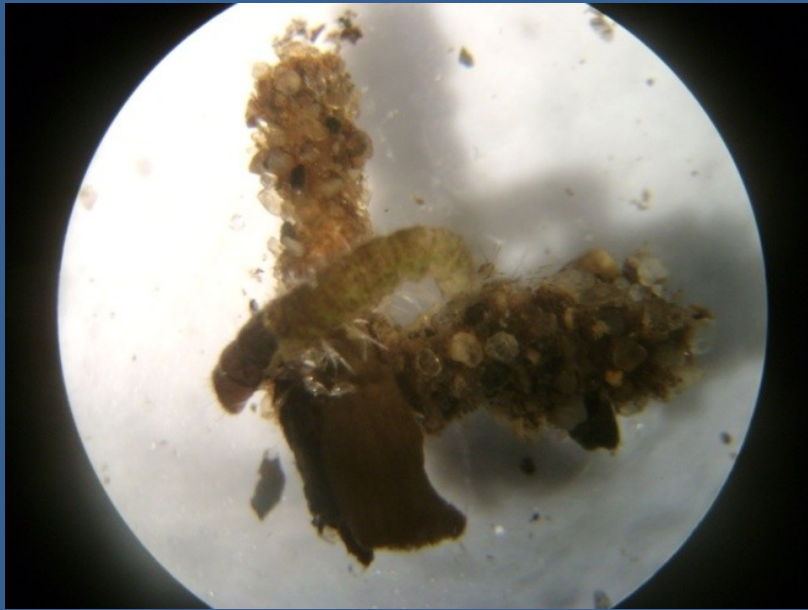


2065 individuals

39 species

12 families

What about invertebrates?

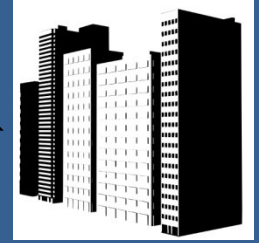
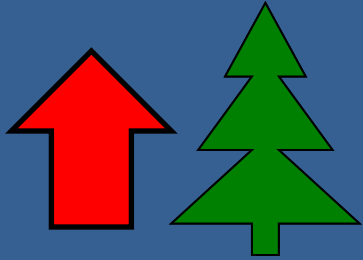


~ 27000 individuals



45 families

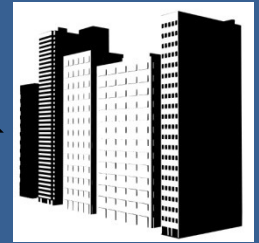
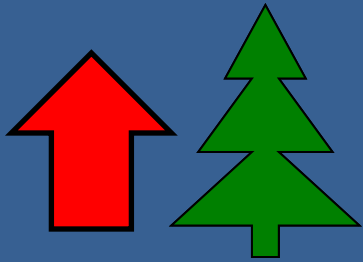
Land use affects biological communities



- “Quality”
- Structures community



Land use affects biological communities

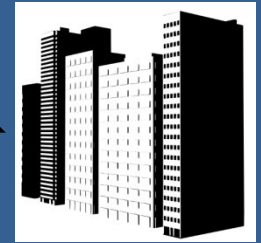
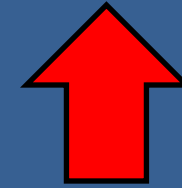
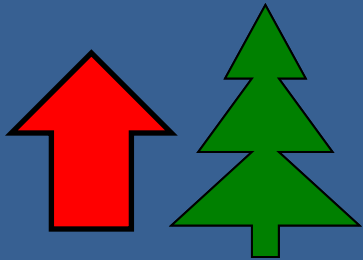


- “Quality”
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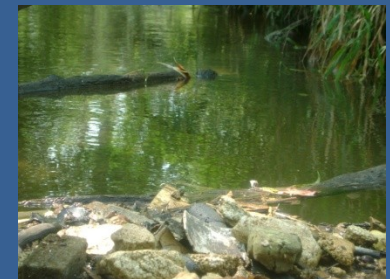
- Quantity
- Loses structure, but gains numbers



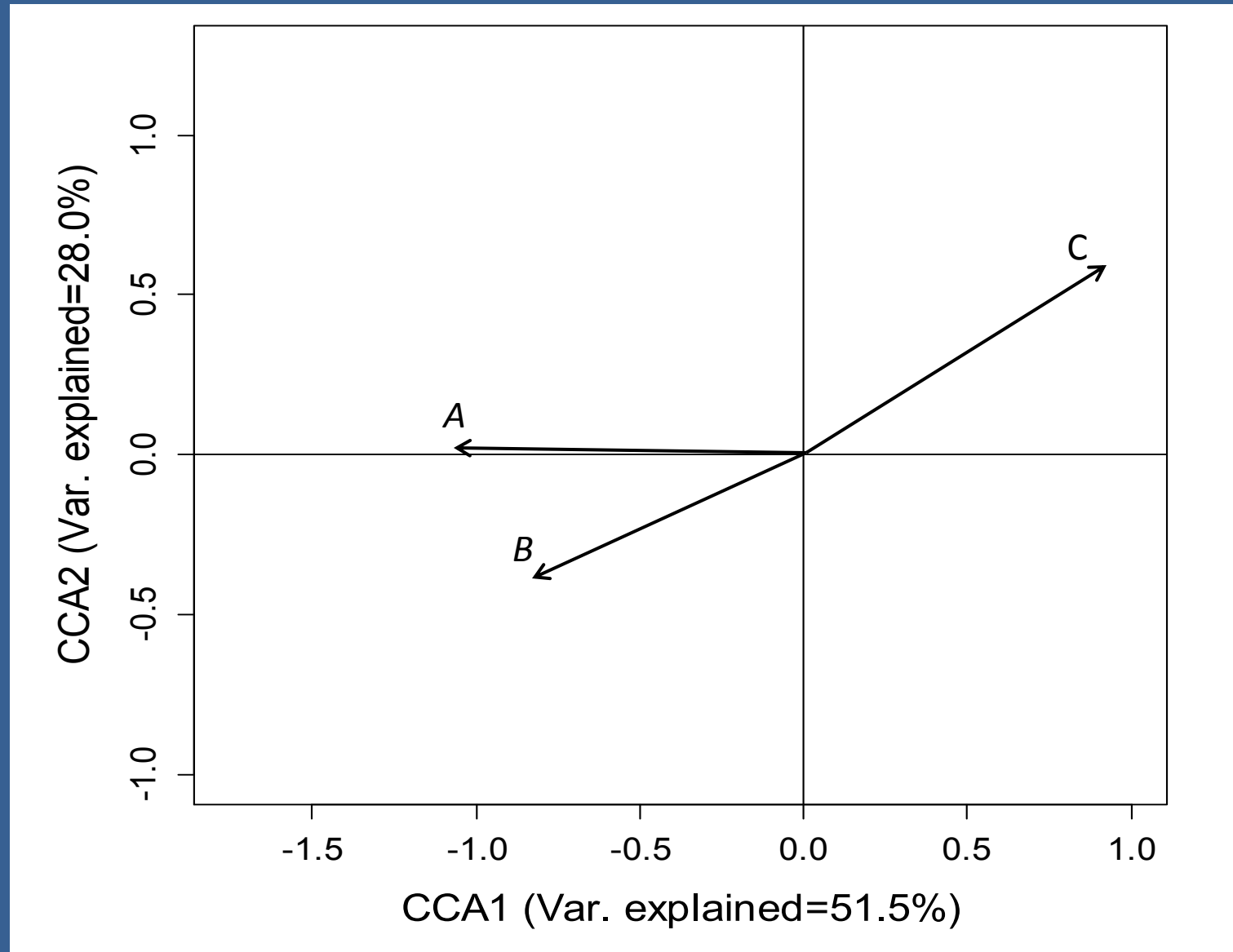
Land use affects biological communities



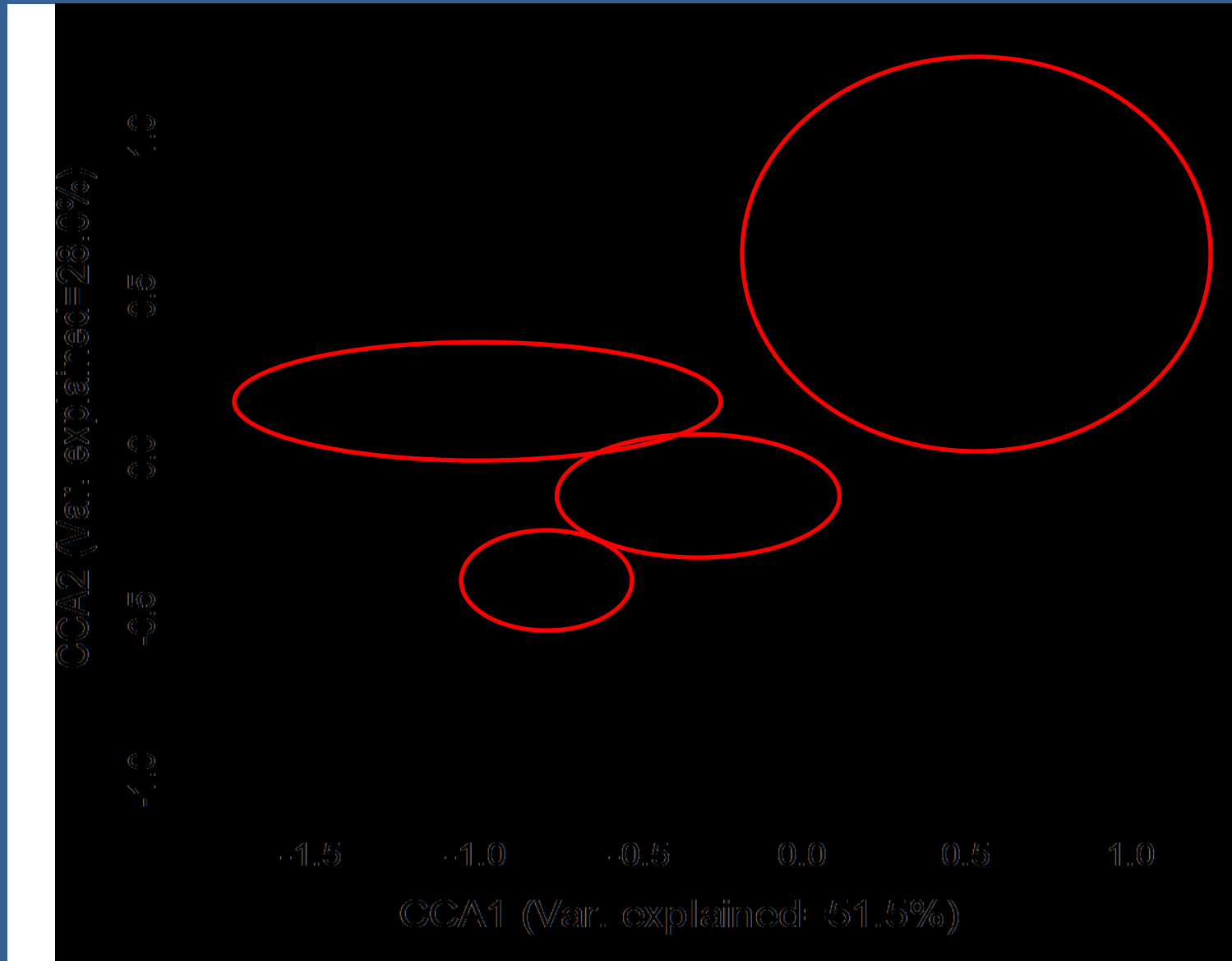
- “Quality”
- Structures community
- Quantity
- Loses structure, but gains numbers
- Lose structure and numbers



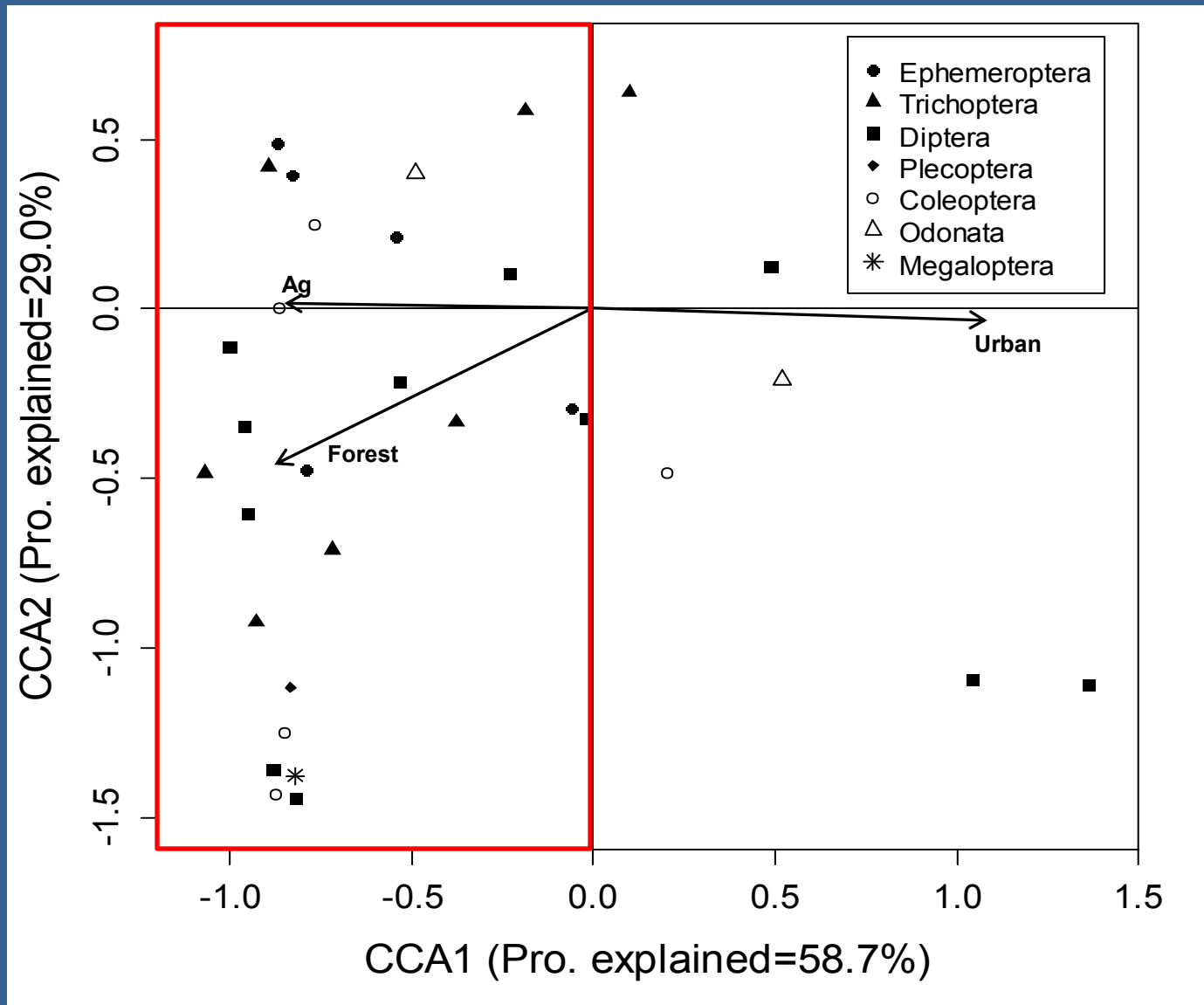
Who is where in an impacted watershed?



Who is where in an impacted watershed?



Distribution of invertebrates in an impacted watershed



Conclusions

- Land use has a significant impact on biological communities
 - Increases with forest and agriculture
 - Decreases with agriculture and urbanization
 - Specialists decrease with human impact
- What's going on?



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