Identification of overlooked climate-sensitive Odonates in North America

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INTRODUCTION

- Freshwater insects are disproportionately affected by climate change
- Much of our knowledge surrounds EPT taxa, yet many odonate species appear to be in decline as well
- Early identification of species at-risk to climate change is crucial, but requires a standardized approach

AIMS

1. Evaluate patterns of intrinsic climate sensitivities between lentic and lotic species
2. Determine taxonomic patterns of intrinsic sensitivity
3. Identify intrinsically at-risk species currently overlooked by global, national, & state conservation efforts

METHODS

For more details visit:
https://github.com/waboys/NAOdonateRCS

- Rarity & Climate Sensitivity Index (RCS) (Mims et al. 2018)
  - Area of Occurrence: area of occupied level 12 HydroSHEDS
  - Climate Sensitivity: variation in 5 climate variables within the area of occurrence for a species across 61 years
  - Scaled relative to all other species to facilitate direct comparisons
  - **Values closer to 1 are more sensitive**

RESULTS

1

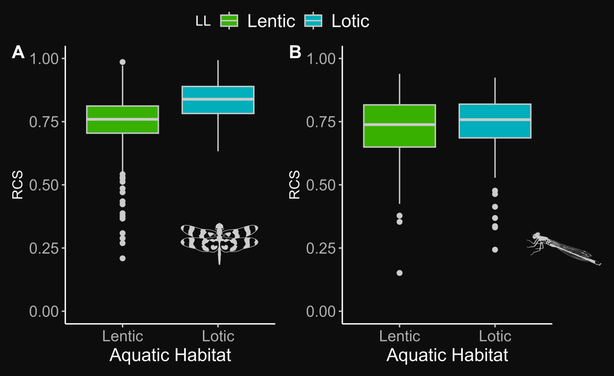

Figure 1 | Lotic dragonflies, but not damselflies, have higher intrinsic sensitivities to climate than lentic species . RCS values for lentic (green) and lotic (blue) (A) dragonflies and (B) damselflies. Boxplots indicate the median, 25th, and 75th percentiles and lines extend to the smallest or largest value up to 1.5 times the interquartile range. Individual black points represent outliers.

2

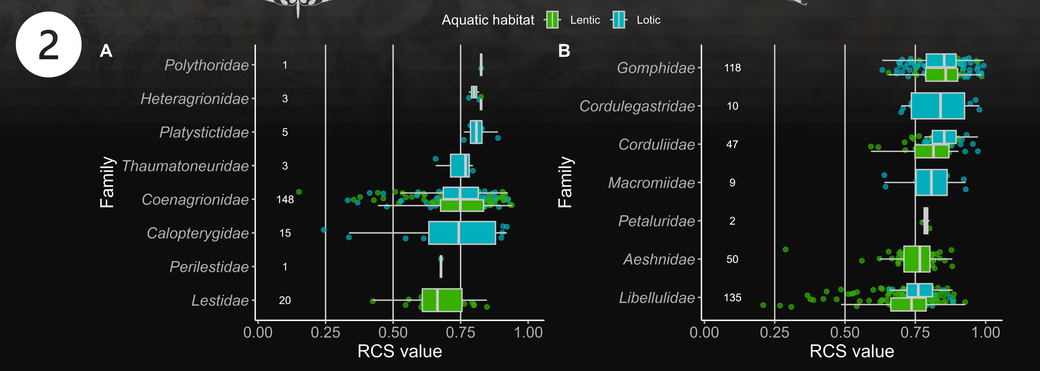

Figure 2 | Intrinsic sensitivities reflected in RCS values did not significantly differ amongst damselfly families (A). The dragonfly families Gomphidae and Corduliidae exhibited significantly higher intrinsic sensitivities compared to Libellulidae (B). Boxplots indicate the median, 25th, and 75th percentiles and lines extend to the smallest or largest value up to 1.5 times the interquartile range. Blue color indicates lotic species and green color indicates lentic species. Small points represent RCS values for an individual species. The number to the left of the box represents the number of species included in each family.

3

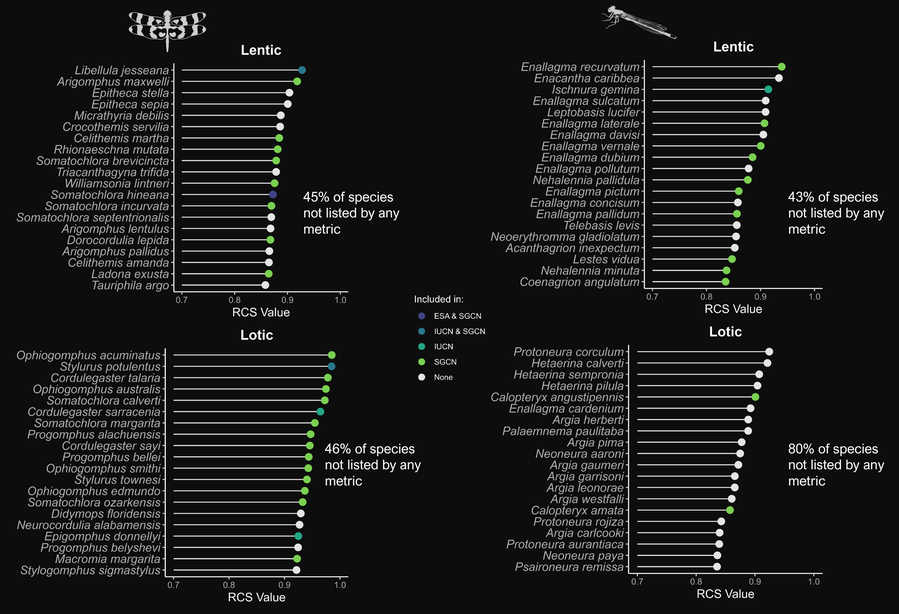

Figure 3| Top 20 most sensitive dragonflies (left) and damselflies (right) and associated conservation listing statuses. RCS values closer to 1 are more sensitive.

CONCLUSIONS

- Lotic dragonflies have higher intrinsic sensitivities to climate change
- Sensitivities generally varied more within families than across families
- Many sensitive species are currently not listed under any conservation framework

ACKNOWLEDGEMENTS

We want to thank Dr. Traci DuBose for her input and help troubleshooting code. We also want to thank Dr. Maya Rocha-Ortega for kindly providing access to records from the CONABIO database and John Abbott for records from OdonataCentral database.

CONTACT INFO

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For more details on this project: https://github.com/waboys/NAOdonateRCS

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