Occurrence of Odonates in the Upper Mississippi River Valley, 2013-2018

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INTRODUCTION

Odonata (dragonflies and damselflies) are one of the most fascinating insect groups on Earth, standing the test of time for over 300 million years. Annual surveys of Odonata were conducted by Daniel Jackson, a citizen scientist, in Navigation Pools 6-10 of the Upper Mississippi River Valley (UMRV), in cooperation with the United States Fish and Wildlife Service (USFWS) from April-November, 2013-2018.

Objectives

- 1) Determined the occurrence and relative abundance of Odonata species in the study area.
- 2) Developed a functional and geo-referenced database for collecting data on Odonata in the UMRV.

METHODS

Study Area

Data on Odonata were collected from Pools 6-10 in the Upper Mississippi River Valley, 2013-2018.

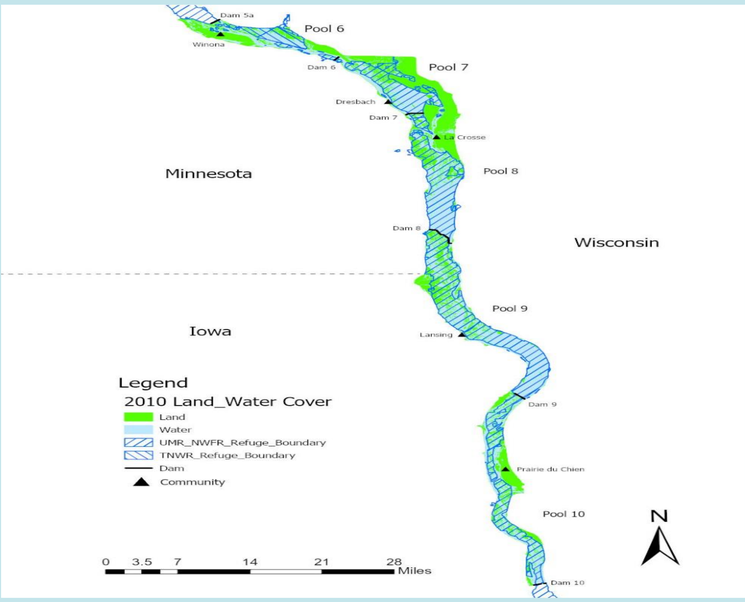

Figure 1. Pools 6 - 10 of the Upper Mississippi River Valley. Image credit – Jar Xiong.

Data Collection

- Citizen Scientist logged 436 hours, identifying and recording data on individual Odonata observed.
- Surveys consisted of point inventories, with locations based on convenience or opportunistic sampling by foot, vehicle, and boat throughout the Pools.
- Observations were recorded only if a free-ranging or netted individual were positively identified.

Data Analysis

- Excel spreadsheets and Excel pivot tables helped evaluate trends.
- Dependent variables included species occurrence, relative abundance, and sampling effort.
- Independent variables Include: year, month, Pool, and County.

RESULTS

Inventory

- 31,159 observations were recorded, 2013-2018.
- 64 species were identified (occurred) in the study area.

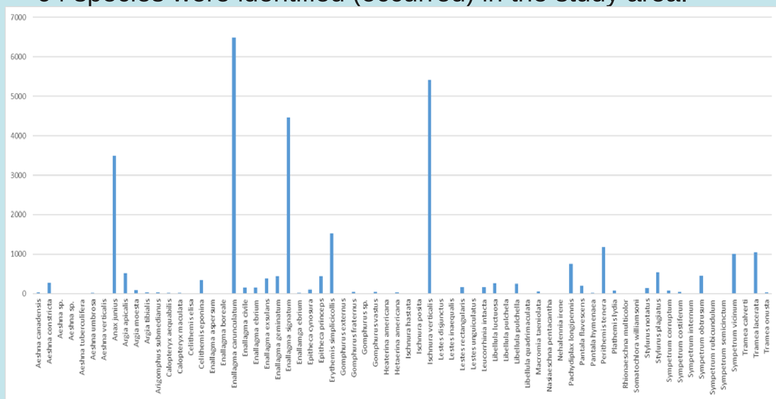

Figure 2. Species and abundance of Odonates observed in the UMRV, 2013-2018. Observations recorded by Daniel Jackson.

- The three most frequently observed species (relative abundance) included:
  tule bluet (*Enallagma carunculatum*) (21%, n=6,487),
  eastern forktail (*Ischnure verticalis*) (17%, n=5,408),
  orange Bluet (*Enallagma signatum*) (14%, n=4455).

Figure 3. Tule Bluet. Image credit – Daniel Jackson.

Scarcity

- Over 65% of Odonata species were observed with few sightings. The following species were observed only once during the 6-year study:
  black-tipped darner (*Aeshna tuberculifera*),
  azure bluet (*Enallagma aspersum*),
  citrine forktail (*Ischnura hastata*),
  fragile forktail (*Ischnura posita*),
  northern spreadwing (*Lestes disjunctus*),
  williamson's emerald (*Somatochlora williamsoni*),
  cherry-faced meadowhawk (*Sympetrum internum*).

DISCUSSION

Inventory

- The most abundant species were observed in each Pool and County and were recorded throughout the summer.
- Variation in occurrence and abundance may have been affected by weather, flooding, land use, and survey effort.

Effort

- Survey sites were established by Daniel Jackson for convenience, maximizing observations rather than a randomized or stratified sampling scheme.
- Convenience sampling may have influenced our estimates of occurrence and relative abundance.

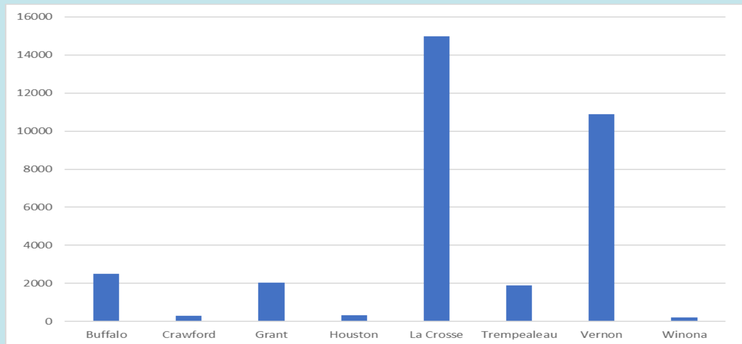

Figure 4. The relative abundance of Odoanta by County in the UMRV, 2013-2018. Data provided by Daniel Jackson.

ACKNOWLEDGEMENTS

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