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# INVERTEBRATES

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## SPECIES DIVERSITY OF DRAGONFLIES AND DAMSELFLIES (ODONATA) AT A MANITOBA POND

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*Figure 1. A view of the study site, a pond 2 km northwest of Pinawa, MB.*

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Periodically the scientific community requests the help of volunteers to study dragonflies and damselflies (order Odonata). This survey was completed between June and September 2008 to assist with a study on the temporal design of site-based odonate surveys being carried out by the Nature Conservancy office in Albany, New York.<sup>2</sup> The purpose of that study was to determine how often surveys should be conducted and how long they should last to obtain the most

accurate data for the minimum amount of time and effort.<sup>1</sup> From my perspective, the survey of the Manitoba pond described here resulted in a list of Odonata species, their flight phenology, and their relative abundance.

### **Study Area**

Volunteers were asked to select a man-made or naturally occurring wetland, lake, or pond (lentic water bodies only) close to their home or work. For this study, I chose

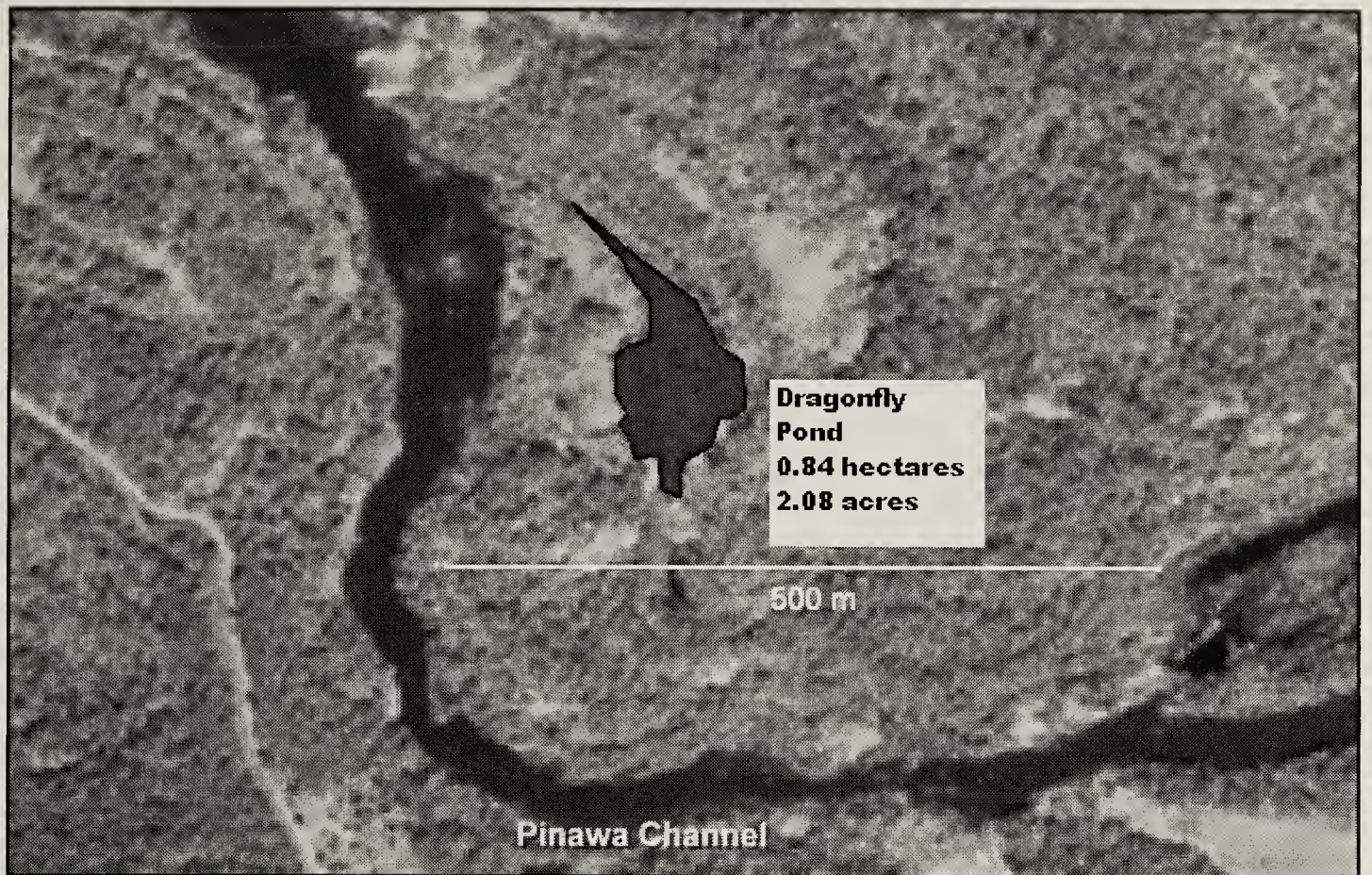


Figure 2. Map of the study site, a pond 2 km northwest of the town of Pinawa, MB.

a pond adjacent to the Pinawa Channel, about 2 km northwest of the town of Pinawa, Manitoba ( $50^{\circ} 09.557' N$ ,  $95^{\circ} 54.147' W$ ). This 0.84 hectare pond, which has no official name, is a picturesque spot with exposed Precambrian Shield granite on one shore and marsh on the other, and there is no road access (Figs. 1 and 2). The pond is only accessible at the south-east shore where the substrate is exposed granite rock. The vegetation is typical of the Boreal Shield Ecozone: Balsam Fir (*Abies balsamea*), White Spruce (*Picea glauca*), poplars (*Populus* spp.), and birches (*Betula* spp.). The marshy areas have cattails and bulrushes or ostrich ferns. The pond is home to a large population of small fishes, Painted Turtles, and Leopard Frogs, which likely consume many odonates. Beavers have been observed in the pond and may be responsible for its existence.

### Methods

I used the following methods for this survey, as directed by the study coordinator. A single observer (the same

each time) visited the pond once a week for 20 or more surveys spaced  $7 \pm 2$  days apart. Surveys were only conducted on sunny days with less than 50% cloud cover, when maximum temperatures were expected to reach at least  $18.3^{\circ}C$  in May and September and  $21.1^{\circ}C$  in June to August. The observer walked around the pond for 1 hour and recorded dragonfly species sightings in 10-minute increments (0-10, 10-20, 20-30, 30-40, 40-50, 50-60). The observer noted whether the dragonflies were male or female and whether indicators of breeding were observed, such as the presence of immatures, guarding behaviour, copulation, or oviposition. The abundance of each species was estimated on a scale of 1 to 4, where 1 = Few (1-5 individuals), 2 = Frequent (6-20), 3 = Common (21-100), and 4 = Abundant (>100). Every week the same route was surveyed in an identical manner at the same time of day. My route took me from the edge of the marshy areas, along the rocky shore, and also high above the pond on rocky outcrops where odonates were sunning

themselves and hunting. Basic weather observations were also recorded.

Where there was uncertainty of identification, I recorded this on data sheets. Time-outs were used during 1-hour survey blocks to allow for catch-identify-release of dragonflies. Difficult groups for identification were treated as a species complex. The species list in Table 1 shows three species complexes at my study site: *Aeshna canadensis-umbrosa-interrupta-eremita*, *Lestes disjunctus-forcipatus*, and four species of *Enallagma* (it was quite easy to distinguish *E. carunculatum* because of its size). Although a specimen from a species complex could be identified in hand, the purpose of this study was distance observation, which precluded the capture of every individual.

One or two mature specimens of all species were collected, treated with acetone where necessary, dried, and placed in clear envelopes with index card labels. They have been deposited in the J.B. Wallis insect collection at the University of Manitoba.

## Results

Thirty-six species of Odonata (23 dragonflies [Anisoptera] and 13 damselflies [Zygoptera]) were found in the vicinity of the study pond in 2008 (Table 1). Another four species have been found on other occasions: a Springtime Darner (*Basiaeschna janata*) on 13 June 2007, and a Lancet Clubtail (*Gomphus exilis*), a Pronghorn Clubtail (*G. graslinellus*), and a Williamson's Emerald (*Somatochlora williamsoni*) all collected on 2 August 2009. The total number of recorded species for the province of Manitoba is approximately 97.<sup>3</sup>

Because it was a cool spring, the first acceptable observation day was 5 June.

Already the Boreal and Northern Bluets (*Enallagma boreale* and *E. cyathigerum*) were quite common floating among the cattails and forming mating wheels. There were several types of Whiteface dragonflies (*Leucorrhinia proxima* and *L. hudsonica*) and the ubiquitous Four-spotted Skimmer (*Libellula quadrimaculata*). Two types of emeralds were present: the Beaverpond Baskettail (*Epitheca canis*) and the American Emerald (*Cordulia shurtleffi*). Common Green Darners (*Anax junius*) could be seen patrolling the stream at high speed; they were also showing mating behaviour.

On 10 June, a Horned Clubtail (*Argomphus cornutus*), a species of Pond Clubtail, was observed emerging at the edge of the pond (Fig. 3) (see inside front cover, bottom). A third species of whiteface was recorded, the Dot-tailed Whiteface (*Leucorrhinia intacta*). The Taiga Bluet (*Coenagrion resolutum*) was present only in the last two surveys in June, and only a single male was found each time. The Sedge Sprite (*Nehalennia irene*) appeared for the first time on 16 June but was found in considerable numbers during the next five surveys.

1 July was a hot (28°C), humid day, and the Four-spotted Skimmers were abundant. Chalk-fronted Corporals (*Ladona julia*) were also present. American Bluets (*Enallagma* sp.) were common; by this time in the summer, the spring species had been replaced by the summer species, Marsh and Hagen's Bluets (*E. ebrium* and *E. hageni*.)

On 14 July, several species appeared that are considered river species, which were likely just hunting in the pond area. They were the Midland Clubtail (*Gomphus fraternus*), which is common on the Winnipeg River at Pinawa, and the River Jewelwing (*Calopteryx aequabilis*),

a beautiful broad-winged damselfly common on the nearby Pinawa Channel. These will not be counted in the Temporal Design study because that study was considering only lentic bodies of water, but they are included here. Also on 14 July, the first spreadwing was seen. It was still immature, but more spreadwings were seen on 20 July; by 1 August, they were common. Both Northern and Sweetflag Spreadwings (*Lestes disjunctus* and *L. forcipatus*) were found but are counted together in Table 1. These damselflies emerge later in the summer because they overwinter as eggs and therefore must complete the larval stage in the spring.

The survey completed on 20 July showed the widest diversity, with a total of 13 species, and the greatest abundance. All bluets captured were Hagen's Bluet. A forktail damselfly was found for the first time, the Eastern Forktail (*Ischnura verticalis*). The Four-spotted Skimmers had become less common and this was their last (recorded) day of the summer. Not only were Chalk-fronted Corporals found but also a few Common Whitetails (*Plathemis lydia*) and one Twelve-spotted Skimmer (*Libellula pulchella*). The first blue darner of the season was observed but not captured or identified to species. Also the first meadowhawk of the season was observed. By 1 August, little red meadowhawks were common and found to be all White-faced Meadowhawks (*Sympetrum obtrusum*).

1 August was the first record for the Tule Bluet (*Enallagma carunculatum*). These were never very common at the pond and tended to be found in the rocky areas away from the water. On this warm August day, the big blue darners (*Aeshna* spp.) were cruising fast along the edges of the pond, while the smaller red or yellow meadowhawks patrolled the shore. The weeds were full of spreadwings and

Sedge Sprites (*Nehalennia irene*) and the bluets were flying low over the weedy areas of the water looking for places to mate and lay their eggs.

On 9 August, another interesting spreadwing appeared, the Slender Spreadwing (*Lestes rectangularis*). This long delicate insect was found on three days of the survey. On the same day, a Swift River Cruiser (*Macromia illinoensis*) was found at the pond. As its name suggests, this is not truly a pond species so it was probably just visiting the area and not breeding in the pond. 9 August was the last sighting of a whiteface (*Leucorrhinia* sp.) for the summer.

On 20 August, another clubtail species was recorded, the giant Dragonhunter (*Hagenius brevistylus*), one of which was eating a Black-tipped Darner (*Aeshna tuberculifera*; the darner was not recorded on my species list because it was not found alive). Another species of darner also appeared in small numbers late in the summer, the Zig-zag Darner (*A. sitchensis*). White-faced Meadowhawks flew right up until 12 September, but three other meadowhawks also appeared late in the summer. The Autumn Meadowhawk or Yellow-legged Meadowhawk (*Sympetrum vicinum*) first found on 15 August, was quite common by 9 September, and was still mating and laying eggs on 27 September. I had expected to find more Black Meadowhawks (*S. danae*) late in the season but found only a single individual, on 15 September. The Saffron-winged Meadowhawk (*S. costiferum*) was found on four dates in August and September, including the last on 27 September.

Another late-season species was the Spotted Spreadwing (*Lestes congener*). These were not seen until 31 August, by which time they were already quite common, showing mating behaviour and





ovipositing. They were found right up to the end of the season.

In spite of my best efforts, I was only able to complete 17 surveys, and they were sometimes closer together than 5 days and sometimes farther apart than 9 days.

### Conclusions

These data present a simple picture of the sequence of odonate species that lived around one little pond in the course of one summer. I hope that this list will help naturalists to realize that the time of year can make a big difference for successful searching. The most species found on a single day was only 13; it took a whole summer's effort to come up with

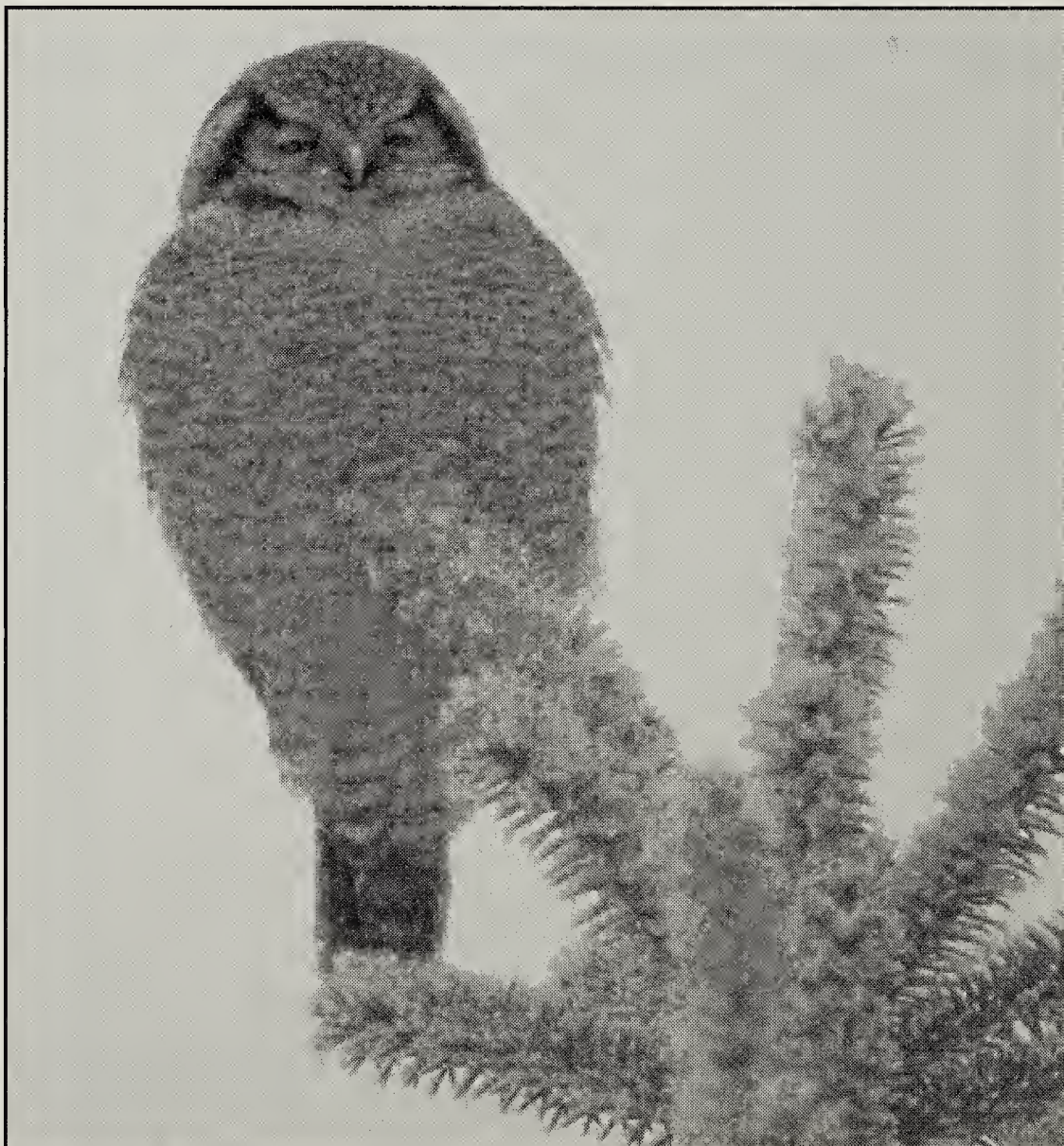
36 species. You do not need to travel far; the pond or lake in your area will certainly yield a great diversity if you take the time to visit it over the course of a summer.

### Acknowledgements

I thank Mary Van Buskirk for her help with editing this manuscript; David Hughes for the use of his dragonfly photographs; and of course, my husband Colin for being so willing to accompany me in the field.

1. BRIED, J.T., P. HUNT and W.B. WORTHEN. 2007. How often and how long? Studying temporal survey design for adult odonates. *Argia* 18:8–11.

2. BRIED, J.T., P. HUNT, W.B. WORTHEN, J. MARTIN and R.G. BUTLER. 2007. An invitation to join unique and important research: please RSVP ASAP. *Argia* 18:34–35.



Hawk Owl.

Nick Saunders