Species Inventory of the Order Odonata (Dragonflies and Damselflies) for the Shield Inventory Project

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Prepared for:

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January 2001

2. Executive Summary

During the summer months of 2000 odonate surveys were carried out for the Marguerite Crag and Tail, Maybelle River, and Richardson River Dunes Wildland Provincial Parks, located near the southeast corner of Wood Buffalo National Park. An intensive survey (looking primarily for odonates) occurred from June 11th until June 21st, 2000, while a passive survey (primarily looking for lepidopterians with incidental collections of odonates) occurred from August 20th to August 24th, 2000. The surveys resulted in detecting the presence of 19 dragonfly species (12 in the spring, 7 in the late summer). Five significant records were established (those for *Libellula julia*, *Aeshna subartica, Aeshna canadensis, Calopteryx aequabilis,* and *Leucorrhinia glacialis*) dramatically extending those ranges and significantly contributing to the lack of current data on these species in Alberta. Recommendations include the need for odonate surveys later in the summer, and for protection of the fragile aquatic ecosystems containing these odonates from fishing exploitation.

3. Introduction

The objective of the odonate aspect of the resource inventory project was to collect presence/absence data on the dragonfly fauna of the selected study sites. Due to this area's remote nature and the relative lack of odonate surveys in Alberta, this inventory also included the objective of gathering baseline data.

4. Project and Study Sites

Three systems-wide inventory areas were chosen: Maybelle River Wildland Provincial Park, Marguerite Crag & Tail, and Richardson River Dunes Wildland Provincial Park. Within these three above-mentioned areas, specific sites were chosen based on habitat suitability ascertained from aerial photographs and ecological land classification maps. Routinely, sites were selected that were adjacent to water.

Selected sites and general areas chosen for surveys are included below in Table 1.

Table 1 – Specific site selection during Shield Inventory Project

Date	Easting	Northing	Datum	Inventory Area
11 June	0497592	6415724	83	Camp
12 June	0514569	6392796	83	Marguerite
12 June	0517822	6394824	83	Marguerite
13 June	0496695	6426517	83	Maybelle / Richardson
13 June	0503366	6437074	83	Maybelle / Richardson
13 June	0496692	6426516	83	Maybelle /Richardson
14 June	0535276	6395329	83	Marguerite
14 June	0535253	6394577	83	Marguerite
15 June	0539686	6396759	83	Marguerite
15 June	0539287	6395759	83	Marguerite
15 June	0538881	6396464	83	Marguerite
15 June	0539287	6395754	83	Marguerite
16 June	0513497	6461768	83	Maybelle
16 June	0513345	6461886	83	Maybelle
17 June	0509630	6447142	83	Maybelle
18 June	0505324	6446436	83	Maybelle
18 June	0506724	6447901	83	Maybelle
18 June	0507078	6446614	83	Maybelle
19 June	0497275	6426725	83	Maybelle
21 June	0507239	6459063	83	Maybelle
21 June	0507482	6459037	83	Maybelle

5. Methods

A faunal survey, specifically focused on presence/absence of odonates, was carried out between June 11thand June 21st, 2000, in northern Alberta in an area southeast of

Wood Buffalo National Park. Taking into account accessibility and odonate suitability, specific areas (approximately 5 km hikes) were chosen using ecological land classification maps, base maps, and visual inspection from the air.

Dragonflies were collected using an aerial insect net while haphazardly walking through dragonfly habitat. Odonates were collected and identified during the warmer hours of the day, approximately between 10:00 AM and 6:00 PM. Exuviae (the shed skin of larval odonates when they pass from aquatic to terrestrial form) were collected by the two primary researchers and by the other researchers. Aquatic habitats were surveyed minimally as they typically do not provide the most information (larvae are difficult to identify); aerial nets were used underwater with limited results.

Voucher specimens were collected for all species encountered. Individuals other than the principal investigators, Jonathan Hornung and Christine Rice, contributed some specimens and identifications included in this report, primarily Doug Macaulay and Greg Pohl.

6. Results

The current information on dragonflies in Alberta has recently been well documented in a status report specifically on the odonates of Alberta (Rice, 2000). This report clearly outlines the need to establish multi-year monitoring programs in addition to increasing the geographical scope of dragonfly monitoring programs. This inventory project represents a program that is addressing those very requirements.

With the limited number of species encountered during this survey, largely due to the time of year, it is possible to evaluate each species separately. Locations for voucher specimens have been recorded with the specimen and reported via Alberta Natural Heritage Information Centre Vertebrate & Invertebrate Report Forms. Observed dragonfly species locations, in addition to non-dragonfly incidental species encounters, have also been recorded and appear with UTM locations in Appendix 1.

Calopteryx aequabilis - River Jewelwing (uncommon, found along small forested streams, eastern)

Found: Maybelle River Wildland Provincial Park

Significance: This species account represents a significant find in that sightings of this damselfly are rare in Alberta and therefore not much is known about this species' distribution. Given that this species prefers slow, forested streams, and has been found consistently around Fort MacMurrary, it is quite likely that it is also found in the other two wildland areas being surveyed.

Enallagma boreale - Boreal Bluet (widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Enallagma cyathigerum - Northern Bluet (widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Nehalennia irene – Sedge sprite

Found: Maybelle River Wildland Provincial Park

Ophiogomphus colubrinus - Boreal Snaketail (Cordillera – specifically, foothills zone – and boreal)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Aeshna subartica – Subarctic Darner (likely Boreal, not found since 1983; central & Cordillera)

Found: Maybelle River Wildland Provincial Park

Significance: This record represents a significant contribution to odonatology in Alberta. This species has not been recorded in over 15 years, this identification places it approximately 700 km away from the closest record and adds to the meagre number of sightings this species has in the province (Rice 2000). This species prefers cooler climates and boggy habitats, and is assumed to be distributed over northern Alberta where this habitat is plentiful. Unfortunately, a lack of sampling effort does not allow us to delineate range maps for this region, or confidentially across the province.

Aeshna eremita – Lake Darner (common, widespread)

Found: Marguerite Crag and Tail Wildland Provincial Park

Aeshna canadensis - Canada Darner (central & southern)

Found: Maybelle River Wildland Provincial Park

Significance: This record expectedly expands the range of this species, the lack of distribution information is presumed to hinge on the lack of sampling effort in Alberta.

Cordulia shurtleffi - American Emerald (absent from the grasslands; widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Epitheca spinigera - Spiny Baskettail (absent from the grasslands; central)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Leucorrhinia borealis - Boreal Whiteface (absent from the grasslands; widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Leucorrhinia glacialis - Crimson-ringed Whiteface (likely widespread though not common; central)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Significance: Very few records exist for this species in Alberta, yet it is assumed widespread. This survey helps to delineate this species' distribution and abundance.

Leucorrhinia hudsonica - Hudsonian Whiteface (absent from the grasslands; widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Libellula julia - Chalk-fronted Corporal (few records, absent from the prairies; widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Significance: This is an important find. *L. julia* has a short flight season (approximately 6 weeks), beginning mid-June in Alberta, making it easy to miss with mid to late summer surveys. The 'early in the field season for dragonflies' nature of this survey has allowed us to record an odonatological event that has most likely been missed in the past, reflected by the absence of records for this species (less than 5).

L. julia favours the still waters of bogy ponds and large swampy areas that are characteristic of this area. It is these areas that require protection for this infrequently encountered dragonfly, and these areas that are threatened by oil & gas activity in the northern boreal forest and northern Albertan shield.

Libellula quadrimaculata - Four-spotted Skimmer (widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Sympetrum danae - Black Meadowhawk (widespread)

Found: Maybelle River Wildland Provincial Park and Marguerite Crag and Tail Wildland Provincial Park

Sympetrum costiferum - Saffron-winged Meadowhawk

Found: Maybelle River Wildland Provincial Park

Sympetrum obtrusum - White-faced Meadowhawk

Found: Maybelle River Wildland Provincial Park

7. Discussion

Overall Evaluation of the Site

Such a remote location for surveying dragonflies provides excellent data on species distributions and abundances, especially for a new science such as odonatology. Five significant records were established (those for *Libellula julia, Aeshna subartica, Aeshna canadensis, Calopteryx aequabilis,* and *Leucorrhinia glacialis*) dramatically extending those ranges in Alberta.

The large numbers of *Libellula julia* stand out as a significant record. *L. julia* is not an often recorded species (Rice 2000), and the abundance of this insect was left to speculation, until this survey. This species was encountered in large numbers throughout the study area. Another significant record is that of *Aeshna subarctica*. Again, this species was assumed to be in the area and abundant, this survey has shown this.

The presence of water is a requirement for odonate proliferation and essential to their life cycle (Corbet 2000). While much of the inventoried area is on sandy soils resulting in continuous Jack Pine stands or dunes, a large portion of these areas are bogs, small lakes, and flowing water. It is these areas that show the highest dragonfly density and are most important for their protection. During this inventory, the Maybelle River Wildland Provincial Park showed the highest abundances and richness of dragonfly species.

It was anticipated that with the radically changing habitat (dunes, bogs, lakes, rivers, rock outcroppings, and uniform coniferous forest stands all closely spatially associated) we would find unexpected species for this province and for the ecosystem type. Although these habitats were investigated, no new species to the province were found, and none were found that are reported to rely on dunes.

Project Critique and Limitations

Unfortunately, only the spring session for surveying (June 11 – 21, 2000) could be attended (with passive sampling in the second round in July), and therein lies this assessment's downfall. It is difficult to make recommendations and assessments about an organism that is short lived during the summer months when the survey visit is for a short time only and not during the peak season. This said, if it was not for the early visit, it is doubtful that *Libellula julia* would have been encountered. It has been shown in the case of *Sympetrum corruptum* (results in Hornung and Rice 1999) that a lack of dragonfly survey effort in the early moths of summer can result in an incorrect assessment of a species' status.

8. Recommendations

Dragonfly surveys should continue under this project, as the benefits are numerous (long term, remote surveyed area, new species distributions). The most important recommendation is that these surveys be undertaken between the dates of July 1st and October 1st, as to maximize results and efficiency. It has been mentioned above that the

timing of this survey provide unique, valuable results, although it is in my opinion that a later date would provide more accurate, fruitful data.

The protection of the dune ecosystems dominates the landscape in this area, yet it is not this habitat that is important for the odonates; as mentioned above, water is a requirement for odonate life history. With the high amount of fisherman traffic in the area and the fragile state of these small lakes, it is the aquatic environments that need protecting (Walters and Kitchell 2001). Many of the small lakes in the area support piscivorus fish populations, some undoubtedly stocked with Pike or Walleye. To protect the aquatic environments in this area the stocking and fishing of piscivorus sportfish (Pike, Walleye) should end. The presence of these fish (or the removal of these fish) represents a means to alter dragonfly habitats via trophic effects (Strong 1992, McPeek 1990) and a means to ecologically disruptive ends.

Recent studies have shown that only a small amount of fishing pressure is needed to significantly alter trophic dynamics in Alberta lakes (pers. comm. M. Sullivan 2000), potentially disrupting odonate populations. If an area is slated for protection, quad traffic should not be allowed to access the lakes, and fishing banned. Aquatic dragonfly populations depend on the intricate balance provided by the presence or absence of these fish (Johnson and Crowley 1980).

9. Conclusion

Eighteen species of dragonfly (between the intensive spring survey and the passive late summer survey) were identified during the 2000 shield inventory project. The identification of five of these species has resulted in valuable information for odonatology in Alberta. None of the above mentioned species are identified as “at risk” or “sensitive”, as defined by a recent status report on the dragonflies of Alberta (Rice 2000).

This survey would have benefited by concentrating its efforts in the warmer, mid to late summer months with more specimens of dragonflies and in addition to other invertebrates (*pers. comm*. Chris Schimdt, Greg Pohl, Doug Macaulay, 2000).

Fishing pressure or fish stocking in small isolated lakes has been shown to drastically alter the aquatic ecosystems via trophic interactions (McPeek 1990, Strong 1992, Walters and Kitchell 2001). It is this threat to dragonfly habitat that is most important in this area, and should be investigated to preserve those aquatic habitats residing within the protected parks.

10. Literature Cited

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Appendix 1. Odonate specimens collected in three wildland parks in northeastern Alberta during June and August of 2000.

Appendix 1. Odonate specimens collected in three wildland parks in northeastern Alberta during 2000.

SNAME	COMMON NAME	COLLECTOR	COLLECTION DATE	ID_BY	ID_OK	SITE DESCRIPTION	Latitude	Longitude	ZONE (datum)	UTM easting	UTM northing	Confidence	Location of Specimen
Aeshna canadensis	Canada Darner	D. Macaulay	20-Aug-00	J. Hornung	Yes	Athabasca Sand Dunes P.P.	58' 9.88	110' 50.61				100%	personal collection
Aeshna eremita	Lake Darner	D. Macaulay	24-Aug-00	J. Hornung	Yes	Marguerite	57' 41.40	110' 23.79				100%	personal collection
Aeshna subartica	Subartic Darner	D. Macaulay	20-Aug-00	J. Hornung	Yes	Athabasca Sand Dunes P.P.	58' 9.88	110' 50.61				100%	personal collection
Calopteryx aequabilis	River Jewelwing	J. Hornung	21-Jun-00	J. Hornung	Yes	Maybelle			83	507482	6459037	100%	personal collection
Cordulia shurtleffi	American Emerald	J. Hornung	13-Jun-00	J. Hornung	Yes	Maybelle			83	496695	6426517	100%	personal collection
Cordulia shurtleffi	American Emerald	J. Hornung	12-Jun-00	J. Hornung	Yes	Marguerite			83	514569	6392796	100%	personal collection
Enallagma boreale	Boreal Bluet	J. Hornung	13-Jun-00	J. Hornung	Yes	Maybelle			83	496695	6426517	100%	personal collection
Enallagma boreale	Boreal Bluet	J. Hornung	12-Jun-00	J. Hornung	Yes	Marguerite			83	514569	6392796	100%	personal collection
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Lestes disjunctus	Common Spreadwing	D. Macaulay	20-Aug-00	J. Hornung	Yes	Athabasca Sand Dunes P.P.	58' 9.88	110' 50.61				100%	personal collection
Lestes disjunctus	Common Spreadwing	D. Macaulay	24-Aug-00	J. Hornung	Yes	Marguerite	57' 41.40	110' 23.79				100%	personal collection
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Libellula julia	Chalk-fronted Corporal	J. Hornung	11-Jun-00	J. Hornung	Yes	Sheild Inventory Camp			83	497592	6415724	100%	personal collection
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