

A damselfly is perched on a green leaf in the lower-left corner of the page. The damselfly has a dark body and transparent wings with visible veins. The background is a soft-focus image of green leaves and branches, creating a naturalistic setting.

Survey of the Odonate Fauna in Birch Mountains Wildland Park

**Prepared for the Alberta Natural Heritage Information Centre
Parks and Protected Areas Division
Alberta Community Development**

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Figure 1. The author and Gerald Hilchie walking through a bog northwest of Gardiner Lake near site 6. (Photo by Stacy Macaulay)



Figure 2. Stacy Macaulay crossing a beaver dam at a beaver pond located between Gardiner and Big Island Lakes near site 3. (Photo by Doug Macaulay)

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INTRODUCTION

In Alberta, the Subarctic Subregion is restricted to the tops of the Birch Mountains, the Caribou Mountains, and the Cameron Hills in the northern part of the province (Beckingham and Archibald 1996; Strong and Leggat 1992). These hill systems are erosional remnants that rise above the surrounding plain as flat-topped hills with escarpments that are dissected by numerous small streams (Alberta Community Development 2002).

An odonate survey was conducted in the summer of 2000 (Hornung 2001) in the Maybelle River, Marguerite River and Richardson River Dunes Wildland Parks. The latter two parks are located in the Central Mixedwood Subregion. Maybelle River WP is located in the Athabasca Plain Subregion. In the summers of 2001 and 2002, three wildland parks located in the Kazan Upland Subregion were surveyed. These were La Butte Creek and Fidler-Greywillow in 2001 and Colin-Cornwall Lakes in 2002 (Macaulay 2002, Macaulay 2003). Most recently, two wildland parks within the Subarctic Subregion were surveyed; the Caribou Mountains in 2003 and Birch Mountains in 2004. These surveys were the first for all of these parks.

The field camp in Birch Mountains WP was located on the north end of Gardiner Lake, about 120 km northwest of Fort McMurray. The Subregion where this wildland park is located contains extensive bogs, numerous muskeg ponds, streams and lake habitats. The purpose of the survey was to provide an annotated summary of the odonate species that occur in the park, including notes on such parameters as relative abundance, distribution patterns, range extensions and any other relevant biological or behavioral information. The information obtained contributes towards an increased understanding of the odonate fauna found within this wildland park but also within the broader context of Alberta.



Figure 3. Gerald Hilchie at a beaver pond located between Gardiner and Big Island Lakes near site 3.

(photo by Stacy Macaulay)

METHODS

The odonate survey was conducted within Birch Mountains WP during two time periods from June 6-18, and July 6-19, 2004. For the June survey, Ted Johnson, Wayne Nordstrom, Robert Holmberg, Jim Hilchie and Gerald Hilchie were involved. Gerald Hilchie, Ted Johnson, Stacy Macaulay and the author conducted the July survey.

Odonates were collected in a variety of ways. Adult specimens were netted with butterfly nets, collected out of pan or malaise traps and larval exuviae were gathered by hand. Photographs were taken of some species. Many of the collection sites were located near lake / pond shorelines or adjacent to creeks. Habitats from which specimens were collected included: lake shorelines (LS), riparian meadows along streams (RM), beaver ponds (BP), (PF) pine forest, (SF) spruce forest, (SB) spruce bogs and muskeg ponds (MP) (Table 1).

Collected specimens were inserted into glassine envelopes and labeled with locality, collector, date and GPS coordinates. Then they were placed in acetone for approximately 2-3 hours to preserve their colors. Once they were removed from the acetone, specimens were dried and stored in a protective container.

The primary sources used for identification of species and any associated biological information were Walker (1925; 1953; 1958), Walker and Corbet (1975), Needham *et al.* (2000), Dunkle (2000) and Acorn (2004). Common names are based on Cannings (2002).

Voucher specimens will be deposited at the University of Alberta's Strickland Museum in Edmonton.

Table 1: Habitats and locations of collection sites in Birch Mountains Wildland Park (see Appendix 1 and 2 that shows the mapped collection locations).

Site #	Habitat	Location	Coordinates
Birch Mountains Wildland Park:			°N°W
1	LS	Gardiner Lake, basecamp	57.58027°N 112.46851°W
2	LS and SP	Gardiner Lake, north along trail	57.58364°N 112.47174°W
3	BP	Gardiner Lake, north of basecamp @ beaverpond south side	57.58649°N 112.45847°W
4	BP	Gardiner Lake, north of basecamp @ beaverpond north side	57.58881°N 112.45891°W
5	SB	Gardiner Lake, northwest of camp along cutline	57.58621°N 112.48804°W
6	SF	Gardiner Lake, northwest of camp along cutline	57.58450°N 112.50633°W
7	SF	Gardiner Lake, northwest of camp along cutline	57.58241°N 112.53213°W
8	MP	Gardiner Lake, northwest of camp along cutline at pond	57.58616°N 112.52941°W
9	RM and PF	Gardiner Lake, pine forest by creek	57.53339°N 112.48985°W
10	SB	Gardiner Lake, north of basecamp in bog W of beaver pond	57.58688°N 112.46400°W
11	BP	Gardiner Lake, beaver pond near sand beach	57.53624°N 112.48546°W
12	SB	Gardiner Lake, southwest of camp	57.56441°N 112.51784°W
13	LS and SB	Gardiner Lake, Island south of basecamp	57.57370°N 112.48071°W
14	LS	Big Island Lake, north island	57.62300°N 112.55400°W
15	LS	Birch Lake	57.58200°N 112.75100°W
16	RM	Mikkwa River	57.51800°N 113.23500°W
17	RM	Sand River, lower	57.57854°N 112.44321°W
18	RM	Sand River, stop 1	57.58454°N 112.44437°W
19	RM	Sand River, north	57.59561°N 112.43956°W
20	RM	Sand River, upper	57.59495°N 112.42535°W
21	RM	Sand River at north end of Sand Lake	57.67100°N 112.28600°W
22	LS	Namur Lake, beach east of lodge	57.36330°N 112.74023°W
23	LS	Namur Lake, west bay	57.40486°N 112.75252°W
24	LS	Namur Lake, beach by lodge	57.37538°N 112.76556°W

RESULTS

A total of 135 odonate specimens belonging to five families and twenty species, were collected in Birch Mountains WP. Of the twenty species, five were from the Suborder Zygoptera (damselflies) and fifteen from the Suborder Anisoptera (dragonflies) (Appendix 3). A species list and collection summary appears in Appendix 3; full collection data appears in Appendix 4. Appendix 1 and 2 illustrates the collection sites in map form.

Table 2 indicates that La Butte Creek WP had the least number of specimens collected (54) while Caribou Mountains WP had the most (165). Birch Mountains had the second highest number of collected specimens (135). In addition, 20 different species were found in the Birch Mountains while only 19 and 17 were found in La Butte Creek and Colin-Cornwall Lakes WPs, respectively. Caribou Mountains WP had the highest number of recorded species (21). *Somatochlora kennedyi* was the only unique species that was found in the Birch Mountains when compared to the other three parks. Unique species, in this case, refers to those species that were found only in one of the four parks but not in the other three.

Table 2. Comparison of numbers of specimens collected and numbers of species found within Wildland Parks.

Wildland Park	# of Specimens	# of Species	# Unique Species
Birch Mountains	135	20	(<i>Somatochlora kennedyi</i>)
Caribou Mountains	165	21	(<i>Leucorrhinia patricia</i>)
Colin-Cornwall Lakes	107	17	(<i>Leucorrhinia intacta</i>)
La Butte Creek	54	19	(<i>Aeshna canadensis</i> , <i>Somatochlora</i> prb. <i>cingulata</i> , <i>Sympetrum danae</i> , <i>S.</i> <i>internum</i> , and <i>S. obtrusum</i>)

DISCUSSION

I. Factors affecting the Survey

Most odonate species are active all summer either as adults or naiads (Dunkle 2000). Therefore, a complete survey of adults, naiads and their exuviae would require regular collecting (approximately every month) throughout the entire season, from May to the end of September. As well, species are often localized in particular microhabitats, some of which were not accessible on this survey.

The number of species that were collected in Birch Mountains WP was less than that collected in the Caribou Mountains but exceeded that collected in both Colin-Cornwall Lakes and La Butte Creek WP (Table 2). This relatively high species count was achieved because of efforts made to locate a variety of potential wetland habitats and to survey them more extensively. These efforts proved valuable, particularly when surveying for *Somatochlora*. Six species within this genus were found in the Birch Mountains, two more than the next highest count of four that were found in the Caribou Mountains in 2003.



Figure 4. *Somatochlora hudsonica* collected by a beaver pond between Gardiner and Big Island Lakes.

(photo by Stacy Macaulay)

Birch Mountains WP could have as many as 33 species of odonates based on information gathered from personal experience, the previous four surveys in other wildland parks and range information from sources such as Dunkle (2000) and Acorn (2004). The following 14 species could exist in the Birch Mountains WP: *Aeshna canadensis*, *A. subarctica*, *A. sitchensis*, *Libellula julia*, *Leucorrhinia proxima*, *Leucorrhinia patricia*, *Ophiogomphus colubrinus*, *Sympetrum danae*, *S. internum*, *S. costiferum*, *S. obtrusum*, *Lestes disjunctus*, *Coenagrion interrogatum* and *Enallagma ebrium*. Many, such as the genera *Lestes*, *Ophiogomphus* and *Sympetrum*, hatch late and are not present until August. *Libellula julia* that flies in June lives in boggy ponds and was only observed in the Caribou Mountains. It is suspected that a population could be found at site 8, a bog pond located about 4 km northwest of Gardiner Lake (Table 1). *Aeshna sitchensis* is another late summer species and may be present in August. *Aeshna canadensis* and *A. subarctica* probably exist in habitats away from the big lakes where *A. eremita* and *A. interrupta* seem to dominate. *Leucorrhinia proxima* is generally a very common species, but for some reason was not collected; we may need to get away from the big lakes or try different dates. *L. patricia* is quite rare and only one specimen was collected during the surveys at Caribou Mountains. It likely exists in the Birch Mountains wherever a mixture of floating moss and open water peatlands can be found. *Coenagrion interrogatum* is another species that prefers ponds with floating moss, a habitat that was not extensively surveyed last summer. Lastly, *Enallagma ebrium* remains to be discovered here, it was found in the Caribou Mountains and literature suggests that it prefers habitats without fish; here again we may need to explore wetlands located some distance from the big lakes.

For future surveys of odonata in this wildland park, the following methods may help to increase the number of recorded species for the area. First, habitats such as patterned fens and small isolated ponds should be explored in attempts to find possible new species. Secondly, more thorough sampling should be done in June to pick up some of the spring species. Thirdly, a survey in August should be done to target those late season species. Lastly, collection of naiads should be done, especially in July to try and find some of the late season species.



Figure 5. Upper Sand River near site 18.
(photo by Doug Macaulay)

II. Distribution patterns and taxa

The following is an annotated list of the species that were collected in Birch Mountains WP. For each species, notes are included for any significant range extensions, the collection location, relative abundance and any other relevant biological or behavioral information. The list is arranged according to the Suborders Zygoptera and Anisoptera.

Suborder Zygoptera (Damselflies) (range information is based on Walker (1953), Cannings (2002) and (Acorn 2004))

Family Calopterygidae

- *Calopteryx aequabilis* 'River Jewelwing' – An uncommon species and a rare find in Alberta. It was collected at Fort McMurray, Chinchaga River to the west of High Level, and at Maybelle River, La Butte Creek, Colin-Cornwall Lakes and Caribou Mountains Wildland Parks. Many were observed along the slow-moving Sand River that runs between Gardiner and Sand Lake. It may occur elsewhere in the park where suitable habitat occurs. The four specimens collected were found along the Sand River and represent one of the northern populations in Alberta and Canada. The specimens were collected at sites 17, 19 and 20 (Appendix 3).



Figure 6. *Calopteryx aequabilis* male at Gardiner Lake Wildland Park.

(photo by Drajs Vujnovic)

Family Coenagrionidae

- *Nehalennia irene* 'Sedge Sprite' - A common species found in localized populations. This species is only found in areas that have dense semi-aquatic grasses or sedges alongside lakes or streams. In Alberta, they tend to exist in localized colonies and are quite inconspicuous making them difficult to find. In Birch Mountains WP, both specimens were collected north of Gardiner Lake in a spruce bog that contained small ponds (Figure 7). The specimens were collected at sites 5 and 10 (Appendix 3).



Figure 7. Boggy pool in muskeg north of Gardiner Lake near site 10.

(photo by Stacy Macaulay)

- *Coenagrion resolutum* ‘Taiga Bluet’ - An abundant species found throughout the boreal forest in still marshy waters. This species exists in prairie and boreal forest lakes across Canada. Specimens collected in the Birch Mountains were found along the shorelines of Namur, Gardiner and Big Island Lakes at sites 2, 11 and 23 (Appendix 3).
- *Enallagma boreale* ‘Boreal Bluet’ - An abundant species found in many of the wetlands throughout the boreal forest. This species is found across Canada including records from Colin-Cornwall Lakes, Caribou Mountains, La Butte Creek, Maybelle River and Marguerite River WPs. Specimens collected in Birch Mountains were found either on islands, isolated ponds or along streams (sites 4, 6, 8, 9, 13, 14 and 18). Another species, *Enallagma cyathigerum*, was often found near lakeshores. Others have observed these habitat preferences of the two species and suspect it is due to interspecific competition (Acorn 2004, Cannings and Stuart 1977). *E. boreale* tends to occur wherever *E. cyathigerum* is absent.
- *Enallagma cyathigerum* ‘Northern Bluet’ - An abundant species found throughout the boreal forest in the cool marshy waters, peatlands and lakeshores. This species is found across Canada including records from the Athabasca delta, and Maybelle River, Caribou Mountains, Colin-Cornwall Lakes and Marguerite River WPs of Alberta north to the Great Slave Lake region of the Northwest Territories. The thirteen specimens collected around Gardiner and Big Island Lakes represent one of the most northern populations known in Alberta. The specimens were collected at sites 1, 4, 10 and 11 (Appendix 3).



Figure 8. *Enallagma cyathigerum* perched on a blade of grass by Gardiner Lake.

(photo by Drajs Vujnovic)

Suborder Anisoptera (Dragonflies)

Family Aeshnidae (range and biological information from Walker (1958), Dunkle (2000), Needham *et al.* (2000) and Cannings (1996 and 2002))

- *Aeshna eremita* ‘Lake Darner’ (Figure 9) - An abundant boreal species that prefers deep lakes with little vegetation. This species was previously collected in Colin-Cornwall Lakes, Marguerite River, La Butte Creek, Caribou Mountains and Fidler-Greywillow WPs as well as Fort Smith, NWT. The eleven specimens collected represent one of the most northern populations known in Alberta. The specimens were collected at site 4, 6, 8, 11 and 22 (Appendix 3).
- *Aeshna interrupta* ‘Variable Darner’ - A common species that is found in shallow marshy bays, boggy ponds and slow streams with emergent vegetation. The thirteen specimens collected represent one of the most northern populations known in Alberta. Other locations at which this species has been collected include La Butte Creek, Caribou Mountains and Colin-Cornwall Lakes WPs. The specimens were collected at sites 3, 4, 8, 9, 10, 12, 15, 16 and 22 (Appendix 3).



Figure 9. *Aeshna eremita* perched on a spruce branch by Gardiner Lake.

(photo by Drajs Vujnovic)

- *Aeshna juncea* 'Sedge Darner' - A common species that exists in peatlands that contain an extensive cover of sedges and other peatland vegetation. The six specimens from Gardiner and Namur Lakes represent some of the most northerly known populations in Alberta. This species has also been found at Colin-Cornwall Lakes, La Butte Creek, Caribou Mountains and Fidler-Greywillow WPs. The specimens from Birch Mountains were collected at sites 6, 22 and 24 (Appendix 3).

Family Corduliidae (range and biological information from Walker (1925), Walker and Corbet (1975), Cannings *et al.* (1991), Needham *et al.* (2000), Dunkle (2000) and Cannings (2002))

- *Cordulia shurtleffii* 'American Emerald' - An abundant species found in quiet boreal streams, ponds and lakes across Canada. The species is known from many areas in northern Alberta such as Fort Chipewyan, and Caribou Mountains, Colin-Cornwall Lakes, La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River WPs as well as Fort Smith, NWT. The five specimens from the Birch Mountains WP were collected at sites 8, 10 and 23 (Appendix 3).
- *Somatochlora hudsonica* 'Hudsonian Emerald' (Figure 10) - This common species exists in deep sedge-bordered lakes, ponds and peatlands. It is found west of Hudson Bay through Alberta and into British Columbia. The thirteen specimens collected in Birch Mountains represent one of the most northern populations in Alberta along with the Caribou Mountain and La Butte Creek WP specimens. The specimens in this survey were collected at sites 1, 2, 4, 8, 9, 15, 18 and 21 (Appendix 3).



Figure 10. *Somatochlora hudsonica* perched on a spruce branch by Gardiner Lake.

(photo by Drajs Vujnovic).

- *Somatochlora albicincta* ‘Ringed Emerald’ – This is an uncommon species that exists in bog ponds across the boreal forest of Canada. Banff, Jasper and Nordegg represent the only three other documented populations for the province. The Birch Mountains population is, therefore, **a substantial range extension and a significant find for the province**. All eleven specimens were taken beside a small bog lake that contained no significant emergent vegetation. The specimens were collected at site 8 (Appendix 3) and were not found elsewhere in the park in those habitats sampled.
- *Somatochlora forcipata* ‘Forcinate Emerald’ - This **rare species** is found in small, boggy spring fed streams and swamps in the boreal forest across Canada. The female specimen collected at Wentzel Lake in 2003 was a **substantial range extension**; the only other record is from Simpson’s Pass near the British Columbia border. In Birch Mountains WP, five specimens were collected in muskeg clearings near wetlands, the dragonflies often perching on a spruce branch. Collections were made at the following sites: 6, 7, 10 and 12 (Appendix 3).



Figure 11. Open area in a leatherleaf bog north of Gardiner Lake near site 12.

(photo by Doug Macaulay).

- *Somatochlora franklini* ‘Delicate Emerald’ - This **rare species** is a *Sphagnum* bog specialist that breeds in areas containing small spring fed pools. Previous Alberta records include Wentzel Lake in Caribou Mountains WP, Simpson, Healy Creek, Boom Creek, Red Deer, Nordegg, and Banff as well as Great Slave Lake and Fort Simpson, NWT. In Birch Mountains WP, this species was discovered on an island in Gardiner Lake. The specimen was collected as it was patrolling in a *Sphagnum* bog. This bog had some tiny pools of water interspersed among the mossy hummocks. The single specimen was collected at site 13 (Appendix 3).
- *Somatochlora kennedyi* ‘Kennedy’s Emerald’ – This **rare species** is a cool water specialist that breeds in bog ponds and streams of the boreal forest and is a **new species for the province**. It was documented to occur in Alberta prior to this discovery but after reviewing the literature it was noticed that the previous record was from Fort Smith, just north of the Alberta-Northwest Territories border (Walker and Corbet 1975). Other records to the north of Alberta in the NWT include Fort Resolution, Great Slave Lake, Norman Wells and Fort Simpson. The one specimen collected in Birch Mountains WP from site 4 (Appendix 3) was taken as it patrolled near a small sedge-bordered beaver pond that was located on the edge of a *Sphagnum* bog (Figure 3).
- *Somatochlora minor* ‘Ocellated Emerald’- This uncommon species exists in slow-moving, clear-water streams. Four specimens were collected in Birch Mountains WP – one at Gardiner Lake and the others along Mikkwa River. These records, along with the Caribou Mountains and Colin-Cornwall Lakes specimens, are the most northerly records for the province. These localities are substantial range extensions since the only other known populations were from Whitecourt and Nordegg. The specimens from Birch Mountains were collected at sites 1 and 16 (Appendix 3).

- *Tetragoneuria canis* ‘Beaver pond Baskettail’ – This common species is found around boggy or marshy ponds as well as by slow streams containing acidic infertile water. The species was collected in the Birch Mountains along the Sand River, beside Birch Lake and at a small beaver pond near Big Island Lake. The six specimens were found at the following sites: 4, 15, 18 and 19 (Appendix 3).
- *Tetragoneuria spinigera* ‘Spiny Baskettail’ – This common species is found near marshy lakes, ponds and slow streams. It ranges across Canada’s boreal forest. In the Birch Mountains, this species was collected near Gardiner and Namur Lakes at the following sites: 1, 10 and 24 (Appendix 3).



Figure 12. *Tetragoneuria spinigera* perched on a spruce branch at Gardiner Lake.

(photo by Drajs Vujnovic).

Family Libellulidae (range and biological information from Walker and Corbet (1975), Needham *et al.* (2000), Dunkle (2000) and Cannings (2002))

- *Leucorrhinia hudsonica* ‘Hudsonian Whiteface’ - A common boreal forest species that prefers the cool waters of boggy ponds. It was found in the Caribou Mountains, Colin-Cornwall Lakes, La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River WPs as well as at Fort Smith, NWT. Nine specimens in total were collected in Birch Mountains WP at sites 4, 5, 10 and 14 (Appendix 3).
- *Leucorrhinia borealis* ‘Red-waisted Whiteface’ – A common species that inhabits lakes, ponds and slow streams across the boreal forest. It has been found in the Caribou Mountains, Colin-Cornwall Lakes, La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River WPs. The one specimen collected in Birch Mountains WP was taken at site 14 along the shoreline of an island in Big Island Lake (Appendix 3).
- *Libellula quadrimaculata* ‘Four-spotted Skimmer’ – An abundant species that inhabits boggy and marshy waters across Canada. It has been found in the Caribou Mountains, Colin-Cornwall Lakes, La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River WPs as well as Fort Smith, NWT. Two specimens were collected beside a beaver pond that bordered a muskeg at sites 3 and 4 (Appendix 3).



Figure 13. *Libellula quadrimaculata* perched on a spruce branch by Gardiner Lake.

(photo by Drajs Vujnovic)

SUMMARY AND CONCLUSIONS

A total of 20 odonate species were found during the 2004 survey of the Birch Mountains WP. This represents 15 species from the Suborder Anisoptera and 5 from the Suborder Zygoptera. Most species in the area were common ones that have wide distributions across Canada. Several species, however, were rare or uncommon or are known to have restricted ranges in Alberta. Some of the uncommon species were *Calopteryx aequabilis*, *Somatochlora albicincta* and *Somatochlora minor*. *C. aequabilis* and *S. minor* were found along slow-moving streams whereas *S. albicincta* preferred isolated bog ponds. Three of the *Somatochlora* species were rare discoveries – *S. forcipata*, *S. franklini* and *S. kennedyi*. All three were collected in boggy wetlands. **One species, *Somatochlora kennedyi*, was a new discovery for the province.** It was collected beside a beaver pond north of Gardiner Lake. With further sampling, it is expected that several more riparian, peatland and river specialists could be found.

ACKNOWLEDGEMENTS

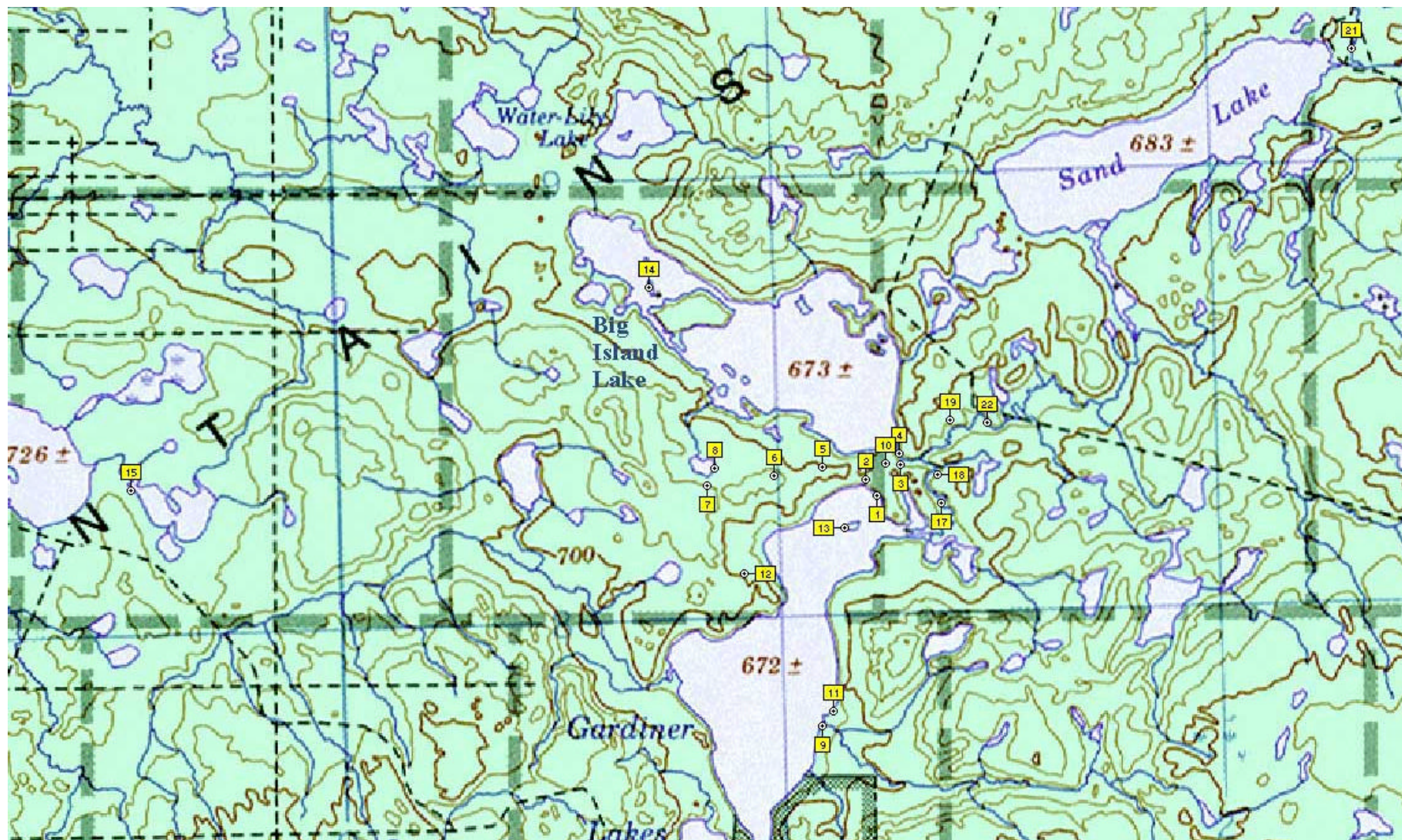
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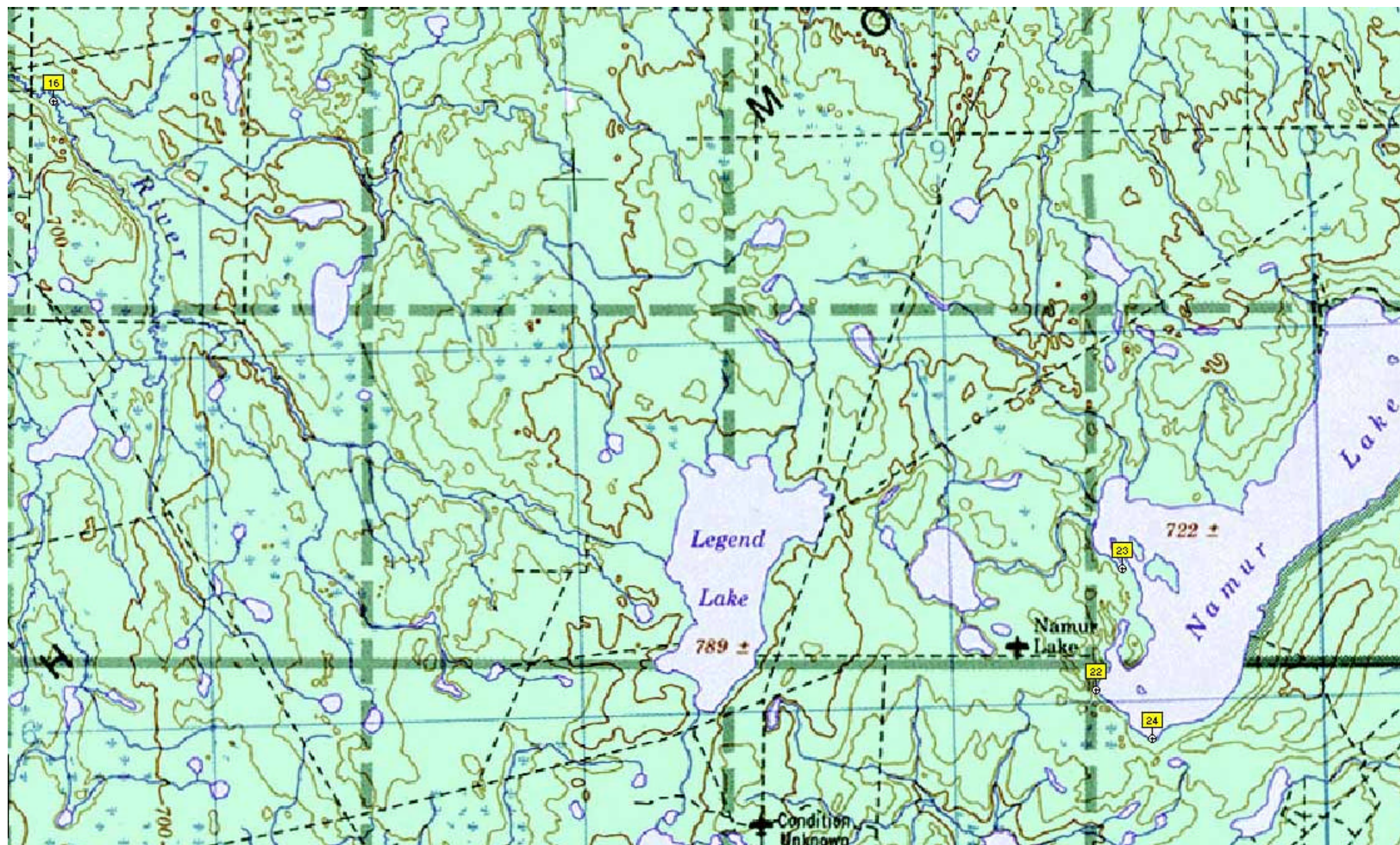
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Appendix 1. Collection sites at Birch Mountains Wildland Park near Gardiner Lake, the distance between the vertical and horizontal blue lines on the topographic map is 10 km.



Appendix 2. Collection sites at Birch Mountains Wildland Park near Namur Lake, the distance between the vertical and horizontal blue lines on the topographic map is 10 km.



				Collection Sites																								
Abn.	Sp. No.	Family	Genus species subspecies	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TT
	Suborder Anisoptera (dragonflies)																											
A	1	AESHNIDAE	<i>Aeshna eremita</i> Scudder				1		5		3			1											1			11
A	2	AESHNIDAE	<i>Aeshna interrupta</i> Scudder			1	2				2	1	1		1			2	1						2			13
C	3	AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)					1																2		3	6	
C	4	CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder								2		1												2		5	
C	5	LIBELLULIDAE	<i>Leucorrhinia borealis</i> Hagen														1										1	
C	6	LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen				2	1					1				5										9	
C	7	LIBELLULIDAE	<i>Libellula quadrimaculata</i> Linnaeus			1	1																				2	
U	8	CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)								11																11	
R	9	CORDULIIDAE	<i>Somatochlora forcipata</i> (Scudder)					2	1				1		1												5	
R	10	CORDULIIDAE	<i>Somatochlora franklini</i> (Selys)													1											1	
C	11	CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	2	1		4				1	1						1			2			1			13	
R	12	CORDULIIDAE	<i>Somatochlora kennedyi</i> Walker				1																				1	
U	13	CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	1															3								4	
C	14	CORDULIIDAE	<i>Tetragoneuria canis</i> McLachlan				2											1			2	1					6	
C	15	CORDULIIDAE	<i>Tetragoneuria spinigera</i> (Selys)	2									1													1	4	
	Subtotal			5	1	2	13	1	8	1	19	2	5	1	2	1	6	4	4	0	4	1	0	1	5	2	4	92
	Suborder Zygoptera (damselflies)																											
R	16	CALOPTERYGIDAE	<i>Calopteryx aequabilis</i> Say											8					1		2	1					4	
A	17	COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)		2																				1		11	
C	18	COENAGRIONIDAE	<i>Enallagma boreale</i> Selys				1	1			5	1				3	1				1						13	
A	19	COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	9			1						2	1													13	
C	20	COENAGRIONIDAE	<i>Nehalennia irene</i> (Hagen)					1					1														2	
	Subtotal			9	2	0	2	1	1	0	5	1	3	9	0	3	1	0	0	1	1	2	1	0	0	1	0	43
	Total			14	3	2	15	2	9	1	24	3	8	10	2	4	7	4	4	1	5	3	1	1	5	3	4	
	Final Total			135																								135

Appendix 4: Complete Data for specimens collected in Birch Mountains Wildland Park

Family	Genus species subspecies	Date	Locality	Site #	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage	NA#
CALOPTYRIDAE	<i>Calopteryx aequabilis</i> Say	10-Jul-04	Sand River, north	19	57.59561	112.43956	Nordstrom, W.	female	adult	1
CALOPTYRIDAE	<i>Calopteryx aequabilis</i> Say	10-Jul-04	Sand River, north	19	57.59561	112.43956	Nordstrom, W.	male	adult	1
CALOPTYRIDAE	<i>Calopteryx aequabilis</i> Say	10-Jul-04	Sand River, upper	20	57.59495	112.42535	Hilchie, G.; Macaulay, D.; Macaulay, S.	female	adult	1
CALOPTYRIDAE	<i>Calopteryx aequabilis</i> Say	11-Jul-04	Sand River, lower	17	57.57854	112.44321	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	1
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jun-04	Namur Lake, west bay	23	57.40486	112.75252	Hilchie, G.; Hilchie, J.; Holmberg, R.	female	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	07-Jul-04	Gardiner Lake, north along trail	2	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	07-Jul-04	Gardiner Lake, north along trail	2	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	male	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	female	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	male	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	male	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	female	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	male	adult	72
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	female	adult	72
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	female	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	08-Jul-04	Gardiner Lake, Island south of basecamp	13	57.57370	112.48071	Macaulay, D; Macaulay, S.	male	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	08-Jul-04	Gardiner Lake, Island south of basecamp	13	57.57370	112.48071	Macaulay, D; Macaulay, S.	female	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	08-Jul-04	Gardiner Lake, Island south of basecamp	13	57.57370	112.48071	Macaulay, D; Macaulay, S.	male	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	09-Jul-04	Gardiner Lake, pine forest by creek	9	57.53339	112.48985	Macaulay, D; Macaulay, S.	female	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	09-Jul-04	Sand River, stop 1	18	57.58454	112.44437	Macaulay, D; Macaulay, S.	male	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	11-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	female	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	female	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	female	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	female	adult	77
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	19-Jul-04	Big Island Lake, north island	14	57.62300	112.55400	Nordstrom, W.	male	adult	77
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	08-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	08-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Hilchie, G.; Macaulay, D.; Macaulay, S.	female	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	08-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Macaulay, D; Macaulay, S.	female	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	08-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Macaulay, D; Macaulay, S.	male	adult	83

Appendix 4: Complete Data for specimens collected in Birch Mountains Wildland Park										
Family	Genus species subspecies	Date	Locality	Site #	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage	NA#
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	08-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Macaulay, D; Macaulay, S.	female	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	08-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Macaulay, D; Macaulay, S.	male	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	female	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	08-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	male	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	08-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	female	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.		adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	10-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Nordstrom, W.	male	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	10-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	83
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Chap.)	11-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	83
COENAGRIONIDAE	<i>Nehalennia irene</i> (Hagen)	07-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	female	adult	126
COENAGRIONIDAE	<i>Nehalennia irene</i> (Hagen)	11-Jul-04	Gardiner Lake, northwest of camp along cutline	5	57.58621	112.48804	Macaulay, D; Macaulay, S.	female	adult	126
AESHNIDAE	<i>Aeshna eremita</i> Scudder	09-Jul-04	Gardiner Lake, sand beach @ beaverpond	11	57.53624	112.48546	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	10-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	11-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	female	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	11-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	female	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	11-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	11-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	11-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	female	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	14-Jul-04	Namur Lake, beach east of lodge	22	57.36330	112.74023	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna eremita</i> Scudder	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	138
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	07-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	male	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	09-Jul-04	Gardiner Lake, pine forest by creek	9	57.53339	112.48985	Macaulay, D; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	11-Jul-04	Gardiner Lake, north of basecamp @ beaverpond S	3	57.58649	112.45847	Hilchie, G.; Macaulay, D.; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	13-Jul-04	Namur Lake, beach east of lodge	22	57.36330	112.74023	Macaulay, D; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	14-Jul-04	Namur Lake, beach east of lodge	22	57.36330	112.74023	Macaulay, D; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	15-Jul-04	Gardiner Lake, southwest of camp	12	57.56441	112.51784	Macaulay, D; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	female	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	139

Appendix 4: Complete Data for specimens collected in Birch Mountains Wildland Park										
Family	Genus species subspecies	Date	Locality	Site #	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage	NA#
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	17-Jul-04	Mikkwa River	16	57.51800	113.23500	Nordstrom, W.	male	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	18-Jul-04	Birch Lake	15	57.58200	112.75100	Nordstrom, W.	male	adult	139
AESHNIDAE	<i>Aeshna interrupta</i> Scudder	18-Jul-04	Birch Lake	15	57.58200	112.75100	Nordstrom, W.	male	adult	139
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	11-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	male	adult	140
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	14-Jul-04	Namur Lake, beach east of lodge	22	57.36330	112.74023	Macaulay, D; Macaulay, S.	female	adult	140
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	14-Jul-04	Namur Lake, beach by lodge	24	57.37538	112.76556	Macaulay, D; Macaulay, S.	male	adult	140
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	14-Jul-04	Namur Lake, beach by lodge	24	57.37538	112.76556	Macaulay, D; Macaulay, S.	female	adult	140
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	14-Jul-04	Namur Lake, beach by lodge	24	57.37538	112.76556	Macaulay, D; Macaulay, S.	female	adult	140
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	18-Jul-04	Namur Lake, beach east of lodge	22	57.36330	112.74023	Johnson, T.		adult	140
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	09-Jun-04	Namur Lake, west bay	23	57.40486	112.75252	Hilchie, G.; Hilchie, J.; Holmberg, R.	female	adult	291
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	09-Jun-04	Namur Lake, west bay	23	57.40486	112.75252	Hilchie, G.; Hilchie, J.; Holmberg, R.	female	adult	291
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	07-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	female	adult	291
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	291
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	291
CORDULIIDAE	<i>Tetragoneuria canis</i> McLachlan	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	294
CORDULIIDAE	<i>Tetragoneuria canis</i> McLachlan	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	294
CORDULIIDAE	<i>Tetragoneuria canis</i> McLachlan	08-Jul-04	Sand River, stop 1	18	57.58454	112.44437	Macaulay, D; Macaulay, S.	male	adult	294
CORDULIIDAE	<i>Tetragoneuria canis</i> McLachlan	09-Jul-04	Sand River, stop 1	18	57.58454	112.44437	Macaulay, D; Macaulay, S.	female	adult	294
CORDULIIDAE	<i>Tetragoneuria canis</i> McLachlan	10-Jul-04	Sand River, north	19	57.59561	112.43956	Nordstrom, W.	female	adult	294
CORDULIIDAE	<i>Tetragoneuria canis</i> McLachlan	18-Jul-04	Birch Lake	15	57.58200	112.75100	Nordstrom, W.	female	adult	294
CORDULIIDAE	<i>Tetragoneuria spinigera</i> (Selys)	11-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	301
CORDULIIDAE	<i>Tetragoneuria spinigera</i> (Selys)	11-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	301
CORDULIIDAE	<i>Tetragoneuria spinigera</i> (Selys)	16-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	male	adult	301
CORDULIIDAE	<i>Tetragoneuria spinigera</i> (Selys)	18-Jul-04	Namur Lake, beach by lodge	24	57.37538	112.76556	Johnson, T.	female	adult	301
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313

Appendix 4: Complete Data for specimens collected in Birch Mountains Wildland Park										
Family	Genus species subspecies	Date	Locality	Site #	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage	NA#
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burm.)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	313
CORDULIIDAE	<i>Somatochlora forcipata</i> (Scudder)	11-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	male	adult	320
CORDULIIDAE	<i>Somatochlora forcipata</i> (Scudder)	15-Jul-04	Gardiner Lake, southwest of camp	12	57.56441	112.51784	Macaulay, D; Macaulay, S.	female	adult	320
CORDULIIDAE	<i>Somatochlora forcipata</i> (Scudder)	16-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	male	adult	320
CORDULIIDAE	<i>Somatochlora forcipata</i> (Scudder)	16-Jul-04	Gardiner Lake, northwest of camp along cutline	6	57.58450	112.50633	Macaulay, D; Macaulay, S.	male	adult	320
CORDULIIDAE	<i>Somatochlora forcipata</i> (Scudder)	16-Jul-04	Gardiner Lake, northwest of camp along cutline	7	57.58241	112.53213	Macaulay, D; Macaulay, S.	male	adult	320
CORDULIIDAE	<i>Somatochlora franklini</i> (de Selys)	07-Jul-04	Gardiner Lake, Island south of basecamp	13	57.57370	112.48071	Macaulay, D; Macaulay, S.	male	adult	321
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	07-Jul-04	Big Island Lake, south along trail	2	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	08-Jul-04	Sand River, stop 1	18	57.58454	112.44437	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	09-Jul-04	Gardiner Lake, pine forest by creek	9	57.53339	112.48985	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	09-Jul-04	Sand River, stop 1	18	57.58454	112.44437	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	11-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	14-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Macaulay, D; Macaulay, S.	female	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	15-Jul-04	Sand River at north end of Sand Lake	21	57.67100	112.28600	Nordstrom, W.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	16-Jul-04	Gardiner Lake, northwest of camp along cutline at pond	8	57.58616	112.52941	Macaulay, D; Macaulay, S.	male	adult	324
CORDULIIDAE	<i>Somatochlora hudsonica</i> (Selys)	18-Jul-04	Birch Lake	15	57.58200	112.75100	Nordstrom, W.	male	adult	324
CORDULIIDAE	<i>Somatochlora kennedyi</i> Walker	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	326
CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	10-Jul-04	Gardiner Lake, basecamp	1	57.58027	112.46851	Macaulay, D; Macaulay, S.	male	adult	329
CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	17-Jul-04	Mikkwa River	16	57.51800	113.23500		male	adult	329
CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	17-Jul-04	Mikkwa River	16	57.51800	113.23500	Nordstrom, W.	male	adult	329
CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	17-Jul-04	Mikkwa River	16	57.51800	113.23500	Nordstrom, W.	female	adult	329
LIBELLULIDAE	<i>Leucorrhinia borealis</i> Hagen	10-Jul-04	Big Island Lake, south along trail	14	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	376
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	06-Jun-04	Big Island Lake, south along trail	14	57.58364	112.47174	Hilchie, G.; Hilchie, J.; Holmberg, R.	female	adult	379
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	07-Jul-04	Big Island Lake, south along trail	14	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	379
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	07-Jul-04	Big Island Lake, south along trail	14	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	379
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	07-Jul-04	Big Island Lake, south along trail	14	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	379

Appendix 4: Complete Data for specimens collected in Birch Mountains Wildland Park										
Family	Genus species subspecies	Date	Locality	Site #	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage	NA#
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	08-Jul-04	Gardiner Lake, north of basecamp W of beaverpond	10	57.58688	112.46400	Macaulay, D; Macaulay, S.	male	adult	379
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	379
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	379
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	11-Jul-04	Big Island Lake, south along trail	14	57.58364	112.47174	Hilchie, G.; Macaulay, D.; Macaulay, S.	male	adult	379
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	11-Jul-04	Gardiner Lake, northwest of camp along cutline	5	57.58621	112.48804	Macaulay, D; Macaulay, S.	female	adult	379
LIBELLULIDAE	<i>Libellula quadrimaculata</i> Linnaeus	08-Jul-04	Gardiner Lake, north of basecamp @ beaverpond S	3	57.58649	112.45847	Hilchie, G.; Macaulay, D.; Macaulay, S.	female	adult	397
LIBELLULIDAE	<i>Libellula quadrimaculata</i> Linnaeus	10-Jul-04	Gardiner Lake, north of basecamp @ beaverpond	4	57.58881	112.45891	Macaulay, D; Macaulay, S.	male	adult	379