



Survey of Odonata in the Canadian Shield Natural Region of Northeastern Alberta

II. 2002 Survey of Colin-Cornwall Wildland Park

Prepared for the Alberta Natural Heritage Information Centre

**Parks and Protected Areas Division
Alberta Community Development**

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Figure 1. Author with *Calopteryx aequabilis* (in La Butte Creek Wildland Park, 2001).

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INTRODUCTION

In Alberta, the Canadian Shield Eco-region is restricted to the extreme northeast part of the province (Beckingham and Archibald 1996; Strong and Leggat 1992). It is subdivided into the Kazan Upland Subregion and the Athabasca Plain Subregion, located to the north and south of Lake Athabasca, respectively. There are several wildland parks that have recently been established in these two subregions.

An odonate survey was conducted in the summer of 2000 (Hornung 2001) within three of the wildland parks that are located in the Athabasca Plain Subregion, namely Maybelle River, Marguerite River and Richardson River Dunes. The 2000 survey was the first for these three parks. The next survey was conducted in the summer of 2001 (Macaulay 2002) within two of the wildland parks that are located in the Kazan Upland Subregion, namely La Butte Creek and Fidler-Greywillow.

Colin-Cornwall Wildland Park, within the Kazan Upland Subregion, was the focus of an odonate survey in the summer of 2002. Colin-Cornwall is located about 35 km north of Lake Athabasca near the Alberta-Saskatchewan border. The subregion in which this wildland park is located contains extensive riparian, lakeshore and shield outcrop 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 would contribute towards an increased understanding of the odonate fauna found within this wildland park but also within the broader context of Alberta.

METHODS

The odonate survey was conducted within Colin-Cornwall Wildland Park during two time periods from June 6-14, and July 6-10, 2002. For the June survey, the author, Ted Johnson and Wayne Nordstrom were involved. Lorna Ash, Duncan Hilchie, Gerald Hilchie, Terri MacKinnon and Wayne Nordstrom conducted the July survey.

Odonates were collected in a variety of ways. Adult specimens were netted with butterfly nets or pan trapped. 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: a sand esker¹ (SE) located on the north side of "Esker Lake"² (Figure 2), sand beaches (SB), rock outcrops with jack pine (RO) (Figure 3), mixedwoods (RF), peatlands (RP) and marshland (RM) (Figure 3) (Table 1).

¹ 'esker' refers to a long sinuous, steep sided ridge composed of cross bedded sands left behind by a retreating glacier (Fairbridge 1968).

² 'Esker Lake' refers to the un-named lake located directly west of Colin Lake and is where the basecamp was located.

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 (1923), Walker (1953), Walker (1958), Walker and Corbet (1975), Acorn (1981), and Dunkle (2000). Common names for odonate species were based on Cannings (2002).

Voucher specimens have been deposited at the University of Alberta's Strickland Museum.

Table 1: Habitats and locations of collection sites in Colin-Cornwall Wildland Park (also see Appendix 4).

Site No.	Habitat	Location	Coordinates
Colin-Cornwall Wildland Park:			
1	RF	Esker Lake, base camp	59.55533°N 110.26314° W
2	RP	Esker Lake, bog SE of base camp	59.55504° N 110.26177° W
3	SE	Esker Lake, sand esker NW of Camp (Figure 2)	59.55898° N 110.26923° W
4	RF	Esker Lake, NE of Camp	59.55421° N 110.25874° W
5	RO	Esker Lake SW, burn & rock outcrop	59.54148° N 110.28350° W
6	RO	Esker Lake S, rock outcrop	59.53560° N 110.26940° W
7	RO	Esker Lake, rock outcrop W of Camp	59.54351° N 110.31531° W
8	SB	Colin Lake W, sand beach	59.56243° N 110.22321° W
9	RF	Colin Lake, Trapper's Island	59.55080° N 110.21282° W
10	RM	Colin Lake E, streamside	59.53245° N 110.02230° W
11	RF	Colin Lake NW, outlet	59.57708° N 110.22231° W
12	RM	Woodman Creek E, Riparian Area	59.54487° N 110.35970° W
13	RM	Woodman Creek, Riparian Area (Figure 3)	59.54586° N 110.38097° W
14	RM	Woodman Creek W, Riparian Area	59.54502° N 110.38846° W
15	RF	Woodman Lake near outlet, Stream Hill	59.55434° N 110.47104° W
16	RO	Woodman Lake E, near rock outcrop	59.54934° N 110.43033° W
17	RF	Woodman Lake near outlet	59.54610° N 110.43402° W

RESULTS

A total of 107 Odonate specimens, belonging to 5 families and 17 species, were collected in Colin-Cornwall Wildland Park. Of the 17 species, 6 were from the Suborder Zygoptera (damselflies) and 11 from the Suborder Anisoptera (dragonflies) (Appendix 1). A species list and collection summary appears in Appendix 1; full collection data appears in Appendix 2. Appendix 3 illustrates the collection sites in map form.

Table 2 indicates that twice as many specimens were collected from Colin-Cornwall as compared to La Butte Creek Wildland Park. However, La Butte Creek had double the number of unique species. The term 'unique' in this case refers to those species that were found in only one of the two parks, but not both.

Table 2. Comparison of numbers of specimens collected and numbers of species found within Colin-Cornwall and La Butte Creek Wildland Parks.

<i>Wildland Park</i>	<i># of Specimens</i>	<i># of Species</i>	<i># Unique Species</i>
Colin-Cornwall	107	17	5
La Butte Creek	54	19	10



Figure 2. South-facing slope of the sand esker located on the north shore of Esker Lake.

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 the beginning of 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 collected in Colin-Cornwall Wildland Park was slightly lower (17 vs. 19) than in La Butte Creek (Table 2). This was likely due to a combination of weather and real habitat differences.

The weather of both June and July in 2002 may have led to the reduced species counts. The June survey at Colin-Cornwall was affected by the late spring; whereby most species appeared a month later than usual. Rafts of crumbling ice were still present on Colin Lake on June 9th. About two or three days later, however, most of the ice had melted while the weather remained cool. Odonates were not evident until about June 12th. In comparison, La Butte Creek experienced considerably warmer temperatures and relatively normal weather in 2001, which resulted in the collection of many more species of Odonata.

In July 2002, the hot and dry weather conditions throughout the shield area in northeast Alberta led to numerous forest fires. For safety reasons, the base camp was evacuated on July 10th. This reduced the collecting period for odonates by about 10 days, a factor that likely contributed to a lower species count than for La Butte.

Given the large size of Colin-Cornwall Wildland Park, collection efforts for odonates were concentrated on those habitats that were accessible and which represented the range of habitats found in the park. These habitats primarily included: lake shorelines, backshore forests, backshore shrublands, streams, and the 'sand esker' (Figure 2) on the north shore of 'Esquer Lake'. A wider diversity of habitats were studied while at La Butte Creek Wildland Park, including: riparian areas (both river and stream), marshes, upland forests, meadows and beaver ponds. A greater sampling effort in habitats other than lakeshore or near lakeshore at Colin-Cornwall would likely add to the species complement for this park. This is because its lakeshore habitats probably harbor fewer species than its forest, interior wetland and other habitats.

II. Distribution patterns and taxa

The following is an annotated list of the species that were collected in Colin-Cornwall Wildland Park. 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)

Family Calopterygidae (range information is based on Walker (1953))

- *Calopteryx aequabilis* 'River Jewelwing' (Figure 1) – An uncommon species and a rare find in Alberta. It has been collected at Fort McMurray, Chinchaga River to the west of High Level, Maybelle River and La Butte Creek. It was observed and collected in Colin-Cornwall Wildland Park along some slow-moving streams bordered by forests, shrubs or graminoids. It may occur elsewhere in the park where suitable habitat occurs. The five specimens collected were found along Woodman Creek – this is the most northern population known from Alberta, and possibly Canada. Collected at site # 12 & 13 and observed at site # 11 (Appendix 1).



Figure 3. Woodman Creek riparian area.

Family Coenagrionidae (range information is based on Walker (1953) & Cannings (2002))

- *Nehalennia irene* 'Sedge Sprite' - A common species found in localized populations. This species is only found in areas that have dense shoreline grasses or sedges. In Colin-Cornwall Wildland Park, two specimens were collected, the first from a pan trap along Woodman creek and the other at the south side of Esker Lake. Collected at site # 12 & 13 (Appendix 1).

- *Coenagrion interrogatum* 'Subarctic Bluet' – A common species found throughout the boreal forest in wetlands containing floating aquatic vegetation. It is one of the most northern species because it can tolerate the cool waters of boreal lakes and streams. This species is found across Canada including records from Northwest Territories and the Yukon. The seven specimens collected on Colin and Esker Lakes are the most northern populations known in Alberta. Collected at site # 6, 9 & 11 (Appendix 1).
- *Coenagrion resolutum* 'Taiga Bluet'- A common species found throughout the boreal forest in still marshy waters. This species is found across Canada including records from Fort Chipewyan, La Butte Creek Wildland Park, and the Great Slave Lake region of the Northwest Territories. The four specimens collected on Esker Lake are the most northern populations known in Alberta. Collected at site #1 & 6 (Appendix 1).
- *Enallagma cyathigerum* 'Northern Bluet' - An abundant species found throughout the boreal forest in the cool marshy waters and peatlands. This species is found across Canada including records from the Athabasca delta, Maybelle River and Marguerite River Wildland Parks of Alberta north to the Great Slave Lake region of the Northwest Territories. The eleven specimens collected on Woodman Creek, Esker and Colin Lakes are the most northern populations known in Alberta. Collected at site # 6, 9 & 16 (Appendix 1).
- *Enallagma boreale* 'Boreal Bluet' (Figure 4) - A common species found in marshy areas throughout the boreal forest. This species is found across Canada including records from La Butte Creek, Maybelle River and Marguerite River Wildland Parks. The six specimens collected on Woodman Creek, Esker Lake and Woodman Lake are the most northern populations known in Alberta. Collected at site # 5, 6, 14 & 15 (Appendix 1).



Figure 4. A male *Enallagma boreale* in Colin-Cornwall Wildland Park.

Suborder Anisoptera (Dragonflies)

Family Aeshnidae (range and biological information from Dunkle (2000), Walker (1958) and Cannings (1996 and 2002))

- *Aeshna eremita* 'Lake Darner' (Figure 5) - An abundant boreal species that prefers deep lakes with little vegetation. This species was previously collected in Marguerite River, La Butte Creek and Fidler-Gerywillow Wildland Parks as well as Fort Smith, NWT. The ten specimens collected on Woodman Creek, Esker and Colin Lakes are the most northern populations known in Alberta. Collected at site # 4, 6, 7 & 10 (Appendix 1).



Figure 5. *Aeshna* prob. *eremita* perched on a burned pine snag near Esker Lake.

- *Aeshna juncea* 'Sedge Darner' - A common species that exists in peatlands that contain an extensive cover of sedges and other peatland vegetation. The two Esker Lake specimens are the most northern populations known in Alberta though it was also found in both La Butte Creek and Fidler-Greywillow Wildland Parks in 2001. Collected at site #1 (Appendix 1).

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

- *Cordulia shurtleffii* 'American Emerald' - An abundant species found in quiet boreal streams, ponds and lakes across Canada. The 22 specimens from Woodman Creek, Esker, Colin and Woodman Lakes are the most northern populations in Alberta. Collected at site # 1, 2, 3, 4, 5, 8, 11, 12, 13, 14, 15 (Appendix 1). The species has also been collected at Fort Chipewyan, and La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River Wildland Parks. Records are known from Fort Smith, NWT.
- *Epithea spinigera* 'Spiny Baskettail' - A common boreal species that prefers the marshy waters of lakes and streams. This species was previously collected in La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River Wildland Parks. The three specimens collected on Woodman Creek, Esker Lake are the most northern populations known in Alberta. Collected at site # 6 & 13 (Appendix 1).
- *Somatochlora albicincta* 'Ringed Emerald' – This uncommon species exists in lakes, ponds and slow-moving streams with sparse vegetation. It ranges across Canada and seems to be endemic to the Canadian Shield and Rocky Mountains according to Walker (1925) and Corbet (1975). Only one specimen was collected at Esker Lake base camp and is the first specimen taken north of Jasper. Collected at site # 1 (Appendix 1).
- *Somatochlora minor* 'Ocellated Emerald'- This uncommon species exists in slow-moving, clear-water streams. It is an occupant of the Canadian shield and mountainous regions of Canada. Only three specimens were collected along Woodman Creek and the only other record for Alberta is Nordegg. Collected at site # 13 (Appendix 1).

Family Libellulidae (range and biological information from Dunkle (2000), Walker and Corbet (1975) and Cannings (2002))

- *Libellula quadrimaculata* 'Four-spotted Skimmer' – An abundant species that inhabits boggy and marshy waters across Canada. It has been found in La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River Wildland Parks as well as Fort Smith, NWT. Several were observed flying in willow / sedge / bog birch habitats adjacent to Woodman Creek (W. Nordstrom, *pers. comm*).
- *Leucorrhinia hudsonica* 'Hudsonian Whiteface' (Figure 6) - A common boreal forest species that prefers the cool waters of boggy ponds. It was found in La Butte Creek, Fidler-Greywillow, Maybelle River and Marguerite River Wildland Parks as well as Fort Smith, NWT. Five specimens were collected on Esker and Colin lakes; these are the most northern populations known from Alberta. Collected at site # 1, 3 & 7 (Appendix 1).



Figure 6. *Leucorrhinia hudsonica* in Colin-Cornwall Wildland Park.

- *Leucorrhinia glacialis* 'Crimson-ringed Whiteface' - An uncommon species in the north, preferring marshy lakes and ponds. A species that is rarely encountered north of central Alberta. Records from Colin-Cornwall are the most northern ones for Alberta. The species has also been found at La Butte Creek, Maybelle River and Marguerite River Wildland Parks. The three specimens collected on Esker Lake and Woodman Creek are the most northern populations known from Alberta. Collected at site # 6 & 14 (Appendix 1).
- *Leucorrhinia proxima* 'Red-waisted Whiteface' - A common species that inhabits marshy areas of the boreal forest. It is found throughout central Alberta and southern Northwest Territories as well as at La Butte Creek Wildland Park. The seven specimens collected on Esker and Colin Lake are the most northern populations known from Alberta. Collected at site # 6, 9 & 10 (Appendix 1).
- *Leucorrhinia intacta* 'Dot-tailed Whiteface' – A common species across Canada occurring in non-acidic water bodies. This is a substantial range extension having been found only in central Alberta until being collected in Colin-Cornwall in 2002. Only one specimen was collected at the Esker Lake base camp. Collected at site # 1 (Appendix 1).

SUMMARY AND CONCLUSIONS

A total of 17 odonate species were collected during the survey of 2002 at Colin-Cornwall Wildland Park. This represents 11 species from the Suborder Anisoptera and 6 from the Suborder Zygoptera. Though most species collected are common across Canada, four of them (*Calopteryx aequabilis*, *Leucorrhinia glacialis* and *Somatochlora albicincta* and *Somatochlora minor*) are uncommon in Alberta. *Calopteryx aequabilis* is an uncommon species that inhabits the boreal forest, and *Leucorrhinia glacialis* represents a range extension from central Alberta. Both *Somatochlora albicincta* and *S. minor* are uncommon residents of the Canadian Shield ecoregion. With further sampling it is expected that several more riparian, shield and wetland specialists will likely be found.

ACKNOWLEDGEMENTS

This report would not have been possible without the assistance of members of the Alberta Lepidopterists' Guild, particularly Gerald Hilchie and Wayne Nordstrom (who collected specimens along with the author). Thanks are also due to Lorna Ash, Duncan Hilchie, Ted Johnson, and Terri MacKinnon who collected specimens during their July visit to Colin-Cornwall Park. Wayne Nordstrom and Greg Pohl supplied photographs.

The opportunity to inventory the odonates was made possible through an invitation to the members of the Alberta Lepidopterists' Guild from the Alberta Natural Heritage Information Centre of the Parks and Protected Areas Division. In addition, park's staff of the Lac La Biche District made this project feasible by providing logistic support, including transportation, field camps and food. Without the efforts of Ted Johnson, Jennifer Okrainec and the rest of the park's staff along with the field camp crew, this project would not have been possible.

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Appendix 1. List of species found in Colin-Cornwall Wildland Park

			Collection Sites																			
Sp. No.	Family	Genus species subspecies	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	?	TT	
Suborder Anisoptera (dragonflies)																						
1	AESHNIDAE	<i>Aeshna eremita</i> Scudder				1		5				1					3					10
2	AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	2																			2
3	CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	2	2	4	2	3			2			1		1	1	3	1				22
4	CORDULIIDAE	<i>Epitheca spinigera</i> (Selys)						1								2						3
5	CORDULIIDAE	<i>Somatochlora albicincta</i> (Burmeister)	1																			1
6	CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)														3						3
7	LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert						4			1	1								1		6
8	LIBELLULIDAE	<i>Leucorrhinia glacialis</i> Hagen					2									1						3
9	LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen			3				1		1											5
10	LIBELLULIDAE	<i>Leucorrhinia intacta</i> Hagen	1																			1
11	LIBELLULIDAE	<i>Libellula quadrimaculata</i> Linnaeus														1*						1
Suborder Zygoptera (damselflies)																						0
12	CALOPTERYGIDAE	<i>Calopteryx aequabilis</i> Say											2*	2	3							7
13	COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)			4			2			1											7
14	COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	2					2														4
15	COENAGRIONIDAE	<i>Enallagma boreale</i> Selys					1	1							1	1	2					6
16	COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)						1			1									10		12
?	COENAGRIONIDAE	<i>Enallagma sp.</i>	1			3		7			1		1								1	13
17	COENAGRIONIDAE	<i>Nehalennia irene</i> (Hagen)						1												1		2
Subtotal			9	2	11	6	6	24	1	2	5	2	4	2	5	9	8	1	11	2		
Total			110																			

* No specimen, identified in field. The yellow highlighted boxes indicate visual observations (see Appendix 3 for site locations)

Appendix 2: Complete data for specimens collected in Colin-Cornwall Wildland Park.

Family	Scientific Name	Date	Locality	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage
AESHNIDAE	<i>Aeshna eremita</i> Scudder	09-Jul-02	Colin Lake E, streamside	59.53245	110.02230	Nordstrom, W.	M	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	06-Jul-02	Esker Lake S, rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	07-Jul-02	Esker Lake S, rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	07-Jul-02	Esker Lake S, rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	07-Jul-02	Esker Lake S, rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	06-Jul-02	Esker Lake, NE of Camp	59.55421	110.25874	Nordstrom, W.	M	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
AESHNIDAE	<i>Aeshna eremita</i> Scudder	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	06-Jul-02	Esker Lake, Base Camp	59.55533	110.26314	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
AESHNIDAE	<i>Aeshna juncea</i> (Linnaeus)	06-Jul-02	Esker Lake, Base Camp	59.55533	110.26314	Johnson, T.	M	Adult
CALOPTERYGIDAE	<i>Calopteryx aquabilis</i> Say	07-Jul-02	Woodman Creek E, Riparian Area	59.54487	110.35970	Nordstrom, W.	F	Adult
CALOPTERYGIDAE	<i>Calopteryx aquabilis</i> Say	07-Jul-02	Woodman Creek E, Riparian Area	59.54487	110.35970	Nordstrom, W.	F	Adult
CALOPTERYGIDAE	<i>Calopteryx aquabilis</i> Say	08-Jul-02	Woodman Creek, Riparian Area	59.54586	110.38097	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
CALOPTERYGIDAE	<i>Calopteryx aquabilis</i> Say	08-Jul-02	Woodman Creek, Riparian Area	59.54586	110.38097	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
CALOPTERYGIDAE	<i>Calopteryx aquabilis</i> Say	10-Jul-02	Woodman Creek, Riparian Area	59.54586	110.38097	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	M	Adult
COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	F	Adult
COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	F	Adult
COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	F	Adult
COENAGRIONIDAE	<i>Coenagrion interrogatum</i> (Hagen)	06-Jul-02	Colin Lake, Trapper's Island	59.55080	110.21282	Johnson, T.	M	Adult
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	07-Jul-02	Esker Lake S, nr. rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	07-Jul-02	Esker Lake S, nr. rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	06-Jul-02	Esker Lake, Base Camp	59.55533	110.26314	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
COENAGRIONIDAE	<i>Coenagrion resolutum</i> (Hagen)	06-Jul-02	Esker Lake, Base Camp	59.55533	110.26314	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	07-Jul-02	Esker Lake S, burn & rock outcrop	59.54148	110.28350	Johnson, T.	M	Adult
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	M	Adult
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	08-Jul-02	Woodman Creek, Riparian Area	59.54586	110.38097	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
COENAGRIONIDAE	<i>Enallagma boreale</i> Selys	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
COENAGRIONIDAE	<i>Enallagma cyathigerum</i> (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult

Appendix 2: Complete data for specimens collected in Colin-Cornwall Wildland Park.

Family	Scientific Name	Date	Locality	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	?	Adult
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	?	Adult
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	?	Adult
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	?	Adult
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	?	Adult
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	July 6-8, 2003	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	?	Adult
COENAGRIONIDAE	Enallagma cyathigerum (Charp.)	09-Jul-02	Colin Lake, Trapper's Island	59.55080	110.21282	Nordstrom, W.	M	Adult
COENAGRIONIDAE	Enallagma sp.	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	09-Jul-02	Colin Lake, Trapper's Island	59.55080	110.21282	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	06-Jul-02	Esker Lake, NE of Camp	59.55421	110.25874	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	06-Jul-02	Esker Lake, NE of Camp	59.55421	110.25874	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	06-Jul-02	Esker Lake, NE of Camp	59.55421	110.25874	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	July 6-8, 2002	Esker Lake, Base Camp	59.55533	110.26314	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
COENAGRIONIDAE	Enallagma sp.	10-Jul-02	Colin Lake NW, outlet	59.57708	110.22232	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Enallagma sp.	01-Jul-02	?	?	?	?	F	Adult
COENAGRIONIDAE	Nehalennia irene (Hagen)	07-Jul-02	Esker Lake S, nr. rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
COENAGRIONIDAE	Nehalennia irene (Hagen)	July 6-8, 2002	Woodman Lake E, nr outlet	59.54610	110.43402	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	06-Jul-02	Esker Lake S, burn & rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	08-Jul-02	Woodman Lake E, nr. rock outcrop	59.54934	110.43033	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	July 6-8, 2002	Esker Lake S, burn & rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	M	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	08-Jul-02	Woodman Creek, Riparian Area	59.54586	110.38097	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	M	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	06-Jul-02	Esker Lake, NE of Camp	59.55421	110.25874	Nordstrom, W.	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	06-Jul-02	Esker Lake, NE of Camp	59.55421	110.25874	Nordstrom, W.	F	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
CORDULIIDAE	Cordulia shurtleffii Scudder	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult

Appendix 2: Complete data for specimens collected in Colin-Cornwall Wildland Park.

Family	Scientific Name	Date	Locality	Dec. Lat.	Dec. Long.	Collector	Sex	Life Stage
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	07-Jul-02	Woodman lake N outlet, Stream Hill	59.55434	110.47104	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	13-Jun-02	Esker Lake, Bog SE of Camp	59.55504	110.26177	Macaulay, D.	F	Adult
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	13-Jun-02	Esker Lake, Bog SE of Camp	59.55504	110.26177	Macaulay, D.	M	Adult
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	13-Jun-02	Esker Lake, Base Camp	59.55533	110.26314	Macaulay, D.	F	Adult
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	06-Jul-02	Esker Lake, Base Camp	59.55533	110.26314	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	09-Jul-02	Colin Lake W, sand beach	59.56243	110.22321	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	09-Jul-02	Colin Lake W, sand beach	59.56243	110.22321	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	<i>Cordulia shurtleffii</i> Scudder	10-Jul-02	Colin Lake NW, outlet	59.57708	110.22232	Nordstrom, W.	F	Adult
CORDULIIDAE	<i>Epitheca spinigera</i> (Selys.)	07-Jul-02	Esker Lake S, rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
CORDULIIDAE	<i>Epitheca spinigera</i> (Selys.)	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	M	Adult
CORDULIIDAE	<i>Epitheca spinigera</i> (Selys.)	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	F	Adult
CORDULIIDAE	<i>Somatochlora albicincta</i> (Burmeister)	05-Jul-02	Esker Lake, base Camp	59.55533	110.26314	Hilchie, G.J, L. Ash. D. N. Hilchie	F	Adult
CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	M	Adult
CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	M	Adult
CORDULIIDAE	<i>Somatochlora minor</i> (Calvert)	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	M	Adult
LIBELLULIDAE	<i>Leucorrhinia glacialis</i> Hagen	07-Jul-02	Esker Lake S, burn & rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
LIBELLULIDAE	<i>Leucorrhinia glacialis</i> Hagen	07-Jul-02	Esker Lake S, burn & rock outcrop	59.54148	110.28350	Hilchie, G.J, L. Ash. D. N. Hilchie	M	Adult
LIBELLULIDAE	<i>Leucorrhinia glacialis</i> Hagen	08-Jul-02	Woodman Creek W, Riparian Area	59.54502	110.38840	Nordstrom, W.	F	Adult
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	12-Jun-02	Esker Lake, rock outcrop W of Camp	59.54351	110.31531	Macaulay, D.	F	Adult
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	M	Adult
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	M	Adult
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	13-Jun-02	Esker Lake, Sand Esker NW of Camp	59.54953	110.25416	Macaulay, D.	F	Adult
LIBELLULIDAE	<i>Leucorrhinia hudsonica</i> Hagen	06-Jul-02	Colin Lake, Trapper's Island	59.55080	110.21282	Johnson, T.	F	Adult
LIBELLULIDAE	<i>Leucorrhinia intacta</i> Hagen	07-Jul-02	Esker Lake, Base Camp	59.55533	110.26314	Johnson, T.	F	Adult
LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert	09-Jul-02	Colin Lake E, streamside	59.53245	110.02230	Nordstrom, W.	M	Adult
LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert	07-Jul-02	Esker Lake S, nr. rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert	07-Jul-02	Esker Lake S, nr. rock outcrop	59.53561	110.26942	Nordstrom, W.	M	Adult
LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert	07-Jul-02	Esker Lake S, nr. rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert	07-Jul-02	Esker Lake S, nr. rock outcrop	59.53561	110.26942	Nordstrom, W.	F	Adult
LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert	09-Jul-02	Colin Lake, Trapper's Island	59.55080	110.21282	Nordstrom, W.	M	Adult
LIBELLULIDAE	<i>Leucorrhinia proxima</i> Calvert	01-Jul-02	?	?	?	?	M	Adult

Appendix 3. Odonate collection sites within Colin-Cornwall Wildland Park. The distance between the blue vertical and horizontal lines on the topographic map is 10 km.

