

Dragonflies at Risk in British Columbia

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ABSTRACT

In 1993, British Columbia's dragonflies and damselflies (Order Odonata) were listed and ranked as to their conservation status in the province, based upon the knowledge at the time. Inventory efforts were then focused on the species considered at risk, in order to more accurately determine their status and to identify specific sites for conservation. For 3 years, surveys were conducted in 5 regions of the province: the northeast corner, the Lower Mainland, southern Vancouver Island, the Okanagan, and the Columbia Basin. During the course of these surveys, known ranges of many species were extended, knowledge of habitat requirements increased, and 3 new species were confirmed for the province. While many of the targeted species were found only sparsely or not at all, a number of them were discovered to be more abundant than previously thought, and their conservation ranks were changed accordingly.

Key words: dragonfly, inventory, Odonata.

One of the goals of the British Columbia Conservation Data Centre is to portray as accurately as possible the status of species and habitats in the province. The first stage in this process is to draw up initial lists of all of the species of the province, with each species given a numerical value ranking its rarity or endangerment. The ranks are based on a number of factors, including the number of populations, the number of individuals, population trends, threats, and distribution. Each species is assigned an "S" (provincial) rank, ranging from 1 (most at risk) to 5 (not at all at risk; Harcombe 1994).

The dragonflies and damselflies (Order Odonata) are a relatively well known group of insects that are present in a wide variety of streams, lakes, and wetlands. In British Columbia these wetland habitats have been and continue to be altered, lost, or destroyed due to development, agriculture, and resource extraction (Stevens et al. 1995). Dragonflies are considered a priority group for inventory (Scudder 1996) because, unlike most invertebrates, they can be relatively easily identified, even in the field in many cases. They are upper-level predators in the invertebrate food-chain and have often been identified as indicators of ecosystem health (Walker and Corbet 1975, Carle 1979, Trevino 1997).

In 1993, all of British Columbia's odonates (82 at the time) were ranked by the Conservation Data Centre as to their known conservation status. However, despite the fact that the Odonata are among the best known insects, our

knowledge of detailed species distribution, especially of rare species, was still very limited. The main source of information was Cannings and Stuart (1977), as well as records from a few casual collectors over the intervening years. So, to more accurately rank the dragonflies of the province, a series of surveys were initiated throughout British Columbia.

METHODS

In 1995–98, surveys were conducted in 5 areas of the province: southern Vancouver Island (Hutchings 1997), the Lower Mainland, the Okanagan (Cannings 1998), the northeast corner, and the Columbia/Kootenay area. In the latter region we concentrated on the mountain national parks: Yoho, Revelstoke, Glacier, and Kootenay. The sites visited within these areas were chosen on the basis of historic records, recommendations by locals, and pre-study of topographical maps, and by scouting the region by vehicle.

In order to maximize the chances of recording all species present in an area, surveys were conducted at various times throughout the active odonate flying season, and key sites were visited several times. Some early- or late-flying species have been under-represented in earlier collections because entomologists collect primarily in mid-summer. At each site, voucher specimens were collected of each species observed. Adults were collected using aerial nets. Relative abundance estimates were made for each of the species at a site. When weather conditions would not allow aerial collections, larvae were collected in dip nets. The adult voucher specimens

were killed with ethyl acetate, then fixed in acetone for 8–24 hours, dried, and stored in glassine or acetate envelopes until accessioned by the Royal British Columbia Museum. Larvae were placed into 70% ethanol. Specimens were identified using Cannings and Stuart (1977), Westfall and May (1996), Walker (1953, 1958), Walker and Corbet (1975), Cannings (1996), and Paulson (1997), as well as by using comparative material in the Royal British Columbia Museum and the Spencer Entomological Museum at the University of British Columbia.

Habitat descriptions were made for each site where specimens were collected. Wetland type, dominant vegetation, temperature, pH, and amount of disturbance were recorded.

RESULTS

A total of 78 species were collected from more than 550 sites. Eighteen of the 22 species on the preliminary list of rare dragonflies of British Columbia were collected. Changes in rank were made for 10 species based on the results of the surveys. The result is a rare and endangered list of 24 species (Appendix A) and a total provincial list of 85. This includes the addition of 3 new species to the provincial list: *Somatochlora kennedyi*, *S. forcipata*, and *Lestes forcipatus*.

S. kennedyi had been collected at Loon Lake in the Yukon Territory within 3 km of the British Columbia border (Cannings et al. 1991) and from the southern Northwest Territories (Walker and Corbet 1975), so was a target species during the surveys in the northeast. Only 1 individual was recorded: a female, flying near a sedge fen near Andy Bailey Provincial Park just southeast of Fort Nelson.

Edmund Walker collected *S. forcipata* in the 1920s at Boom Creek, Alberta, about 3 km from the British

Columbia–Alberta border in Banff National Park. This had been the only record west of Manitoba. By keying in on areas that matched Walker’s descriptions of this species’ habitat—small, spring-fed boggy streams “following a devious course” in “glades in spruce forests”—3 locations in British Columbia were found: 2 in Yoho National Park, and 1 in Kootenay National Park.

L. forcipatus had been recently found in Washington State, the first record west of Montana (Paulson 1997). In Canada it was not known west of Saskatchewan (Walker 1953). We located it in the Bluewater Creek area, in the Rocky Mountain Trench north of Golden. It is possible that this species may be more widespread, as *L. forcipatus* looks much like the widespread and abundant *L. disjunctus*. The males of the 2 species are virtually indistinguishable.

Two species were encountered frequently enough that they have been removed from the tracking list: *Coenagrion angulatum* (Fig. 1) and *Ischnura erratica*. *C. angulatum* previously had only been known from 1 site in the Dawson Creek area, but in 1997 it was found commonly in ponds, disturbed or otherwise, at a number of sites in northeastern British Columbia. In the rest of its range across the prairies it is a common pond or slough resident. Previous to the 1996 surveys of the Lower Mainland and southern Vancouver Island, *I. erratica* was considered “rare and local throughout its range [in B.C.]” (Cannings and Stuart 1977). The survey turned up this early-flying species in many new localities, including roadside ditches in suburban Vancouver!

Both *Aeshna tuberculifera* and *Somatochlora cingulata* (Fig. 2) remain on the list, but increased information about their range, habitat, and abundance has changed their rarity ranks from S2S3? to S3.

A number of species were either not found or found to be

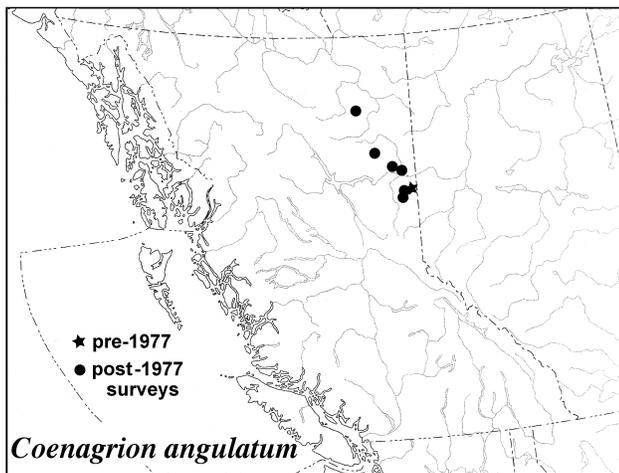


Figure 1. The present knowledge of the distribution of *Coenagrion angulatum* in British Columbia.

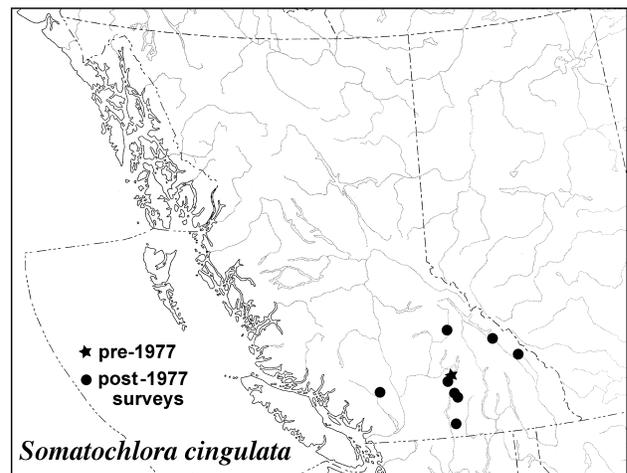


Figure 2. The present knowledge of the distribution of *Somatochlora cingulata* in British Columbia.

not very common or in threatened habitats. The ranks of these species either remained the same or were given a rank denoting that the species was rarer than previously thought. Species that were given a rarer ranking were *Somatochlora hudsonica* (S5 to S4S5), *S. septentrionalis* (S3S4? to S3?), *Erythemis collocata* (S2S3 to S2), and *Leucorrhinia patricia* (S3S4? to S3?). The change in the rank of *E. collocata* changes its provincial list status from Blue to Red.

In addition to increasing our knowledge of the rare species of dragonflies, we learned much more about the distribution, habitat requirements, and flight period of some of the more common species. A few examples of these are given here. *Somatochlora walshii* was only known from half a dozen locations, scattered throughout the southern half of the province. It soon became apparent that it could be found in many spring-fed wetlands with slow-moving water. *Nehalennia irene*, another example of an early-flying species missed by mid-summer entomologists, is now known from the northeast portion of the province, Vancouver Island, and in the Columbia Basin, and for a longer flying season than previously known. When *The Dragonflies of British Columbia* was published in 1977 (Cannings and Stuart 1977), this tiny, iridescent damselfly had only been found in the interior of the province and no further north than Terrace. *Aeshna subarctica* had always been assumed to be more common than the scanty records indicated, and these surveys confirmed this with many records from the Columbia Valley/Kootenays and northeastern portion of the province. Even though it was known from the southern Yukon (Cannings et al. 1991), *Somatochlora minor* had been only found in British Columbia south of 52°N. Several records now exist from as far north as the Fort Nelson area.

DISCUSSION

These surveys were done on a relatively small scale, primarily by 1 or 2 people for a limited amount of time over a single season, but even with this level of effort and with many more areas to survey, places to revisit, and species to look for, they have resulted in a much more defensible Red and Blue list.

Because we were able to visit some key sites repeatedly, we were able to obtain a good estimate of the relative numbers of each species, as well as good species lists for those sites. These initial baseline data can thus be used to monitor populations of dragonflies at these sites. There are also data to monitor specific species over a number of sites.

When the assemblages of observed dragonflies and their habitats are associated, one can begin to predict what species will occur in which habitats within a certain geographical range. This can be applied to the rare as well as the common species. The reverse is also true—certain dragonfly species can be used to predict wetland type. For example, if an *Argia vivida* is found, one can be certain that the waters

are spring-fed. Used in conjunction with vegetation, the presence of rare ecosystems can be predicted and defined.

A less tangible but very beneficial result was the fostering of interest amongst amateurs. We led dragonfly field trips for local naturalists and presented slide shows and offered informal information sessions. In addition, the results of these and other surveys will be gathered together to aid in the production of a field guide to the Odonata of the Pacific Northwest. A comprehensive field guide will make it easier and more rewarding for naturalists to identify dragonflies in the field, encouraging them and allowing them to provide reliable information about the group throughout the region. A parallel field where this has proven to be extremely useful has been ornithology; good field guides have enabled amateur birders to contribute useful and accurate data to the overall knowledge of ranges, habitats, and habits of many birds. Because of the large size of British Columbia and the seasonality of the Odonates, the recruitment of enthusiastic, well-informed amateurs is essential to complete the picture of dragonflies in the province.

These results highlight the value of intensive, targeted surveys and illustrate the dynamic nature of the ranked lists. This is, of course, true for not only this group, but for all taxa. They not only fill in key blank spaces in our knowledge, but also focus future studies on species and regions for which there is still information lacking.

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Appendix A. The rare Odonata of British Columbia.

Scientific name	English name	Global	Provincial	
		Rank	Rank	List
FAMILY LESTIDAE				
<i>Lestes forcipatus</i>	Sweetflag Spreadwing	G5	S1S3	RED
FAMILY COENAGRIONIDAE				
<i>Argia emma</i>	Emma's Dancer	G5	S3S4	BLUE
<i>Argia vivida</i>	Vivid Dancer	G5	S2	RED
<i>Enallagma civile</i>	Familiar Bluet	G5	S1	RED
<i>Enallagma hageni</i>	Hagen's Bluet	G5	S3S4	BLUE
<i>Ischnura damula</i>	Plains Forktail	G5	S1	RED
FAMILY AESHNIDAE				
<i>Aeshna constricta</i>	Lance-tailed Darner	G5	S2S3	BLUE
<i>Aeshna tuberculifera</i>	Black-tipped Darner	G4	S3	BLUE
FAMILY GOMPHIDAE				
<i>Gomphus graslinellus</i>	Pronghorn Clubtail	G5	S2	RED
<i>Octogomphus specularis</i>	Grappletail	G4	S2	RED
<i>Ophiogomphus colubrinus</i>	Boreal Snaketail	G5	S3?	BLUE
<i>Stylurus olivaceus</i>	Olive Clubtail	G4	S2	RED
FAMILY PETALURIDAE				
<i>Tanypteryx hageni</i>	Black Petaltail	G3	S2S3	BLUE
FAMILY MACROMIIDAE				
<i>Macromia magnifica</i>	Western River Cruiser	G4	S3	BLUE
FAMILY CORDULIIDAE				
<i>Epitheca canis</i>	Beaverpond Baskettail	G5	S2S3	BLUE
<i>Somatochlora cingulata</i>	Lake Emerald	G5	S3	BLUE
<i>Somatochlora forcipata</i>	Forcinate Emerald	G5	S1S2	RED
<i>Somatochlora kennedyi</i>	Kennedy's Emerald	G5	S1S2	RED
<i>Somatochlora septentrionalis</i>	Muskeg Emerald	G5	S3?	BLUE
FAMILY LIBELLULIDAE				
<i>Erythemis collocata</i>	Western Pondhawk	G5	S2	RED
<i>Leucorrhinia patricia</i>	Canada Whiteface	G4	S3?	BLUE
<i>Libellula pulchella</i>	Twelve-spotted Skimmer	G5	S3	BLUE
<i>Pachydiplax longipennis</i>	Blue Dasher	G5	S2S3	BLUE
<i>Sympetrum vicinum</i>	Yellow-legged Meadowfly	G5	S3S4	BLUE

