
Appendix 5.4.15B

American Emerald Species Account

PROJECT NAME: *Blackwater*

Scientific Name: *Cordulia shurtleffii*
Species Code: IO-CORSHU
Status: Yellow-listed (not of conservation concern in British Columbia)

1.0 DISTRIBUTION

Provincial Range

American Emerald is distributed throughout most of BC (Cannings and Stuart, 1977; Cannings 2002). The available records are primarily from the E-Fauna BC database of dragonfly and damselfly records, with some additional central BC records from the Project's Environmental Assessment and some from inventory near Bear Lake north of Prince George.

Elevational Range

Elevation is as low as near sea level on the coast, from the E-fauna BC distribution map. The upper elevational limit is unknown because most available records do not include the elevation. It is likely to occur at least occasionally in the subalpine (extrapolated from habitat).

Adult Flight Season

The adult flight season is early May to late August, occasionally to early September. They are most abundant from late May to late June (Cannings and Stuart, 1977).

Provincial Context

American Emeralds apparently occur throughout BC where appropriate habitat is present. The habitat is forest lakes and wetlands, especially sphagnum bogs (Cannings and Stuart, 1977). In the Davidson Creek area they frequently occur in sedge fens along the edge of lakes and streams; there are relatively few bogs in the area (C. Guppy, unpubl. observ.). The total distribution within central BC is presumably correlated with the occurrence of appropriate habitat.

Project Area

The Project area is on the Fraser Plateau from Mount Davidson in the south to Highway 16 in the north. This species-habitat model is concerned only with the central BC populations within the area of the Project (mine and transmission line study areas). The area considered in this Project is limited to the following:

Ecoprovince:	Central Interior
Ecoregions:	Fraser Plateau / Central Canadian Rocky Mountains
Ecosections:	Nazko Upland (NAU); Bulkley Basin (BUB) / Nechako Lowland (NEL)

Biogeoclimatic Zones: SBS; SBPS; ESSF

Project Map Scale: 1:20,000

2.0 ECOLOGY AND KEY HABITAT REQUIREMENTS

American Emeralds fly and breed in non-forested bogs and sedge-dominated fen wetlands (Cannings and Stuart 1977; C. S. Guppy, unpub. observ.). The wetlands may occur as thin strips along the edge of a stream, pond, or lake. Adults observed away from these habitats are considered to be foraging for food (flying insects).

The herbaceous layer of fen habitats is dominated by sedges (*Carex* sp.) and that of bogs is dominated by peatmosses (*Sphagnum* sp.). **Table 1** summarizes the key habitat features.

The adult flight period, and therefore the breeding period, extends from early May to early September, with inter-year variation depending on warmth of the summers. Only one generation of adults flies each year (univoltine). The species is common every year in good habitats.

American Emeralds are not territorial. Males patrol patches of reproductive habitat, flying about 1 m above the water surface and aggressively chasing off males of their own and similar species (Cannings and Stuart, 1977; Cannings, 2002). Females are less often seen, generally staying low along the surface of the habitat, frequently amongst vegetation, so that, once mated, they are less visible to males and predators.

Table 1. Important habitat features for American Emerald

Season	Habitat Feature
All	<ul style="list-style-type: none"> • Sphagnum bog or sedge fen wetland • Non-forested • Sedge (<i>Carex</i>) or peatmoss (<i>Sphagnum</i>) moss dominant in herbaceous layer

3.0 HABITAT USE: LIFE REQUISITES

Living

The life requisite that is rated for American Emerald is 'Living', which is satisfied by the presence of suitable larval and adult habitats, as described in detail below.

Larval (Naiads) Habitat

Eggs and naiads of American Emerald are aquatic, frequently in very cold water. The naiads live in ponded water in submerged vegetation and woody debris on the bottom of lakes or bogs. They do not actively pursue prey but wait for it pass by. Prey are other aquatic fish and sometimes small fish. Naiads may require several years to mature, and typically emerge as adults at night (Paulson, 1999).

Adult Feeding / Security / Reproduction Habitat

The adults feed by capturing flying insects over their reproductive habitat or in forest openings nearby. They will eat almost any soft-bodied flying insect. Males patrol along the water's edge searching for females, and chase away other males. After mating, the male detaches and the female lays her eggs by dipping the tip of her abdomen on the surface of the water while hovering above it (Paulson, 1999).

4.0 SEASON OF USE

American Emerald is a year-round resident of any habitat patch in which it occurs. Adults are typically in flight from early May to early September, mate, and lay eggs at that time. The eggs likely hatch within a few weeks, and the larvae (nymphs) feed on aquatic insects until the water cools in late summer. The larvae are then dormant through fall and winter until the water warms in spring. When mature, the larvae crawl out of the water, typically on stems or leave so emergent plants. Once out of the water, they molt into the adult form.

Within a patch of habitat, eggs are present in early to mid-summer, larvae are present at almost all times, and adults are present in early to mid-summer. Therefore, only one all-season rating is used. **Table 2** summarizes the life requisites required for each month of the year.

Table 2. Monthly Life Requisites for American Emerald

Month	Season*	Life Requisites	Specific Time Period for Life-Stages
January	Winter	Living	Dormant larvae
February	Winter	Living	Dormant larvae
March	Winter	Living	Dormant larvae
April	Winter	Living	Dormant larvae
May	Spring	Living	Larvae; Adults
June	Spring	Living	Adults; eggs; larvae
July	Summer	Living	Adults; eggs; larvae
August	Summer	Living	Adults; eggs; larvae
September	Fall	Living	Adults; eggs; larvae
October	Fall	Living	Dormant larvae
November	Winter	Living	Dormant larvae
December	Winter	Living	Dormant larvae

*Seasons defined as per the Chart of Seasons (Ministry of Environment, Lands and Parks, 1999).

5.0 HABITAT USE AND ECOSYSTEM ATTRIBUTES

Table 3 outlines how each life requisite relates to specific ecosystem attributes.

Table 3. Terrestrial Ecosystem Mapping (TEM) Relationships for each Life Requisite for American Emerald

Life Requisite	TEM Attribute
Living Habitat (eggs, larvae, adults)	• Wetland type

6.0 RATINGS

There is an intermediate level of knowledge on the habitat requirements of American Emerald in BC and therefore, a 4-class rating scheme is used.

Provincial Benchmark

There is no existing provincial benchmark. No specific geographic area within the overall range of American Emerald in central BC is known to be better than others; instead, various qualities of habitat occur over the entire range. It is assumed that optimal patches of habitat occur in the SBS and SBPS in one ecosection:

Ecosection: Nazko Upland (NAU)
 Biogeoclimatic Zones: SBS; SBPS
 Habitats: Sphagnum bogs and sedge fens

Ratings Assumptions

- Units consisting of *Sphagnum* bogs or sedge fens will be rated 'moderate' to 'high' living habitat.
- Units consisting of other non-forested wetland types will be rated 'nil' to 'low' living habitat.
- Units consisting of forested wetland types, and terrestrial habitats, will be rated 'nil' living habitat.

Table 4 summarizes the habitat requirements for American Emerald in the study area for the seasons and life requisite being modelled.

Table 4. Habitat Requirements for American Emerald

Season	Life Requisite	Structural Stage	Crown Closure	Requirements
All Seasons	Living	1	0	Sphagnum bog or <i>Carex</i> sedge-dominated fen wetland.

7.0 RATINGS ADJUSTMENTS

Ratings adjustments (downward) may be required for the following habitat patches:

- Small habitat patches;
- Fens along streams rather than ponds/lakes.

8.0 LITERATURE CITED

- Cannings, R.A. 2002. Introducing the Dragonflies of British Columbia and the Yukon. Victoria, BC: Royal British Columbia Museum. 96 pp.
- Cannings, R.A. and K.M. Stuart. 1977. The dragonflies of British Columbia. British Columbia Prov. Museum Handbook No. 35. Victoria, BC. 254 pp.
- Paulson, D.R. 1999. Dragonflies of Washington. Seattle Audubon Society, Seattle, WA, 32 pp.