4-1-2003

Butterflies of the North Okanagan, British Columbia, Canada

David L. Threatful
Vernon, British Columbia, Canada

Volume 4 **1 April 2003** **Number 2**

The Taxonomic Report

OF THE INTERNATIONAL LEPIDOPTERA SURVEY

BUTTERFLIES OF THE NORTH OKANAGAN, BRITISH COLUMBIA, CANADA

DAVID L. THREATFUL
#14 -1501-32nd St., Vernon, B.C.V1T 5K4 Canada

Abstract. An annotated list of 106 species of butterflies known to occur in the north Okanagan area of British Columbia, Canada is presented. Information is provided on flight phenology, elevation and habitat for each species. Field work over the past 100 years shows that this is one of the premiere areas in Canada for butterfly species diversity. More than one third of all known Canadian butterflies have been found in this small area.

Additional key words: biodiversity, conservation, taxonomy.

INTRODUCTION

The butterfly fauna of British Columbia has been described as part of larger geographic areas in sundry books (e.g. Guppy and Shepard 2001, Layberry et al. 1998, Scott 1986). But considering the size (90 million hectares) and lengthy history of butterfly study in the province; the butterfly fauna of specific areas has been poorly documented. Some areas that have received local treatments are the Peace River area (Kondla et al. 1994), Pend-d'Oreille valley (Kondla 1999), Glacier and Mount Revelstoke National Parks (Threatful 1982, 1989), Cherry Creek (Threatful 2000a), Red Mountain (Threatful 2000b), Chilcotin grasslands (Fischer et al. 2000), Lillooet area (McDunnough 1927), Kootenay region (Dyar 1904), Kootenay Lake (Schmidt 1996), Forbidden Plateau (Hardy 1954) and Shuswap (Buckell 1947). Previous literature specific to the butterflies of the north Okanagan is limited to Downes (1918) and Threatful (2001). Blackmore (1920, 1921) and Llewellyn-Jones (1951) mention some butterfly records from Vernon and Armstrong. The information contained in this report is primarily from my field notes and specimens I collected 1970 - 2002. I visited more than 49 discrete sites on various dates and many sites were sampled repeatedly over the years.

Supplemental information was garnered from the insect collection of the BC Ministry of Agriculture, Fisheries and Food (BCMAFF) in Kelowna through the courtesy of Hugh Philip. The collection had been in the office of the Provincial Entomologist in Vernon but when that office was closed the collection was transferred to BCMAFF, Kelowna. Butterfly specimens in the BCMAFF collection were taken between 1903 and 1932, primarily by staff of the former Provincial and Federal entomology offices in Vernon. The early entomologists who contributed to the BCMAFF collection were C. Bigland; N.L. Cutler; E.A. Rendell; M.H. Ruhmann - resided in Vernon 1912-43, Provincial Entomologist 1935-42 (Riegert, 1991); N.W. Ruhmann; R.C. Treherne - resided in Vernon 1914-22, Head, Field Crop Insect Laboratory,Vernon 1914-22 (Riegert, 1991); R.C. Woodward; and I. J. Ward - resided in Vernon 1912-47, Provincial Entomologist 1943-47 (Riegert, 1991). From this collection I have been able to include 84 new records (locations/dates) and three new species of butterflies collected in the north Okanagan. Personal collection data was also provided by C.S. Guppy and N.G. Kondla. The Canadian Biodiversity Information Facility was searched by N.G. Kondla for additional historical records.

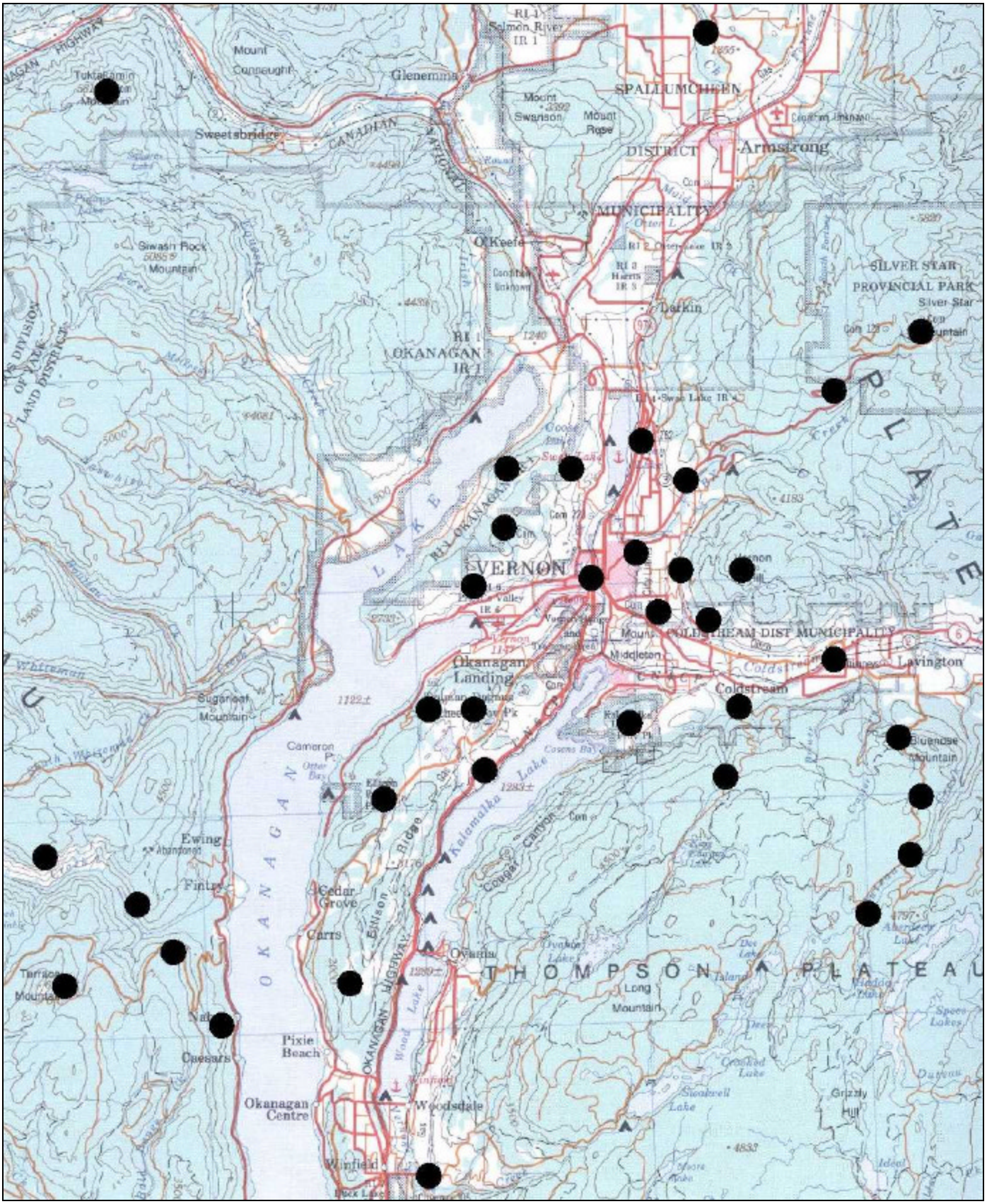

Figure 1. Map of the study area showing the approximate location of many of the specific sites where observations were made or voucher specimens were collected. Map scale: 1 cm = approximately 2.6 km

The earliest known butterfly records for the study area are by J. Fletcher in 1899 in the vicinity of Vernon and include specimens of *Lycaena helloides* and *Cercyonis sthenele*. One or more voucher specimens are in the collection of the University of Guelph and the Canadian National Collection. A number of additional people have collected butterflies in the study area over the years: E. Anderson, R.G. Bartman, R.A. Cannings, R. Carcasson, J. Carr, J.K. Cooper, E. Fuller, A.N. Gartrell, J.L. Gordon, C. Guiget, G.A. Hardy, G.E. Hutchings, S. Ife, J. K. Jacob, G.H. Larnder, J.R. Lewellyn-Jones, A.P. Mackie, R.P. Nelson, J. Reichel, E.A. Rendell, G.B. Straley, A. Tate, E.P. Venables; J.B. Wallis.

The subspecies designations should be treated with caution because the taxonomic status of a number of species in this area is only poorly known. Figure 1 shows the approximate location of the major sites within the study area where butterflies have been observed or collected. The study area covers approximately 1900 km^2.

The common names for the butterflies conform to those provided in Guppy and Shepard (2001). Zoological names are not drawn from one source but have been mostly researched individually to determine the most reasonable taxonomic interpretation and resulting nomenclature. I follow Johnson (1992) for the callophryne elfins and Balint and Johnson (1997) for the polyomatine blues. Common names for plants are used throughout, with the corresponding botanical names provided on first use of the name.

Specimens of nearly all the butterfly taxa documented in this paper are in a representative collection that I have donated to the north Okanagan Naturalists Club. The Vernon Museum, as custodian of the collection, has provided specialized cabinets to house the collection for viewing and study.

NORTH OKANAGAN ECOSYSTEMS

In British Columbia two ecosystem classification systems widely in use – the biogeoclimatic ecosystem classification and the ecoregion classification systems. The differences and similarities between the two systems have been well described by Harding and McCullum (1994). For this brief overview of the study area ecosystems, I have chosen to use a modified version of the biogeoclimatic classification (Meidinger and Pojar 1991). The study area is on the Thompson Plateau of the north Okanagan Valley.

The ecosystems have characteristic mean annual precipitation regimes, elevation ranges, and seasonal temperatures. These physical characteristics determine in part the presence of associated flora including those species of plants used by butterflies for larval food and nectar sources for the adults. The mean annual precipitation at low elevation Vernon is 30 – 40 cm; that at high elevation on Silver Star Mountain is 40 – 50 cm (Farley, 1979). I refer to four elevation zones in the habitat descriptions and in the species accounts: low elevation (400m - 450m); moderate elevation (450m - 1070m); moderately high elevation (1070m - 1590m), and high elevation (1590m+).

Subalpine Forest

Subalpine Forest occurs at the highest elevations found in the north Okanagan. At these elevations, Subalpine Fir (*Abies lasiocarpa*) and Engelmann Spruce (*Picea engelmannii*) are the predominant trees species with Whitebark Pine (*Pinus albicaulis*) established on the drier sites, as on Terrace Mountain near Fintry. Subalpine meadows, with a rich assortment of plant species whose flowers are both colourful and major nectar sources, are characteristic of the higher elevation subalpine forests. Spotted saxifrage (*Saxifraga bronchialis*) is present and stonecrop (*Sedum* spp) is abundant on rocky sites. Ragwort (*Senecio* spp), Indian paintbrush (*Castilleja* spp), arctic lupine (*Lupinus arcticus*), subalpine daisy (*Erigeron peregrinus*), and Sitka valerian (*Valeriana sitchensis*) grow in the subalpine meadows, with Indian Hellebore (*Veratrum viride*) common along streambeds and seepage slopes. However, species vary with locality and aspect. For example, columbian monkshood (*Aconitum columbianum*) is present on Silver Star Mountain, but not on most other mountains in the area. Silver Star Mountain also has shrubs like blue-

berries (*Vaccinium* spp) and white flowered rhododendron (*Rhododendron albiflorum*). On Terrace Mountain, at 1904 metres, whitebark pine grows in the rocky open subalpine habitat on south facing slopes, while Engelmann spruce mixed with subalpine fir grows on the north facing slopes.

Four butterflies characteristic of the subalpine forests are the Opis Fritillary (*Speyeria mormonia opis*), the Hydaspe Fritillary (*Speyeria hydaspe rhodope*), Vidler's Alpine (*Erebia vidleri*), and the Lilac-bordered Copper (*Lycaena nivalis browni*).

Mountain Forest

Mountain Forest covers extensive areas of the north Okanagan. It is an intermediate biogeoclimatic zone between the subalpine forest above and the interior Douglas fir forest below. This ecosystem occupies much of the Thompson Plateau. Highest elevations of this zone are often dominated by Engelmann spruce and Engelmann X white spruce hybrids. Shrubs such as Labrador tea (*Ledum groenlandicum*) appear frequently in bogs, while soopallalie (*Shepherdia canadensis*) is abundant on drier sites of semi-open forests. Lodgepole pine (*Pinus contorta*) and Douglas fir (*Pseudotsuga menziesii*) are frequent fire-successional species.

At lower elevations (ca. 600 m) on north facing slopes and at moderate elevations (ca. 1150 m) the forest is highly transitional in nature. The forests here are mostly a mix of western larch (*Larix occidentalis*), western red cedar (*Thuja plicata*), lodgepole pine and Douglas fir. Drier areas support shrubs like raspberry (*Rubus* ssp) and thimbleberry (*Rubus parviflorus*). Fireweed is often very abundant on logged and burned sites. On southwest facing slopes the interior Douglas fir forest occurs at higher elevations than does mountain forest at lower elevations on north facing slopes.

Butterflies characteristic of the Mountain Forest include the Chryxus Arctic (*Oeneis chryxus chryxus*), the Pink-edged Sulphur (*Colias interior*), the Persius Duskywing (*Erynnis persius*), Freija Fritillary (*Boloria freija*), Western Meadow Fritillary (*Boloria epithore chermocki*), Cedar Hairstreak (*Mitoura rosneri*), Margined White (*Pieris marginalis reicheli*), Stella's Orange-tip (*Anthocharis stella*), Roadside Skipper (*Amblyscirtes vialis*) and the Anna's Blue (*Plebejus anna*).

Interior Douglas-fir Forest

The Interior Douglas-fir Forest covers a large area of the north Okanagan. In the north Okanagan it is above the Ponderosa Pine forests, where it merges into the Mountain Forest. It also extends down to lower elevations, to 400m, on the north-facing slopes of the Thompson Plateau, north and east of Kalamalka Lake. Douglas-fir is the predominant tree species. In some localities and at higher elevations western larch (*Larix occidentalis*) blends from this ecosystem into that of the Mountain Forest. Douglas maple (*Acer glabrum*) grows at low elevations in the openings on north-facing slopes and black cottonwood (*Populus balsamifera trichocarpa*) occurs along sunny riparian areas. In open sunny clearings occur shrubs such as soopollalie, ocean spray (*Holodiscus discolor*), and redstem ceanothus (*Ceanothus sanguineus*). In sunny openings in the forest occur flowering plants such as heart-leaved arnica (*Arnica cordifolia*), tiger lily (*Lilium columbianum*), red columbine (*Aquilegia formosum*), and Solomon's –seal (*Smilacina* spp). Pinegrass (*Calamagrostis rubescens*) and rough-leaved ricegrass (*Oryzopsis asperifolia*) occur in grassy openings with red Indian paintbrush (*Castilleja miniata*). Stonecrop is common in sunny breaks on south-facing slopes. On dry sites of south facing lopes adjacent to Douglas-fir forests are grasslands characterized by bluebunch wheatgrass (*Agropyron spicatum*) and rough fescue (*Festuca scabrella*) growing with big sagebrush (*Artemisia tridentata*). Big sagebrush can be locally abundant where soil conditions permit. Flowering plants are similar to those of the Ponderosa Pine ecosystem grasslands, and include silky lupine (*Lupinus sericeus*), arrow-leaved balsamroot (*Balsamorhiza sagittata*), and creamy buckwheat (*Eriogonum heracleoides*).

Butterflies that occur in the dry grasslands include the Nevada Skipper (*Hesperia nevada*), the Desert Marble (*Euchloe lotta*), and the Rocky Mountain Apollo (*Parnassius smintheus magnus*). Butterflies in the sunny forest openings include the Northern Cloudywing (*Thorybes pylades*) and Lorquin's Admiral (*Limenitis lorquini itelkae*).

Ponderosa Pine Forest and Grassland

Forests dominated by ponderosa pine (*Pinus ponderosa*) occupy the valley bottoms from Okanagan and Kalamalka Lakes northward through Armstrong. There it gives way in a transitional zone to the Interior Douglas-fir forests and the wetter western red cedar and western larch forests. Plants of the dry south-facing slopes are mostly shade intolerant species including balsamroot, saskatoon (*Amelanchier alnifolia*), smooth sumac (*Rhus glabra*), mock orange (*Philadelphus lewisii*) and chokecherry (*Prunus virginiana*). These species usually grow among the rocky outcrops with ponderosa pine on steeper terrain. In some areas bluebunch wheatgrass is still present among open stands of pine but is being replaced by two grasses; rough fescue on the dry to moist sites and Idaho fescue (*Festuca idahoensis*) on cooler, north-facing slopes.

Dry grasslands occur at the periphery of the Ponderosa Pine ecosystem, and are dominated by bluebunch wheatgrass. Other plants include silky lupine, creamy buckwheat, balsamroot, and sagebrush buttercup (*Ranunculus glaberrimus*). Where soil conditions are favorable big sagebrush is present. Tarragon (*Artemisia dracunculus*) is abundant on the open slopes. Black hawthorn (*Crataegus douglasii*) is common in the moister draws of the grasslands. Lake borders and riparian areas often have stands of black cottonwood.

Butterflies that fly in the open areas include the Great Basin Woodnymph (*Cercyonis sthenele sineocellata*), the Western Pine Elfin (*Incisalia eryphon*). The Oreas Anglewing (*Polygonia oreas threatfuli*) occurs mainly in riparian habitats in dry Douglas fir and Ponderosa Pine Forest where *Ribes* spp. are present. Butterflies found in the dry grasslands include Sheridan's Hairstreak (*Callophrys sheridanii neoperplexa*), the Arrowhead Blue (*Glaucopsyche piasus toxeuma*), the Oregon Swallowtail (*Papilio bairdii oregonius*), and the Common Sootywing (*Pholisora catullus*).

Abundance

The five terms used to describe abundance are as follows:

1. Common: A species usually encountered in numbers of >10 each day during its flight period.
2. Uncommon: A species encountered in small numbers <10 each day during its flight period.
3. Rare: A species encountered only on a few days during its flight period.
4. Extremely rare: A species not seen in most years with few records for any given location.
5. Local: A species known only from restricted localities and habitats. It may be further designated as common or rare depending upon the circumstances.

These terms are all relative. They may only apply in an average year. A species population may be considerably reduced during wet or cold years and in some cases habitat destruction may decimate a population.

Flight Periods

Flight periods are fairly constant in seasonable years, as evidenced by the synchronous dates for both the historic and present day collections. Early in the butterfly season, overwintering species only fly on sunny warm days of late February and March. During inclement weather there is no butterfly activity. Weather can delay or advance emergence by two to three weeks.

SPECIES ACCOUNTS

Specific flight dates are given only for the historic records from BCMAFF to provide a published record and a few other records of note. Abbreviations for institutional record credits are: Canadian National Collection of Insects and Arthropods (CNC), Royal British Columbia Museum (RBCM), Royal Ontario Museum (ROM). Records from the Canadian Biodiversity Information Facility (http://www.cbif.gc.ca/home_e.php) which repeat my own or other local records are not repeated here since they are easily retrievable.

SKIPPERS, FAMILY HESPERIIDAE

Northern Cloudywing - *Thorybes pylades* (Scudder)
Records: Vernon; Cosens Creek, northeast side of Kalamalka Lake 730m. **Habitat:** flies in open sunny clearings, roadsides, and edges of Douglas-fir forests at moderate elevations. It can be found on moist ground, usually in small numbers. Absent from open dry grasslands. **Flight period:** May to early July.

Dreamy Duskywing - *Erynnis icelus* (Scudder and Burgess)
Records: Vernon; Bella Vista 595m; Ellison Ridge 600 m. **Habitat:** moderate elevations, in grassy areas at forest edges and in gullies, often where there are willows and aspen groves. Absent from open, dry grasslands. **Flight period:** mid-May to early July.

Pacuvius Duskywing - *Erynnis pacuvius lilius* (Dyar)
Records: Spionkop Hill on Ellison Ridge 750m **Habitat:** absent from the open, dry grasslands. It flies in open dry, rocky areas with snowbrush (*Ceanothus velutinus*) in Ponderosa pine forests located at moderate elevations. **Flight period:** late May through June. **Note:** In BC this is generally viewed as a rare and local species but it is likely more widespread and abundant than records suggest due to the ease with which it can be overlooked while flying with other *Erynnis* species.

Persius Duskywing - *Erynnis persius* (Scudder)
Records: Vernon; Vernon Hill, east of Vernon, 1160m; King Edward Lake, southeast of Vernon, 1340m; Cosens Bay, Kalamalka Lake Prov. Park 400m; Aberdeen Lake road; Goose Lake; Shorts Creek canyon; Ellison Ridge; Silver Star Mtn. (ROM). **Habitat:** flies in a wide range of habitats at low to moderately high elevations. In the spring, low elevation sites include the open grasslands as well as openings at forest edges, roadsides, clearings, and damp ground at lakeshores. At moderate elevation, such as Vernon Hill it flies in lupine-rich grasslands adjacent to stands of Douglas-fir. At moderately high elevations, such as the King Edward Lake area, it frequents open fen edges. **Flight period:** May to early July.

Two-banded Checkered Skipper - *Pyrgus ruralis* (Boisduval)
Records: Vernon Hill, 1220m; Kalamalka Lake 550m; Aberdeen Lake road 1250m; Silver Star Mtn. road 1150m; Armstrong (CNC) **Habitat:** flies near forest edges, clearings and roadsides at moderate to moderately high elevations; no records for lower elevations or open dry grasslands. **Flight period:** late April through June.

Checkered Skipper - *Pyrgus communis communis* (Grote)
Records: known only from a few historical records by N.W. & M.H. Ruhmann and R.C. Woodward at Vernon in 1918. **Habitat:** no habitat information exists with the historical specimens; lack of subsequent records suggests the species may no longer be present in the study area. **Flight period:** The historical records are dated July 7, August 13 and August 19.

Common Sootywing - *Pholisora catullus* (Fabricius)
Records: West side of Kalamalka Lake, 400m; Kalamalka Lake Prov. Park 456m. **Habitat:** low, open, dry areas of the grasslands, and along lakeshores, roadsides and trails. **Flight period:** at least two generations per year; from April through September.

Arctic Skipper - *Carterocephalus palaemon* (Pallas)
Records: Kalamalka Lake Prov. Park 400m; Aberdeen Lake road 1250m. **Habitat:** occurs at low to moderate elevations, usually flying over open wet grassy margins along roadsides and near forest edges. Also occurs in forest clearings with grass, often in wet areas. The Kalamalka Lake record consisted of three specimens flying in grassy areas with a mix of shade and sun. Absent from the open dry grasslands of the north Okanagan. **Flight period:** late May to July, depending on elevation.

Garita Skipperling - *Oarisma garita* (Reakirt)
Records: Vernon, VI-19-1906. (collector unknown); contemporary presence in the study area is questionable. **Habitat:** extremely rare and local, with only the one record. Likely habitats would be grassy margins bordering small ponds and in grassy open areas at moderate elevations with stands of aspen, Douglas-fir and/or ponderosa pine. **Flight period:** mid-June to early July. **Note**: In contrast to the north Okanagan it can be common in the south Okanagan (eg. White Lake) in favorable years (D. St. John pers. comm.).

European Skipper - *Thymelicus lineola* (Ochsenheimer)
Records: Vernon 400m; Silver Star Mtn. 1650m; Ellison Ridge 600m; Aberdeen Lake road 1250m. **Habitat:** A common introduced species that was first discovered near London, Ontario in 1910, and since the 1950's has become widespread across Canada and the northern US. This European immigrant is rapidly spreading throughout BC. The initial movement is unclear but specimens were first observed in Sicamous in 1980 (Procter 1981) and then in the north Okanagan where it occurs at low to moderate elevations. Open grassy areas such as roadsides, railway right-of-ways, hayfields and other agricultural and urban areas where the native grass species have been replaced by introduced species. It has not been found in the open dry grasslands. **Flight period:** It flies from June into July.

Juba Skipper - *Hesperia juba* (Scudder)
Records: Bella Vista area 620m; commonage on Ellison Ridge 580m. **Habitat:** found in open sagebrush and on damp ground trampled by cattle. Elsewhere in BC it has been found in a variety of different habitats and can be easily seen nectaring on rabbit brush (*Chrysothamnus*) during the late summer-fall flight. **Flight period:** May in this study area but no September observations yet due to insufficient late season fieldwork.

Western Branded Skipper - *Hesperia colorado idaho* (W.H. Edwards)
Records: Goose Lake 500 m; Bella Vista area 790m; Shorts Creek canyon 1400m; Aberdeen Lake road 1250m; Silver Star Mtn. 1650m. **Habitat:** flies at low to moderate elevations, usually along roadsides and open dry forest edges. Nectars on knapweed and gathers on damp ground. **Flight period:** June through September. **Note:** Often flies with *Ochlodes sylvanoides* during summer months and early fall. Taxonomy and nomenclature follows Scott (1998).

Nevada Skipper - *Hesperia nevada* (Scudder)
Records: Vernon, VIII-1904 (collector unknown); Bella Vista area 790m; Goose Lake 550m. **Habitat:** flies locally over open rocky ridges in moderate elevation areas with dry grasslands and big sagebrush. Often occurs with *Callophrys affinis.* **Flight period:** mid-May to early June.

Peck's Skipper - *Polites peckius* (Kirby)
Records: northeast side of Kalamalka Lake 580m; Aberdeen Lake road 1250m. **Habitat:** The one specimen taken near Kalamalka Lake was from a small grassy meadow. Rare in the study area and it is absent from the dry grasslands. **Flight period:** mid-June to July.

Sandhill Skipper - *Polites sabuleti* (Boisduval)
Records: Ellison Ridge 640m; Silver Star Mtn 1650m. **Habitat:** Known from only two individuals; one in grassland and the other from a ski area parking lot. **Flight period:** Probably late May through June. **Note:** This is generally viewed as a rare species in BC. In 2001 I found it common in a spring flight and a late summer flight near Osoyoos in the south Okanagan.

Long Dash Skipper - *Polites mystic* (W.H. Edwards)
Records: Lower Shorts Creek valley, 580 m; Aberdeen Lake road, 1250 m. **Habitat:** The Shorts Creek valley site is dry grassy meadow, while the Aberdeen Lake road site is a wet grassy area. **Flight period:** mid June into early July.

Tawny-edged Skipper - *Polites themistocles turneri* (Freeman)
Records: Vernon, 28-VI-1903 (collector unknown); Bella Vista area 700m; Goose Lake 500m; Aberdeen Lake road 1250m; Armstrong (RBCM). **Habitat:** flies at moderate elevations over the wet grassy margins of small ponds and in open grassy areas in stands of aspen. Absent from the open dry grasslands. **Flight period:** mid-June into early July.

Woodland Skipper - *Ochlodes sylvanoides* (Boisduval)
Records: Vernon, 15-VIII-1932, 16-VIII-1932 (collector unknown); Goose Lake 500m; Kalamalka Lake Prov. Park 400m; Silver Star Mtn. 1650m; Lavington 535m. **Habitat:** very common in the open dry grasslands at low to moderate elevations. It visits damp ground in large numbers and often nectars on knapweed (*Centaurea* spp) and thistles (*Cirsium* spp). **Flight period:** July through September. **Note:** This species is the most abundant skipper during the summer and early autumn.

Roadside Skipper - *Amblyscirtes vialis* (W.H.Edwards)
Records: Vernon, 20-V-1904, 26-V-1905, VI-1907, 30-VI-1906 (collector unknown); 14-VI-1919 (M.H. Ruhmann); Silver Star Mtn. 1150m; Ellison Ridge 620m. **Habitat:** flies along forest roads, trails, forest clearings, and riparian areas at moderate elevations. Absent from the open dry grasslands of the north Okanagan. **Flight period:** mid-May to early July.

SWALLOWTAILS AND PARNASSIANS, FAMILY PAPILIONIDAE

Rocky Mountain Apollo - *Parnassius smintheus magnus* (Wright)
Records: Vernon VI-1905 (collector unknown); Vernon, 10-VI-1918 (M.H. Ruhmann); Vernon Hill 1160m; Terrace Mtn. 1905m; Silver Star Mtn. 1890m; Shorts Creek canyon 1500m; Aberdeen Lake road 1100m; Okanagan Landing (RBCM). **Habitat:** flies at moderate to high elevation sites with rocky ridges, and open rocky grassy slopes with its larval food plant, stonecrop. **Flight period:** mid-June through August, depending on elevation. **Note:** Most of the research for Guppy (1986) was completed on Vernon Hill and Silver Star Mountain.

Baird's Swallowtail - *Papilio bairdii oregonius* W.H. Edwards
Records: Vernon 1-VI-1909, 5-VIII-1909, 29-IV-1922 (M.H. Ruhmann); Goose Lake area 500m; Vernon Hill 1065 to 1250m; Kalamalka Lake Prov. Park 457m; Bella Vista area 790m; Ellison Ridge 600 to 900m; west side of Kalamalka Lake 400m. **Habitat:** flies over rocky, open areas and knolls in the dry grasslands at low to moderate elevations. Often seen on damp ground and during summer nectaring on thistles. Males occur in numbers on rocky hilltops above Goose Lake. **Flight period:** late April through September, with two generations per year. **Note:** Often treated as a subspecies of the European species *P. machaon*. Pyle (2002) treats *oregonius* as a full species.

Anise Swallowtail - *Papilio zelicaon* Lucas
Records: Vernon, 12-VII-1924 (E.A.Rendell); Bluenose Mtn. 1220m; one specimen was seen at Cosens Bay, Kalamalka Lake Prov. Park 400m; Silver Star Mtn. 1890m; Bella Vista area 790m; Aberdeen Lake road 1250m; Bluenose Mtn. 1213m; Shorts Creek canyon 1500m. **Habitat:** an uncommon species, flying at low to high elevations in open forest edges, subalpine meadows, mountain summits, and riparian areas. It frequents damp ground along forest roadsides. Males hilltop. In the spring it is often seen nectaring on common dandelion (*Taraxacum officinale*). **Flight period:** late April through early August, depending on elevation.

Canadian Tiger Swallowtail - *Papilio canadensis* Rothschild and Jordan
Records: Goose Lake area 500 m; One specimen observed at Kalamalka Lake Prov. Park 400m; Ellison Ridge 600m; Silver Star Mtn. 1150m; Shorts Creek canyon 1130m; Aberdeen Lake road 1250 m. **Habitat:** flies in open forest edges, riparian areas and clearings. It gathers in large numbers on damp ground. It has many nectar sources including spreading dogbane (*Apocynum androsaemifolium*) and tiger lily. **Flight period:** late May through early July. However, the one specimen seen in late September at Cosens Bay was in perfect condition.

Western Tiger Swallowtail - *Papilio rutulus rutulus* Lucas
Records: Ellison Ridge 580 to 650m; Kalamalka Lake Prov. Park 400m; Shorts Creek Canyon 580m. **Habitat:** flies in open sunny places, in similar habitat as *P. canadensis* with which it is reported to hybridize. Both species and the

hybrid can be seen on wet ground along the shoreline at Cosens Bay. It has many nectar sources including mock-orange and american vetch. **Flight period:** late May through early July.

Pale Swallowtail - *Papilio eurymedon* (Lucas)
Records: Vernon 31-V-1907 (collector not known); Ellison Ridge 750 to 914m; Bluenose Mtn. 1215m; Shorts Creek canyon 580 m; Kalamalka Lake Provincial Park 400m; Bluenose Mtn. 1213m; Aberdeen Lake road 1250m. **Habitat:** low to moderately high elevations in the cooler Douglas-fir areas where it inhabits open forest edges in association with redstem ceanothus. It frequents moist areas along lake shorelines. Males hilltop. Various nectar sources include red columbine and orange honeysuckle. **Flight period:** late May to early July, although the specimen observed at Cosens Bay in September was in perfect condition.

Two-tailed Swallowtail - *Papilio multicaudatus pusillus* Austin and Emmel
Records: Vernon, 13-VI-1927 (I.J. Ward); Goose Lake area 500m; Kalamalka Lake Prov. Park 400m; Ellison Ridge 580m. **Habitat:** forest edges, riparian areas, clearings, and open sunny places. It frequents moist ground and takes moisture along lake shores. At low to moderate elevations it often flies high above its larval food plant, chokecherry. Nectar sources include thistles. **Flight period:** late May through August. **Note:** Individuals of this species are the largest of the swallowtails in western Canada.

WHITES AND SULPHURS, FAMILY PIERIDAE

Pine White - *Neophasia menapia tau* (Scudder)
Records: Silver Star Mtn. 1150m and 1650m; Shorts Creek canyon 1524m; Lavington (CNC); Oyama (RBCM). **Habitat:** most often seen at open forest edges including those in the subalpine, roadsides, and clearings. It takes nectar from asters. The larval food plant is ponderosa pine as well as other conifer species within its range. In some years the adults are abundant around these host trees. **Flight period:** mid-July to mid-September.

Becker's White - *Pontia beckerii* (W.H. Edwards)
Records: Goose Lake 500m, Coldstream 500m (R.P. Nelson). **Habitat:** It is rare at moderate elevations. **Flight period:** July.

Spring White - *Pontia sisymbrii flavitincta* (Comstock)
Records: Vernon, 1-V-1920 (M.H. Ruhmann); Kalamalka Lake Prov. Park 455m; Vernon Hill 1189m; Shorts Creek canyon 1067m; Winfield area 500m; Bella Vista area 750m; Kalamalka Lake 490m; Ellison Ridge 670 m. **Habitat:** low to moderate elevations in dry open grasslands, rocky ridges near open forests, and on wet ground along roadsides. **Flight period:** mid-April to May. **Note:** Local populations of the Spring White fluctuate yearly from common to rare.

Western White - *Pontia occidentalis occidentalis* (Reakirt)
Records: Vernon, VI-1905 (not identified); Vernon, 16-IX-1932 (C. Bigland); Goose Lake 500m; Kalamalka Lake 400m; Shorts Creek Canyon 1524m; Terrace Mtn. 1904m; Aberdeen Lake road 1250m; Silver Star Mtn. 1890m; Bella Vista area 750m; Ellison Ridge 914m; Winfield (CNC). **Habitat:** It occurs from low to high elevations in open dry grasslands, open forest edges, roadsides, agricultural lands, and on mountain summits. The spring generation is local and rare. The summer generation flies in alfalfa fields during the late summer and early fall along with *Colias eurytheme* and *C. philodice.* It nectars from asters as well as alfalfa. **Flight period:** mid-April to September, or early October in some years, with usually two generations per year. **Note:** Adults of the first generation in the spring are smaller and have darker veination on the ventral hind-wing than those of the summer generation.

Cabbage White - *Pieris rapae* (Linneaus)
Records: Vernon, IX-1914 (M.H. Ruhmann); Vernon, IX-1917 (M.H. Ruhmann); Vernon, 6-VIII-1920 (N.L. Cutler); Goose Lake 500m; Ellison Ridge 580m; Kalamalka Lake 456m; Aberdeen Lake road 1250m; Armstrong area 480m; Silver Star Mtn. 1650m. **Habitat:** This species was introduced from Europe into Quebec about 1860 and rapidly extended its range throughout North America. It occurs in all habitats, particularly agricultural lands and in

urban areas at lower elevations. It frequents damp earth. It takes nectar from alfalfa and many other plants. **Flight period:** mid-April to early October, with two generations per year.

Margined White - *Pieris marginalis reicheli* Eitschberger
Records: Silver Star Mtn. Road 1585m, 1650 m and 1150m; Vernon Hill 1219m; Aberdeen Lake road 1250m. **Habitat:** It inhabits forest openings, clearings, forest edges, and roadsides in the sub-alpine and mountain forest ecosystems, but not in the lower elevation open dry forests and grasslands. In the spring dandelions are a nectar source. **Flight period:** mid-April to August, with two generations per year.

Large Marble - *Euchloe ausonides* (Lucas)
Records: Goose Lake 520m; Kalamalka Lake Prov. Park 500m; Ellison Ridge 730 and 600m; Shorts Creek canyon 1097m; Armstrong 480m; Bella Vista area 595 m. **Habitat:** open dry grasslands and rocky terrain at low to moderate elevations. It was observed nectaring on lemonweed (*Lithospermum ruderale*) in Kalamalka Lake Prov. Park. **Flight period:** mid-May to June.

Desert Marble - *Euchloe lotta* Beutenmuller
Records: Vernon, 13-V-1903 (collector unknown); Vernon, 16-IV-1920, 20-IV-1920 (R.C. Treherne); Vernon, 1-V-1920 (M.H. Ruhmann); Kalamalka Lake Prov. Park 490m; Vernon Hill 1158m; Bella Vista area 600 to 750m; Ellison Ridge 620m. **Habitat:** open dry grasslands at low to moderate elevations. It flies along ridges with *Pontia sisymbrii*. Both species take nectar from rock cress (*Arabis* spp), which is also the larval food plant. **Flight period**: mid-April into May, in some years as early as late March. Like *Pontia sisymbrii,* it is one of the earliest species to emerge and fly after overwintering in the pupal stage.

Stella's Orangetip - *Anthocharis stella* W.H. Edwards
Records: Vernon, 16-V-1903, 23-VI-1905 (collector unknown); Ellison Ridge 600 to 730m; Kalamalka Lake Prov. Park 500m; Shorts Creek canyon 1067m; Goose Lake 500m; Armstrong 480m; Bella Vista area 595m; Aberdeen Lake road 1250m; Silver Star Mtn. 1150 to 1650m; Winfield area 500m. **Habitat:** open dry forest edges, trails, roadsides, rocky areas, and in riparian areas situated at low to moderately high elevations. It sometimes takes nectar from dandelions but it is more frequently noted on rockcress and other species in the mustard family. **Flight period:** mid-April to early July.

Clouded Sulphur - *Colias philodice eriphyle* W.H. Edwards
Records: Vernon, 19-VIII-1917 (M.H. Ruhmann); Armstrong, 480m; Goose Lake area 500m; Silver Star Mtn. 1150 to 1650m; Ellison Ridge 600 to 730m; Kalamalka Lake Prov. Park 500m; Shorts Creek canyon 1159m; Bella Vista area 600m; Aberdeen Lake road 1250m. **Habitat:** found in all habitats but it is particularly abundant on agricultural lands, and takes nectar from alfalfa. Adults occasionally gather in numbers on moist ground. **Flight period:** late April through October, with a few individuals flying in the first week of November.There are at least three generations per year, especially at lower elevations. **Note:** Early spring and late autumn specimens are smaller and have dark scaling on the ventral surfaces of their hindwings which is usually absent in the larger summer brood adults. Rarely hybridizes with the Orange Sulphur, *Colias eurytheme*.

Orange Sulphur - *Colias eurytheme* Boisduval
Records: Silver Star Mtn. road 1150 to 1650m; Lavington 535m; Shorts Creek canyon; 579 and 1219m; Aberdeen Lake road 1250m; Ellison Ridge 600m; Terrace Mtn. 1904m. **Habitat:** not as common as *C. philodice*, but summer generation adults are widespread in all habitats including those at high elevations on Silver Star Mountain. Alfalfa is its nectar source and larval food plant. **Flight period:** mid-July to October, with at least two generations per year.

Alexandra's Sulphur - *Colias alexandra pseudocolumbiensis* Guppy & Shepard
Records: NE of Kalamalka Lake 550m; Shorts Creek canyon 579m; Aberdeen Lake road 1150m. **Habitat:** open dry areas, roadsides and gathers on moist ground in the Douglas-fir transition forest at moderate elevations. Adults nectar on a member of the pea family, tentatively identified as creamy peavine (*Lathyrus ochroleucus*). **Flight period:** mid-June into July.

Pink-edged Sulphur - *Colias interior* Scudder
Records: King Edward Lake road 1350m; Aberdeen Lake road 1250m; Silver Star Mtn. 1150m; Shorts Creek canyon 1463m. Two individuals were seen at Cosens Bay, Kalamalka Lake Prov. Park, 400m, 15-VI-1994. **Habitat:** flies in open dry, lodgepole pine / Engelmann spruce forests. It nectars on thistles in cut block areas. Observed laying eggs on a species of blueberry (*Vaccinium* sp) near King Edward Lake. The Cosens Bay specimens were observed on damp ground and were probably strays from higher elevations. It is local and uncommon, and is usually not found in the dry grasslands or in the open dry forests at lower elevations. **Flight period:** late June to August.

GOSSAMER-WINGS, FAMILY LYCAENIDAE

Blue Copper - *Lycaena heteronea* (Boisduval)
Records: Vernon, 28-VI-1906 (collector unknown); Vernon, 14-VI-1917 (R.C. Treherne); Kalamalka Lake Prov. Park 457m; Vernon Hill 1189m; Shorts Creek canyon 1128m; Ellison Ridge 600m; Bella Vista area 610m; Goose Lake 500m. **Habitat:** low to moderately high elevation, open, dry, rocky grasslands with buckwheat, its larval food plant and nectar source. Adults frequent moist ground. It may be present at high elevations on Silver Star Mountain. **Flight period:** mid-June to August.

Purplish Copper - *Lycaena helloides* (Boisduval)
Records: Vernon 21-VII-1906 (collector unknown); Vernon, 6-VIII-1920 (N.L. Cutler); Goose Lake 503m; Ellison Ridge 600m; Bella Vista area 595m; Kalamalka Lake Prov. Park 400m; Lavington 535m; Armstrong 480m; Aberdeen Lake road 1250m. **Habitat:** normally moist or wet habitats in the dry grasslands, although C. Guppy observed this species at high elevations on Silver Star Mtn. It flies near roadsides, open forest edges, fields and agricultural land. Oviposition on yard knotweed (*Polygonum aviculare*) and water smartweed (*Polygonum amphibium*) was observed. Nectaring on water smartweed in shallow water at Goose Lake was observed. **Flight period:** mid-May through September, with two generations per year and a possible third generation in late summer or early fall. **Note:** Many specimens in the study area are indistinguishable from the taxon *Lycaena florus*.

Lilac-bordered Copper - *Lycaena nivalis browni* (dos Passos)
Records: Terrace Mtn. 1800m; Shorts Creek canyon 1463m. **Habitat:** open dry clearings and forest edges in the Subalpine and Mountain Forest ecosystems. Elevations at Terrace Mountain range from moderately high to high at the summit. **Flight period:** July and August. **Note:** This is a rare species that barely enters the north Okanagan. *L.n.browni* is listed as vulnerable in Canada because its range is largely restricted to the Okanagan Valley (Guppy et al., 1994). It may be present at high elevations on Silver Star Mountain.

Reakirt's Copper - *Lycaena mariposa penroseae* (Field)
Records: Silver Star Mtn. 1150 to 1650m; Shorts Creek canyon 1463m; Aberdeen Lake road 1250m. **Habitat:** high elevations on Silver Star Mountain, it occurs in moist habitats such as bogs, riparian areas, open subalpine forest clearings, wet roadsides, and open forest edges. It is often seen taking nectar from pearly everlasting (*Anaphalis margaritacea*) along roadsides at moderately high elevations. **Flight period:** late June into August.

Coral Hairstreak - *Satyrium titus* (Fabricius)
Records: Goose Lake 500m; Vernon Hill 1127m; Bella Vista area 600m. **Habitat:** moderate elevations in open grassland areas with its larval food plant, chokecherry. It is often seen taking nectar on thistles. This is more a south Okanagan butterfly that is seldom seen in the north Okanagan. However this apparent rarity could be largely due to its' cryptic behaviour. **Flight period:** late June to August.

Sylvan Hairstreak - *Satyrium sylvinum nootka* Fisher
Records: Goose Lake 500m; Bella Vista area 600m; Shorts Creek canyon 1158m; Silver Star Mtn. 1150m; Armstrong (CNC). **Habitat:** moderate elevations in sites with its larval food plant, willow (*Salix* sp.), and near moist habitats in the grasslands. Adults observed at Goose Lake were seen taking nectar on Showy Milkweed (*Asclepias speciosa*), and it also takes nectar from Pearly Everlasting. **Flight period:** late June to August.

Hedgerow Hairstreak - *Satyrium saepium okanaganum* (McDunnough)
Records: upper Shorts Creek Canyon 1463 to 1575m. **Habitat:** Found locally in the study area at moderate elevations in association with *Ceanothus velutinus*. **Flight Period:** late June to late August. **Notes**: I have found it to be abundant in some years. Nectaring has been observed on *Sedum lanceolatum*.

Immaculate Green Hairstreak - *Callophrys affinis washingtonia* Clench.
Records: Goose Lake area 500m; Kalamalka Lake Prov. Park 456m; Kalamalka Lake, west side, 400m; Ellison Ridge 600 to 700m; Bella Vista area 790m. **Habitat:** open dry Ponderosa pine forests and rocky knolls and ridges in dry grasslands. It gathers on moist ground in these sites. It is rare and local at low elevations in the grasslands, and is uncommon at moderate elevations. **Flight period:** mid-May to June.

Sheridan's Hairstreak - *Callophrys sheridanii neoperplexa* Barnes and Benjamin
Records: Kalamalka Lake Prov. Park 460m; Goose Lake 500m; Ellison Ridge 580 to 730m; Bella Vista area 610m; Okanagan Landing (CNC). **Habitat:** dry open grasslands often near rocky places and trails where it perches upon low vegetation. Adults infrequently take moisture on damp ground and sometimes nectar on fern-leaved desert parsley (*Lomatium dissectum*). **Flight period:** mid-March to mid-May although the peak flight is normally early April into mid April. It is one of the first species to appear in the spring. **Note:** There are differing views on the correct subspecies name for this area. Guppy and Shepard (2001) and Layberry et al. (1998) use *newcomeri*, while Pyle (2002) limits the distribution of *newcomeri* to areas south of British Columbia. Further work on this is needed.

Thicket Hairstreak - *Mitoura spinetorum* (Hewitson)
Records: Ellison Ridge, west of Winfield, 750m; Westside Road, Okanagan Lake, nr. Nahum, 410m; Shorts Creek canyon 1524m. **Habitat:** In the north Okanagan it is extremely rare and spotty. It usually occurs at moderate elevations in open dry transition forests of Douglas-fir and ponderosa pine/lodgepole pine and along forest roads. It takes nectar from snowbrush, a species of pussytoes (*Antennaria*) and dandelions. **Flight period:** mid-April into early July. **Note:** Some authors place this species under a supergenus concept of *Callophrys*, while others use a microgenus concept of *Loranthomitoura*. I take a middle of the road approach.

Cedar Hairstreak - *Mitoura rosneri* Johnson
Records: observed along Cosens Creek, 600m northeast side of Kalamalka Lake. **Habitat:** moderate elevations, along roadsides and forest edges. Its habitat must include its larval food plant, western red cedar. It is not found in the open dry forests and grasslands of the north Okanagan. **Flight period:** mid-May through June. **Note:** Some authors treat this species as being conspecific with *M. nelsoni* but there is no published evidence to support this view.

Juniper Hairstreak - *Mitoura barryi* Johnson.
Records: Bluenose Mtn. 1150m; Kalamalka Lake 490m; Jade Bay, Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 1067m; Armstrong (CNC). **Habitat:** On the west side of Kalamalka Lake it is often seen in small numbers in rocky dry grasslands, nectaring on sources close to their larval food plant, Rocky Mountain Juniper. This subspecies flies locally at low elevations in our area, and is rare at moderately high elevations. The single adult recorded at Jade Bay was on damp ground. **Flight period:** early April to May. **Note:** This butterfly has been placed as a subspecies of *M. siva* or *M. grynea* by some authors, however, there is no published evidence to support these interpretations.

Brown Elfin - *Deciduphagus iroides* (Boisduval)
Records: Silver Star Mtn. road 550m; Bluenose Mtn. 1150m; Winfield area 500m; Bella Vista area 550m; Kalamalka Lake 490m; Shorts Creek canyon 1128m; Ellison Ridge 580m; Armstrong (RBCM). **Habitat:** uncommon at moderate elevations, where it flies in open forest edges and clearings and visits damp ground along forest roads. It occurs in numbers near the summit of Bluenose Mountain, from mid- to late-May, perching on Common Juniper. **Flight period**: mid-April to early June.

Moss' Elfin - *Deciduphagus mossii schryveri* Cross
Records: Vernon, 2-VI-1905 (collector unknown); Kalamalka Lake Prov. Park 456m; Ellison Ridge 580 to 730m; Shorts Creek canyon 1158m; Bella Vista area 790m; Okanagan Landing (CNC). **Habitat:** local and sometimes common at moderate elevations; inhabits the dry grasslands in rocky areas where its larval food plant, lance-leaved

stonecrop grows. It sometimes takes nectar from sagebrush buttercup, and occasionally visits damp ground. Similar to *C. sheridanii* which it flies with. It often lands on dry rocky ground and perches upon low vegetation in the grasslands. **Flight period:** late March through early May. This species, along with *C. sheridanii*, is the first to appear in the spring other than those species whose adults overwinter.

Hoary Elfin - *Deciduphagus polios obscurus* (Ferris)
Records: Armstrong, 30-V-1920 (M.H. Ruhmann); Vernon Hill 1160m; Kalamalka Lake 550m; Bluenose Mtn. 1050m; Armstrong (RBCM). **Habitat:** occurs at a moderately high elevation on Vernon Hill. In the open, dry Douglas-fir transition forest it flies low to the ground where its larval food plant Kinnikinnick grows. It is not found at low elevations in the dry grasslands. **Flight period:** late April into early June.

Western Pine Elfin - *Incisalia eryphon* (Boisduval)
Records: Kalamalka Lake Prov. Park 500m; Shorts Creek canyon 1463m; Ellison Ridge 600m; Winfield area 500m; Silver Star Mtn. 1150m. **Habitat:** uncommon but occurs near open dry Ponderosa pine forests at low to moderate elevations, and visits moist ground along open forest roads. Adults often perch on the needles of regenerating ponderosa pine that are 150 -180 cm high. **Flight period**: Late April to June.

Gray Hairstreak - *Strymon melinus setonia* McDunnough
Records: Goose Lake 500m; Kalamalka Lake Provincial Park 456m; Kalamalka Lake 550m; Ellison Ridge 600m; Shorts Creek canyon 580m. **Habitat:** flies at low to moderate elevations in the dry grasslands and rocky ridges on the west side of Kalamalka Lake. It also occurs in agriculturally disturbed areas and along trails in open dry forests. From mid- to late-September this species, along with *H. colorado idaho* and *O. sylvanoides,* often takes nectar from common rabbit brush. **Flight period:** mid-April to early September, with two generations per year.

Western Tailed Blue - *Cupido amyntula* (Boisduval)
Records: Vernon, 13-IV-1907 (collector not identified); Vernon, 14-VI-1919 (M.H. Ruhmann); Kalamalka Lake Prov. Park 400m; Ellison Ridge 600m; Shorts Creek canyon 1127m; Vernon Hill 1219m; Armstrong (RBCM). **Habitat:** absent from the dry open grasslands, and is uncommon at low elevations in the open forest edges and riparian areas of Douglas-fir forests. It oviposits on peavine and vetch (*Vicia*). **Flight period:** late April through June. **Note:** This butterfly has in North America been traditionally placed in the genus *Everes* but due to extremely minor differences between *Cupido* and *Everes*, I treat *Everes* as a junior subjective synonym of the older name *Cupido*, as has been done by some other recent authors.

Western Spring Azure - *Celastrina echo* (W.H. Edwards)
Records: Kalamalka Lake Prov. Park 455m; Ellison Ridge 580 to 730m; Shorts Creek canyon 1127m; Goose Lake 500m; Bella Vista area 610m; Aberdeen Lake road 1250m; Silver Star Mtn. road 1150m; Winfield area 500m; Vernon Hill 1189m. **Habitat:** flies in open forest edges, clearings, and riparian areas, and often gathers in large numbers on damp ground along forest roads and lakeshores. It is not found in dry open grasslands. **Flight period:** late March to mid-May. **Note:** This nominal taxon needs further study and taxonomic review in southern British Columbia. Preliminary review by N. Kondla reveals that the phenotypes present in this study area and other interior locations are not compliant with the nominal taxon *echo*, differ from the coastal populations of southwestern British Columbia and are a mix of the nominal taxa *nigrescens* and *bakeri*.

Square-Spotted Blue - *Euphilotes battoides glaucon* (W.H. Edwards)
Records: Goose Lake 500m; Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 580 to 1087m; Ellison Ridge 580 to 610m; Bella Vista area 600m; Vernon Hill 1189m; Winfield (CNC). **Habitat:** open dry grasslands where its larval food plant and nectar source, buckwheat, is present. It occurs at low to moderate elevations, often on moist ground. **Flight period:** late May to June.

Arrowhead Blue - *Glaucopsyche piasus toxeuma* F.M. Brown
Records: Goose Lake 500m; Kalamalka Lake Prov. Park 456m; Ellison Ridge 600 to 730m; Armstrong (RBCM). **Habitat:** rare, and occurs in open dry grasslands at low to moderate elevations where its larval food plant, lupine, is present. Adults are sometimes seen on moist ground. **Flight period:** late April through May.

Silvery Blue - *Glaucopsyche lygdamus columbia* (Skinner)
Records: Vernon, 20-V-1904 (collector unknown); Vernon, 6-V-1929 (I.J. Ward); Goose Lake 500m; Ellison Ridge 580 to 730m; Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 580 to 1524m; Bella Vista area 595m; Aberdeen Lake road 1250m; Silver Star Mtn. 1150 to 1650m; Winfield area 500m; Armstong area 480m; King Edward Lake road 1350m. **Habitat:** common in openings in forest edges, subalpine meadows, and subalpine forest clearings. Seasonally, it can be very common in dry open grasslands. It can be observed at low to high elevations throughout the north Okanagan; including at high elevations on Silver Star Mountain. It is far more common and widespread than the Arrowhead Blue. It is commonly seen flying near its larval host plant, lupine, in spring. It sometimes gathers in large numbers on damp ground. **Flight period:** mid-April to July.

Anna's Blue - *Plebejus anna* (W.H. Edwards)
Records: Silver Star Mtn. 1150 to 1650m; Aberdeen Lake road 1250m; Shorts Creek canyon 1524m; Terrace Mtn. 1600m; King Edward Lake road 1350m; Vernon Hill 1189m. **Habitat:** It occurs at high elevations in open dry subalpine forests and on drier gravelled sites, and along roadsides with lupines, its larval food plant. Adults sometimes gather in large numbers on moist ground. **Flight period:** mid-July through August. **Note:** Guppy and Shepard (2001) place study area butterflies as *Lycaeides idas scudderi* [sic]. The correct spelling of this taxon is *scudderii*. Subsequent work by Guppy, Kondla and C. Schmidt (unpublished data) reveals that *scudderii* is not an appropriate name to use for study area butterflies. Although most populations of this butterfly in the study area are not phenotypically compliant with *P. anna ricei*, I place them with *anna* as a species at this time because I have found them laying eggs on lupines but not blueberries. Butterflies at Shorts Creek canyon include both classic *P. anna ricei* phenotypes and also *P. 'idas' atrapraetextus* phenotypes. Aberdeen Lake area butterflies are phenotypically more like *atrapraetextus* than they are to the boreal forest taxon *scudderii*. Butterflies on Silver Star Mtn. are most like *anna* in series. Additional research on the taxonomy of these butterflies is needed.

Melissa's Blue - *Plebejus melissa* (W.H. Edwards)
Records: Vernon, V-1906 (collector unknown); Vernon, 16-VII-1917, 24-VII-1917 (R.C. Treherne); Goose Lake 500m; Kalamalka Lake Prov. Park 400m; Bella Vista area 600 to 790m; Ellison Ridge 580 to 600m; Kalamalka Lake 400m. **Habitat:** It flies in open, dry grasslands and roadsides in ponderosa pine and Douglas-fir forests. Adults frequent moist ground and use a variety of nectar sources. Lupine is its probable larval food plant. **Flight Period:** mid-May through September, with at least two generations per year.

Greenish Blue - *Aricia saepiolus amica* (W.H. Edwards)
Records: Vernon Hill 1220m; Silver Star Mtn. 1150 to 1650m; Aberdeen Lake road 1250m; Shorts Creek canyon 1219m; Kalamalka Lake Prov. Park 400m; King Edward Lake road 1350m; Armstrong (RBCM). **Habitat:** it frequents moist areas in open forest edges, bogs, grassy fields, meadows, and roadsides, but also flies in drier sites at moderate elevations. It is uncommon at high elevations on Silver Star Mountain. It is not found in the dry open grasslands and open forests at lower elevations of the north Okanagan. Adults take nectar at the introduced perennial white clover (*Trifolium repens*), its larval food plant. **Flight period:** June to August, depending on elevation.

Boisduval's Blue - *Aricia icarioides* (Boisduval)
Records: Vernon, 14-VI-1917 (R.C. Treherne); Goose Lake 500m; Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 1158m; Ellison Ridge 600m; Bella Vista area 595m; Vernon Hill 1189m; Silver Star Mtn. 1150m; Armstrong area 480m; Coldstream (RBCM). **Habitat:** common in open dry grasslands at low to moderately high elevations, where there is lupine, its larval food plant. It often gathers in large numbers on moist ground. **Flight period:** late May to July. **Note:** Study area populations have historically been assigned to ssp *pembina* but this needs to be reconsidered because they are different in size and appearance from the southern Alberta populations which have also been historically assigned to the same ssp.

Lutz's Blue - *Aricia lupini lutzi* (dos Passos)
Records: Goose Lake 500m; Kalamalka Lake Provincial Park 400m; Shorts Creek canyon 1524 m; Ellison Ridge 580m; Vernon Hill 1189m; Bella Vista area 610m; Winfield (CNC). **Habitat:** low to moderate elevations in open dry grasslands where there is buckwheat, its larval food plant and nectar source. It frequents moist ground, sometimes in large numbers. **Flight period:** late May to July. **Note:** This butterfly has been variably placed in the literature at the

species level as *acmon* or as *lupini.* I have chosen to treat them as species *lupini* because the local butterflies are more akin to *lupini* in terms of phenotype and voltinism than they are to *acmon*.

Arctic Blue - *Agriades rusticus megalo* (McDunnough)
Records: Terrace Mtn. 1900m; Bluenose Mtn., 1220m; Shorts Creek canyon 1524m. **Habitat:** occurs on moss-covered rockslides, barren rocky ridges and scree slopes with saxifrage, its larval food plant. It often gathers on wet ground. It is rare on Bluenose Mountain., which is about the lowest elevation at which it occurs in the north Okanagan. It has not been seen on Silver Star Mountain. **Flight period:** mid-June through early September, depending on elevation. **Note:** This taxon has often been treated as a subspecies of the endemic European Alps species *A. glandon*. Nothing has been published to establish this relationship and published information supports the arrangement used here. Some researchers have recently concluded that *megalo* and *rustica* are separate species also.

BRUSHFOOTS, FAMILY NYMPHALIDAE

Satyr Anglewing - *Polygonia satyrus* (W.H. Edwards)
Records: Vernon, 2-V-1905 (collector unknown); Silver Star Mtn. Road 1150 to 1650m; Shorts Creek canyon 580m; Ellison Ridge 580 to 730m; Kalamalka Lake Prov. Park 457m; Aberdeen Lake road 1250m. **Habitat:** The species is common and overwinters as adults. It occurs at moderate elevations and inhabits moist riparian areas, open forest edges and roadsides where there is stinging nettle (*Urtica dioica*), its larval food plant. **Flight period:** late March through October, together with *A. milberti* and *Nymphalis* spp.

Green Comma - *Polygonia faunus rusticus* (W.H. Edwards)
Records: Vernon, 16-V-1903 (collector unknown); Silver Star Mtn. 1150 to 1650m; Kalamalka Lake Prov. Park 457m; Shorts Creek canyon 1219m; Ellison Ridge 600 to 730m; Aberdeen Lake road 1250m. **Habitat:** a forest species that gathers in large numbers on moist ground along creeks, forest edges, riparian areas, trails and roadsides, at all elevations. **Flight period:** late March through October, with the earliest and latest flight dates being overwintering adults flying at low elevations.

Zephyr Anglewing - *Polygonia gracilis zephyrus* (W.H.Edwards)
Records: Silver Star Mtn. 1150 to 1650m; Kalamalka Lake 395m; Kalamalka Lake Provincial Park 400m; Shorts Creek canyon 1524m; Aberdeen Lake road 1250m; Ellison Ridge 600m. **Habitat:** It is a forest species that flies at moderate to high elevations in open subalpine forests, forest edges, subalpine meadows and on moist earth on forest roads. It nectars on asters. Like other *Polygonia* species it is a frequent visitor to honey dew, tree sap, and animal feces. **Flight period:** late March through October, with the earliest and latest flight dates being overwintering adults flying at low elevations.

Oreas Anglewing - *Polygonia oreas threatfuli* Guppy and Shepard
Records: Goose Lake 500m; Ellison Ridge 600 to 730m; Bella Vista area 720m; Vernon 400m; Kalamalka Lake Provincial Park 400m. **Habitat:** frequents edges of open dry Douglas-fir forests adjacent to grasslands at low to moderate elevations; sometimes seen on moist earth bordering lakes and nectaring on dandelions. It is quite rare and apparently limited to small areas. The adults overwinter. **Flight period:** mid March, on warm sunny days, through October.

Compton Tortoise Shell - *Polygonia l-album watsoni* (G.C. Hall)
Records: Kalamalka Lake Provincial Park 455m; Shorts Creek canyon 1158m; Silver Star Mtn. 1150 to 1650m; Aberdeen Lake road 700 to 1250m. **Habitat:** It is a forest species and occurs along forest edges at low to moderate elevations in cooler areas. It is absent from the ponderosa pine ecosystem at lower elevations of the north Okanagan. The larval host plant is birch (*Betula papyrifera*). It overwinters as an adult. **Flight period:** late March through October. **Notes:** The species is noted for its extreme yearly fluctuations in numbers. It can be common one year and almost absent the next. The genus name *Polygonia* appears to be the most appropriate, based on a phylogenetic analysis of this group of genera (Nylin et al. 2001), rather than *Roddia* as used by Guppy & Shepard (2001) or *Nymphalis* as used by many earlier authors.

California Tortoise Shell - *Nymphalis californica* (Boisduval)
Records: Vernon 4-VIII-1932 (O. Bigland); Vernon 400m, 16-IX-1972 (R.P. Nelson); Kalamalka Lake Provincial Park 400m; Silver Star Mtn. 1150m. **Habitat:** low to moderate elevations near sunny dry areas of open forests and riparian areas with its larval food plant, snowbrush. It frequents damp ground along forest roads. The adults overwinter. **Flight period:** Late March to October. **Notes:** Periodically it occurs in mass numbers in the north Okanagan. Populations may become established but usually die out after a year or so and then may not be seen again for twenty years.

Mourning Cloak - *Nymphalis antiopa* (Linnaeus)
Records: Goose Lake 500m; Kalamalka Lake Prov. Park 400m; Ellison Ridge 600 to 730m; Shorts Creek canyon 579 to 1524m; Bella Vista area 700m; Aberdeen Lake road 1250m; Silver Star Mtn. 1150 to 1650m; Vernon 400m. **Habitat:** a common species, particularly noticeable early in the spring, that occurs at low to moderate elevations. Its habitat includes open forest edges and riparian areas, and it frequents damp ground along forest roads and seeps. Similar to *Polygonia* and other *Nymphalis* spp. it gathers on aphid honeydew, on rotting fruit, tree sap, and animal feces. The adults overwinter. **Flight period:** late March to October.

Milbert's Tortoise Shell - *Aglais milberti* (Godart)
Records: Silver Star Mtn. 1200 to 1650m; Ellison Ridge 580 to 730m; Kalamalka Lake Prov. Park 457m; Shorts Creek canyon 1524m; Goose Lake 500m; Bella Vista area 750m; Aberdeen Lake road 1250m. **Habitat:** it is one of the earliest species to fly in the spring, and frequents subalpine meadows, forest roads, open forest edges and riparian areas. Adults take nectar from asters (*Aster* spp). It overwinters in the adult stage at low elevations. In the summer, adults freshly emerged from pupae, are often seen at higher elevations. **Flight period:** late February through October.

American Lady - *Vanessa virginiensis* (Drury)
Records: Sovereign Lake Ski Club Day Lodge area on Silver Star Mtn. 1650m, 31-VIII-2001. Specimen deposited in Royal BC Museum. **Habitat:** There are only a few BC records of this migrant. The Silver Star specimen was found nectaring on pearly everlasting. **Flight period:** late August.

Painted Lady - *Vanessa cardui* (Linnaeus)
Records: Vernon, 21-VI-1926 (I.J. Ward); Goose Lake 500m; Silver Star Mtn. 1150 to 1650m; Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 1524m; Ellison Ridge 600m. **Habitat:** arrives as a migranyt from southwest USA by mid-May. Becomes very abundant in some years, and occurs at most locations from low to high elevations. Adults take nectar from many sources, especially dandelions in the early spring and thistles during the late summer. This species does not overwinter in the north Okanagan. **Flight period:** mid-May to October.

West Coast Lady - *Vanessa annabella* (Field)
Records: Silver Star Mtn. 1150 to 1650m; Kalamalka Lake Prov. Park 490m; west side Kalamalka Lake 400m. **Habitat:** rare to uncommon, but occurs throughout the area at low to high elevations. It takes nectar from thistles growing along roadsides and open forest edges. During mid- to late-September it flies in the open dry grasslands of the north Okanagan nectaring on common rabbit brush. This species may overwinter here since individual adults have been seen in the early spring, year after year. **Flight period:** May to October.

Red Admiral - *Vanessa atalanta rubria* (Fruhstorfer)
Records: Kalamalka Lake Prov. Park 475m; Silver Star Mtn. 1150 to 1650m; Aberdeen Lake road 1250m; Bluenose Mtn. 1213m. **Habitat:** this uncommon species occurs in open forest edges, along forest roads and riparian areas at low to moderate elevations. In the nearby Revelstoke district it flies with *Vanessa cardui* in flower gardens during late summer and fall. Thistles are a nectar source. Butterflies frequent rotten fruit and are often seen with *Polygonia* and *Nymphalis* species. This species might overwinter in the adult stage throughout our area, as individuals have been seen year after year in the early spring. **Flight period:** May to October.

Great Spangled Fritillary - *Speyeria leto* (Behr)
Records: Goose Lake 500m; Bella Vista area 790m; Silver Star Mtn. 1150m; Shorts Creek canyon 1128m; King Edward Lake road 500 to 1188m; Vernon Hill 1128 to 1250m; Armstrong (CNC). **Habitat:** common at moderate

elevations but restricted to the open dry Interior Douglas-fir forest edges and adjacent open grasslands. It often nectars on thistles and asters along forest edges, pond margins and roadsides. It is uncommon and local in the ponderosa pine forests at moderate elevations and is not found at the lower elevations in the dry grasslands. **Flight period:** mid-July to early September. **Note:** The taxon *leto* has been mostly treated as a subspecies of *cybele* over the past 50 years. But nothing has been published to justify this interpretation. Other authors (eg. Layberry et al. 1998; Pyle 2002) have expressed the view that it is likely a distinct species and field work by Kondla and by E.M. Pike has failed to discern any intergradation between these taxa in Canada.

Zerene Fritillary - *Speyeria zerene picta* (McDunnough)
Records: Armstrong, VIII-1914 (M. H. Ruhmann); Goose Lake 500 m; Kalamalka Lake Prov. Park 457m; Bella Vista area 790m; Vernon Hill 1128 to 1250m; Ellison Ridge 600m; Shorts Creek canyon 1067m; Aberdeen Lake road 1250m; Silver Star Mtn. 1650m; King Edward Lake road 1350m. **Habitat:** clearings, roadsides and forest edges, and adjacent open grasslands in the dry ponderosa pine and Interior Douglas-fir forests at moderate elevations. Similar to other species of *Speyeria,* nectar sources include thistles. Not yet found in the dry grasslands at the lowest elevations of the study area. **Flight period:** late June to early September.

Callippe Fritillary - *Speyeria callippe semivirida* (McDunnough)
Records: Goose Lake 500m; Swan Lake 400m; Kalamalka Lake Prov. Park 457m; Bella Vista area 790m; King Edward Lake road 1350m; Ellison Ridge 600m; Vernon Hill 1128 to 1250m; Silver Star Mtn. 1650m; Shorts Creek canyon 1524m. **Habitat:** at moderate elevations it flies in open dry grasslands and along forest edges, ridges and rocky knolls, roadsides and clearings. It gathers on moist ground and nectars on thistle and other flowers. **Flight period:** mid-June to August.

Atlantis Fritillary - *Speyeria atlantis hollandi* (F. & R. Chermock)
Records: Vernon, VII-1903 (collector unknown); Silver Star Mtn. Road (R.P. Nelson) 1525m and Silver Star Mtn. 1650m; King Edward Lake Road 1350m; Aberdeen Lake road 1250m. Vernon Hill 1220 to 1250m. **Habitat:** moderately high elevations, flying in open forest edges, roadsides, and fens with Engelmann Spruce and Lodgepole Pine; moist transition forest on Vernon Hill. **Flight period:** late June to August.

Northwestern Fritillary - *Speyeria hesperis brico* (Kondla, Scott and Spomer)
Records: King Edward Lake road 1350m; Vernon Hill 1189 to 1250m; Aberdeen Lake road 1250m; Silver Star Mtn. 1150m. **Habitat:** it occurs, at moderately high elevations, in the open Douglas-fir forests adjacent to grasslands, as well as in forest edges near roadsides, clearings, riparian areas, subalpine meadows and open subalpine and transition forests. Adults frequent damp spots along forest roads. Nectar sources include spreading dogbane, thistles, asters and other flowers in the sunflower family. **Flight period:** mid-June to early September. **Note:** This *Speyeria* can be quite variable and difficult to identify to species level at times, especially where it overlaps the range of *S. aphrodite*.

Hydaspe Fritillary - *Speyeria hydaspe rhodope* (Edwards)
Records: Silver Star Mtn. 1150 to 1650m; Bluenose Mtn. 1213m; Shorts Creek canyon 610 to 1524m; Aberdeen Lake road 1250m; Vernon Hill 1250m; Lavington area 535m; Terrace Mtn. 1904m. **Habitat:** it flies on drier sites in subalpine meadows, in open subalpine and transition forests, clearings and roadsides at moderate to high elevations. Males hilltop on Silver Star Mountain, Bluenose Mountain and Tuktakamin Mountain. It frequents damp earth and wet areas and nectars on cow-parsnip. **Flight period:** late June to August. **Note:** Recent books have used tha subspecies name *sakuntala* but Kondla (2001) has shown that *rhodope* is the correct name instead.

Mormon Fritillary - *Speyeria mormonia opis* (W.H. Edwards)
Records: Silver Star Mtn. 1150 to 1650m; Aberdeen Lake road 1250m; Terrace Mtn. 1800m; Whiterocks Mtn. 1750m; King Edward Lake road 1350m. **Habitat:** similar to *S. atlantis, S.hesperis* and *S. hydaspe.* It inhabits cool, high elevation sites including subalpine meadows, open subalpine forests and roadsides at high elevations. It gathers on wet ground and takes nectar from asters. **Flight period:** late June to early September.

Silver-bordered Fritillary - *Boloria myrina atrocostalis* (Huard)
Records: Swan Lake 400m; Vernon (CNC). **Habitat:** In the north Okanagan the Silver-bordered Fritillary is rare and local. It occurs in the open, wet, grassy margins along Swan Lake and not in dry grasslands. **Flight period:** mid-June through July. **Note:** Kondla advises that for the past 60 years this butterfly has been treated as a subspecies of the European *B. selene*, apparently because Clark (1941) could see little difference between the North American and European butterflies. Besides presenting a very weak argument for lumping, Clark also expressed the view that *Speyeria mormonia washingtonia* is a subspecies of the Asian taxon *aglaja* (variably placed in *Argynnis*, *Fabriciana* or *Mesoacidalia* by various authors). Thus I place little credence in his taxonomic call with respect to *myrina*/*selene*. In contrast, species status for *B. myrina* is supported by the results of laboratory hybridization experiments by Oliver (1977). In contrast to Clark's inability to see differences; Kondla and J. Laiho were able to see several phenotypic differences between northern European and North American specimens. Oliver (1977) also reports differences. Subspecies status as *atrocostalis* is uncertain because the most recent North American revision (Kohler 1977) does not show the taxon *atrocostalis* coming anywhere close to BC.

Western Meadow Fritillary - *Boloria epithore chermocki* E. & S. Perkins
Records: Silver Star Mtn. 1370 to 1650m; King Edward Lake road 1350m; Aberdeen Lake road 1250m; Shorts Creek canyon 1219m. **Habitat:** a common species at moderate to high elevations. It occurs on damp ground along forest roads, in subalpine meadows, in clearings adjacent to rocky slopes, edges of fens, and open forest edges. **Flight period:** mid-June to early August, depending on elevation.

Freija Fritillary - *Boloria freija* (Becklin)
Records: King Edward Lake road 1370 m; one specimen seen in a small wet grassy meadow, northeast side of Kalamalka Lake 580m; Kalamalka Lake Prov. Park 400m; Aberdeen Lake road 1250m. **Habitat:** uncommon and occurs at moderately high elevations in habitats with Engelmann Spruce. It flies over open fens with short grass and willows. The sightings in Kalamalka Lake Prov. Park may have been strays from a higher elevation. **Flight period:** late May through June.

Arctic Fritillary - *Boloria grandis* (Barnes & McDunnough)
Records: Vernon, VIII-1903 (collector unknown); King Edward Lake road 1350m; Aberdeen Lake road 1250m. **Habitat:** flies at moderately high elevation in open fens with short grass and willows, and in open Engelmann Spruce and Lodgepole Pine forest edges. Thistles are a nectar source. At King Edward Lake it was often seen flying along with *Colias interior.* It is local and not common. **Flight period:** mid-July to early September. **Note:** Taxonomy of the *B. 'chariclea'* group of taxa in North America is the subject of active debate and research. On the basis of published and unpublished information there appears to be more than one species in North America. *B. grandis* is the oldest available name for butterflies that are structurally and phenotypically compliant with study area butterflies.

Northern Pearl Crescent - *Phyciodes cocyta* (Cramer)
Records: Vernon, VI-1904, 17-VI-1905, 16-VI-1906 (collector unknown); Vernon, 8-VII-1932 (C. Bigland); Vernon 400m; Goose Lake 500m; Kalamalka Lake Prov. Park 400m; Aberdeen Lake road 1250m; Shorts Creek canyon 1249m; Ellison Ridge 580m; Armstrong (CNC). **Habitat:** at lower elevations it flies along roadsides, in fields and clearings and also in open forests and their edges. It nectars on asters and other flowers and commonly gathers on damp ground. **Flight period:** late May to early August. **Note:** BC butterflies of this species were erroneously placed in the different species *tharos* in Guppy and Shepard (2001). Subspecies assignment of local populations as *pascoensis* is also suspect and needs review (Pyle 2002).

Field Crescent - *Phyciodes pulchellus* (Boisduval)
Records: Silver Star Mtn. 1220 to 1650m; Kalamalka Lake Prov. Park 400m; Aberdeen Lake road 1250m; Shorts Creek canyon 1219m; Terrace Mtn. 1800m; Armstrong (CNC). **Habitat:** along roadsides and edges of dry, open subalpine forests adjacent to subalpine meadows. Adults frequent damp ground , often in large numbers. Asters are a source for nectar. **Flight period:** late May to early August. **Note:** As shown by Kondla and Guppy (2002) and by Scott (1994), use of the name *pratensis* for this butterfly is incorrect.

Pale Crescent - *Phyciodes pallidus barnesi* Skinner
Records: Kalamalka Lake Prov. Park 400m; west side of Kalamalka Lake 400m; Shorts Creek canyon 1463m. **Habitat:** uncommon and mostly occurs in low elevation rocky, dry, open grassland with wavy-leaved thistle (C*irsium undulatum*), adjacent to open Ponderosa pine forests. The Shorts Creek canyon site is an unusually high elevation for this butterfly in BC. In Kalamalka Lake Provincial Park its habitat is now being lost to invading knapweed and introduced non-native grasses. **Flight period:** late May through June.

Mylitta Crescent - *Phyciodes mylitta* (W.H. Edwards)
Records: Vernon, V-1904 (collector unknown); west side of Kalamalka Lake 400m; Vernon 400m; Shorts Creek canyon 579 to 1158m; Goose Lake 500m; Aberdeen Lake road 1250m; Ellison Ridge 600m; Bella Vista area 595m; Silver Star Mtn. 1150m. **Habitat:** a very common species at low to moderate elevations, where it occurs in open habitats from agicultural land to forest edges and along roadsides and shorelines. It frequents damp ground. Thistles are a nectar source. **Flight period:** late April through October, occasionally early November, with at least two generations at lower elevations.

Northern Checkerspot - *Chlosyne palla* (Boisduval)
Records: Vernon, VI-1907 (collector not known); Goose Lake 500m; King Edward Lake road 1370m;. Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 580m; Bella Vista area 790m; Ellison Ridge 580m; Armstrong (CNC); Silver Star Mtn. (ROM). **Habitat:** common in the open dry transition forests of Ponderosa pine and Douglas-fir; and in clearings, along roadsides, and in grasslands with aspen. A local population at a moderately high elevation occurs at King Edward Lake in a dry area with Lodgepole pine. It may gather in large numbers on damp ground along roadsides and ditches. **Flight period:** mid-June into July. **Note:** The most appropriate ssp designation is unclear. Guppy and Shepard (2001) use *calydon*, while Pyle (2002) uses *palla*.

Anicia Checker-spot - *Euphydryas anicia* (Doubleday)
Records: Vernon, 29-IV-1906 (collector unknown); Vernon, 11-VI-1917 (R.C. Treherne); Vernon, 26-V-1924 (M.H. Ruhmann); Ellison Ridge 600 m; Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 1069m; Goose Lake area 500 to 535m; Bella Vista area 610m; Armstrong area 480m; Vernon Hill 1127m; Aberdeen Lake road 1250m; Winfield (CNC). **Habitat:** occurs from low to high elevations over a wide variety of habitats; from low elevation lakeshores and open dry grasslands and rocky ridges, to open subalpine forests with meadows, ridges and rockslides. It is absent from the summits of Silver Star and Terrace Mountains. At low elevations it nectars on balsamroot and it gathers on moist ground. At moderate elevations in the open dry areas of the transition forest it is local and rare. **Flight period:** It flies from late April to early September depending on elevation. **Note**: Local populations have been assigned to ssp *hopfingeri* by Guppy and Shepard (2001) but they generally do not comply well with the appearance of *hopfingeri* and Pyle (2002) views them as being nearer ssp *howlandi*. Additional work is needed to clarify this matter.

White Admiral - *Limenitis arthemis rubrofasciata* (Barnes & McDunnough)
Records: Junction of Mt. Baldy and King Edward Lake Roads 595m; observed in Y Lake area, west of Goose Lake 685m; Vernon Hill 1219m. **Habitat:** flies in a habitat with streams, ponds, and stands of birch and aspen. The White Admiral is not found in open dry forests and grasslands at lower elevations. **Flight period:** mid-June through August. **Notes:** This species hybridizes with *L. lorquini*. Hybrid specimens are known from Enderby, just north of this study area, and from Vernon.

Lorquin's Admiral - *Limenitis lorquini itelkae* Guppy
Records: Vernon, 5-VII-1918 (M.H. Ruhmann); Vernon, 13-VI-1919 (R.C. Treherne); Vernon, 14-VI-1919 (M.H. Ruhmann); Vernon, 16-VI-1924 (E.A. Rendell); Ellison Ridge 600m; Bella Vista area 790m; Kalamalka Lake Prov. Park 400m; Shorts Creek canyon 579m; Goose Lake 500m; Silver Star Mtn. 1150m; Aberdeen Lake road 1250m; Vernon Hill 750m. **Habitat:** It is common on the lakeshore at Cosens Bay. It flies in shrubby clearings of open forests, riparian areas, and gathers on damp roads at open forest edges. It perches on branches at considerable height from the ground. It is occasionally seen on flowers of spreading dogbane and pearly everlasting, on animal feces and at aphid honeydew. **Flight period:** mid-June through August, sometimes to early September.

Common Ringlet - *Coenonympha california columbiana* McDunnough
Records: Goose Lake 500m; Kalamalka Lake Prov. Park 457m; Shorts Creek canyon 580m; Ellison Ridge 600m; Silver Star Mtn. 1150m; Aberdeen Lake road 1250m; Bella Vista area 610m; Vernon Hill 1158m. **Habitat:** common at low to moderate elevations in the open dry grasslands and grassy forest openings. Often seen on moist soil along trails and roads. **Flight period:** late May to September.

Common Wood Nymph - *Cercyonis pegala ariane* (Boisduval)
Records: Vernon 15-VIII-1932 (C. Bigland); Goose Lake 500m; Kalamalka Lake Prov. Park 457m; Shorts Creek canyon 580m; Ellison Ridge 600m; Vernon Hill 750m; one found unusually high at 1650m on Silver Star Mtn.; Armstrong (CNC) **Habitat:** a grassland species primarily occurring at low to moderate elevations, in open forest edges, trails and roadsides with a mix of shade and sun, in moist grassy habitats. During the hottest part of the day it avoids direct sunlight. Thistles are a source for nectar. **Flight period:** mid-July into August.

Great Basin Woodnymph - *Cercyonis sthenele sineocellata* Austin and Emmel
Records: Kalamalka Lake Provincial Park 457m; west side Kalamalka Lake 400m; Shorts Creek canyon 580 to 610m. **Habitat:** locally at low elevations in open dry Ponderosa pine forests adjacent to grasslands. It frequents hotter and drier habitats than *C. pegala*. In August adults frequently gather in numbers on white clematis (*Clematis ligusticifolia*) along the dry west side of Kalamalka Lake. **Flight period:** late June through August.

Small Woodnymph - *Cercyonis oetus phocus* (W.H. Edwards)
Records: A record for Vernon exists in the Royal British Columbia Museum; Aberdeen Lake road 1250m. **Habitat:** flies in open, drier areas of lodgepole pine in the Aberdeen Lake road area. **Flight period:** June through August.

Vidler's Alpine - *Erebia vidleri* Elwes
Records: Terrace Mountain 1830m; Shorts Creek canyon 1524m; Silver Star Mtn. 1650m (north Okanagan Naturalists Club). **Habitat:** local at moderately high elevations along roadsides and in open dry subalpine forests and meadows. **Flight period:** July through August.

Common Alpine - *Erebia epipsodea epipsodea* Butler
Records: Ellison Ridge 600m; Kalamalka Lake Prov. Park 400m; Goose Lake 500m; Bella Vista area 790m; Vernon Hill 1128m; Shorts Creek canyon 1067m; Aberdeen Lake road 1250m; Silver Star Mtn. 1219m. **Habitat:** the commonest species of subalpine areas, and occurs at low to high elevations in open grasslands. Adults frequent moist ground and grassy areas along lakeshores and roadsides. **Flight period:** mid-May through July, depending on elevation.

Macoun's Arctic - *Oeneis macounii* (W.H. Edwards)
Records: Bluenose Mtn. 1213m; Aberdeen Lake road 1250m. **Habitat:** a local species that occurs at moderate to moderately high elevations. On the north-facing summit of Bluenose Mountain it flies among the large rock outcrops and grassy openings in the Douglas-fir and Engelmann spruce forests. **Flight period:** mid-June and early July.

Chryxus Arctic - *Oeneis chryxus chryxus* (Doubleday)
Records: Vernon, 16-VI-1920 (R.C. Treherne); Vernon Hill 1220m; Bluenose Mtn. 1213m; Vernon Hill 1189m; Silver Star Mtn. 1830m; Aberdeen lake road 1250m; Shorts Creek canyon 1524m. **Habitat:** It is the most common and widespread *Oeneis* species at moderate to high elevations. Its habitat includes rocky outcrops and subalpine draws and open dry Douglas-fir forests adjacent to grasslands. It occupies similar habitat and elevations as *Oeneis macounii* but has a later flight period. At moderate elevations it occurs in open grasslands with Lodgepole pine and Aspen. **Flight period:** mid-July through August. **Note:** Adults are often territorial and defend their flight area from other species.

MILKWEED BUTTERFLIES, FAMILY DANAIDAE

Monarch - *Danaus plexippus* (Linnaeus)
Records: Vernon, 16-VIII-1918 (R.C. Woodward); Lavington, 13 km east of Vernon, 535m, 24-VIII-1970 (J. Grant). Goose Lake 500m; Aberdeen Lake road 1250 m; Kalamalka Lake Prov. Park 400m. **Habitat:** flies in open

country at low elevations where showy milkweed, its larval food plant, is present. Adults take nectar from many species of flowers. The Goose Lake specimen was collected while it was flying around a clump of showy milkweed. **Flight period:** Migrates into the north Okanagan by late June. The summer brood probably leaves the area by late August or early September. **Note:** It has only been found as a few individuals in this study area.

DISCUSSION

To date I have been able to confirm the presence of 106 butterfly species in the north Okanagan study area as defined in this paper. Additional species that have been found nearby and which may yet be found in this study area include: *Pieris oleracea*, *Satyrium californicum*, *Speyeria aphrodite*, and *Boloria bellona*. Guppy and Shepard (2001) show *Hesperia comma manitoba*, *Boloria bellona, Euphydryas editha* and *Cupido comyntas* as present in the study area but I have not been able to verify these records. It is unlikely that alpine specialists will turn up in the study area due to lack of alpine habitats. Fieldwork over the past 100 years shows that the study area is one of the premiere areas in Canada for species level butterfly diversity. More than one third of all known Canadian butterfly species have been found in this relatively small area.

There are no endangered butterflies in the study area. Guppy et al. (1994) and Kondla et al. (2000) have reviewed the butterflies of conservation concern in British Columbia. Guppy and Kondla (2000) assigned provincial conservation status ranks of S3-Sensitive to the following study area taxa: *Pyrgus communis*, *Polites sabuleti*, *Callophrys affinis*, *Lycaena nivalis*, *Danaus plexippus*. These are species that are not believed to be at risk of extirpation or extinction, but that may require special attention or protection to prevent them from becoming at risk.

The study area has vast areas of natural and semi-natural habitats that will sustain robust butterfly populations into the foreseeable future. The habitats and hence species most likely to be adversely affected by increasing human population are the low elevation species. The supply and quality of low elevation habitats will likely continue to decrease through continued urbanization and agriculture. Forestry is practiced on a sustainable harvest basis and is not believed to be a significant factor in butterfly abundance at the landscape scale. A greater impact on butterfly populations in predominantly forested areas is that of grassland loss by forest encroachment and loss of host plants in open canopy forests through forest ingrowth and resultant shading out of host plants that cannot survive under a continuous tree canopy.

ACKNOWLEDGEMENTS

Identification of the north Okanagan material was confirmed in part by: Crispin S. Guppy, Norbert G. Kondla and Jon H. Shepard. Guppy and Kondla shared their collection information for this area and Kondla also searched databases for museum records and the literature for relevant papers. Creation of the digital file of this paper was begun by P. Jones, furthered by Guppy and completed by Kondla. Kondla also digitized the photos used in this paper and produced the map. Guppy and Kondla also provided peer review of draft manuscripts. Masthead photos of the *C. affinis* and *C. sheridanii* are by Kondla. This project would have been impossible without their help, expertise and encouragement. It was greatly appreciated.

Special thanks go to the late Robert P. Nelson of Vernon and the late James Grant of Lavington. Both of these knowledgeable men showed me a number of collecting localities and generously provided records of several species they had collected in the north Okanagan.

I acknowledge the assistance of the following for their participation in the project: Ms. Terry Hurst, Vernon; Bob McVickar, Sicamous; Ron Candy, Curator of the City of Vernon Museum; Gordon Bloom and Peter Mayfield, volunteers at the Museum; and Leonard Threatful, Revelstoke.

REFERENCES

BALINT, Z. AND K. JOHNSON. 1997. Reformation of the *Polyommatus* section with a taxonomic and biogeographic overview. Neue Entomologische Nachrichten 40:1-68.

BIRD, C.D., G.J. HILCHIE, N.G. KONDLA, E.M. PIKE, AND F.A.H. SPERLING. 1995. Alberta Butterflies. Edmonton: The Provincial Museum of Alberta. 349 pp.

BLACKMORE, E.H. 1920. The Lycaeninae of British Columbia. Proceedings of the Entomological Society of British Columbia 14:5-11.

_____. 1921. The genus *Argynnis* in British Columbia. Proceedings of the Entomological Society of British Columbia 16:27-31.

BUCKELL, E.R. 1947. A list of the Lepidoptera collected in the Shuswap Lake district of British Columbia by Dr. W.R. Buckell. Proceedings of the Entomological Society of British Columbia 43:11–21.

CLARK, A.H. 1941. Notes on the American respresentatives of the butterfly genus *Argynnis*. Journal of the Washington Academy of Sciences 31(9):381-384.

DOWNES, W. 1918. Notes on the Lepidoptera of the northern Okanagan. Proceedings of the Entomological Society of British Columbia 10:11-13.

DYAR, H.G. 1904. The Lepidoptera of the Kootenai district of British Columbia. Proceedings of the United States National Museum 27(1376):779–938.

FARLEY, A.L. 1979. Atlas of British Columbia. UBC Press. 136pp.

FISCHER, A.I., J.H. SHEPARD AND C.S. GUPPY. 2000. Butterflies and moths of the Chilcotin district, British Columbia. Report for Ministry of Environment, Lands and Parks; Government of British Columbia. 66 pp.

GUPPY, C.S. 1986. The adaptive significance of alpine melanism in the butterfly *Parnassius phoebus* F. (Lepidoptera: Papilionidae). Oecologia 70(2):205-213.

GUPPY, C.S. AND N.G. KONDLA. 2000. Status of the butterflies and skippers of British Columbia for the National Accord for the Protection of Species at Risk. Prepared for Conservation Data Centre, Ministry of Environment, Lands and Parks. 87 pp. + MS Excell Spreadsheet.

GUPPY, C.S., J.H. SHEPARD AND N.G. KONDLA. 1994. Butterflies and skippers of conservation concern in British Columbia. Canadian Field-Naturalist 108(1): 31-40.

GUPPY, C.S., AND J.H. SHEPARD. 2001. Butterflies of British Columbia. Vancouver, BC: UBC Press 414pp.

HARDING, L.E., AND E MCCULLUM. 1994. Overview of Ecosystem Diversity. Chpt. 18. Pp.227-243. *In*: Biodiversity in British Columbia: Our Changing Environment. Eds.: Harding, L.E., and E. McCullum. Environment Canada, Canadian Wildlife Service. Ottawa. Ministry of Supply and Services. 426pp.

HARDY, G.A. 1954. [Rhopalocera]. Pages B51-B52 in The Natural History of the Forbidden Plateau Area, Vancouver Island, British Columbia. Report Provincial Museum Natural History and Anthropology (British Columbia) 1954:B24-B63.

JOHNSON, K. 1992. The palearctic “elfin” butterflies (Lycaenidae, Theclinae). Neue Entomologische Nachrichten 29:1-141.

KOHLER, S. 1977. Revision of North American Boloria selene (Nymphalidae) with description of a new subspecies. Journal of the Lepidopterists’ Society 31(4):243-268.

KONDLA, N.G. 1999. Pend-d’Oreille Butterfly Survey. Living Landscapes Program report for Royal BC Museum and Columbia Basin Trust. 38 pp. (http://www.livingbasin.com/cbasin/butterfly/index.html)

_____. 2001. Clarification of and comments on northern *Speyeria hydaspe* subspecies (Lepidoptera:Nymphalidae). Taxonomic Report 3(1):1-5.

KONDLA, N.G. AND C.S. GUPPY. 2002. Nomenclatural correctness of *Phyciodes pratensis* vs *Phyciodes pulchellus* (Lepidoptera: Nymphalidae). Journal of the Lepidopterists’ Society 56:171-172.

KONDLA, N.G., E.M. PIKE AND F.A.H. SPERLING. 1994. Butterflies of the Peace River region of Alberta and British Columbia. Blue Jay 52:71-90.

KONDLA, N.G., C.S. GUPPY AND J.H. SHEPARD. 2000. Butterflies of conservation interest in Alberta, British Columbia, and Yukon. Pp. 95-100 in Darling, L.M. (ed.). Proceedings of a Conference on the Biology and Management of Species and Habitats at Risk. Volume 1. BC Ministry of Environment, Lands and Parks and University College of the Caribou. 490 pp. (http://owlnut.rr.ualberta.ca/~barb/butsatrisk3.html)

Figure 2. View from Vernon Hill looking southwest towards Kalamalka Lake.

Figure 3. Goose Lake area just northwest of Vernon. Moderate elevation open grassland and rock outcrop habitat.

Figure 4. Kalamalka Lake Provincial Park.

Figure 5. Shorts Creek canyon, north rim looking towards the northeast.

Figure 6. King Edward Lake area with a fen in the foreground and typical forest habitat in the background.

Figure 7. Ski hill clearing on Silver Star Mountain with adjacent subalpine forest.

Fig. 8. *Polygonia l-album*

Fig. 9. *Carterocephalus palaemon*

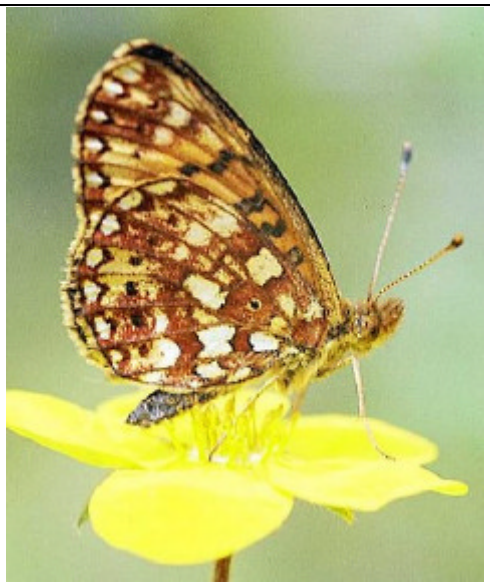

Fig. 10. *Boloria myrina*

Fig. 11. *C. sheridanii*

Fig. 12. *C. affinis*

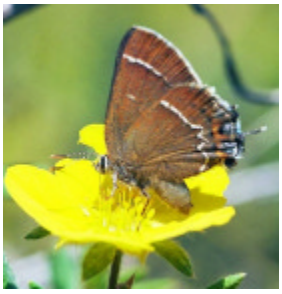

Fig. 13. *M. spinetorum*

Fig. 14. *Papilio multicaudatus*

Fig. 15. *Papilio zelicaon*

Fig. 16. *Plebejus anna* mostly *atrapraetextus* phenotypes. These and Fig. 17 specimens Leg. Threatful.

Fig. 17. *Plebejus anna atrapraetextus* and *P. anna* phenotypes from Shorts Creek canyon.

Figs. 8-10 and 13-15 photos by C. Guppy. Figs. 11-12 photos and 16-17 scan by N. Kondla.

LAYBERRY, R.A., P.W. HALL, AND J.D. LAFONTAINE. 1998. The Butterflies of Canada. Toronto, ON: University of Toronto Press. 280 pp.
LLEWELLYN-JONES, J.R. 1951. An annotated check list of the macrolepidoptera of British Columbia. Occ. Pap. Ent. Soc. Brit. Columbia No. 1:1-148.
MCDUNNOUGH, J.H. 1927. The Lepidoptera of the Seton Lake region, British Columbia.Canadian Entomologist 59(7):152–162
MEIDINGER, D., AND J. POJAR. 1991. Ecosystems of British Columbia. Victoria, BC: BC Ministry of Forests. 330 pp.
NYLIN, S., K. NYBLOM, F. RONQUIST, N. JANZ, J. BELICEK, AND M. KÄLLERSJÖ. Phylogeny of *Polygonia*, *Nymphalis* and related butterflies (Lepidoptera: Nymphalidae): a total evidence analysis. Zoological Journal of the Linnean Society 132:441-468.
OLIVER, C.G. 1977. Genetic incompatibility between populations of the nymphalid butterfly *Boloria selene* from England and the United States. Heredity 39(2):279-285.
PROCTOR, P.J. 1981. European (Essix) Skipper. Note sent to all District Agriculturists. Feb. 1981.
PYLE, R.M. 2002. The Butterflies of Cascadia. Seattle, WA: Seattle Audubon Society. 420 pp.
RIEGERT, P.W. 1991. Entomologists of British Columbia. Publisher: The Entomological Society of Canada and The Entomological Society of British Columbia. 90 pp.
SCHMIDT, C. 1996. Butterflies of the Kootenays – a report on the Crawford Bay area. Cordillera 3:32-39.
SCOTT, J.A. 1984. A review of *Polygonia progne* (*oreas*) and *P. gracilis* (*zephyrus*) (Nymphalidae) including a new subspecies from the southern Rocky Mountains. Journal of Research on the Lepidoptera 23:197-210.
_____. 1986. The Butterflies of North America. Stanford,CA: Stanford University Press. 583 pp.
_____. 1998. New western North American butterflies. Papilio (New Series) 11:1-12.
_____. 1994. Biology and systematics of *Phyciodes* (*Phyciodes*). Papilio (New Series) 7:1–120.
THREATFUL, D.L. 1982. Butterflies of Mount Revelstoke and Glacier National Parks, British Columbia, Canada. Parks Canada, Western Region. 20pp.
_____. 1989. A list of the butterflies and skippers of Mount Revelstoke and Glacier National Parks, British Columbia, Canada (Lepidoptera). Journal of Research on the Lepidoptera 27(3–4):213–221.
_____. 2000a. Butterflies of the Cherry Creek area Cherryville, BC. Boreus 20(2):26-28.
_____. 2000b. Butterflies of the subalpine and alpine zones of Red Mountain, Camelsfoot Range, interior plateau of BC. Boreus 20(2):24-25. (http://esbc.harbour.com/Bor20_1.html)
_____. 2001. Butterflies of Shorts Creek canyon area, north Okanagan, BC. Boreus 21(1):24-26. (http://esbc.harbour.com/Bor21_1.html)

THE TAXONOMIC REPORT

is a publication of ***The International Lepidoptera Survey (TILS).***
(A Tax Exempt Non-Profit Scientific Organization)

The Taxonomic Report is projected for publication at the rate of 8-10 issues a year. Subscription/dues for Volume **Four** are $45 US for North America (Can., US., Mex.) and $55 US for overseas subscribers. The subscription year follows the calendar year. All issues are mailed 1st class. At the end of each year, subscribers receive that year's volume on a read-only compact disc (CDR) for permanent archiving and reproduction for personal use (i.e. museums & universities may make as copies as needed in whatever format desired). Non-members may receive individual issues in print for $5 per issue. Individual issues on CDR to non-members are $15 per issue post paid. **Subscriptions** and **individual issue** orders should be made payable to **TILS;** and mailed to: **Treasurer, 126 Wells Road, Goose Creek, SC USA 29445-3413. Articles for publication are sought.** They may deal with any area of taxonomic research on Lepidoptera. Before sending a manuscript, simply write **TILS** at the above address to set up discussion on how to best handle your research for publication.

Catch us on the web at: **www.tils-ttr.org**