



## STUDIES ON THE PLECOPTERA OF THE KOOTENAY LAKE DRAINAGE: A REVISITATION OF THE STONEFLIES FROM THE PURCELL RANGE, BRITISH COLUMBIA, CANADA

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### ABSTRACT

Thirty five streams entering Kootenay Lake, British Columbia were sampled for stoneflies over a seven day period in late May and early June, 2010. The collections include 874 specimens and 34 species which increase the number of stonefly species reported for this area to 42, and many new locality records are added for British Columbia. Male and female specimens of *Megaleuctra* collected at two sites in the study area were determined as *M. stigmata* (Banks) which supports the synonymy of *M. spectabilis* Neave with this species. Samples were also taken from Summit Creek and the South Salmo River, two streams outside the Kootenay Lake basin for comparison. A checklist of 42 Plecoptera species reported for the Kootenay Lake drainage basin is presented and the first provincial records for *Paraleuctra jewetti* Nebeker & Gaufin and *P. projecta* (Frison) are given.

**Keywords:** Plecoptera, stoneflies, Kootenay Lake, Purcell Mountains, British Columbia, Canada

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### INTRODUCTION

Despite the allure generated by the title of Neave's (1934) classic study, few Plecoptera workers are known to have collected additional specimens from the Purcell Range and other streams entering the Kootenay Lake drainage of southeastern British Columbia. Neave (1934) lists 19 stonefly species collected chiefly from the Campbell Creek drainage of the Purcell Mountains during May and June 1933, and Banks (1907) includes seven species collected by R.P. Currie and colleagues in 1903 from the Kaslo/Ainsworth area on the west side of Kootenay Lake; five of these species from the Banks (1907)

study are also reported by Neave (1934) so 21 total species were reported for the Kootenay Lake drainage at that time, and one of these, *Leuctra bradleyi* Needham & Claassen, was later placed in the synonymy of *Paraleuctra occidentalis* (Banks) by Ricker (1954), a decision supported by Baumann & Stark (2009), thus reducing the species number reported for the region to 20 (Table 1). Subsequently, Ricker & Scudder (1975) list 120 species for all of British Columbia, 30 from localities in the Kootenay Lake drainage, including the first area records for 13 species. This increased the list of species known for the area to 33, but *Alloperla imbecilla* (Say) and *Sweltsa*

*coloradensis* (Banks) reported by Banks (1907) were excluded by Ricker & Scudder (1975), and *Taenionema nigripenne* (Banks) was subsequently placed in synonymy with *T. pallidum* (Banks) (Stanger & Baumann 1993), consequently the list of potentially valid species recognized for the Kootenay Lake drainage by Ricker & Scudder (1975) stands at 30. More recently, Stewart & Oswood (2006) include records for 132 species from British Columbia in their (Chapter 12) data base. In comparison, Donald & Anderson (1977) list 73 species from the Waterton River drainage in Alberta and Newell et al. (2008) list

100 species from the Glacier National Park area of Montana.

We recently became interested in evaluating Claassen's (1937) synonymy of *Megaleuctra spectabilis* Neave with *M. stigmata* (Banks) because Ricker & Scudder (1975) and Scudder (1994) rejected the synonymy perhaps on the basis that no male specimens were available from the Kootenay Lake area for comparison. This instigated our travel to Kootenay Lake which afforded an opportunity to evaluate changes in the May-June stonefly fauna for this area after an interval of 77 years.

**Table 1.** Stoneflies reported from Kootenay Lake, B.C. drainages by Banks (1907) [=B] and Neave (1934) [=N]. Names are updated to reflect nomenclatorial changes.

Taxon	Reported By	Specimens	Location
<b>Capniidae</b>			
<i>Eucapnopsis brevicauda</i>	N	3 ♂ 3 ♀	Campbell Crk
<b>Leuctridae</b>			
<i>Megaleuctra stigmata</i>	N	4 ♀	Campbell Crk, Fry Crk
<i>Paraleuctra occidentalis</i>	B, N	~3 ♂ 2 ♀	Ainsworth, Campbell Crk
<i>Pomoleuctra purcellana</i>	N	1 ♂	Campbell Crk
<b>Nemouridae</b>			
<i>Podmosta delicatula</i>	N	1 ♂ 1 ♀	Campbell Crk
<i>Zapada cinctipes</i>	B, N	~ 3 specimens	Kaslo, Campbell Crk
<i>Zapada columbiana</i>	N	~ 3 ♀	Campbell Crk, 10 Mile Crk
<i>Zapada frigida</i>	N	1 ♂	Campbell Crk
<b>Taeniopterygidae</b>			
<i>Doddsia occidentalis</i>	B, N	3 specimens	Kaslo, Campbell Crk
<i>Taenionema pacificum</i>	B, N	~ 3 specimens	Kaslo, Campbell Crk
<i>Taenionema pallidum</i>	N	1 ♂ 1 ♀	Campbell Crk
<b>Chloroperlidae</b>			
<i>Alloperla</i> (det <i>imbecilla</i> )	B	?	Ainsworth
<i>Alloperla serrata</i>	N	1 ♀	Campbell Crk
<i>Kathroperla perdita</i>	N	6 ♂ 4 ♀, larvae	Campbell Crk
<i>Paraperla frontalis</i>	N	1 ♂ 1 ♀	Campbell Crk, Fry Crk
<i>Sweltsa borealis</i>	N	Many specimens	Campbell Crk, 10 Mile Crk
<i>Sweltsa coloradensis</i>	B	?	Kaslo, Ainsworth
<b>Peltoperlidae</b>			
<i>Yoraperla</i> sp.	N	larvae	Campbell Crk
<b>Perlodidae</b>			
<i>Megaracys irregularis</i>	B, N	~ 2 specimens	Kaslo, Campbell Crk
<i>Setoena bradleyi</i>	N	larvae	Campbell Crk

## MATERIALS AND METHODS

An attempt was made to sample all streams entering Kootenay Lake which could be accessed. The lack of access roads and rough terrain precluded our taking samples from some potential sites, and high flow rates limited our opportunity to take kick samples at most sites. Therefore our samples consist primarily of adult specimens with a few pre-emergent larvae and exuviae collected with beating sheets and by hand picking.

Thirty five total sites were sampled in the Kootenay Lake drainage basin and stoneflies were taken from all of these except Boulder Creek at Hwy 3A and Salisbury Creek at Johnsons Landing. Three additional samples were taken outside the principal study area on Summit Creek and South Salmo River in southeastern British Columbia for comparison. Specimens were preserved in 75-80% ethanol and identified in our respective laboratories at Brigham Young University and Mississippi College. A synoptic collection of the common stonefly species collected during this survey was deposited at the Spencer Entomological Museum, University of British Columbia, Vancouver, B. C.

## RESULTS AND DISCUSSION

A total of 874 stonefly specimens representing 34 species were collected from 33 sites in the Kootenay Lake drainage between 27 May and 2 June 2010. Five species, *Doddsia occidentalis* (Banks), *Megarcys irregularis* (Banks), *Paraperla frontalis* (Banks), *Podmosta delicatula* (Claassen), and *Taenionema pacificum* (Banks), previously reported by Banks (1907) and Neave (1934) were not collected from the Kootenay Lake drainage during our survey. Ricker & Scudder (1975) reported 29 potentially valid species from the area including 12 not recorded by Banks (1907) and Neave (1934); six of these species, *Isogenoides colubrinus* (Hagen), *Isoperla petersoni* Needham & Christenson, *Megarcys signata* (Hagen), *Suwallia pallidula* (Banks), *Sweltsa revelstoka* (Jewett) and *Zapada haysi* (Ricker) were absent in our survey, but 13 species not reported in the earlier studies were found in 2010. One of the species collected in 2010, *Paraperla wilsoni* Ricker, is probably the same species reported as *P. frontalis* by Neave (1934), consequently the latter species is not included on our checklist. Four additional species, *Capnia confusa* Claassen,

*Hesperoperla pacifica* (Banks), *Isoperla sobria* (Hagen) and *Paraleuctra jewetti* Nebeker & Gaufin were collected during our survey from nearby sites outside the Kootenay Lake basin. The records of *P. jewetti* and *P. projecta* (Frison) represent the first provincial records of these species for British Columbia (Ricker & Scudder 1975; Stark et al. 2009; Stewart & Oswood 2006). The following species accounts include collection records from the 2010 survey; species not reported by Banks (1907), Neave (1934) or Ricker & Scudder (1975) are listed in bold. All collections were made by the authors from May 27-June 2, 2010.

### Family CAPNIIDAE

Among Capniidae, only *Eucapnopsis brevicauda* Claassen was previously reported by Banks (1907), Neave (1934) and Ricker & Scudder (1975) from the study area. We also found this species at several sites and found six additional capniids, five from the Kootenay Lake drainage. Collections made during the winter season should result in additional species records for the region. Baumann et al. (1977) list 30 capniid species for the Northern Rocky Mountains.

#### *Capnia confusa* Claassen

(Non-Kootenay Drainage Material) South Salmo River, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 1♀.

#### *Capnia gracilaria* Claassen

Kootenay Drainage Material: Seeps into Duhamel Creek, Six Mile Lake Road, above 6 km marker, 49° 37' N, 117° 15' W, 27 May 2010, 1♀. Lockhart Creek, Lockhart Creek Provincial Park, 49° 31' N, 116° 47' W, 31 May 2010, 1♀. Preacher Creek, Crawford Bay Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 2♂. Sitkum Creek, Kane Road, off Hwy 3A, near Crescent Bay, 49° 36' N, 117° 10' W, 30 May 2010, 9♂, 26♀. South Fork Gray Creek, Oliver Lake Road, 49° 37' N, 116° 42' W, 1 June 2010, 1♂. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 3♂, 4♀.

(Non-Kootenay Drainage Material): Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48'

W, 2 June 2010, 4♀.

***Capnia petila* Jewett**

Kootenay Drainage Material: South Fork Gray Creek, Oliver Lake Road, 49° 37' N, 116° 42' W, 1 June 2010, 1♀.

***Capnia sextuberculata* Jewett**

Kootenay Drainage Material: South Fork Gray Creek, Oliver Lake Road, 49° 37' N, 116° 42' W, 1 June 2010, 3♂, 2♀.

***Eucapnopsis brevicauda* Claassen**

Kootenay Drainage Material: Kaslo River, Kaslo River Trail, Hwy 31A, 49° 55' N, 116° 55' W, 29 May 2010, 1♀. Kootenay Joe Creek, Fry Creek Trail, Purcell Mountains Wilderness Park, 28 May 2010, 1♂. Preacher Creek, Crawford Bay Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 2♂, 2♀. Sitkum Creek, Kane Road, off Hwy 3A, near, Crescent Bay, 49° 36' N, 117° 10' W, 30 May 2010, 3♂, 5♀. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 2♂, 1♀. Woodbury Creek, Woodbury Creek Forest Service Road, W Woodbury Point, 49° 48' N, 116° 55' W, 30 May 2010, 3♂, 12♀.

(Non-Kootenay Drainage Material): South Salmo River, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 1♂, 8♀. Summit Creek, Hwy 3, mouth of canyon, 49° 09' N, 116° 39' W, 2 June 2010, 2♀. Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 1♂, 10♀.

***Isocapnia vedderensis* (Ricker)**

Kootenay Drainage Material: Loki Creek, Kootenay Lake East Road, 40° 50' N, 116° 51' W, 31 May 2010, 1♀.

***Utacapnia trava* (Nebeker & Gaufin)**

Kootenay Drainage Material: Duhamel Creek, Six Mile Lake Road, 49° 38' N, 117° 16' W, 30 May 2010, 3♀. Schroeder Creek, Hwy 31, Schroeder Point, 50° 02' N, 116° 54' W, 29 May 2010, 1♀.

Family **LEUCTRIDAE**

Three valid leuctrid species were included by Banks (1907) and Neave (1934) for the Kootenay Lake area (Table 1). One of these, *Megaleuctra stigmata* (Banks) was originally proposed by Neave (1934) as a new species, *M. spectabilis*, based on four females, collected at Campbell Creek and from a tributary of Fry Creek. Claassen (1937) placed *M. spectabilis* as a synonym of *M. stigmata* (Banks) (Banks 1900), a species known at that time only from the male. Ricker & Scudder (1975) apparently rejected this synonymy and reintroduced *M. spectabilis* as a valid name without comment. Our collections of *Megaleuctra* from two areas include male and female specimens whose genitalic structures support Claassen's (1937) position. Ricker & Scudder (1975) re-identified some material listed by Banks (1907) as *Leuctra occidentalis* and some listed by Neave (1934) as *L. bradleyi*. These changes resulted in recognition of *Paraleuctra forcipata* (Frison) and *Paraleuctra vershina* Gaufin & Ricker for the area. In addition to five previously reported species, we include the first local records for *Perlomyia utahensis* Needham & Claassen, and the first records of *Paraleuctra jewetti* and *P. projecta* from British Columbia. Autumnal collecting in the area could add records of an additional species, *Despaxia augusta* (Banks).

***Megaleuctra stigmata* (Banks)**

Kootenay Drainage Material: Seeps into Duhamel Creek, Six Mile Lake Road, above 6 km marker, 49° 37' N, 117° 15' W, 27 May 2010, 1♀, 1 larva. Same site, 30 May 2010, 2♀, 1 exuvium. Seeps into Duhamel Creek, Six Mile Lake Road, above 7 km marker, 49° 38' N, 117° 16' W, 30 May 2010, 1♂. Seeps into South Fork Gray Creek, Oliver Lake Road, 49° 37' N, 116° 42' W, 1 June 2010, 1♂, 1♀.

***Paraleuctra forcipata* (Frison)**

Kootenay Drainage Material: Bernard Creek, Garland Bay Recreation Site, 49° 52' N, 116° 52' W, 31 May 2010, 1♂. Duhamel Creek, above 7 km marker, Six Mile Lake Road, 49° 38' N, 117° W, 30 May 2010, 4♂, 9♀. Busk Creek, Kokanee Creek Road, 49° 38' N, 117° 09' W, 27 May 2010, 2♂, 2♀. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N,

116° 47' W, 31 May 2010, 1♂, 7♀. Sanca Creek, Hwy 3A, north of Sanca, 49° 23' N, 116° 43' W, 1 June 2010, 1♀. Sherraden Creek, Riondel Road, S Riondel, 49° 44' N, 116° 51' W, 31 May 2010, 4♂, 3♀. Sitkum Creek, Kane Road, off Hwy 3A, near Crescent Bay, 49° 36' N, 117° 10' W, 30 May 2010, 4♂, 4♀. South Fork Gray Creek, Oliver Lake Road, 49° 37' N, 116° 42' W, 1 June 2010, 4♂, 4♀. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 3♂, 8♀. Woodbury Creek, Woodbury Creek Forest Service Road, W Woodbury Point, 49° 48' N, 116° 55' W, 30 May 2010, 1♀.

(Non-Kootenay Drainage Material): Summit Creek, Hwy 3, mouth of canyon, 49° 09' N, 116° 39' W, 2 June 2010, 1♂. Summit Creek, Blazed Creek Rest Area, Hwy 3, 49° 08' N, 116° 48' W, 2 June 2010, 10♂, 9♀.

#### *Paraleuctra jewetti* Nebeker & Gaufin

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 1♂.

#### *Paraleuctra occidentalis* (Banks)

Kootenay Drainage Material: Sherraden Creek, Riondel Road, S Riondel, 49° 44' N, 116° 51' W, 31 May 2010, 1♂, 3♀. Stream near Pebble Beach Recreation Site, Kootenay Lake East Road, 49° 50' N, 116° 51' W, 31 May 2010, 1♂, 3♀.

#### *Paraleuctra projecta* (Frison)

Kootenay Drainage Material: Seeps into Duhamel Creek, Six Mile Lake Road, above 7 km marker, 49° 38' N, 117° 16' W, 30 May 2010, 15♂, 10♀. Seeps into Duhamel Creek, Six Mile Lake Road, above 6 km marker, 49° 37' N, 117° 15' W, 27 May 2010, 2♀. Same site, 30 May 2010, 4♂, 3♀. Stream near Pebble Beach Recreation Site, Kootenay Lake East Road, 49° 50' N, 116° 51' W, 31 May 2010, 1♂, 4♀.

#### *Paraleuctra vershina* Gaufin & Ricker

Kootenay Drainage Material: Bernard Creek, Garland Bay Recreation Site, 49° 52' N, 116° 52' W, 31 May

2010, 2♀. Duhamel Creek, Six Mile Lake Road, 49° 38' N, 117° 16' W, 30 May 2010, 2♂, 1♀.

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 2♂, 1♀.

#### *Perlomyia utahensis* Needham & Claassen

Kootenay Drainage Material: Gar Creek, Johnsons Landing, 50° 05' N, 116° 53' W, 28 May 2010, 1♀.

#### *Pomoleuctra purcellana* (Neave)

Kootenay Drainage Material: South Fork Gray Creek, Oliver Lake Road, 49° 37' N, 116° 42' W, 1 June 2010, 4♀.

#### Family NEMOURIDAE

Three *Zapada* species: *Z. cinctipes* (Banks), *Z. columbiana* (Claassen), *Z. frigida* (Claassen) and *Podmosta delicatula* (Claassen) were the only nemourid species reported by Banks (1907) and Neave (1934) for streams in the Kootenay Lake drainage (Table 1). However, Ricker & Scudder (1975) added records of *Malenka californica* (Claassen) and *Zapada haysi* (Ricker) from the Slocan area and a record of *Zapada oregonensis* (Claassen) from Kaslo. We collected specimens of four *Zapada* species, found *Prostoia besametsa* (Ricker) to be very common in the area, and also caught one specimen of *Malenka californica*. No specimens of *Podmosta delicatula* or *Zapada haysi* were collected.

#### *Malenka californica* (Claassen)

Kootenay Drainage Material: Gar Creek, Johnsons Landing, 50° 05' N, 116° 53' W, 28 May 2010, 1♂.

#### *Prostoia besametsa* (Ricker)

Kootenay Drainage Material: Bernard Creek, Garland Bay Recreation Site, 49° 52' N, 116° 52' W, 31 May 2010, 5♀. Cooper Creek, Hwy. 31, Cooper Creek, 50° 12' N, 116° 58' W, 29 May 2010, 7♂, 32♀, 1 larva. Crawford Creek, Hwy 3A, Crawford Bay, 49° 40' N, 116° 49' W, 1 June 2010, 9♂, 17♀. Hamill Creek, above Junction Duncan River, Cooper Creek, 50° 12'



N, 116° 56' W, 29 May 2010, 1♂, 2♀. Kaslo River, Kaslo River Trail, Hwy 31A, 49° 55' N, 116° 55' W, 29 May 2010, 3♂, 8♀. Loki Creek, Kootenay Lake East Road, 49° 50' N, 116° 51' W, 31 May 2010, 1♀. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 3♂, 4♀. Sanca Creek, Hwy 3A, S Sanca, 49° 23' N, 116° 43' W, 1 June 2010, 1♀. Sitkum Creek, Kane Road, off Hwy 3A, W Crescent Bay, 49° 36' N, 117° 10' W. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 3♂, 11♀.

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, 49° 04' N, 117° 15' W, 2 June 2010, 12♂, 25♀. Summit Creek, Hwy 3, mouth of canyon, W Kootenay River, 49° 09' N 116° 39' W, 2 June 2010, 1♂, 4♀. Summit Creek, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 35♂, 119♀.

*Zapada cinctipes* (Banks)

Kootenay Drainage Material: Busk Creek, Kokanee Creek Road, 49° 38' N, 117° 09' W, 27 May 2010, 2♀. Duhamel Creek, Six Mile Lake Road, 49° 38' N, 117° 16' W, 30 May 2010, 3♀. Gar Creek, Johnsons Landing, 50° 05' N, 116° 53' W, 28 May 2010, 1♀. Hendryx Creek, Riondel, 49° 46' N, 116° 51' W, 31 May 2010, 1♀. Stream near Pebble Beach Recreation Site, Kootenay Lake East Road, 49° 50' N, 116° 51' W, 31 May 2010, 1♀. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 1 June 2010, 2♂, 3♀. Sitkum Creek, Kane Road, off Hwy 3A, W Crescent Bay, 49° 36' N, 117° 10' W, 30 May 2010, 3♀.

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, 49° 04' N, 117° 15' W, 2 June 2010, 1♀. Summit Creek, Hwy 3, mouth of canyon, W Kootenay River, 49.09° N, 116° 39' W, 2 June 2010, 1♀. Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 2♀.

*Zapada columbiana* (Claassen)

Kootenay Drainage Material: Seeps into Duhamel Creek, Six Mile Lake Road, above 6 km marker, 49° 37' N, 117° 15' W, 27 May 2010, 1♀. Duhamel Creek, Six Mile Lake Road, 49° 38' N, 117° 16' W, 30 May

2010, 2♀.

(Non-Kootenay Drainage Material): Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 1♀.

*Zapada frigida* (Claassen)

Kootenay Drainage Material: Bernard Creek, Garland Bay Recreation Site, 49° 52' N, 116° 52' W, 31 May 2010, 4♂. Hamill Creek, above junction Duncan River, Cooper Creek, 50° 12' N, 116° 56' W, 29 May 2010, 2♂. Lockhart Creek, Hwy 3A, Lockhart Creek Provincial Park, 49° 31' N, 116° 47' W, 1 June 2010, 1♀. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 1 June 2010, 1♂. Sanca Creek, Hwy 3A, S Sanca, 49° 23' N, 116° 43' W, 1 June 2010, 1♂. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 5♀.

*Zapada oregonensis* (Claassen)

Kootenay Drainage Material: Seeps into Duhamel Creek, Six Mile Lake Road, above 7 km marker, 49° 38' N, 117° 16' W, 30 May 2010, 1♂. Seeps into Duhamel Creek, Six Mile Lake Road, above 6 km marker, 49° 37' N, 117° 15' W, 30 May 2010, 2♀.

Family **TAENIOPTERYGIDAE**

Banks (1907) and Neave (1934) include records for two species, *Doddsia occidentalis* (Banks) and *Taenionema pacificum* (Banks), which we did not collect, and Neave (1934) reported specimens of *T. pallidum* (Banks) which we found at several sites. Ricker & Scudder (1975) identified a few specimens collected in Kaslo by R.P. Currie and H.G. Dyar as either *T. pallidum* or *T. nigripenne*; currently these are considered synonyms (Stanger & Baumann 1993).

*Taenionema pallidum* (Banks)

Kootenay Drainage Material: Cooper Creek, Hwy 31, Cooper Creek, 50° 12' N, 116° 58' W, 29 May 2010, 1♀. Duhamel Creek, Six Mile Lake Road, 49° 38' N, 117° 16' W, 30 May 2010, 1♂, 1♂. Seeps into Duhamel Creek, Six Mile Lake Road, above 7 km marker, 49° 38' N, 117° 16' W, 30 May 2010, 1♀. Fry Creek, Fry

Creek Trail below bridge, Purcell Mountains Wilderness Park, 28 May 2010, 1♀. Hamill Creek, above junction Duncan River, Cooper Creek, 50° 12' N, 116° 56' W, 29 May 2010, 1♀. Kaslo River, Hwy 31A, Kaslo River Trail, 49° 55' N, 116° 55' W, 29 May 2010, 1♂. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 2♀. Woodbury Creek, Woodbury Creek Road, W Woodbury Point, 49° 48' N, 116° 55' W, 30 May 2010, 1♀.

(Non-Kootenay Drainage Material): Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 3♂, 5♂.

#### Family CHLOROPERLIDAE

Two chloroperlid species were reported by Banks (1907), four by Neave (1934) and seven by Ricker & Scudder (1975) from the study area. One species, *Alloperla imbecilla* (Say), listed in Banks (1907) study from Ainsworth, is an eastern species not known from west of Kentucky (Stark et al. 2009) and was excluded from the list by Ricker & Scudder (1975). *Alloperla serrata* Needham and Claassen was included by Neave (1934) based on a female specimen but we found only *Alloperla medveda* Ricker and *A. severa* (Hagen) in our survey. Although, *A. serrata* could occur in the Kootenay Lake drainage it cannot be verified based on a female specimen. Three of the other five species listed in Table 1 appear to be valid but we found *Sweltsa borealis* (Banks) only occasionally while *Sweltsa fidelis* (Banks) was the most common stonefly species collected in our 2010 study. Neave (1934) included only *S. borealis* which brings into question the true identity of his specimens. Ricker & Scudder (1975) also exclude *S. coloradensis* (Banks) from the list of Kootenay area species but our collections indicate this species is present in the area. Our collections include several specimens of *Paraperla wilsoni* but no *P. frontalis*, the species listed by Neave (1934), were found. As mentioned above, we have removed *P. frontalis* from the list until its presence can be verified.

#### *Alloperla medveda* Ricker

Kootenay Drainage Material: Gar Creek, Johnsons Landing, 50° 05' N, 116° 53' W, 28 May 2010, 15♂, 6♀.

#### *Alloperla severa* (Hagen)

Kootenay Drainage Material: Duncan River, Argenta Road, E Cooper Creek, 50° 12' N, 116° 58' W, 29 May 2010, 1♂.

#### *Kathroperla perdita* Banks

Kootenay Drainage Material: Lost Ledge Creek, Lost Ledge Provincial Park, 50° 06' N, 116° 56' W, 29 May 2010, 1 exuvium. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 2♂. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 1 exuvium.

(Non-Kootenay Drainage Material): Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 1♀.

#### *Paraperla wilsoni* Ricker

Kootenay Drainage Material: Davis Creek, Davis Creek Provincial Park, 50° 08' N, 116° 57' W, 29 May 2010, 1 exuvium. Seeps into Duhamel Creek, Six Mile Lake Road, above 7 km marker, 49° 38' N, 117° 16' W, 30 May 2010, 1♂. Fry Creek, Fry Creek Trail below bridge, Purcell Mountains Wilderness Park, 28 May 2010, 1♂, 6♀. Hamill Creek, Argenta Road, NE Cooper Creek, 50° 12' N, 116° 56' W, 29 May 2010, 1 exuvium. Kaslo River, Hwy 31A, Kaslo River Trail, 49° 55' N, 116° 55' W, 29 May 2010, 1♀. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 1♂, 1♀. Sherraden Creek, Riondel Road, S Riondel, 49° 44' N, 116° 51' W, 1♀. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 2♀. Woodbury Creek, Woodbury Creek Road, W Woodbury Point, 49° 48' N, 116° 55' W, 30 May 2010, 1♀.

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 2♂. Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 1♂.

#### *Plumiperla diversa* (Frison)

Kootenay Drainage Material: Bernard Creek, Garland

Bay Recreation Site, 49° 52' N, 116° 52' W, 31 May 2010, 10♂, 3♀. Cooper Creek, Hwy 31, Cooper Creek, 50° 12' N, 116° 58' W, 29 May 2010, 1♀. Crawford Creek, Hwy 3A, Crawford Bay, 49° 40' N, 116° 49' W, 1 June 2010, 1♂. Davis Creek, Davis Creek Provincial Park, 50° 08' N, 116° 57' W, 29 May 2010, 12♂, 2♀. Fry Creek, Fry Creek Trail below bridge, Purcell Mountains Wilderness Park, 28 May 2010, 10♂, 1♀, 2 larvae. Gray Creek, Hwy 3A, Gray Creek, 49° 37' N, 116° 47' W, 1 June 2010, 1♂. Hamill Creek, above junction Duncan River, Cooper Creek, 50° 12' N, 116° 56' W, 29 May 2010, 3♂, 1 exuvium. Kaslo River, Kaslo River Trail, Hwy 31A, 49° 55' N, 116° 55' W, 29 May 2010, 1♀. Loki Creek, Kootenay Lake East Road, 49° 50' N, 116° 51' W, 31 May 2010, 3♂. Sanca Creek, Hwy 3A, S Sanca, 49° 31' N, 116° 43' W, 1 June 2010, 1♂, 2♀. Woodbury Creek, Woodbury Creek Forest Service Road, W Woodbury Point, 49° 48' N, 116° 55' W, 30 May 2010, 3♂.

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 2♂, 1 larva.

*Sweltsa borealis* (Banks)

Kootenay Drainage Material: Duhamel Creek, Six Mile Lake Road, 49° 38' N, 117° 16' W, 30 May 2010, 1♂. Seeps South Fork Gray Creek, Oliver Lake Road, 49° 37' N, 116° 42' W, 1 June 2010, 1♂. Kaslo River, Hwy 31A, Kaslo River Trail, 49° 55' N, 116° 55' W, 29 May 2010, 1♀. Sitcum Creek, Kane Road, off Hwy 3A, W Crescent Bay, 49° 36' N, 117° 10' W, 30 May 2010, 1♀. Tam O'Shanter Creek, Riondel Road, N Riondel, 49° 48' N, 116° 51' W, 31 May 2010, 1♀.

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 1♀. Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 2♀.

*Sweltsa coloradensis* (Banks)

Kootenay Drainage Material: Duhamel Creek, Six Mile Creek Road, 49° 38' N, 117° 16' W, 30 May 2010, 3♂, 1♀.

(Non-Kootenay Drainage Material): Summit Creek, Hwy 3, mouth of canyon, 49° 09' N, 116° 39' W, 2 June 2010, 1 pharate larva.

*Sweltsa fidelis* (Banks)

Kootenay Drainage Material: Argenta Creek, Wolf Road, 50° 10' N, 116° 55' W, 28 May 2010, 31♂, 17♀. Bernard Creek, Garland Bay Recreation Site, 49° 52' N, 116° 52' W, 31 May 2010, 3♂, 3♀. Cooper Creek, Hwy 31, Cooper Creek, 50° 12' N, 116° 58' W, 29 May 2010, 1♂. Crawford Creek, Hwy 3A, Crawford Bay, 49° 40' N, 116° 49' W, 1 June 2010, 1♀. Davis Creek, Davis Creek Provincial Park, 50° 08' N, 116° 57' W, 29 May 2010, 1♂. Seeps into Duhamel Creek, Six Mile Lake Road, above 6 km marker, 49° 38' N, 117° 16' W, 27 May 2010, 3♂, 3♀. Seeps into Duhamel Creek, Six Mile Lake Road, above 7 km marker, 49° 38' N, 117° 16' W, 30 May 2010, 1 larva. Seeps into Duhamel Creek, Six Mile Lake Road, above 3 km marker, 49° 36' N, 117° 15' W, 30 May 2010, 1♂, 1♀. Fry Creek, Fry Creek Trail below bridge, Purcell Mountains Wilderness Park, 28 May 2010, 1♂. Gar Creek, Johnsons Landing, 50° 05' N, 116° 53' W, 28 May 2010, 52♂, 29♀. Gray Creek, Hwy 3A, Gray Creek, 49° 37' N, 116° 47' W, 1 June 2010, 1♂, 1 larva. Hendryx Creek, Riondel Road, Riondel, 49° 46' N, 116° 51' W, 31 May 2010, 20♂, 37♀. Kaslo River, Hwy 31A, Kaslo River Trail, 49° 55' N, 116° 55' W, 29 May 2010, 1♂. Kootenay Joe Creek, Fry Creek Trail, Purcell Mountains Wilderness Park, 28 May 2010, 2♂, 1♀. LaFrance Creek, Hwy 3A, N Lockhart Beach, 49° 32' N, 116° 47' W, 1 June 2010, 14♂, 7♀. Lockhart Creek, Lockhart Creek Provincial Park, 49° 31' N, 116° 47' W, 1 June 2010, 6♂, 4♀. Stream near Pebble Beach Recreation Site, Kootenay Lake Road, 49° 50' N, 116° 51' W, 31 May 2010, 40♂, 42♀. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 1♂, 1♀. Sherraden Creek, Riondel Road, S Riondel, 49° 44' N, 116° 51' W, 31 May 2010, 12♂, 9♀. Tam O'Shanter Creek, Riondel Road, Dutch Harbor Camp, 49° 48' N, 116° 51' W, 31 May 2010, 1♀.

(Non-Kootenay Drainage Material): Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 1♀.



### Family PELTOPERLIDAE

Neave (1934) includes a record of "*Peltoperla* sp." based on nymphal specimens collected in Campbell Creek which we presume represent *Yoraperla brevis* (Banks). Banks (1907) does not mention specimens of this species in the original description, however, a specimen from Ainsworth in the USNM bears a Banks "cotype" label as discussed by Stark & Nelson (1994).

#### *Yoraperla brevis* (Banks)

Kootenay Drainage Material: Davis Creek, Davis Creek Provincial Park, 50° 08' N, 116° 57' W, 29 May 2010, 1♂. Stream near Pebble Beach Recreation Site, Kootenay Lake East Road, 49° 50' N, 116° 51' W, 31 May 2010, 2♂, 6♀. Preacher Creek, Crawford Creek Road, NE Crawford Bay, 49° 43' N, 116° 47' W, 31 May 2010, 1♀. Sherraden Creek, Riondel Road, S Riondel, 49° 44' N, 116° 51' W, 31 May 2010, 1♀.

### Family PERLIDAE

Banks (1907) and Neave (1934) include no records of Perlidae from the Kootenay Lake basin and we collected no specimens in our samples from the lake drainage but did collect *Hesperoperla pacifica* (Banks) from the South Salmo River southwest of Kootenay Lake. This species should also be found in the Kootenay Lake drainage but efforts to locate specimens, even nymphs or exuviae that are easily identifiable, were not successful.

#### *Hesperoperla pacifica* (Banks)

(Non-Kootenay Drainage Material): South Salmo River, Lost Creek Rest Area, Hwy 3, 49° 04' N, 117° 15' W, 2 June 2010, 2♂.

### Family PERLODIDAE

Banks (1907) reports *Megarcys irregularis* (Banks) from Ainsworth and Kaslo, but Ricker & Scudder (1975) referred the Kaslo specimen to *M. watertoni* (Ricker), and based on our survey, the Ainsworth specimen should also be placed as this species. Ricker & Scudder (1975) also identify a separate Kaslo specimen collected by A.N. Caudell as *M. signata* (Hagen). We have not seen this specimen but consider it a probable misidentification and are

deleting *M. signata* from the list of species known for the area until it can be confirmed. Neave (1934) lists a female "*Perlodes irregularis*" from Campbell Creek but also indicates larvae collected in Campbell Creek are similar "...in the distribution and number of gills..." to larvae of *Setvena tibialis* (Banks) but differ in details of mouthpart morphology. We list these records as *Setvena bradleyi* (Smith) in Table 1; Neave (1934) indicates *S. bradleyi* has been recorded from Kaslo but does not indicate the source for this record, but it may have originated with Needham & Claassen (1925). Our samples from the Kootenay Lake drainage include several specimens of *Megarcys watertoni*, a few specimens of *Frisonia picticeps* (Hanson) and a male and larvae of *Setvena bradleyi*. No specimens of *Isoperla* were reported by Banks (1907) or Neave (1934) from the Kootenay Lake drainage, but Ricker & Scudder (1975) report *I. petersoni* Needham & Christenson from Slocan City. We recorded this genus from the Kaslo River as cast skins only and collected a single male of *Isoperla sobria* (Hagen) from the South Salmo River, outside the Kootenay Lake basin. The genus *Kogotus* is recorded on the basis of a mature larva collected in Hamill Creek.

#### *Frisonia picticeps* (Hanson)

Kootenay Drainage Material: Coffee Creek, Hwy 31, above junction Kootenay Lake, 49° 42' N, 116° 55' W, 27 May 2010, 1♂, 5♀.

#### *Isoperla sobria* (Hagen)

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 1♂.

#### *Isoperla* sp.

Kootenay Drainage Material: Kaslo River, Hwy 31A, Kaslo River Trail, 49° 55' N, 116° 55' W, 29 May 2010, 2 exuviae.

#### *Kogotus* sp.

Kootenay Drainage Material: Hamill Creek, above junction Duncan River, Cooper Creek, 50° 12' N, 116°

56' W, 29 May 2010, 1 larva.

*Megarcys watertoni* (Ricker)

Kootenay Drainage Material: Bernard Creek, Garland Bay Recreation Site, 49° 52' N, 116° 52' W, 31 May 2010, 2♂, 1♀. Coffee Creek, Hwy 31, 49° 42' N, 116° 55' W, 27 May 2010, 2♂, 1♀. Cooper Creek, Hwy 31, Cooper Creek, 50° 12' N, 116° 58' W, 29 May 2010, 3♂, 1♀. Crawford Creek, Hwy 3A, Crawford Bay, 49° 40' N, 116° 49' W, 1 June 2010, 2♀. Davis Creek, Davis Creek Provincial Park, 50° 08' N, 116° 57' W, 29 May 2010, 1♂. Gray Creek, Hwy 3A, Gray Creek, 49° 37' N, 116° 47' W, 1 June 2010, 1♂, 1♀. Kaslo River, Hwy 31A, Kaslo River Trail, 49° 55' N, 116° 55' W, 29 May 2010, 1♀. La France Creek, Hwy 3A, N Lockhart Beach, 49° 32' N, 116° 47' W, 1 June 2010, 1♀. Lockhart Creek, Hwy 3A, Lockhart Creek Provincial Park, 49° 31' N, 116° 47' W, 1 June 2010, 1♂. Sanca Creek, Hwy 3A, S Sanca, 49° 23' N, 116° 43' W, 1 June 2010, 1♀. Sitcum Creek, Kane Road, off Hwy 3A, W Crescent Bay, 49° 36' N, 117° 10' W, 30 May 2010, 1♂. Tam O'Shanter Creek, Riondel Road, N Riondel, 49° 48' N, 116° 51' W, 31 May 2010, 1♀.

(Non-Kootenay Drainage Material): South Salmo River, Hwy 3, Lost Creek Rest Area, 49° 04' N, 117° 15' W, 2 June 2010, 1♂. Summit Creek, Hwy 3, Blazed Creek Rest Area, 49° 08' N, 116° 48' W, 2 June 2010, 1♂.

*Setvena bradleyi* (Smith)

Kootenay Drainage Material: Argenta Creek, Wolf Road, 50° 10' N, 116° 55' W, 28 May 2010, 3 larvae. Fry Creek, Fry Creek Trail below bridge, Purcell Mountains Wilderness Park, 28 May 2010, 1♂.

**Checklist of Stonefly Species Known for the Kootenay Lake Drainage, British Columbia**

*C. gracilaria* Claassen  
*C. petila* Jewett  
*C. sextuberculata* Jewett  
*Eucapnopsis brevicauda* Claassen  
*Isocapnia vedderensis* (Ricker)  
*Utacapnia trava* (Nebeker & Gaufin)  
*Megaleuctra stigmata* (Banks)

*Paraleuctra forcipata* (Frison)  
*P. occidentalis* (Banks)  
*P. projecta* (Frison)  
*P. vershina* Gaufin & Ricker  
*Perlomyia utahensis* Needham & Claassen  
*Pomoleuctra purcellana* (Neave)  
*Malenka californica* (Claassen)  
*Podmosta delicatula* (Claassen)  
*Prostoia besametsa* (Ricker)  
*Zapada cinctipes* (Banks)  
*Z. columbiana* (Claassen)  
*Z. frigida* (Claassen)  
*Z. haysi* (Ricker)  
*Z. oregonensis* (Claassen)  
*Doddsia occidentalis* (Banks)  
*Taenionema pacificum* (Banks)  
*Taenionema pallidum* (Banks)  
*Alloperla medveda* Ricker  
*A. severa* Needham & Claassen  
*Kathroperla perdita* Banks  
*Paraperla wilsoni* Ricker  
*Plumiperla diversa* (Frison)  
*Suwallia pallidula* (Banks)  
*Sweltsa borealis* (Banks)  
*S. coloradensis* (Banks)  
*S. fidelis* (Banks)  
*S. revelstoka* (Jewett)  
*Yoraperla brevis* (Banks)  
*Frisonia picticeps* (Hanson)  
*Isogenoides colubrinus* (Hagen)  
*Isoperla petersoni* Needham & Christenson  
*Isoperla* sp.  
*Kogotus* sp.  
*Megarcys watertoni* (Ricker)  
*Setvena bradleyi* (Smith)

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