

## STONEFLIES (PLECOPTERA) OF MOUNT RAINIER NATIONAL PARK, WASHINGTON

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**ABSTRACT.**—Mount Rainier National Park, with an area of 95,356 ha, is approximately one-third as large as the state of Rhode Island. The lowest point is 490 m in elevation in the southeastern corner near where the Ohanapecosh River crosses the southern boundary. Columbia Crest is the highest point at 4392 m. The entire park is a rugged landscape marked by the major topographical feature, Mount Rainier, comprising over 25,899 ha, almost one-third of the park. The park lies entirely west of the crest line of the Cascade Range. Most streams in the park originate on Mount Rainier; however, several large rivers meander through the park near its boundaries. One of the first attempts to summarize the stoneflies of Washington, including Mount Rainier National Park, was Hoppe's 1938 work that reported ca 8 species. Jewett (1959) reviewed the stoneflies of the Pacific Northwest and listed 7 species that had type localities in the park: *Megaleuctra kincaidi* Frison, *Doddsia occidentalis* (Banks), *Soliperla fenderi* (Jewett), *Frisonia picticeps* (Hanson), *Isoperla rainiera* Jewett, *Megarcys irregularis* (Banks), and *M. subtruncata* (Hanson). Subsequently, *Kathroperla takhoma* Stark and Surdick (1987) was described from the park. Samples of adult stoneflies from 1994 to 2001 indicate the presence of at least 82 species, with 64% of these typical Pacific Northwest species, and 30 species, or 36%, widespread western North American species. Seventeen new Washington state records are listed, including a substantial range extension for *Lednia tumana* (Ricker). One undescribed species in the *Sweltsa borealis* complex was also discovered. We also present illustrations of male terminalia for *Despaxia augusta* (Banks) and *Moselia infuscata* (Claassen) to aid in the identification of these species.

*Key words:* stoneflies, Plecoptera, Mount Rainier National Park, Washington.

Mount Rainier National Park is in Lewis and Pierce counties on the western slope of the Cascade Range of Washington State. Mount Rainier is located approximately 65–110 km from the Seattle-Tacoma metropolitan area known as Puget Sound (Fig. 1). The park area is 95,356 ha, and elevations range from 490 m above sea level to 4392 m at the summit. Mount Rainier, one of the highest and topographically most impressive of the world's volcanoes, owes its scenic beauty to many features. The broad cone rises about 2300 m above its 2100-m foundation and stands in solitary splendor as the highest peak in the Cascade Range. Its rocky ice/snow-mantled slopes above timberline contrast with the dense green forests, giving Mount Rainier the appearance of an arctic island in a temperate sea. There are 26 major glaciers on Mount Rainier and numerous unnamed snow or ice patches.

Mount Rainier was born during the Pleistocene, and gradually the high main cone was built up. As eruptions diminished, Mount Rainier began to deteriorate by explosion,

collapse, and erosion. It has been estimated that the cone was once about 600 m higher than it is now. Even before Mount Rainier reached its greatest height, rivers and glaciers were cutting deep valleys and huge, bowl-shaped cirques into its sides. During the last major glaciation, which ended about 10,000 years ago, the valley glaciers grew to as much as 60 km long, and smaller glaciers nestled in cirques above 1400 m. The peak has essentially remained the same in appearance since the last major glaciations. The last major eruption of the volcano occurred about 2000 years ago, although the last eruption was approximately 150 years ago (Mullineaux 1974).

Mount Rainier is situated within a temperate, maritime climate. Several climatic zones exist elevationally and geographically around the park. However, the east-southeast side of the park is generally the driest, and the northwest side is the wettest sector (especially during spring and summer months). Annual precipitation is heavy, ranging from about 1.5 m at lowest elevations to over 2.5 m in the subalpine

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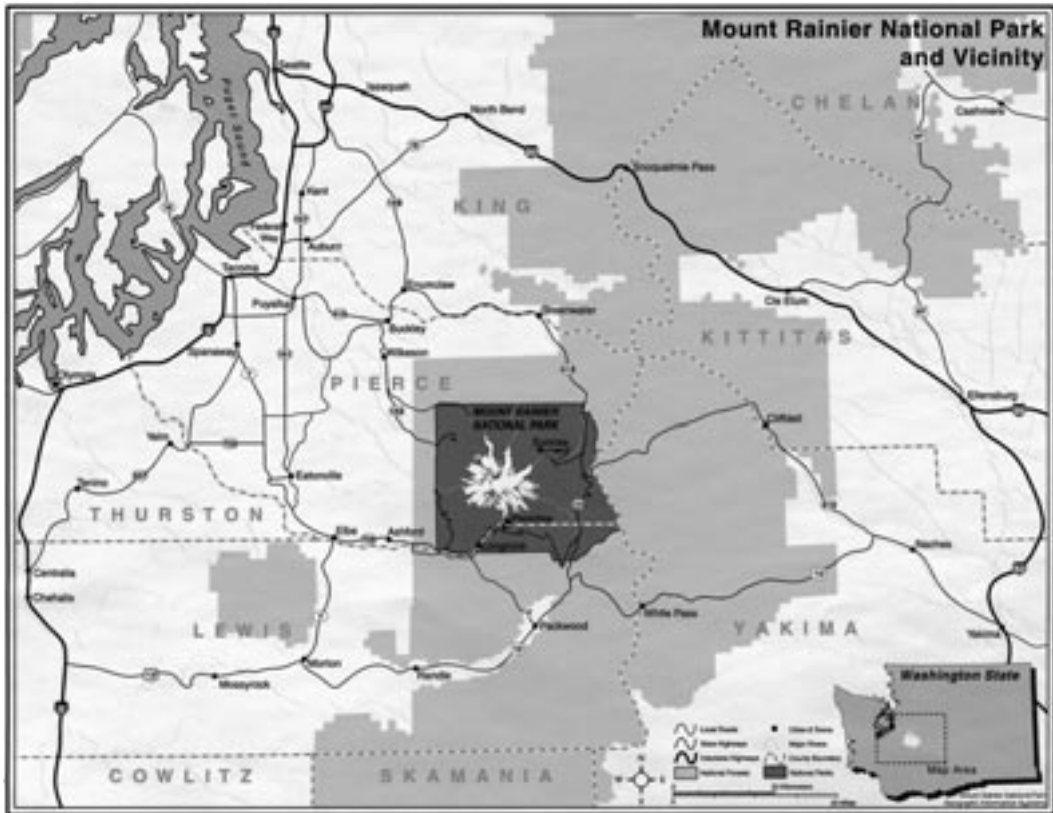


Fig. 1. Map of western Washington, indicating Mount Rainier National Park, Washington.

regions. Because southwesterly winds bear much of the moisture, a rain shadow occurs on the northeast side of the park. Over 90% of the precipitation occurs between November and April. Much of the winter precipitation is snow that accumulates into depths of 6 to 8 m at higher elevations. At Paradise the average annual snowfall is about 17 m, with over 26 m of snow during the winter of 1998–99. Winter temperatures are relatively warm (mean January temperatures of about  $-4^{\circ}$  to  $-1^{\circ}\text{C}$ ). Summers tend to be cool (mean July temperatures of  $10^{\circ}$  to  $20^{\circ}\text{C}$ ), and extended periods of cloudiness are not uncommon. July and August are usually comparatively dry. Fog and high winds may be expected any day of the year.

The topography of the park is rugged and precipitous, consisting mainly of peaks and valleys. Nine major rivers and their tributaries drain the flanks of the mountain, with all but 2 flowing into Puget Sound near Tacoma, Washington. The Muddy Fork and Ohanapecosh

ivers are the exception, flowing into the Cowlitz River, outside the park, and then draining into the Columbia River and on to the Pacific Ocean. Each major river occupies a deep canyon, its floor 300–1000 m below the adjacent divides. Valley floor gradients are steep and increase markedly upstream, especially in Tahoma Creek, North and South Puyallup and Mowich rivers. The park includes 470 mapped rivers and streams, some 400 mapped lakes and ponds, and over 1200 ha of other wetland types, including numerous thermal and mineral springs.

About 800 species of plants are known from the park (Franklin et al. 1988), reflecting the varied climatic and environmental conditions encountered across the 3800-m elevation gradient. Approximately 58% of the park is covered by forests, mostly old-growth stands ranging from 200 to 1000 years old. The subalpine parkland covers approximately 23% of the park; vegetation in this zone is a mosaic of tree clumps and herbaceous meadows extending

from 1500 m to about 2200 m elevation. The alpine zone extends from treeline to the mountain's summit and covers approximately 19% of the park. Permanent snow and ice cover half of the alpine zone, with fragile alpine vegetation growing on rock and soil outcrops.

According to historic records, coho (silver) salmon, chinook, and steelhead were once present in many of the park's major rivers before the construction of dams outside the park. Chinook, steelhead, and coho are now transported around some dams in an effort to restore these anadromous fish runs, thereby allowing access to the headwaters in the park. These fish species are thought to occur in the White and Carbon rivers inside the park. Bull trout are present throughout the park. In addition to native fish species, nonnative and hatchery fish have been introduced to lakes and streams in the park. Nonnative and hatchery fish stocks have probably altered natural lake and stream ecosystems.

One of the first attempts to summarize the stoneflies for the state of Washington, including Mount Rainier National Park, was the work of Hoppe (1938). She reported at least 8 species from the park: *Yoraperla brevis* (Banks) (as *Peltoperia* [sic] *brevis*), *Megarcys irregularis* (Banks) (as *Perlodes irregularis*), *Claassenia sabulosa* (Banks) (as *Perla languida* Needham and Claassen), *Isoperla sordida* Banks, *I. fulva* Claassen (as *I. cascadenis* Hoppe), *Ostrocerca dimicki* (Claassen) (as *Nemoura dimicki*), *Zapada cinctipes* (Banks) (as *Nemoura cinctipes*), and *Doddsia occidentalis* (Banks) (as *Taeniopteryx occidentalis*). Stark and Nelson (1994) did not report *Y. brevis* from Washington, and Hoppe's records probably refer to *Y. nigrisoma* (Banks) or *Y. mariana* (Ricker). Hoppe's record may be the one originally cited by Needham and Claassen (1925). *Ostrocerca dimicki* was not collected from the park during the present study, and the reported specimens were not located. Her record may refer to *O. foersteri* (Ricker); however, both species are known from Washington. These small nemourids are often difficult to specifically identify (Young et al. 1989). Additionally, we have been unable to confirm the presence of the widespread and common *I. fulva* from the park. Hoppe (1938) listed it as *I. cascadenis* from the Nisqually River, a stream draining the park. Szczytko and Stewart (1979) examined the female specimen.

Jewett (1959) in his review of the stoneflies of the Pacific Northwest listed 7 species that had type localities in the park: *Megaleuctra kincaidi* Frison, *D. occidentalis*, *Soliperla fendleri* (Jewett), *Frisonia picticeps*, (Hanson), *I. rainiera* Jewett, *M. irregularis*, and *M. subtruncata* (Hanson). Szczytko and Stewart (1979) included a paratype female for *I. bifurcata* from Longmire; and Stark and Surdick (1987) described *Kathroperla tahoma* from Falls Creek. Table 1 summarizes the primary type localities in the park. Paradise Valley was relatively easy to access in the early history of the park, and a resort was established there.

Our study had 2 main objectives: to document the general distribution of stoneflies of Mount Rainier National Park, and to provide information on endemic, rare, or potentially threatened species. Stoneflies are known to be major indicators of water quality (Baumann 1979) and are often dominant food-web components of most temperate lotic ecosystems (Stewart and Stark 1988). Knowledge of the occurrence and distribution of these insects will help serve as a basis for future biomonitoring programs as dramatic land-use changes occur in adjacent areas.

## METHODS

We sampled over 110 sites between 1994 and 2001 (Fig. 2). These sites were primarily

TABLE 1. Primary types originally described from Mount Rainier National Park, Washington.

LEUCTRIDAE	<i>Megaleuctra kincaidi</i> Frison 1942. Type locality: Fryingpan Creek
TAENIOPTERYGIDAE	<i>Doddsia occidentalis</i> (Banks) 1900. Type locality: Mount Rainier National Park
PELTOPERLIDAE	<i>Soliperla fendleri</i> (Jewett) 1955. Type locality: St. Andrews Creek
CHLOROPERLIDAE	<i>Kathroperla tahoma</i> Stark and Surdick 1987. Type locality: Falls Creek
PERLODIDAE	<i>Frisonia picticeps</i> (Hanson) 1942. Type locality: Paradise River
	<i>Isoperla rainiera</i> Jewett 1954. Type locality: Mount Rainier National Park
	<i>Megarcys irregularis</i> (Banks) 1900. Type locality: Mount Rainier National Park
	<i>Megarcys subtruncata</i> (Hanson) 1942. Type locality: Paradise Valley

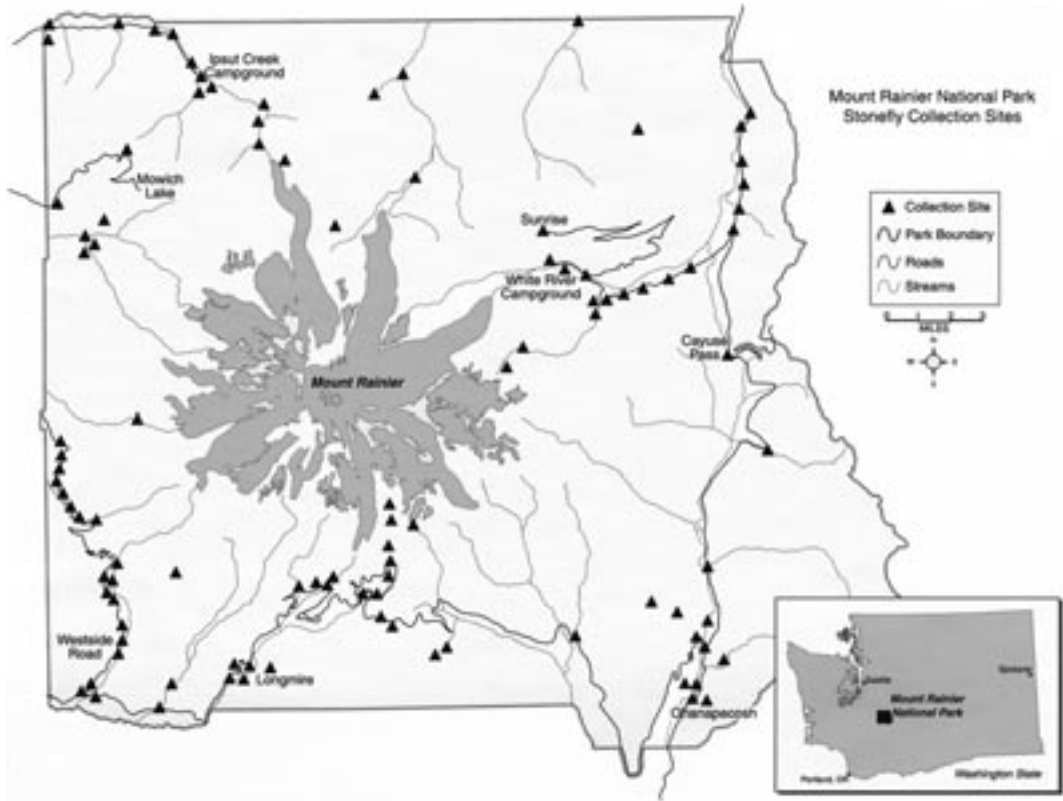


Fig. 2. Map of Mount Rainier National Park, Washington, indicating major streams and roads. Major collecting sites of stoneflies during this study are indicated by ▲.

chosen to cover all relatively accessible major drainages. Large areas of the park (Fig. 2) are roadless or difficult to access due to extreme topography. All adult and larval specimens were preserved in 80% ethanol. We employed standard collection techniques, including beating sheets, aerial nets, and collection by hand. Specimens collected during the study were deposited in the C.P. Gillette Museum of Arthropod Diversity, Colorado State University. We also present illustrations of the male terminalia for 2 common leucotrid species, *Despaxia augusta* (Banks) (Figs. 3, 4) and *Moselia infuscata* (Claassen) (Figs. 5, 6) to aid in their identification.

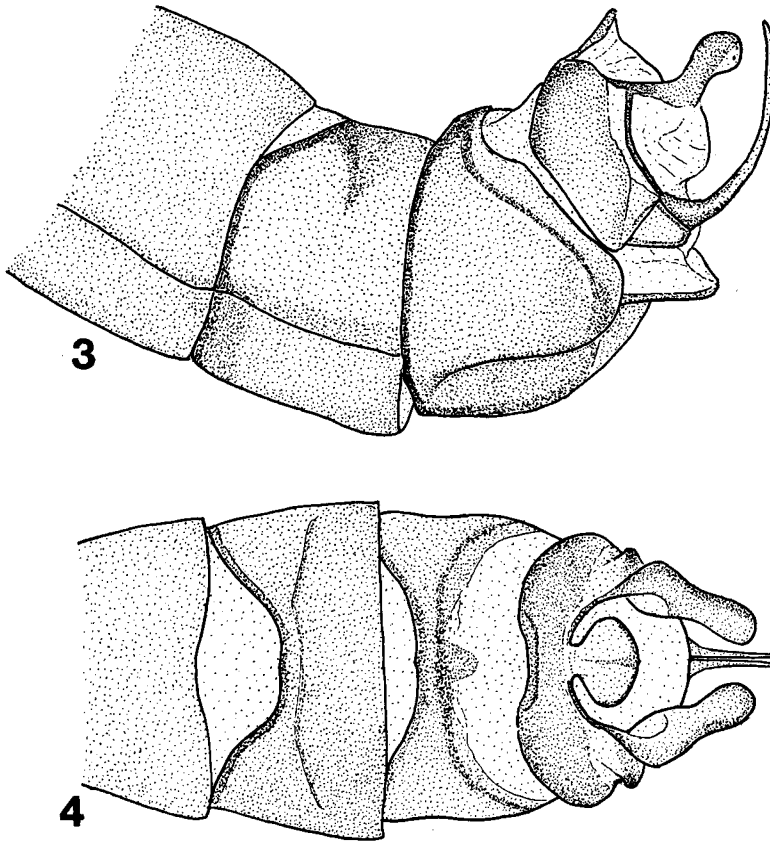
#### RESULTS AND DISCUSSION

We collected over 3600 adult specimens representing at least 82 species of stoneflies in the park during the study; they are listed in Table 2. Sixty-four percent of these taxa are

typical Pacific Northwest species (Ricker 1943, Jewett 1959, Ricker and Scudder 1975), and 30 species, or 36%, are widespread western North American species (Table 3; Baumann et al. 1977). One undescribed species in the *Sweltsa borealis* complex was also discovered and will be described later.

Seventeen new stonefly state records for Washington were collected during the study (Table 2; see Nelson and Baumann 1989, Stark 1998). Sixteen of these species are known from adjacent states or British Columbia (Ricker and Scudder 1975, Stark 1998) and were expected records. However, *Lednia tumana* (Ricker) represents a major range extension. The remarkable Nearctic nemourid genus *Lednia* is currently known only in the literature from Glacier National Park, Montana (Stewart and Stark 1988). R.W. Baumann (personal communication) indicates that specimens of this genus are also known from North Cascades National Park, Washington, and a site in the California





Figs. 3–4. *Despaxia augusta* (Banks), male terminalia: 4, lateral; 5, dorsal.

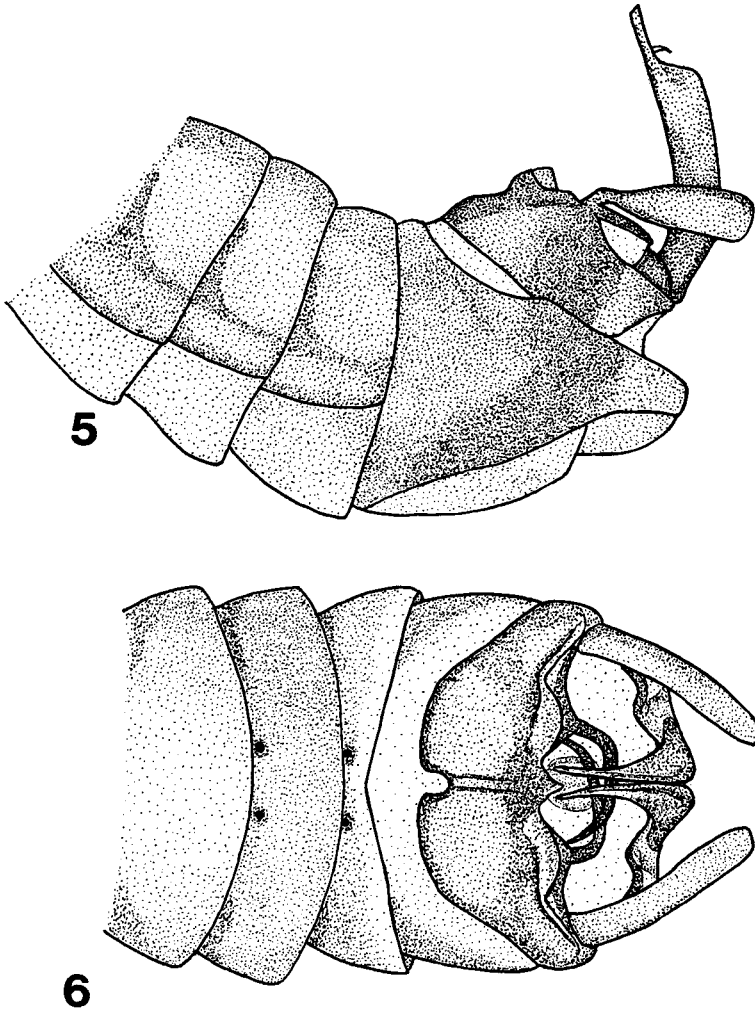
Sierra Nevada. There may be additional relict populations of *Lednia* along the Coast and Cascade mountains of the Pacific Northwest.

Jewett (1955) described *S. fenderi* from a single male collected from St. Andrews Creek in the park. Stark (1983) reported this species only from Mount Rainier, mostly from the St. Andrews Creek area (B.P. Stark, personal communication, has specimens from Mount Adams, Shama Co.). This species can be collected from spring seeps and rheocrenes throughout the park (Appendix).

*Isoperla rainiera* was originally described by Jewett (1954) from the park from a single male. The female was described later from Mt. Hood, Oregon (Jewett 1962). Szczytko and Stewart (1979) did not report any additional specimens from the park. Recently, *I. rainiera* was collected in Montana (S.W. Szczytko personal communication). Another rare species of stonefly known from the park and only a few

outside localities is *M. yosemite* (Needham and Claassen). This species was originally described from Mt. Lyell, Yosemite National Park, California, and was collected during this study from Fryngpan Creek (Van Wieren et al. 2001). Additionally, *M. irregularis*, known only from Washington and British Columbia, occurs abundantly in the park. Ricker (1943) once described a flight of adults at Fryngpan Creek as “a small canyon filled with flying adults to a depth of possibly 100 feet, resembling the swarms of large termites. . . .”

The nymphs of *Setvena tibialis* (Banks) are the dominant stonefly predators of most rheocrenes and small streams of the park. Stewart and Stanger (1985) previously reported this species from the park. Jewett (1959) considered *S. tibialis* a rare species of the Pacific Northwest, and collections from the park represent substantial new material for study.



Figs. 5–6. *Moselia infuscata* (Claassen), male terminalia: 6, lateral; 7, dorsal.

*Despaxia augusta* was found to be an abundant autumn- and early winter-emerging species in the park, occurring in small streams and rheocrenes. This species ranges from Alaska to Montana, southwest to northern California. Ricker (1954) clarified the taxonomy of this species. Baumann et al. (1977) indicated adults of *D. augusta* are uncommonly collected, probably because of their late emergence. Figures 3 and 4 present illustrations of the male terminalia.

The other abundant leuctrid in the park is *Moselia infuscata*. However, very little biological information is available for this species (Stewart and Stark 1988). Nymphs are common

in most small streams of the park. Adult emergence is generally from April to July. Illustrations of the distinctive male terminalia are presented in Figures 5 and 6.

No major distributional patterns for the 82 stonefly species were discernible for the park. Of the species with an adequate number of records, a few species such as *Mesocapnia oenone*, *Malenka californica*, *Doroneuria baumanni*, and *Kogotus nonus* appear restricted to drainages on the west side of the park (Appendix). Most other species are generally distributed throughout the park.

Despite 7 years of relatively intensive collecting, at least 11 species are represented only

TABLE 2. Stonefly species recorded from Mount Rainier National Park, Washington. An asterisk (\*) indicates a new state record for Washington (see Stark [1998] and Nelson and Baumann [1989]). *Zapada cinctipes* (Banks) is not indicated from Washington in Stark (1998); however, the type locality of this species is Olympia, Washington.

## EUHOLOGNATHA

## CAPNIIDAE

- Bolshecapnia sasquatchi* (Ricker)\*  
*Capnia confusa* Claassen  
*C. elongata* Claassen  
*C. excavata* Claassen  
*C. gracilaria* Claassen  
*C. licina* Jewett  
*C. melia* Frison  
*C. nana* Claassen  
*C. sextuberculata* Jewett  
*Eucapnopsis brevicauda* Claassen\*  
*Isocapnia agassizi* Ricker  
*I. grandis* (Banks)\*  
*I. spenceri* Ricker\*  
*I. vedderensis* (Ricker)\*  
*Mesocapnia oenone* (Neave)  
*Paracapnia oswegaptera* (Jewett)

## LEUCTRIDAE

## Leuctrinae

- Despaxia augusta* (Banks)  
*Moselia infusata* (Claassen)  
*Paraleuctra forcipata* (Frison)\*  
*P. occidentalis* (Banks)\*  
*P. projecta* (Frison)  
*P. vershina* Gaufin & Ricker  
*Perlomyia collaris* Banks\*  
*P. utahensis* Needham & Claassen\*

## Megaleuctrinae

- Megaleuctra kincaidi* Frison

## NEMOURIDAE

## Amphinemurinae

- Malenka californica* (Claassen)\*  
*M. cornuta* (Claassen)

## Nemourinae

- Lednia tumana* (Ricker)\*  
*Ostrocerca foersteri* (Ricker)  
*Podmosta decepta* (Frison)\*  
*P. delicatula* (Claassen)\*  
*Prostoia besametsa* (Ricker)\*  
*Soyedina interrupta* (Claassen)  
*S. producta* (Claassen)  
*Visoka cataractae* (Neave)  
*Zapada cinctipes* (Banks)  
*Z. columbiana* (Claassen)  
*Z. cordillera* (Baumann & Gaufin)  
*Z. frigida* (Claassen)  
*Z. haysi* (Ricker)  
*Z. oregonensis* (Claassen)\*

## TAENIOPTERYGIDAE

## Brachypteryinae

- Doddsia occidentalis* (Banks)  
*Taenionema kincaidi* (Hoppe)  
*T. pallidum* (Banks)

## SYSTELLOGNATHA

## CHLOROPERLIDAE

## Chloroperlinae

- Alloperla fraterna* Frison  
*A. serrata* Needham & Claassen  
*Plumiperla diversa* (Frison)  
*Suwallia dubia* (Frison)  
*S. forcipata* (Neave)  
*S. pallidula* (Banks)  
*Steltsa borealis* (Banks)  
*S. exquisita* (Frison)  
*S. occidentis* (Frison)  
*S. revelstoka* (Jewett)  
*S. n. sp.*

## Paraperlinae

- Kathroperla perdita* (Banks)  
*K. takhoma* Stark & Surdick  
*Paraperla frontalis* (Banks)  
*P. wilsoni* Ricker

## PELTOPERLIDAE

- Soliperla fenderi* (Jewett)  
*Yoraperla mariana* (Ricker)  
*Y. nigrisoma* (Banks)  
*Y. siletz* Stark & Nelson

## PERLIDAE

- Doroneuria baumanni* Stark & Gaufin  
*Hesperoperla pacifica* (Banks)  
*Claassenia sabulosa* (Banks)

## PERLODIDAE

## Isoperlinae

- Isoperla bifurcata* Szczytko & Stewart  
*I. fusca* Needham & Claassen  
*I. gravitans* (Needham & Claassen)  
*I. petersoni* Needham & Christenson\*  
*I. rainiera* Jewett  
*I. sobria* (Hagen)  
*I. sordida* Banks  
*I. tilasqua* Szczytko & Stewart\*

## Perlodinae

## Arcynopterygini

- Frisonia picticeps* (Hanson)  
*Megarcys irregularis* (Banks)  
*M. subtruncata* Hanson  
*M. yosemite* (Needham & Claassen)  
*Setvena tibialis* (Banks)  
*Skwala americana* (Klapalek)

## Diploperlini

- Kogotus nonus* (Needham & Claassen)

## PTERONARCYIIDAE

- Pteronarcys princeps* Banks

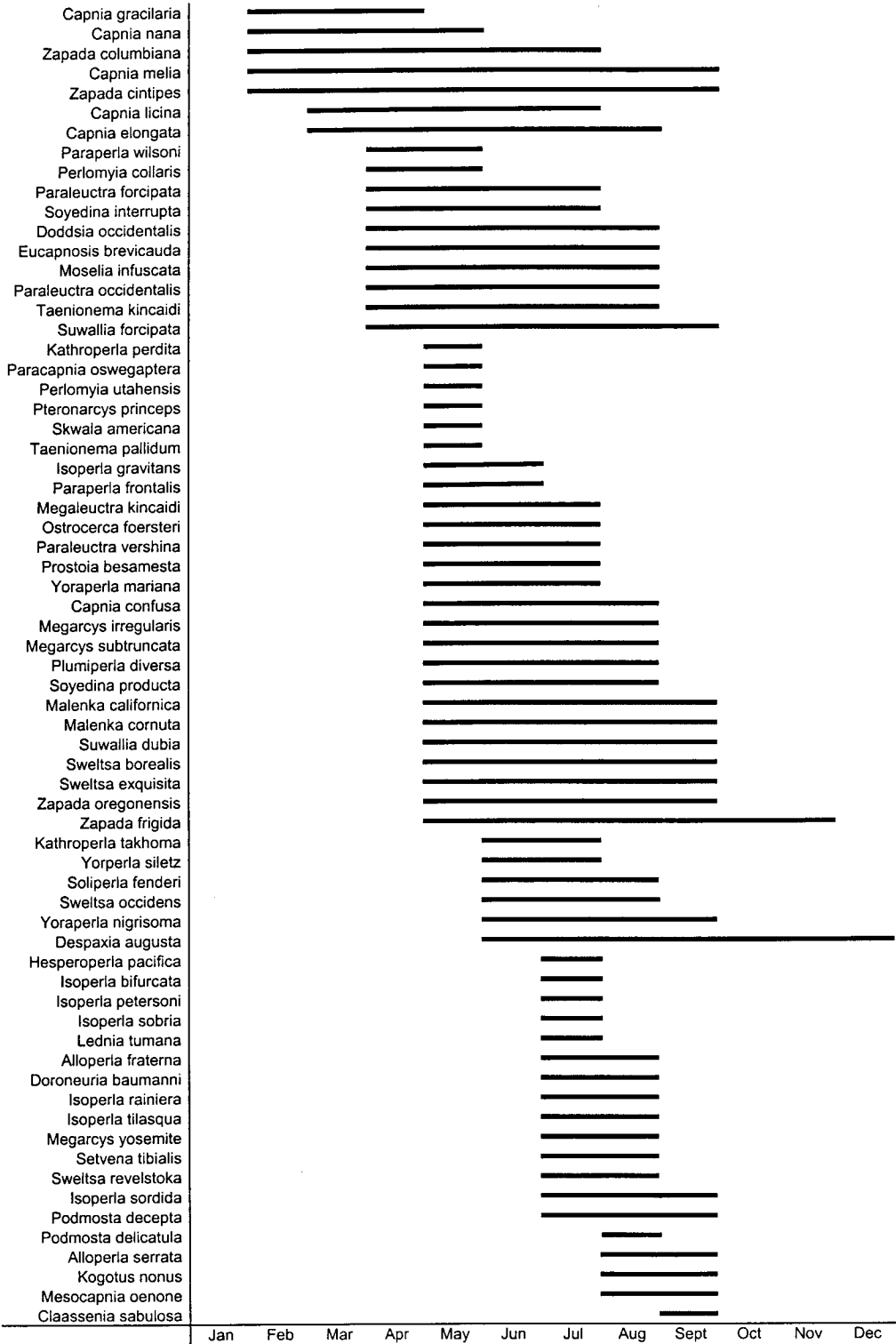


Fig. 7. Seasonal distribution of adult stoneflies occurring at Mount Rainier National Park, Washington.



TABLE 3. Stonefly species occurring at Mount Rainier National Park that are considered widespread western North American species.

<i>Capnia confusa</i> Claassen	<i>Z. columbiana</i> (Claassen)
<i>C. gracilaria</i> Claassen	<i>Z. frigida</i> (Claassen)
<i>C. nana</i> Claassen	<i>Z. haysi</i> (Ricker)
<i>Eucapnopsis brevicauda</i> Claassen	<i>Z. oregonensis</i> (Claassen)
<i>Isocapnia grandis</i> (Banks)	<i>Doddsia occidentalis</i> (Banks)
<i>Paraleuctra occidentalis</i> (Banks)	<i>Sweltsa borealis</i> (Banks)
<i>P. projecta</i> (Frison)	<i>S. revelstoka</i> (Jewett)
<i>P. vershina</i> Gaufin & Ricker	<i>Suwallia pallidula</i> (Banks)
<i>Perlomyia utahensis</i> Needham & Claassen	<i>Kathroperla perdita</i> Banks
<i>Malenka californica</i> (Claassen)	<i>Paraperla frontalis</i> (Banks)
<i>Podmosta decepta</i> (Frison)	<i>Isoperla petersoni</i> Needham & Christenson
<i>P. delicatula</i> (Claassen)	<i>I. sobria</i> (Hagen)
<i>Prostoia besametsa</i> (Ricker)	<i>Skwala americana</i> (Klapalek)
<i>Taenionema pallidum</i> (Banks)	<i>Hesperoperla pacifica</i> (Banks)
<i>Zapada cinctipes</i> (Banks)	<i>Claassenia sabulosa</i> (Banks)

by single collections (Appendix). Included are *Capnia excavata*, *Paracapnia oswegaptera*, *Perlomyia utahensis*, *L. tumana*, *Hesperoperla pacifica*, *Claassenia sabulosa*, *I. bifurcata*, *I. fusca*, *I. petersoni*, *I. sobria*, and *Frisonia picticeps*. Other populations of these species surely occur in the park, yet to be discovered.

The emergence phenology of comparable species of stoneflies of Mount Rainier National Park is very similar to what Jewett (1959), Ricker (1943), and Kerst and Anderson (1974) reported from streams of southwestern British Columbia and Oregon (Fig. 7). For many species, adults can be collected for long periods. Generally, there are winter-emerging species, including the capniids and 2 species of *Zapada*, *Z. cinctipes* and *Z. columbiana* (Fig. 7). Adults of numerous species can be collected beginning in March and April, with some of these species, for example *Taenionema kincaidi*, still present in August. The largest group of species begins to emerge throughout May and June (Fig. 7). There is also a rather distinct late summer- and fall-emerging group of species, typified by *M. oenone*, *D. augusta*, *Alloperla serrata*, and *K. nonus*.

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APPENDIX. Localities for collections records of Plecoptera of Mount Rainier National Park, Washington.

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Order Plecoptera  
Suborder Arctoperlaria  
Group Euholognatha  
Family Capniidae  
Genus *Capnia*

*Bolshecapnia sasquatchi*

Ohanapeosh River, Hwy 143, 17-March-70, R.A. Hite & D.S. Potter, 2 males (BYU); Ohanapeosh River, Hwy 143, 16-March-73, D.S. Potter & L.M. Preble, 1 male (BYU).

*Capnia confusa*

0.6 mile S of Ipsut Campground, 04-Apr-97, 1 female; White River Highway 410, 29-May-97, 2 males, 1 female; Tahoma Creek, 30-May-97, 1 male; Tahoma Creek at Nisqually to Paradise Road, 30-May-97, 2 males; stream by South Mowich River Camp, 04-May-98, 2 males, 1 female; Carbon River entrance, 15-Aug-99, 1 female; Fry- ingpan Creek at Sunrise Road Bridge, 16-Aug-99, 3 females; Tahoma Creek at Fish Creek, 08-Jul-00, 1 female; Cataract Creek at Wonderland Trail, 09-Jul-00, 1 male, 9 females; St. Andrews Creek at Westside Road, 14-Jul-00, 1 male, 2 females; Fryingpan Creek at Sunrise Road, 16-Jul-00, 1 female; Tahoma Creek, 13-May-01, 1 female; seeps into White River on Highway 410, 14-May-01, 3 males, 4 females; Longmire, 15-May-01, 1 female; Ohanapeosh Campground, 16-May-01, 1 female; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 3 males, 4 females.

*Capnia elongata*

0.7 mile SE of Ipsut Campground, 25-Mar-95, 1 male; Paradise River in Paradise Valley, 02-Aug-00, 2 females; Ohanapeosh River at the Grove of the Patriarchs, 16-May-01, 1 male; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 2 males.

*Capnia excavata*

Boggy stream tributary to Tahoma Creek, 07-May-01, 1 male, 1 female.

*Capnia gracilaria*

Paradise River at Fourth Crossing, 21-Apr-96, 1 male; south of Chenuis Falls parking lot, 23-Feb-97, 1 male; Westside Road at Paradise Road, 29-Mar-97, 1 male, 1 female; Kautz Creek at Nisqually to Paradise Road, 04-Apr-01, 18 males, 6 females.

*Capnia licina*

Nisqually River at creek from Tato Falls, 14-Apr-94, 2 males, 1 female; 2.2 miles SE Ipsut Campground, 25-Mar-95, 2 males; Nahunta Falls, 16-Apr-95, 3 males; Glacier View Bridge, 16-Apr-95, 2 males, 1 female; 0.1 mile NE Glacier View Bridge, 14-Apr-96, 5 males; Snow Lake inflow, 15-Jun-97, 7 males, 2 females; Shaw Creek at White River Road, 07-Jul-99, 2 males; Paradise River in Paradise Valley, 10-Jul-00, 4 females; Paradise River in Paradise Valley, 02-Jul-01, 4 males, 3 females.

*Capnia melia*

Ipsut Falls, 23-Feb-95, 54 males, 19 females; 2.2 miles SE of Ipsut Campground, 25-Mar-95, 1 male; 0.7 mile SE of Ipsut Campground, 25-Mar-95, 1 male, 4 females; Nahunta Falls, 16-Apr-95, 3 males; Nisqually River at creek from Tato Falls, 18-Feb-96, 2 males; Pinnacle Peak Trail stream, 14-Apr-96, 5 males, 3 females; Nisqually River at creek from Tato Falls, 14-Apr-96, 2 males; south of Chenuis Falls parking lot, 23-Feb-97, 4 males, 1 female; 0.7 mile SE of Ipsut Campground, 23-Feb-97, 4 males, 1 female; 0.6 mile S of Ipsut Campground, 23-Feb-97, 6 males; Westside Road 1.3 miles N of Paradise Road, 29-Mar-97, 2 males, 6 females; Tahoma Creek at Nisqually to Paradise Road, 29-Mar-97, 1 male; 0.6 mile S of Ipsut Campground, 04-Apr-97, 2 males, 2 females; 0.7 mile SE of Ipsut Campground, 04-Apr-97, 5 males, 9 females; Ipsut Falls on Ipsut Creek, 04-May-97, 9 males, 10 females; Nickel Creek at Stevens Canyon Road, 28-May-97, 1 male; Crystal Creek at Highway 410, 29-May-97, 6 males, 5 females; unnamed stream N of Crystal Creek, Highway 410, 29-May-97, 2 males, 11 females; seeps into White River on Highway 410, 29-May-97, 2 males; Glacier View Bridge, 30-May-97, 4 females; Eagle Peak Creek at Nisqually River, 30-May-97, 3 males, 3 females; Eagle Peak Creek 4360 ft, 14-Jun-97, 3 males; Snow Lake inflow, 15-Jun-97, 1 male; Olallie Creek, 28-Jun-97, 2 males; Fryingpan Creek at Sunrise Road Bridge, 01-Apr-98, 1 male, 1 female; White River Campground, 01-Apr-98, 1 male, 1 female; St. Andrews Creek at Westside Road, 29-Apr-98, 2 males, 6 females; Mountain Meadow Stream at Paul Peak Trail, 07-Jul-98, 1 male; Falls Creek at Stevens Canyon Road, 05-Jun-99, 4 males, 1 female; Falls Creek at Stevens Canyon Road, 11-Jun-99, 3 males; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 4 males; South Puyallup River at Westside Road, 24-Sep-00, 1 female; Eagle Peak Creek at Nisqually River, 13-May-01, 5 males, 9 females; Ipsut Falls at Ipsut Creek, 14-May-01, 1 male; Falls Creek at Stevens Canyon Road, 07-Jun-01, 1 female; White River at Sunrise Road, 15-Jun-01, 1 male; seeps into Fryingpan Creek 0.5 mile upstream from Sunrise Road, 15-Jun-01, 1 male, 2 females.

*Capnia nana*

Tahoma Creek at Nisqually to Paradise Road, 29-Mar-97, 1 female; Glacier View Bridge, 30-May-97, 3 females; Longmire, 15-May-01, 1 female.

*Capnia sextuberculata*

Deer Creek at Eastside Trail, 09-Jun-01, 1 female; Paradise River above Narada Falls, 02-Jul-01, 1 female.

Genus *Eucapnopsis**Eucapnopsis brevicauda*

Laughingwater Creek, 27-Jun-95, 1 female; Nisqually River at Longmire, 28-May-97, 2 males; Ohanapecosh Hot Springs, 28-May-97, 1 male; Ohanapecosh Campground, 28-May-97, 6 males, 5 females; Nickel Creek at Stevens Canyon Road, 28-May-97, 19 males, 28 females; Falls Creek at Stevens Canyon Road, 28-May-97, 11 males, 10 females; Ohanapecosh River at the Grove of the Patriarchs, 28-May-97, 15 males, 4 females; Ohanapecosh River at Sheep Creek, 29-May-97, 13 males, 7 females; Panther Creek at Highway 123, 29-May-97, 22 males, 17 females; Olallie Creek, 28-Jun-97, 2 females; Huckleberry Creek Bridge, 28-Apr-98, 1 male; Falls Creek at Stevens

Canyon Road, 05-Jun-99, 3 females; Falls Creek at Stevens Canyon Road, 11-Jun-99, 2 males, 1 female; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 1 female; Paradise River in Paradise Valley, 16-Aug-99, 1 male, 1 female; Paradise River above Narada Falls, 16-Aug-99, 1 female; Falls Creek at Stevens Canyon Road, 25-Jun-00, 4 females; Ohanapecosh River at the Grove of the Patriarchs, 16-May-01, 2 females; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 4 males, 3 females; Falls Creek at Stevens Canyon Road, 07-Jun-01, 1 male, 2 females; Panther Creek at Highway 123, 09-Jun-01, 1 male, 1 female; Deer Creek at Eastside Trail, 09-Jun-01, 2 males, 1 female; Ohanapecosh River 0.5 mile S of Shriner Peak Trailhead, 09-Jun-01, 1 male, 2 females; Paradise River above Narada Falls, 02-Jul-01, 1 male, 1 female.

Genus *Isocapnia**Isocapnia abbreviata*

Seeps into White River on Highway 410, 14-May-01, 1 male, 3 females; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 2 males, 6 females.

*Isocapnia agassizi*

White River on Highway 410, 29-May-97, 1 male; Tahoma Creek at Nisqually to Paradise Road, 30-May-97, 1 female; seeps into White River on Highway 410, 14-May-01, 2 males, 1 female; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 male, 3 females.

*Isocapnia grandis*

White River on Highway 410, 28-May-97, 1 female; Kautz Creek at Nisqually to Paradise Road, 04-Apr-01, 1 male; seeps into White River on Highway 410, 14-May-01, 6 males, 2 females; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 2 males, 1 female.

*Isocapnia spenceri*

Ohanapecosh Campground, 28-May-97, 1 female; seeps into White River on Highway 410, 14-May-01, 1 male, 1 female.

Genus *Mesocapnia**Mesocapnia oenone*

Carbon River Entrance, 20-Sep-97, 8 males, 3 females; Carbon River Entrance, 15-Aug-99, 1 male; west fork of White River, 13-Sep-99, 1 female.

Genus *Paracapnia**Paracapnia oswegaptera*

Seeps into Eagle Peak Creek, 28-May-97, 1 male.

## Family Leuctridae

Genus *Despaxia**Despaxia augusta*

Westside Road, 0.2 mile NE of Paradise Road, 18-Dec-94, 1 male; Pinnacle Peak trail near road (Reflection Lakes), 28-Oct-95, 1 female; Paradise Valley Road 0.7 mile S of Paradise, 28-Oct-95, 3 males, 6 females; 0.1 mile S of Cayuse Pass, 24-Nov-95, 1 female; Fish Creek near Tahoma Creek, 19-Dec-95, 1 female; 0.1 mile N of Fryingpan Creek Bridge, 03-Nov-96, 1 male, 3 females; 0.2 mile

NE of Fryingpan Creek bridge, 03-Nov-96, 1 female; 0.1 mile E of Ranger Creek Bridge, 17-Nov-96, 1 female; Kautz Creek Trail 0.7 mile N of Nisqually Road, 08-Dec-96, 2 females; Ipsut Creek at Carbon River Road Bridge, 08-Sep-97, 2 males; Carbon River Entrance, 20-Sep-97, 8 males, 3 females; small tributary to Shaw Creek, 07-Jul-99, 6 males, 6 females; tributary to Tahoma Creek at Paradise Road, 08-Jul-99, 1 female; Carbon River Entrance, 15-Aug-99, 1 female; Carbon River at Alice Falls, 15-Aug-99, 1 male; stream by Lake James, 13-Sep-99, 1 male, 1 female; west fork of White River, 13-Sep-99, 1 male; Van Horn Creek at Waterfall, 13-Sep-99, 2 males; Fryingpan Creek at Wonderland Trail Bridge, 29-Jun-00, 1 male, 1 female; seeps 0.9 mile S of St. Andrews Creek, 16-Sep-00, 6 males, 2 females; seeps 0.8 mile S of St. Andrews Creek, 16-Sep-00, 2 males, 2 females; stream 0.4 mile S of St. Andrews Creek, 16-Sep-00, 15 males, 10 females; stream 1.75 miles S of St. Andrews Creek, 16-Sep-00, 9 males; St. Andrews Creek at Westside Road, 16-Sep-00, 18 males, 2 females; stream 1.5 miles S of St. Andrews Creek, 16-Sep-00, 2 males, 3 females; stream 1.15 miles S of St. Andrews Creek, 16-Sep-00, 4 males, 1 female; Dick Creek at Wonderland Trail, 23-Sep-00, 1 female; St. Andrews Creek at Westside Road, 17-Oct-00, 2 females; boggy stream tributary to Tahoma Creek, 07-May-01, 1 male.

#### Genus *Moselia*

##### *Moselia infuscata*

Carbon River Entrance, Rainforest Loop Trail, 08-May-95, 2 females; Reflection Lake, stream near Pinnacle Peak Trail, 14-Apr-96, 1 male; Tahoma Creek at Nisqually to Paradise Road, 29-Mar-97, 1 male; Carbon River Entrance, Rainforest Loop Trail, 27-May-97, 3 males, 2 females; Carbon River Entrance, 27-May-97, 4 males, 5 females; Ohanapecosh River at the Grove of the Patriarchs, 28-May-97, 1 female; Ohanapecosh Campground, 28-May-97, 1 female; Falls Creek at Stevens Canyon Road, 28-May-97, 8 males, 5 females; seeps into Eagle Creek, 28-May-97, 3 males, 6 females; Ohanapecosh River at Sheep Creek, 29-May-97, 1 male, 1 female; unnamed stream N of Crystal Creek, Highway 410, 29-May-97, 14 males, 11 females; unnamed stream 3.4 miles S of park boundary Highway 410, 29-May-97, 9 males, 5 females; seeps into White River on Highway 410, 29-May-97, 12 males, 7 females; Panther Creek at Highway 123, 29-May-97, 3 females; Nisqually River at Glacier View Bridge, 07-Jul-99, 7 males, 6 females; Eagle Peak Creek at Nisqually River, 30-May-97, 10 males, 6 females; Ipsut Creek at Carbon River Road Bridge, 06-Jun-97, 2 males; Eagle Peak Creek 4360 ft, 14-Jun-97, 5 males, 1 female; St. Andrews Creek at Westside Road, 19-Jun-97, 6 males, 15 females; Olallie Creek, 28-Jun-97, 1 female; White River Campground, 23-Jul-97, 4 males, 7 females; White River at Sunrise Road Bridge, 02-Jul-98, 1 male, 2 females; Mountain Meadow Stream at Paul Peak Trail, 07-Jul-98, 2 males; Falls Creek at Stevens Canyon Road, 05-Jun-99, 4 males; Falls Creek at Stevens Canyon Road, 11-Jun-99, 3 males, 4 females; Falls Creek at Stevens Canyon Road, 06-Jul-99, 4 males, 8 females; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 36 males, 38 females; tributary to Ohanapecosh River, 07-Jul-99, 1 male, 4 females; stream into White River at Highway 410 N of White River Entrance, 07-Jul-99, 1 male; Nisqually River at Glacier View Bridge, 30-May-97, 38 males, 11 females; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 7 males, 10

females; Seep into Fryingpan Creek, 08-Jul-99, 3 males, 10 females; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 female; tributary to Tahoma Creek at Paradise Road, 08-Jul-99, 1 female; high-gradient tributary at Nisqually River at Longmire, 09-Jul-99, 1 male, 1 female; Paradise River in Paradise Valley, 16-Aug-99, 1 female; Paradise River at Fourth Crossing, 16-Aug-99, 1 female; creek behind Mystic Lake Ranger Station, 04-Sep-99, 1 male, 2 females; Falls Creek at Stevens Canyon Road, 25-Jun-00, 5 males, 6 females; stream on the Westside Road 1.5 miles from the Paradise Road, 26-Jun-00, 1 male, 3 females; Paradise River in Paradise Valley, 10-Jul-00, 2 males, 4 females; St. Andrews Creek at Westside Road, 14-Jul-00, 6 males, 3 females; Paradise River at Fourth Crossing, 23-Jul-00, 1 male; Paradise River in Paradise Valley, 02-Aug-00, 2 males; seeps into Eagle Peak Creek, 07-May-01, 10 males, 2 females; boggy stream tributary to Tahoma Creek 07-May-01, 17 males, 15 females; seeps by Nisqually River Bridge in Longmire, 13-May-01, 2 males, 2 females; Eagle Peak Creek at Nisqually River, 13-May-01, 13 males, 3 females; Ipsut Falls at Ipsut Creek, 14-May-01, 3 males, 4 females; Huckleberry Creek Bridge, 14-May-01, 7 males; Eagle Peak Creek at Nisqually River, 15-May-01, 1 male; small stream near Ohanapecosh Visitor Center, 16-May-01, 1 male, 3 females; stream into White River at Highway 410 0.5 mile S of park boundary, 16-May-01, 2 males, 2 females; Panther Creek at Highway 123, 09-Jun-01, 2 females; Deer Creek at Eastside Trail, 09-Jun-01, 2 males, 1 female; St. Andrews Creek at Westside Road, 16-Jun-01, 2 males, 1 female; boggy stream tributary to Tahoma Creek, 17-Jun-01, 7 males, 6 females; small stream near Narada Falls, 23-Jul-01, 1 male.

#### Genus *Paraleuctra*

##### *Paraleuctra forcipata*

Westside Road 2.7 miles NNE of Nisqually Entrance, 29-Mar-97, 1 male; Tahoma Creek, 1.8 miles NE of Nisqually Entrance, 29-Mar-97, 1 male, 2 females; Carbon River at Alice Falls, 06-Jun-97, 5 males; Huckleberry Creek Bridge, 28-Apr-98, 2 males; Mountain Meadow Stream at Paul Peak Trail, 07-May-98, 2 males; Falls Creek at Stevens Canyon Road, 05-Jun-99, 1 male, 1 female; Falls Creek at Stevens Canyon Road, 11-Jun-99, 2 males; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 2 males; stream into White River at Highway 410 N of White River Entrance, 07-Jul-99, 3 males; small tributary to Shaw Creek, 07-Jul-99, 3 males; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 male; Falls Creek at Stevens Canyon Road, 25-Jun-00, 2 males, 4 females; Tahoma Creek at Fish Creek, 08-Jul-00, 1 male; St. Andrews Creek at Westside Road, 14-Jul-00, 2 males, 1 female; Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 1 male.

##### *Paraleuctra occidentalis*

White River Road 0.5 mile N of ranger station, 21-Apr-96, 1 male; Westside Road 1.3 miles N of Paradise Road, 29-Mar-97, 3 males; Tahoma Creek 1.8 miles NE of Paradise Road, 29-Mar-97, 3 males, 4 females; Ohanapecosh Campground, 28-May-97, 1 male; Eagle Peak Creek at Nisqually River, 30-May-97, 4 females; Huckleberry Creek Bridge, 21-Apr-98, 1 male; Huckleberry Creek Bridge, 28-Apr-98, 2 males; St. Andrews Creek at Westside Road, 29-Apr-98, 1 male, 2 females; stream by South Mowich



River Camp, 07-May-98, 1 male; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 1 female; tributary to Ohanapecosh River, 07-Jul-99, 4 males; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 1 male, 1 female; Falls Creek at Stevens Canyon Road, 08-Jul-99, 1 male; Paradise River in Paradise Valley, 16-Aug-99, 1 male, 1 female; Falls Creek at Stevens Canyon Road, 25-Jun-00, 2 males, 4 females; Paradise River in Paradise Valley, 10-Jul-00, 3 females; Falls Creek at Stevens Canyon Road, 16-Jul-00, 1 female; Fryingpan Creek 0.25 mile upstream of Sunrise Road, 16-Jul-00 1 male; Ipsut Falls at Ipsut Creek, 14-May-01, 1 male, 2 females; Ohanapecosh River at the Grove of the Patriarchs, 16-May-01, 1 male, 1 female; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 2 males, 2 females; Paradise River in Paradise Valley, 02-Jul-01, 1 male.

*Paraleuctra projecta*

Boggy stream tributary to Tahoma Creek, 07-May-01, 3 males; seeps by Nisqually River Bridge in Longmire, 07-May-01, 8 males; Eagle Peak Creek at Nisqually River, 13-May-01, 35 males, 18 females; seeps by Nisqually River Bridge in Longmire, 13-May-01, 1 male; Ipsut Falls at Ipsut Creek, 14-May-01, 1 male; Eagle Peak Creek at Nisqually River, 15-May-01, 2 males, 7 females; Nisqually River, 2 miles W of Longmire, 15-May-01, 1 male.

*Paraleuctra vershina*

Rainforest Loop Trail at Carbon River Entrance, 08-May-95, 7 males, 1 female; Carbon River Entrance, 24-May-95, 1 male; Carbon River Entrance, Rainforest Loop Trail, 27-May-97, 5 males, 3 females; Nisqually River at Longmire, 28-May-97, 1 male, 2 females; Ohanapecosh Campground, 28-May-97, 1 male; Ohanapecosh River at the Grove of the Patriarchs, 28-May-97, 1 male, 1 female; Ohanapecosh River at Sheep Creek, 29-May-97, 1 male; seeps into White River on Highway 410, 29-May-97, 4 males, 3 females; Panther Creek at Highway 123, 29-May-97, 2 males; stream into White River at Highway 410 N of White River entrance, 07-Jul-99, 2 males; Fryingpan Creek at Sunrise Road Bridge, 29-Jun-00, 1 female; Fish Creek at Westside Road, 14-Jul-00, 1 female; Fish Creek at Dry Creek, 07-May-01, 1 male, 1 female; seeps into White River on Highway 410, 14-May-01, 3 males, 2 females; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 male, 2 females; Ohanapecosh Campground, 16-May-01, 2 males, 1 female; White River at Sunrise Road, 15-Jun-01, 7 males, 4 females; Paradise River in Paradise Valley, 02-Jul-01, 1 male; Fryingpan Creek at Sunrise Road Bridge, 02-Jul-01, 2 males, 3 females; seeps into Fryingpan Creek 0.5 mile upstream from Sunrise Road, 15-Jun-01, 6 males, 1 female.

Genus *Perlomyia*

*Perlomyia collaris*

Huckleberry Creek Bridge, 28-Apr-98, 1 male; stream by South Mowich River Camp, 04-May-98, 1 male; North Mowich River at Wonderland Trail, 07-May-98, 1 male; Mountain Meadow Stream at Paul Peak Trail, 07-May-98, 1 male; seeps by Nisqually River Bridge in Longmire, 07-May-01, 10 males, 1 female; seeps by Nisqually River Bridge in Longmire, 13-May-01, 2 males, 1 female; Eagle Peak Creek at Nisqually River, 13-May-01, 17 males, 4 females; seeps into White River on Highway 410, 14-May-01, 1 male; Ipsut Falls at Ipsut Creek, 14-May-01, 1

female; Huckleberry Creek Bridge, 14-May-01, 2 males, 1 female.

*Perlomyia utahensis*

Eagle Peak Creek at Bridge, 30-May-97, 1 male.

Genus *Megaleuctra*

*Megaleuctra kincaidi*

Ohanapecosh Campground, 09-May-96, 1 female; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 1 male; seep into Fryingpan Creek, 08-Jul-99, 1 male, 2 females; boggy stream tributary to Tahoma Creek, 07-May-01, 1 male.

Family Nemouridae

Genus *Malenka*

*Malenka californica*

Carbon River Entrance, 27-May-97, 1 male; Carbon River Entrance, 21-Sep-97, 1 male; Carbon River Entrance, 15-Aug-99, 2 females; Carbon River Entrance, 17-Aug-99, 6 males.

*Malenka cornuta*

Seeps into Eagle Creek, 28-May-97, 3 females; unnamed stream 3.4 miles S of park boundary on Highway 410, 29-May-97, 1 male; White River on Highway 410, 29-May-97, 1 male, 3 females; seeps into White River on Highway 410, 29-May-97, 1 female; Ipsut Creek at Campground, 08-Sep-97, 1 female; Falls Creek at Stevens Canyon Road, 06-Jul-99, 1 male; Nisqually River at Glacier View Bridge, 07-Jul-99, 1 female; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 male; tributary to Tahoma Creek at Paradise Road, 08-Jul-99, 10 males, 6 females; Carbon River Entrance, 15-Aug-99, 2 females; small tributary on Westside Road 2 miles N of Paradise Road, 17-Aug-99, 3 females; West fork of White River, 13-Sep-99, 1 female; Falls Creek at Stevens Canyon Road, 25-Jun-00, 1 male, 1 female; stream on Westside Road 1.5 miles from Paradise Road, 26-Jun-00, 1 male; Fish Creek at Westside Road, 14-Jul-00, 1 female; Falls Creek at Stevens Canyon Road, 16-Jul-00, 1 male; seep 0.8 mile S of St. Andrews Creek, 16-Sep-00, 1 female; White River at Sunrise Road, 15-Jun-01, 1 male; boggy stream tributary to Tahoma Creek, 17-Jun-01, 4 males, 7 females; boggy stream tributary to Tahoma Creek, 09-Jul-01, 1 male.

Genus *Ledina*

*Ledina tumana*

Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 1 male.

Genus *Ostrocerca*

*Ostrocerca foersteri*

Ipsut Creek at campground, 18-May-95, 3 males; Falls Creek on Carbon River Road, 27-May-97, 1 male; Nisqually River at Longmire, 28-May-97, 3 males; Falls Creek at Stevens Canyon Road, 06-Jul-99, 1 male; small stream near Longmire, 09-Jul-99, 1 male.

Genus *Podmosta*

*Podmosta decepta*

Small stream into Ohanapecosh River near Highway 123, 07-Jul-99, 1 female; Paradise River in Paradise Valley, 16-



Aug-99, 3 males, 5 females; Paradise River above Narada Falls, 16-Aug-99, 1 female; Paradise River in Paradise Valley, 07-Sep-99, 2 females.

*Podmosta delicatula*

Paradise River above Narada Falls, 16-Aug-99, 1 male; Paradise River in Paradise Valley, 16-Aug-99, 9 males, 7 females; Paradise River in Paradise Valley, 02-Aug-00, 1 male; Eagle Peak Creek at Nisqually River, 13-May-01, 1 female.

Genus *Prostoia*

*Prostoia besametsa*

Ohanapecosh River at the Grove of the Patriarchs, 28-May-97, 1 male, 1 female; Ohanapecosh Campground, 28-May-97, 4 males, 5 females; Panther Creek at Highway 123, 29-May-97, 2 males, 5 females; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 1 male; Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 1 male, 1 female; seeps into White River on Highway 410, 14-May-01, 7 males, 6 females; Longmire, 15-May-01, 1 male, 1 female; Ohanapecosh Campground, 16-May-01, 2 males, 5 females; White River on Highway 410, 0.5 mile S of park boundary, 16-May-01, 17 males, 8 females; Ohanapecosh River at the Grove of the Patriarchs, 16-May-01, 2 males, 1 female; Deer Creek at Eastside Trail, 09-Jun-01, 1 female.

Genus *Soyedina*

*Soyedina interrupta*

Summerland, 23-Jul-95, 1 male; 0.5 mile W of White River Ranger Station, 21-Apr-96, 1 male; seeps into Eagle Creek, 28-May-97, 2 males, 1 female; unnamed stream 3.4 miles S of park boundary on Highway 410, 29-May-97, 1 male; seeps into White River on Highway 410, 29-May-97, 4 males, 1 female; Nisqually River at Glacier View Bridge, 30-May-97, 11 males, 3 females; St. Andrews Creek at Westside Road, 19-Jun-97, 1 male, 2 females; White River across from the White River Campground, 02-Jul-98, 1 male; Falls Creek at Stevens Canyon Road, 05-Jun-99, 1 male, 2 females; Falls Creek at Stevens Canyon Road, 11-Jun-99, 1 male, 5 females; Falls Creek at Stevens Canyon Road, 06-Jul-99, 4 males; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 4 males, 5 females; Nisqually River at Glacier View Bridge, 07-Jul-99, 3 males, 5 females; seep into Fryingpan Creek, 08-Jul-99, 3 males, 1 female; stream on Westside Road 1.5 miles from Paradise Road, 26-Jun-00, 1 male, 1 female; Fryingpan Creek at Wonderland Trail, 29-Jun-00, 1 male; South Puyallup River at Westside Road, 14-Jul-00, 1 male, 1 female; Longmire, 13-May-01, 1 male; Eagle Peak Creek at Nisqually River, 13-May-01, 1 male; Ipsut Falls at Ipsut Creek, 14-May-01, 1 male, 1 female; Eagle Peak Creek at Nisqually River, 15-May-01, 1 male; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 male.

*Soyedina producta*

Unnamed stream 3.4 miles S of park boundary on Highway 410, 29-May-97, 3 males; seeps into White River on Highway 410, 29-May-97, 1 male; Nisqually River at Glacier View Bridge, 30-May-97, 24 males, 3 females; Carbon River at Alice Falls, 06-Jun-97, 3 males, 4 females; Ipsut Creek at Carbon River Road Bridge, 06-Jun-97, 1 male, 1 female; North Mowich River at Wonderland Trail, 07-May-98, 2 males; Fryingpan Creek at Sunrise Road

Bridge, 06-Jul-99, 8 males, 4 females; Paradise River in Paradise Valley, 16-Aug-99, 13 males, 3 females; Paradise River above Narada Falls, 16-Aug-99, 3 males, 4 females; Paradise River in Paradise Valley, 02-Aug-00, 1 male; boggy stream tributary to Tahoma Creek, 07-May-01, 3 males, 2 females; seeps into White River on Highway 410, 14-May-01, 2 males; stream into White River at Highway 410, 0.5 mile S of park boundary, 16-May-01, 5 males, 4 females; St. Andrews Creek at Westside Road, 16-Jun-01, 1 male; boggy stream tributary to Tahoma Creek, 17-Jun-01, 5 males; Paradise River above Narada Falls, 02-Jul-01, 5 males, 4 females.

Genus *Visoka*

*Visoka cataractae*

0.6 mile S of Ipsut Campground, 04-Apr-97, 1 male; Ipsut Falls on Ipsut Creek, 04-May-97, 17 males, 1 female.

Genus *Zapada*

*Zapada cinctipes*

0.7 mile SE of Ipsut Campground, 25-Mar-95, 4 males, 2 females; Tahoma Creek at Westside Road, 02-Mar-96, 1 male, 3 females; Tahoma Creek 0.1 mile N of Dry Creek, 02-Mar-96, 1 male, 3 females; Reflection Lake, stream near Pinnacle Peak Trail, 14-Apr-96, 2 males, 2 females; White River Road 0.5 mile N of ranger station, 21-Apr-96, 1 male, 4 females; Ohanapecosh Campground, 12-May-96, 1 female; Ipsut Falls at Ipsut Creek, 23-Feb-97, 1 female; south of Chenuis Falls parking lot, 23-Feb-97, 2 males, 13 females; 0.7 mile SE of Ipsut Campground, 23-Mar-97, 1 female; Westside Road 1.3 miles N of Paradise Road, 29-Mar-97, 4 females; Tahoma Creek, 1.8 miles NE of Nisqually Entrance, 29-Mar-97, 4 males, 8 females; Westside Road, 2.6 miles NNE of Nisqually Entrance, 29-Mar-97, 5 males, 6 females; 0.6 mile S of Ipsut Campground, 04-Apr-97, 1 male, 1 female; Shaw Creek at White River Road, 21-Apr-97, 1 male; White River Campground, 01-Apr-98, 1 female; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 1 female; Paradise River in Paradise Valley, 16-Aug-99, 9 males, 8 females; Paradise River above Narada Falls, 07-Sep-99, 1 male, 2 females; Paradise River at Fourth Crossing, 16-Jul-00, 2 males, 1 female; Paradise River at Fourth Crossing, 23-Jul-00, 1 male; Paradise River in Paradise Valley, 02-Aug-00, 2 males; boggy stream tributary to Tahoma Creek, 07-May-01, 3 females; Longmire, 15-May-01, 1 male.

*Zapada columbiana*

2.2 miles SE of Ipsut Campground, 25-Mar-95, 2 males, 2 females; Nahunta Falls, 16-Apr-95, 12 males; Nisqually River at Longmire, 16-Apr-95, 1 male; 0.15 mile NE of Glacier View Bridge, 16-Apr-95, 2 males; Squaw Lake, 07-May-95, 1 male; Nisqually River at creek from Tato Falls, 14-Apr-96, 5 males, 5 females; Reflection Lake, stream near Pinnacle Peak Trail, 14-Apr-96, 11 males, 5 females; 0.1 mile NE of Glacier View Bridge, 14-Apr-96, 1 male; Paradise River at Fourth Crossing, 21-Apr-96, 22 males, 9 females; Edith Creek at Fourth Crossing, 05-May-96, 2 males, 1 female; Edith Creek at Fourth Crossing, 16-May-96, 15 males, 6 females; Ipsut Falls, 23-Feb-97, 10 males, 3 females; Ipsut Creek, 0.6 mile S of Ipsut Campground, 23-Feb-97, 1 male; Tahoma Creek, 02-Mar-97, 1 male, 1 female; Westside Road, 2.6 miles NNE of Nisqually Entrance, 29-Mar-97, 4 males, 3 females; Westside Road

1.3 miles N of Paradise Road, 29-Mar-97, 2 males; 0.6 mile S of Ipsut Campground, 04-Apr-97, 1 male; 0.7 mile SE of Ipsut Campground, 04-Apr-97, 10 males, 9 females; Ipsut Falls on Ipsut Creek, 04-May-97, 1 female; Crystal Creek at Highway 410, 29-May-97, 1 male, 2 females; Eagle Peak Creek at 4360 ft, 14-Jun-97, 2 males, 2 females; White River Campground, 01-Apr-98, 15 males, 12 females; Fryingpan Creek at Sunrise Road Bridge, 01-Apr-98, 5 males, 4 females; Paradise River in Paradise Valley, 10-Jul-00, 3 males, 11 females; Paradise River in Paradise Valley, 16-Jul-00, 2 males, 3 females; Eagle Peak Creek at Nisqually River, 13-May-01, 1 male, 1 female; Deer Creek at Eastside Trail, 09-Jun-01, 1 male; Paradise River in Paradise Valley, 02-Jul-01, 1 male.

#### *Zapada cordillera*

Westside Road 1.3 miles N of Paradise Road, 29-Mar-97, 1 male, 1 female; Tahoma Creek, 1.8 miles NE of Nisqually Entrance, 29-Mar-97, 1 female; boggy stream tributary to Tahoma Creek, 07-May-01, 1 female; seeps into Eagle Peak Creek, 07-May-01, 1 male.

#### *Zapada frigida*

0.6 mile WSW of Shaw Creek Bridge, 03-Nov-96, 1 female; Carbon River Entrance, Rainforest Loop Trail, 08-May-95, 1 male, 1 female; Carbon River Entrance, Rainforest Loop Trail, 27-May-97, 1 male; Ohanapeosh Campground, 28-May-97, 2 males; Falls Creek at Stevens Canyon Road, 28-May-97, 1 female; Carbon River at Alice Falls, 06-Jun-97, 4 males, 2 females; Ipsut Creek at Carbon River Road Bridge, 06-Jun-97, 1 male; St. Andrews Creek at Westside Road, 19-Jun-97, 5 males; White River across from the White River Campground, 02-Jul-98, 3 males, 1 female; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 11 males, 5 females; Falls Creek at Stevens Canyon Road, 06-Jul-99, 4 males; seep into Fryingpan Creek, 08-Jul-99, 3 males; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 2 males, 1 female; Falls Creek at Stevens Canyon Road, 08-Jul-99, 2 males; high-gradient tributary at Nisqually River Longmire, 09-Jul-99, 2 males; Paradise River in Paradise Valley, 16-Aug-99, 5 males, 4 females; Falls Creek at Stevens Canyon Road, 25-Jun-00, 1 male, 2 females; Paradise River in Paradise Valley, 10-Jul-00, 2 females; St. Andrews Creek at Westside Road, 14-Jul-00, 1 male; Paradise River in Paradise Valley, 02-Aug-00, 1 male, 1 female; seeps into Fryingpan Creek 0.5 mile upstream from Sunrise Road, 15-Jun-01, 4 males, 1 female.

#### *Zapada haysi*

White River across from the White River Campground, 02-Jul-98, 1 male; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 2 males; Ohanapeosh River at the Grove of the Patriarchs, 16-May-01, 1 male; boggy stream tributary to Tahoma Creek, 04-Jul-01, 1 male.

#### *Zapada oregonensis*

Carbon River Entrance, Rainforest Loop Trail, 27-May-97, 4 males, 1 female; unnamed stream N of Crystal Creek, Highway 410, 29-May-97, 3 males; seeps into White River on Highway 410, 29-May-97, 1 male; White River Highway 410, 29-May-97, 1 male; Mountain Meadow Stream at Paul Peak Trail, 07-May-98, 2 males; White River across from the White River Campground, 02-Jul-98, 2 males, 2

females; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 3 males, 1 female; Paradise River in Paradise Valley, 07-Sep-99, 1 male; Ohanapeosh River at the Grove of the Patriarchs, 16-May-01, 1 male; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 2 males; boggy stream tributary to Tahoma Creek, 17-Jun-01, 4 males, 1 female.

#### Family Taeniopterygidae

##### Genus *Doddsia*

#### *Doddsia occidentalis*

Nisqually River at Longmire, 16-Apr-95, 2 males; Paradise Ice Caves, 20-Aug-95, 2 females; Westside Road 2.6 miles NNE of Nisqually Entrance, 29-Mar-97, 6 males, 5 females; Nisqually River at Longmire, 28-May-97, 5 females; seeps into White River on Highway 410, 29-May-97, 7 females; Carbon River at Alice Falls, 06-Jun-97, 2 males; Glacier Basin, 20-Jul-97, 3 females; Glacier Basin, 21-Jul-97, 3 females; Glacier Basin, 27-Jul-97, 16 females; Huckleberry Creek Bridge, 17-Apr-98, 2 males, 2 females; Longmire, 20-Apr-98, 1 male; Huckleberry Creek Bridge, 21-Apr-98, 1 male, 5 females; South Puyallup River at Westside Road, 21-Apr-98, 1 female; St. Andrews Creek at Westside Road, 29-Apr-98, 3 males, 1 female; North Mowich River at Wonderland Trail, 07-May-98, 1 male, 1 female; Glacier Basin, 06-Jun-98, 24 females; Falls Creek at Stevens Canyon Road, 11-Jun-99, 2 females; Falls Creek at Stevens Canyon Road, 06-Jul-99, 2 females; small stream into Ohanapeosh River near Highway 123, 07-Jul-99, 1 female; stream into White River at Highway 410 N of White River Entrance, 07-Jul-99, 1 female; Pebble Creek at 7200 feet, 20-Jul-99, 6 females; Muir Snowfield at 8000 ft, 23-Jul-99, 1 female; Fryingpan Creek at Wonderland Trail, 29-Jun-00, 1 male, 1 female; Paradise River in Paradise Valley, 10-Jul-00, 3 females; Fryingpan Creek at Sunrise Road Bridge, 10-Jul-00, 2 females; Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 19 females; Kautz Creek at Nisqually to Paradise Road, 04-Apr-01, 1 male, 1 female; Paradise Ice Caves, 12-May-01, 2 females; Kautz Creek at Nisqually to Paradise Road, 13-May-01, 1 female; Tahoma Creek at Nisqually to Paradise Road, 13-May-01, 1 male, 1 female; Ipsut Falls at Ipsut Creek, 14-May-01, 3 females; seeps into White River on Highway 410, 14-May-01, 3 males, 7 females; Eagle Peak Creek at Nisqually River, 15-May-01, 1 male; Nisqually River, 2 miles W of Longmire, 15-May-01, 8 males, 6 females; Longmire, 15-May-01, 13 males, 4 females; Paradise River at Stevens Canyon Road, 15-May-01, 1 male, 1 female; Ohanapeosh River at the Grove of the Patriarchs, 15-May-01, 1 male, 1 female; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 male, 2 females; Ohanapeosh Campground, 16-May-01, 4 females.

##### Genus *Taenionema*

#### *Taenionema kincaidi*

Kautz Creek Trail 0.7 mile N of Nisqually Road, 08-May-95, 1 male, 2 females; South Mowich River Camp, 31-May-95, 2 males, 1 female; Tahoma Woods, 29-Apr-96, 1 male; Ohanapeosh Campground, 28-May-97, 6 males, 5 females; Ohanapeosh River at the Grove of the Patriarchs, 28-May-97, 3 males, 3 females; Nisqually River at Longmire, 28-May-97, 4 males, 1 female; Panther Creek at Highway 123, 29-May-97, 5 males, 2 females; seeps into White River on Highway 410, 29-May-97, 17 males, 7 females; Deer

Creek on Highway 123, 29-May-97, 5 males, 3 females; Ohanapecosh River at Sheep Creek, 29-May-97, 5 males, 4 females; Tahoma Creek at Nisqually to Paradise Road, 30-May-97, 6 females; Carbon River at Alice Falls, 06-Jun-97, 6 males, 6 females; Ipsut Creek at Carbon River Road Bridge, 06-Jun-97, 5 males, 4 females; Mountain Meadow Stream at Paul Peak Trail, 07-May-98, 7 males, 8 females; North Mowich River at Wonderland Trail, 07-May-98, 14 males, 4 females; Fryingpan Creek at Sunrise Road Bridge, 03-Jul-98, 1 female; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 18 males, 7 females; Nisqually River at Glacier View Bridge, 07-Jul-99, 1 male, 2 females; stream into White River at Highway 410 N of White River Entrance, 07-Jul-99, 1 female; Shaw Creek at White River Road, 07-Jul-99, 2 males; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 2 females; Falls Creek at Stevens Canyon Road, 08-Jul-99, 1 male; small stream near Longmire, 09-Jul-99, 1 female; Paradise River at Fourth Crossing, 16-Aug-99, 1 male; Paradise River above Narada Falls, 16-Aug-99, 2 males, 27 females; Fryingpan Creek at Sunrise Road Bridge, 16-Aug-99, 5 females; Falls Creek at Stevens Canyon Road, 25-Jun-00, 1 male; Fryingpan Creek at Wonderland Trail, 29-Jun-00, 2 females; Cataract Creek at Wonderland Trail, 09-Jul-00, 2 males, 3 females; Paradise River in Paradise Valley, 10-Jul-00, 1 male, 2 females; Fryingpan Creek at Sunrise Road, 10-Jul-00, 1 female; Fish Creek at Westside Road, 14-Jul-00, 5 females; Fryingpan Creek at Sunrise Road, 16-Jul-00, 4 females; Fryingpan Creek 0.25 mile upstream from Sunrise Road, 16-Jul-00, 1 male, 2 females; Falls Creek at Stevens Canyon Road, 16-Jul-00, 1 female; Paradise River at Fourth Crossing, 16-Jul-00, 4 males, 1 female; Fish Creek at Westside Road, 05-Aug-00, 1 female; seeps by Nisqually River Bridge in Longmire, 07-May-01, 2 males, 1 female; Fish Creek at Dry Creek, 07-May-01, 8 males; Kautz Creek at Nisqually to Paradise Road, 13-May-01, 8 males; Eagle Peak Creek at Nisqually River, 13-May-01, 1 male; Tahoma Creek at Nisqually to Paradise Road, 13-May-01, 6 males; Ipsut Falls at Ipsut Creek, 14-May-01, 2 females; seeps into White River on Highway 410, 14-May-01, 2 males; Huckleberry Creek Bridge, 14-May-01, 1 male; Paradise River at Stevens Canyon Road, 15-May-01, 1 male; Nisqually River, 2 miles W of Longmire, 15-May-01, 4 males, 1 female; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 4 males; Ohanapecosh Campground, 16-May-01, 2 males; Panther Creek at Highway 123, 09-Jun-01, 1 female; Ohanapecosh River 0.5 mile S of Shriner Peak Trailhead, 09-Jun-01, 4 males, 3 females; Deer Creek at Eastside Trail, 09-Jun-01, 1 male; White River at Sunrise Road, 15-Jun-01, 1 male, 1 female; Paradise River above Narada Falls, 02-Jul-01, 2 females.

#### *Taenionema pallidum*

North Mowich River at Wonderland Trail, 07-May-98, 2 males, 1 female; Tahoma Creek at Nisqually to Paradise Road, 13-May-01, 1 male; seeps into White River on Highway 410, 14-May-01, 1 male.

Group Systellognatha  
Family Chloroperlidae  
Genus *Alloperla*

#### *Alloperla fraternus*

Falls Creek at Stevens Canyon Road, 16-Aug-99, 6 males; small stream near Ohanapecosh Visitor Center, 16-May-01, 1 male.

#### *Alloperla serrata*

Edith Creek at Fourth Crossing, 13-Sep-97, 1 male; Paradise River in Paradise Valley, 16-Aug-99, 3 males; Paradise River above Narada Falls, 16-Aug-99, 9 males; Paradise River at Fourth Crossing, 16-Aug-99, 2 males; Paradise River in Paradise Valley, 07-Sep-99, 1 male, 2 females; Paradise River in Paradise Valley, 02-Aug-00, 2 males, 2 females.

#### Genus *Plumiperla*

#### *Plumiperla diversa*

Carbon River Entrance, 27-May-97, 15 males, 16 females; Nisqually River at Longmire, 28-May-97, 1 male; seeps into White River on Highway 410, 29-May-97, 2 males, 1 female; Tahoma Creek at Nisqually to Paradise Road, 30-May-97, 3 males, 2 females; Longmire, 27-Jul-98, 1 male; Falls Creek at Stevens Canyon Road, 06-Jul-99, 5 males, 5 females; small stream near Longmire, 07-Jul-99, 2 males; Nisqually River at Glacier View Bridge, 07-Jul-99, 14 males, 11 females; tributary to Ohanapecosh River, 07-Jul-99, 1 male, 6 females; Tahoma Creek, 08-Jul-99, 1 male, 3 females; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 1 female; Paradise River above Narada Falls, 16-Aug-99, 2 males; Fryingpan Creek at Sunrise Road Bridge, 16-Aug-99, 2 males, 2 females; Falls Creek at Stevens Canyon Road, 25-Jun-00, 2 females; Fryingpan Creek at Sunrise Road Bridge, 29-Jun-00, 1 male, 2 females; Tahoma Creek at Fish Creek, 08-Jul-00, 5 males, 2 females; Cataract Creek at Wonderland Trail, 09-Jul-00, 1 male, 1 female; South Puyallup River at Westside Road, 14-Jul-00, 20 males, 7 females; Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 2 males, 5 females; Fryingpan Creek 0.25 mile upstream of Sunrise Road, 16-Jul-00, 3 males, 4 females; Tahoma Creek at Nisqually to Paradise Road, 13-May-01, 1 male; White River at Sunrise Road Bridge, 15-Jun-01, 3 males, 2 females; boggy stream tributary to Tahoma Creek, 17-Jun-01, 2 males, 1 female; small stream near Narada Falls, 23-Jul-01, 3 males.

#### Genus *Suwallia*

#### *Suwallia dubia*

Ipsut Creek at Carbon River Road Bridge, 08-Sep-97, 1 female; Carbon River Entrance, 15-Aug-99, 1 male, 1 female; Carbon River Entrance, 16-Aug-99, 1 male; Falls Creek at Stevens Canyon Road, 16-Aug-99, 1 male; small tributary on Westside Road 2 miles N of Paradise Road, 17-Aug-99, 1 male; Van Horn Creek at Waterfall, 13-Sep-99, 3 males, 2 females; West fork of White River, 13-Sep-99, 1 female; South Puyallup River at Westside Road, 29-Sep-00, 16 males, 6 females.

#### *Suwallia forcipata*

Nisqually River at Longmire, 04-Apr-96, 1 male, 8 females; Carbon River Entrance, 20-Sep-97, 10 males, 13 females; Huckleberry Creek Bridge, 27-Sep-97, 8 females.

#### *Suwallia pallidula*

South Mowich River Camp, 31-May-95, 4 males, 5 females.

#### Genus *Sweltsa*

#### *Sweltsa borealis*

Carbon River Entrance, Rainforest Loop Trail, 08-May-95, 3 males, 3 females; Wonderland Trail 0.5 mile E of Paul



Peak Trail junction, 01-Jun-95, 1 male, 1 female; Carbon River Entrance, 27-May-97, 1 male, 2 females; Carbon River Entrance, Rainforest Loop Trail, 27-May-97, 2 males, 2 females; Nisqually River at Longmire, 28-May-97, 1 female; Falls Creek at Stevens Canyon Road, 28-May-97, 5 males, 3 females; White River Highway 410, 29-May-97, 1 male, 1 female; unnamed stream N of Crystal Creek, Highway 410, 29-May-97, 10 males, 4 females; seeps into White River on Highway 410, 29-May-97, 3 females; Panther Creek at Highway 123, 29-May-97, 1 female; Eagle Peak Creek at Nisqually River, 30-May-97, 1 female; Ipsut Creek at Carbon River Road Bridge, 06-Jun-97, 1 male, 1 female; St. Andrews Creek at Westside Road, 14-Jun-97, 1 male; Olallie Creek, 28-Jun-97, 2 males; Falls Creek at Stevens Canyon Road, 06-Jul-99, 4 males, 2 females; stream into White River at Highway 410 N of White River entrance, 07-Jul-99, 1 female; tributary to Ohanapecosh River, 07-Jul-99, 7 females; Nisqually River at Glacier View Bridge, 07-Jul-99, 3 females; small stream into Ohanapecosh River near Highway 123, 07-Jul-99, 1 male; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 3 males, 4 females; tributary to Tahoma Creek at Paradise Road, 08-Jul-99, 3 females; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 female; high-gradient tributary at Nisqually River Longmire, 09-Jul-99, 1 male; Paradise River above Narada Falls, 16-Aug-99, 1 male, 3 females; Paradise River in Paradise Valley, 16-Aug-99, 5 males, 7 females; Paradise River in Paradise Valley, 07-Sep-99, 1 male, 1 female; Van Horn Creek at Waterfall, 13-Sep-99, 1 female; Falls Creek at Stevens Canyon Road, 25-Jun-00, 4 males, 2 females; Cataract Creek at Wonderland Trail, 09-Jul-00, 1 female; Paradise River in Paradise Valley, 10-Jul-00, 3 males; Fish Creek at Westside Road, 14-Jul-00, 1 male; South Puyallup River at Westside Road, 14-Jul-00, 1 female; Paradise River in Paradise Valley, 23-Jul-00, 1 female; Paradise River in Paradise Valley, 02-Aug-00, 1 male, 4 females; Olallie Creek at Olallie Creek Camp, 03-Aug-00, 1 female; boggy stream tributary to Tahoma Creek, 07-May-01, 2 males; Ipsut Falls at Ipsut Creek, 14-May-01, 1 male; Ohanapecosh River at the Grove of the Patriarchs, 16-May-01, 1 male; boggy stream tributary to Tahoma Creek, 17-Jun-01, 3 males, 4 females; small stream near Narada Falls, 23-Jul-01, 2 males, 2 females.

#### *Sweltsa exquisita*

Carbon River Entrance, Rainforest Loop Trail, 27-May-97, 1 male; Carbon River Entrance, 27-May-97, 1 male, 1 female; Carbon River at Chenuis Falls Trailhead, 06-Jun-97, 8 males; St. Andrews Creek at Westside Road, 24-Jul-97, 3 males, 1 female; Edith Creek at Fourth Crossing, 13-Sep-97, 2 males; Falls Creek at Stevens Canyon Road, 06-Jul-99, 7 males, 13 females; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 1 male; tributary to Ohanapecosh River, 07-Jul-99, 2 males; Nisqually River at Glacier View Bridge, 07-Jul-99, 2 males; small stream into Ohanapecosh River near Highway 123, 07-Jul-99, 9 males; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 2 males, 3 females; Falls Creek at Stevens Canyon Road, 08-Jul-99, 4 males; small stream near Longmire, 09-Jul-99, 2 males, 3 females; High gradient tributary at Nisqually River at Longmire, 09-Jul-99, 1 male; Paradise River at Fourth Crossing, 16-Aug-99, 1 male; Paradise River above Narada Falls, 16-Aug-99, 7 males, 4 females; Falls Creek at Stevens Canyon Road, 16-Aug-99, 1 female; Paradise

River in Paradise Valley, 16-Aug-99, 8 males, 4 females; Paradise River in Paradise Valley, 07-Sep-99, 2 males, 2 females; Falls Creek at Stevens Canyon Road, 25-Jun-00, 2 males; stream on Westside Road 1.5 miles from Paradise Road, 26-Jun-00, 2 males, 4 females; Fryingpan Creek at Sunrise Road Bridge, 29-Jun-00, 1 male; Cataract Creek at Wonderland Trail, 09-Jul-00, 10 males, 3 females; Fryingpan Creek at Sunrise Road Bridge, 10-Jul-00, 2 males, 2 females; Fish Creek at Westside Road, 14-Jul-00, 2 males, 11 females; St. Andrews Creek at Westside Road, 14-Jul-00, 10 males, 5 females; Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 1 male, 2 females; Fryingpan Creek 0.25 mile upstream from Sunrise Road, 16-Jul-00, 4 males; Paradise River at Fourth Crossing, 23-Jul-00, 3 males; Paradise River in Paradise Valley, 02-Aug-00, 1 male, 6 females; Fish Creek at Westside Road, 05-Aug-00, 1 male, 2 females; boggy stream tributary to Tahoma Creek, 01-Jun-01, 8 males, 2 females; Falls Creek at Stevens Canyon Road, 07-Jun-01, 1 male, 1 female; Panther Creek at Highway 123, 09-Jun-01, 1 male; boggy stream tributary to Tahoma Creek, 17-Jun-01, 6 males; Paradise River above Narada Falls, 02-Jul-01, 1 male; boggy stream tributary to Tahoma Creek, 09-Jul-01, 2 males, 1 female; small stream near Narada Falls, 23-Jul-01, 2 males.

#### *Sweltsa occidens*

Laughingwater Creek, 27-Jun-95, 5 males; St. Andrews Creek at Westside Road, 24-Jul-97, 4 males, 32 females; high-gradient tributary at Nisqually River Longmire, 09-Jul-99, 3 males; Paradise River in Paradise Valley, 16-Aug-99, 4 males, 7 females; Paradise River above Narada Falls, 16-Aug-99, 52 males, 15 females; Paradise River at Fourth Crossing, 16-Aug-99, 1 male; Falls Creek at Stevens Canyon Road, 25-Jun-00, 1 male; Cataract Creek at Wonderland Trail, 09-Jul-00, 2 males; St. Andrews Creek at Westside Road, 14-Jul-00, 4 females; Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 1 male, 2 females; Fryingpan Creek 0.25 mile upstream Sunrise Road, 29-Jun-00, 1 male; Paradise River at Fourth Crossing, 23-Jul-00, 2 males, 1 female; Tamanos Creek at trail, 03-Aug-00, 10 males, 5 females; Panther Creek at Highway 123, 09-Jun-01, 1 male; boggy stream tributary to Tahoma Creek, 17-Jun-01, 1 male; Fryingpan Creek at Sunrise Road Bridge, 02-Jul-01, 1 male; small stream near Narada Falls, 23-Jul-01, 1 male.

#### *Sweltsa revelstoka*

White River Campground, 23-Jul-97, 7 males, 6 females; inflow upper Palisade Lake, 08-Aug-97, 17 males, 8 females; White River across from White River Campground, 02-Jul-98, 4 males, 1 female; seep into Fryingpan Creek, 08-Jul-99, 1 male; Fryingpan Creek at Sunrise Road Bridge, 16-Aug-99, 1 female; Paradise River above Narada Falls, 16-Aug-99, 3 males, 5 females; Paradise River in Paradise Valley, 16-Aug-99, 5 males, 3 females; Paradise River at Fourth Crossing, 16-Aug-99, 5 males, 7 females; creek behind Mystic Lake Ranger Station, 04-Sep-99, 1 female; Cataract Creek at Wonderland Trail, 09-Jul-00, 1 female; Fryingpan Creek at Sunrise Road, 10-Jul-00, 6 males, 2 females; Fryingpan Creek at Sunrise Road, 16-Jul-00, 1 female; Paradise River at Fourth Crossing, 23-Jul-00, 7 males, 1 female; Paradise River in Paradise Valley, 02-Aug-00, 4 males, 4 females; Tamanos Creek at Trail, 03-Aug-00, 2 males; Paradise River in Paradise Valley, 02-Jul-01, 1 male; Fryingpan Creek at Sunrise Road, 02-Jul-01, 1 female; Dick Creek at Wonderland Trail, 27-Jul-01, 1 female.

*Sweltsa* new species

Tributary to Tahoma Creek at Westside Road, 08-Jul-99, 1 male.

Genus *Kathroperla**Kathroperla perdita*

White River Highway 410, 29-May-97, 2 males; unnamed stream 3.4 miles S of park boundary on Highway 410, 29-May-97, 1 female; Crystal Creek at Highway 410, 29-May-97, 1 male, 1 female; unnamed stream N of Crystal Creek, Highway 410, 29-May-97, 2 females; Panther Creek at Highway 123, 29-May-97, 1 female; Tahoma Creek at Nisqually to Paradise Road, 30-May-97, 2 males; Mountain Meadow Stream at Paul Peak Trail, 07-May-98, 1 male; seeps into White River on Highway 410, 14-May-01, 1 female; Ipsut Falls at Ipsut Creek, 14-May-01, 1 male, 1 female; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 male, 2 females; Deer Creek at Eastside Trail, 09-Jun-01, 1 male; White River at Sunrise Road, 15-Jun-01, 1 female.

*Kathroperla tahoma*

Falls Creek at Stevens Canyon Road, 06-Jul-99, 1 female; tributary to Ohanapecosh River, 07-Jul-99, 1 female; Falls Creek at Stevens Canyon Road, 25-Jun-00, 1 female; small stream near Ohanapecosh Visitor Center, 16-May-01, 1 male.

Genus *Paraperla**Paraperla frontalis*

Ohanapecosh Ranger Station, 22-Jun-96, 1 female; Carbon River Entrance, 27-May-97, 2 females; Ohanapecosh River at the Grove of the Patriarchs, 28-May-97, 1 male; White River Highway 410, 29-May-97, 1 male.

*Paraperla wilsoni*

0.15 mile NE of Glacier View Bridge, 16-Apr-95, 1 female; 0.6 mile S of Ipsut Campground, 04-Apr-97, 1 female; Nisqually River at Longmire, 28-May-97, 3 females, 1 nymph; Panther Creek at Highway 123, 09-Jun-01, 1 male.

## Family Peltoperlidae

Genus *Soliperla**Soliperla fenderi*

Tributary to Tahoma Creek, 08-Jul-99, 4 males, 1 female; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 female; Falls Creek at Stevens Canyon Road, 08-Jul-99, 1 male, 1 female; small tributary on Westside Road 2 miles N of Paradise Road, 17-Aug-99, 4 males, 1 female; boggy stream tributary to Tahoma Creek, 17-Aug-99, 1 female; stream on Westside Road 1.5 miles from Paradise Road, 26-Jun-00, 1 male; Cataract Creek at Wonderland Trail, 09-Jul-00, 1 male; Dick Creek at Wonderland Trail, 27-Jul-01, 4 males.

Genus *Yoraperla**Yoraperla mariana*

Ohanapecosh Campground, 28-May-97, 1 male, 4 females; Panther Creek at Highway 123, 29-May-97, 2 males, 1 female; Ohanapecosh River at Sheep Creek, 29-May-97, 1 male, 1 female; unnamed stream N of Crystal Creek, Highway 410, 29-May-97, 9 males, 7 females; Mountain Meadow Stream at Paul Peak Trail, 07-May-98, 1 male;

White River across from the White River Campground, 02-Jul-98, 1 female; boggy stream tributary to Tahoma Creek, 07-May-01, 1 male, 2 females; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 female; stream into White River at Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 male; Ohanapecosh River 0.5 mile S of Shriner Peak Trailhead, 09-Jun-01, 5 females.

*Yoraperla nigrisoma*

Mowich Road at Grindstone Trail Crossing, 07-Jul-95, 1 female; Ipsut Creek at Carbon River Road Bridge, 06-Jun-97, 1 female; Falls Creek at Stevens Canyon Road, 11-Jun-99, 2 males; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 1 male, 1 female; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 female; tributary to Tahoma Creek at Westside Road, 08-Jul-99, 25 males, 12 females; tributary to Tahoma Creek at Paradise Road, 08-Jul-99, 2 males, 1 female; Paradise River in Paradise Valley, 16-Aug-99, 1 male, 1 female; Paradise River above Narada Falls, 16-Aug-99, 2 females; Falls Creek at Stevens Canyon Road, 16-Aug-99, 2 females; small tributary on Westside Road 2 miles N of Paradise Road, 17-Aug-99, 1 male; creek behind Mystic Lake Ranger Station, 04-Sep-99, 2 males, 3 females; Falls Creek at Stevens Canyon Road, 25-Jun-00, 9 males, 4 females; Paradise River in Paradise Valley, 10-Jul-00, 6 males; St. Andrews Creek at Westside Road, 14-Jul-00, 3 males, 2 females; Falls Creek at Stevens Canyon Road, 16-Jul-00, 1 male, 3 females; Paradise River in Paradise Valley, 02-Aug-00, 5 females; Olallie Creek at Olallie Creek Camp, 03-Aug-00, 1 female; boggy stream tributary to Tahoma Creek, 07-May-01, 1 male, 2 females; small stream near Ohanapecosh Visitor Center, 16-May-01, 1 male; Ohanapecosh River 0.5 mile S of Shriner Peak Trailhead, 09-Jun-01, 1 female; boggy stream tributary to Tahoma Creek, 17-Jun-01, 8 males, 2 females; boggy stream tributary to Tahoma Creek, 04-Jul-01, 1 male; boggy stream tributary to Tahoma Creek, 09-Jul-01, 2 females.

*Yoraperla siletz*

Falls Creek at Stevens Canyon Road, 06-Jul-99, 9 males, 11 females; Falls Creek at Stevens Canyon Road, 08-Jul-99, 5 males, 5 females; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 male, 1 female; Falls Creek at Stevens Canyon Road, 25-Jun-00, 2 males, 2 females.

## Family Perlidae

Genus *Doroneuria**Doroneuria baumanni*

Carbon River Entrance at June Creek, 13-Jul-95, 2 nymphs; tributary to Tahoma Creek at Paradise Road, 08-Jul-99, 1 female; Carbon River Entrance, 15-Aug-99, 5 males, 1 female.

Genus *Hesperoperla**Hesperoperla pacifica*

Ohanapecosh Ranger Station, 17-Jul-97, 1 female.

Genus *Claassenia**Claassenia sabulosa*

Ohanapecosh Ranger Station, 09-Sep-97, 1 female.



Family Perlodidae  
Genus *Isoperla*

*Isoperla bifurcata*

Carbon River Entrance, 15-Aug-99, 1 female.

*Isoperla fusca*

Seeps into White River on Highway 410, 29-May-97, 1 nymph.

*Isoperla gravitans*

Carbon River Entrance, Rainforest Loop Trail, 08-May-95, 1 male; Falls Creek at Stevens Canyon Road, 25-Jun-00, 1 male.

*Isoperla petersoni*

Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 3 males, 1 female.

*Isoperla rainiera*

White River Campground, 23-Jul-97, 1 female; Nisqually River at Glacier Vista Bridge, 07-Jul-99, 1 female; Paradise River above Narada Falls, 16-Aug-99, 2 males, 1 female; Paradise River in Paradise Valley, 02-Aug-00, 16 males, 2 females; Fryingpan Creek at Wonderland Trail, 31-Oct-00, 1 female.

*Isoperla sobria*

Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 1 male, 1 female; White River Highway 410, 0.5 mile S of park boundary, 16-May-01, 1 male.

*Isoperla sordida*

Fryingpan Creek at Wonderland Trail, 03-Jul-98, 1 female; Longmire, 08-Sep-98, 1 female; stream into White River at Highway 410 N of White River entrance, 07-Jul-99, 3 males; small tributary on Westside Road 2 miles N of Paradise Road, 08-Jul-99, 1 male; boggy stream tributary to Tahoma Creek, 17-Aug-99, 1 female; Fryingpan Creek at Sunrise Road Bridge, 05-Sep-99, 1 female; Paradise River in Paradise Valley, 07-Sep-99, 2 males; Fryingpan Creek at Sunrise Road Bridge, 13-Sep-99, 1 male; North Puyallup River at Wonderland Trail, 24-Sep-00, 2 males, 32 females.

*Isoperla tilasqua*

Stream into White River at Highway 410 N of White River Entrance, 07-Jul-99, 3 males; tributary to Tahoma Creek at Paradise Road, 08-Jul-99, 2 males, 3 females; boggy stream tributary to Tahoma Creek, 17-Aug-99, 1 female.

Genus *Frisonia**Frisonia picticeps*

Muir Snowfield at 8000 ft, 28-Jul-95, 1 female.

Genus *Megarcys**Megarcys irregularis*

Carbon River Entrance, 27-May-97, 8 males, 3 females; Nisqually River at Longmire, 28-May-97, 2 males, 1 female; White River Highway 410, 29-May-97, 8 males, 1 female; Tahoma Creek at Nisqually to Paradise Road, 30-May-97, 2 females; Fryingpan Creek at Sunrise Road

Bridge, 06-Jul-99, 1 male, 2 females; Fryingpan Creek at Sunrise Road Bridge, 16-Aug-99, 1 female; Cataract Creek at Wonderland Trail, 09-Jul-00, 1 female; Fryingpan Creek at Sunrise Road Bridge, 10-Jul-00, 2 females; Nisqually River at Longmire, 13-May-01, 1 male, 1 female; seeps into White River on Highway 410, 14-May-01, 9 males, 2 females; Paradise River above Narada Falls, 02-Jul-01, 1 female; Cataract Creek at Wonderland Trail, 20-Jul-01, 1 female; Puyallup River at Wonderland Trail, 28-Jul-01, 1 male.

*Megarcys subtruncata*

Deer Creek on Highway 123, 27-May-97, 2 males; Ohanapechosh River at the Grove of the Patriarchs, 28-May-97, 1 male, 1 female; Goat Creek on Highway 410, 29-May-97, 4 males, 1 female; Panther Creek at Highway 123, 29-May-97, 1 male; Carbon River at Chenuis Falls Trailhead, 06-Jun-97, 2 females; Ipsut Creek at Carbon River Road Bridge, 06-Jul-97, 2 females; Glacier Basin, 20-Jul-97, 4 females; Glacier Basin, 21-Jul-97, 4 females; Glacier Basin, 27-Jul-97, 2 females; Fryingpan Creek at Sunrise Road Bridge, 06-Jul-99, 1 male, 1 female; Paradise River above Narada Falls, 16-Aug-99, 1 female; Paradise River in Paradise Valley, 16-Aug-99, 3 females; Fryingpan Creek at Sunrise Road Bridge, 16-Aug-99, 1 male, 2 females; Falls Creek at Stevens Canyon Road, 25-Jun-00, 2 males; Fryingpan Creek at Sunrise Road Bridge, 29-Jun-00, 1 female; Huckleberry Creek Bridge, 14-May-01, 2 males; Longmire, 15-May-01, 1 male; Ohanapechosh Campground, 16-May-01, 1 male; Panther Creek at Highway 123, 09-Jun-01, 1 male, 2 females; boggy stream tributary to Tahoma Creek, 17-Jun-01, 1 male.

*Megarcys yosemite*

Fryingpan Creek at Sunrise Road Bridge, 16-Aug-99, 1 male; Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 4 females.

Genus *Setvena**Setvena tibialis*

Mowich Road at Grindstone Trail Crossing, 07-Jul-95, 1 female; Paradise Ice Caves, 20-Aug-95, 1 male, 1 female; St. Andrews Creek at Westside Road, 24-Jul-97, 2 females; Paradise Ice Caves, 13-Sep-97, 1 female; Sunrise Visitor Center, 13-Aug-98, 1 male; Falls Creek at Stevens Canyon Road, 06-Jul-99, 3 males, 1 female; Paradise River in Paradise Valley, 16-Aug-99, 2 males; Paradise River at Fourth Crossing, 16-Aug-99, 1 male; Falls Creek at Stevens Canyon Road, 16-Aug-99, 1 female; small tributary on Westside Road 2 miles N of Paradise Road, 17-Aug-99, 1 female; Paradise River in Paradise Valley, 10-Jul-00, 1 male; Paradise River at Fourth Crossing, 23-Jul-00, 1 male.

Genus *Skwala**Skwala americana*

Ohanapechosh Ranger Station, 05-May-96, 1 female; Ohanapechosh Campground, 28-May-97, 2 females; Ohanapechosh Hot Springs, 28-May-97, 1 female; Ohanapechosh Ranger Station, 28-May-97, 2 males.

Genus *Kogotus**Kogotus nonus*

Ipsut Creek at Carbon River Road Bridge, 08-Sep-97, 1 male; Carbon River Entrance, 15-Aug-99, 1 male, 2 females;

Fryingpan Creek at Sunrise Road Bridge, 16-Jul-00, 1 female.

Family Pteronarcyidae  
Genus *Pteronarcys*

*Pteronarcys princeps*

Stevens Canyon Entrance, 15-May-95, 1 female; Panther Creek at Highway 123, 29-May-97, 1 male; small stream near Ohanapecosh Visitor Center, 16-May-01, 3 nymphs.

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