

ARTICLES

The 2014 *Sierraperla* (Plecoptera: Peltoperlidae) Pacific Northwest U.S.A. Expedition

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During 13-30 May 2014, we traveled to the Pacific Northwest to obtain additional material of the western Nearctic peltoperlid genus *Sierraperla* to confirm that two different taxa exist. Most of our collecting was focused in Oregon and northern California, U.S.A. Fifty-seven sites in 23 counties were collected in these states, and collections were made at two additional sites from two counties in Idaho and Utah (Table 1, Fig. 1). Most adults and nymphs of *Sierraperla* were specifically collected in 95% ethanol for DNA extractions. A paper was written describing a new species of *Sierraperla* based on male aedeagal characters, egg characters, and molecular evidence (Stark et al. 2015). Additionally, fresh material of *Osobenus yakimae* (Hoppe) allowed us to describe the distinctive epiproctal structures of this Pacific Northwest species (Sandberg et al. 2015) and specimens of the banded-wing phenotype of *Moselia infuscata* (Claassen) were collected for DNA barcode (Cytochrome c Oxidase subunit I [COI]) analysis (Gill et al. 2015).

Other stonefly species were either preserved in 70-95% ethanol or returned to Mississippi College, Colorado State University or Paradise, California for adult rearing. Most adults were collected by using beating sheets (DeWalt et al. 2014). The scanning electron micrograph was produced by a JEOL JSM-6500F Field Emission Scanning Electron Microscope (FESEM) at the Central Instrument Facility, Imaging Laboratory, Colorado State University, Fort Collins, Colorado (<http://cif.colostate.edu/imaging-laboratory/>).

A total of 3,059 stoneflies representing at least 91 species were collected (Table 2), and several of these were reared. Several of the known species are uncommon and others represented new species or new state records. *Salmoperla sylvanica* Baumann & Lauck, a rare perlodid species previously known from a few streams in northern California (Baumann & Lauck 1987, Nelson and Stark 1987, Stark and Baumann 2006) was reared from a stream in Jackson Co., Oregon, (Split Rock Creek, Wagner Gap Road, 12 mi S Talent, 42.09480°N, 122.77397°W) and specimens of an apparent new species of *Kathroperla* were also collected at the same site. Other

relatively uncommon Pacific Northwest species included two perlodid stoneflies, *Frisonia picticeps* (Hanson) and *Susulus venustus* (Jewett), and a significant range extension is reported for *Soliperla quadrispinula* (Jewett) from Meacham Creek, Umatilla Co., Oregon. This species is presently known from sites along the Coast Range of northern California to Clatsop and Benton counties in Oregon (Stark & Gustafson 2004). We also present a SEM image of the epiproct of *Alloperla delicata* Frison to illustrate the characteristic ellipsoidal dorsal aspect of the epiproct with the two anterolateral horns (Fig. 2). Lyon and Stark (1997) previously presented SEM images of the epiproct of this species; however the apex was obscured by the dense hair fringe of the epiproct and abdominal terga. In our images the distinctive epiproct tip of this species is more clearly illustrated.

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Table 1. 2014 Sierraperla Expedition. * indicates multiple visits.

| State | County | # | Waterbody | Location | Date |
|-------|-----------|----|-----------------------|---------------------------------|-------|
| OR | Jackson | 1 | Union Creek | Falls (mapped), 0.6 mi S Hwy 62 | 5/16 |
| | | 2 | Trib of Union Cr. | 1000 Springs Rd 3 mi SE Hwy 62 | 5/16 |
| | Douglas | 3 | Clearwater River | Clearwater Falls CG, Hwy 138 | 5/16 |
| | | 4 | Watson Creek | Watson Falls NFD37RD & Hwy 138 | 5/16 |
| | Union | 5 | Grande Ronde River | Birdtrack Springs CG | 5/16 |
| | | 6 | Grande Ronde River | Hilgard Jct, Hwy 244 | 5/16* |
| | Clatsop | 7 | Fishhawk Creek | Nr Jewel, Fishhawk Falls Hwy | 5/17 |
| | Clackamas | 8 | Still Creek | Near Still Creek CG | 5/17* |
| | Linn | 9 | North Santiam River | Hwy 22, 0.5 mi W Bruno Mtn. Rd. | 5/18 |
| | | 10 | Seeps on Willis Creek | NFD 2255 | 5/18 |

| | | | | | | |
|--------|------------|--------------|-----------------------------|-------------------------------------|----------------------------------|------|
| | | 11 | Marion Creek | Hwy 22 | 5/18 | |
| | Benton | 12 | Alder Creek | Hwy 30 Alder Creek Falls Marys Pk | 5/19 | |
| | | 13 | Unknown stream | Mary's Peak, 2 mi W Hwy 30 | 5/19 | |
| | | 14 | Thornton Creek | Thornton Creek Rd | 5/19 | |
| UT | Summit | | Weber River | I-84 Exit 112, Fish Access | 5/19 | |
| ID | Twin Falls | | 4th Fork Rock Creek | Rock Creek Rd, 1/4 mi S of 5th fork | 5/19 | |
| | Malheur | 15 | Snake River (Hwy 201) | Ontario State Rec Site | 5/19 | |
| | Multnomah | 16 | Wahkeena Spring | Hwy 84, 20 mi E Troutdale | 5/18 | |
| | | 17 | Wahkeena Creek | Wahkeena Falls, Hwy 30 | 5/20 | |
| | Clackamas | 18 | Salmon River | Salmon River Rd | 5/20 | |
| | Umatilla | 19 | Meacham Creek | Off Exit 238 I-84 | 5/20 | |
| OR | Josephine | 20 | Rogue River | Grants Pass, Riverside Park | 5/21 | |
| | | 21 | Cave Creek | Grayback CG, Hwy 46 | 5/21 | |
| | | 22 | Spring Trib of Lake Cr. | NFD-070 Foot Trail | 5/21 | |
| | | 23 | Lake Creek | NFD-070 Foot Trail | 5/21 | |
| | | | 24 | West Fork Illinois R. | Illinois Forks State Park | 5/21 |
| | Jackson | | 25 | Wagner Creek | Wagner Creek Rd, 5 mi S Talent | 5/22 |
| | | | 26 | Basin Creek | Wagner Creek Rd, 5.9 mi S Talent | 5/22 |
| | | | 27 | Sheep Creek | NFD-22-RD, 10.5 mi S Talent | 5/22 |
| | | | 28 | Corral Creek | NFD-22-RD, 10.7 mi S Talent | 5/22 |
| | | | 29 | Jim Creek | NFD-22-RD, 11.1 mi S Talent | 5/22 |
| | | | 30 | Split Rock Creek | NFD-22-RD, 12.4 mi S Talent | 5/22 |
| | | | 31 | Beaver Dam Creek | Daley Cr CG nr Deadwood Junction | 5/22 |
| | | 32 | McDonald Creek | NFD-22 Rd | 5/22 | |
| CA | Siskiyou | 33 | Big Springs Creek | Mt Shasta City Park | 5/23 | |
| | | 34 | Black Butte Spring Cr. | Black Butte | 5/23* | |
| | | 35 | McCloud River | Lower Falls Pic Area Hwy 89 | 5/23 | |
| | Modoc | 36 | SF Davis Creek | Plum Valley CG, 3.5 mi E Davis Cr | 5/23 | |
| | | 37 | NF Pit River | Lowhead dam, 0.8 mi N Surprise Sta. | 5/23 | |
| | | 38 | Thoms Creek | Cedar Pass CG, 15 mi E Alturas | 5/23 | |
| OR | Harney | 39 | Trout Creek | Whitehorse Ranch Rd 18 mi S Fields | 5/24 | |
| CA | Nevada | 40 | Rock Creek | N Bloomfield Rd, 4.2 mi N NV City | 5/24 | |
| | | 41 | Spring Trib South Yuba R | N Bloomfield Rd, Edwards Crossing | 5/24 | |
| | | 42 | Patrick Creek | Patrick Creek Rd (1st Bridge) | 5/24 | |
| | Del Norte | 43 | Small Falls into Patrick Cr | Patrick Creek Rd | 5/24 | |
| | | 44 | Sml Falls above Shelly Cr | Patrick Creek Rd | 5/24 | |
| | Humboldt | 45 | Prairie Creek | Prairie Cr Redwoods SP, Drury Pkw. | 5/25 | |
| | | 46 | Freshwater Creek | Freshwater Pool Park | 5/25 | |
| | | 47 | Ruby Creek | Hwy 299 | 5/25 | |
| | | 48 | Sml Waterfall | Hwy 299 above Boise Creek CG | 5/25 | |
| | Trinity | 49 | Sml Stream | Burnt Ranch Hwy 299 NFCG | 5/25 | |
| | | Butte | 50 | Butte Creek | Humboldt Rd E Butte Meadows 1 | 5/25 |
| | | | 51 | Butte Creek | Humboldt Rd E Butte Meadows 2 | 5/25 |
| | | | Butte Creek | Humboldt Rd E Butte Meadows 3 | 5/25 | |
| Tehama | | 52 | Deer Creek | Hwy 32, below Potato Patch CG | 5/25 | |
| | 53 | Morgan Creek | Hwy A6 | 5/26 | | |
| | | 54 | Deer Creek | Hwy 32 Elam Picnic Area | 5/26 | |
| | Plumas | 55 | Domingo Springs | Old Red Bluff Rd | 5/26 | |
| | Sierra | 56 | Big Spring | Hwy 49 near Bassetts | 5/26 | |

Table 2. 2014 *Sierraperla* Expedition taxa list. N* indicates nymph and exuviae.

| | | | | | | |
|-------------------------------|----------------|-----|----------------------------|-----|-----|----|
| | CAPNIIDAE | | <i>A. fraterna</i> | 36♂ | 29♀ | |
| <i>Capnia glabra</i> | 4♂ | 33♀ | <i>Alloperla</i> sp. | | 11♀ | |
| <i>C. gracilaria</i> | 3♂ | 5♀ | <i>Kathroperla perdita</i> | 2♂ | 2♀ | 1E |
| <i>C. melia</i> | 28♂ | 37♀ | <i>Kathroperla</i> n.sp | 1♂ | 3♀ | |
| <i>C. sextubercata</i> | 3♂ | 15♀ | <i>Paraperla frontalis</i> | 1♂ | 4♀ | 1E |
| <i>Capnia</i> sp. | | 10♀ | <i>Suwallia</i> sp. | | 1♀ | |
| <i>Eucapnopsis brevicauda</i> | 14♂ | 51♀ | <i>Sweltsa borealis</i> gr | 49♂ | 62♀ | |
| <i>Paracapnia</i> sp. | | 1♀ | <i>S. coloradensis</i> | 27♂ | 18♀ | |
| | CHLOROPERLIDAE | | <i>S. fidelis</i> | 21♂ | 8♀ | 1N |
| <i>Alloperla chandleri</i> | 8♂ | | <i>S. oregonensis</i> | 2♂ | | |
| <i>A. delicata</i> | 22♂ | 9♀ | <i>S. pacifica</i> | 23♂ | 16♀ | |

| | | | |
|-------------------------------|------|------|-----|
| <i>S. salix</i> | 34♂ | 38♀ | |
| <i>Sweltsa</i> sp. | 1♂ | 3♀ | 7N |
| <i>S. townesi</i> | 73♂ | 46♀ | |
| <i>S. umbonata</i> | 21♂ | 40♀ | |
| <i>Triznaka pintada</i> | 10♂ | 7♀ | |
| <i>T. signata</i> | 2♂ | | |
| LEUCTRIDAE | | | |
| <i>Megaleuctra complicata</i> | 3♂ | 5♀ | |
| <i>Megaleuctra kincaidi</i> | 2♂ | 2♀ | 1N |
| <i>Moselia infuscata</i> | 167♂ | 120♀ | |
| <i>Paraleuctra forcipata</i> | 28♂ | 45♀ | |
| <i>P. occidentalis</i> | 15♂ | 27♀ | |
| <i>P. vershina</i> | 138♂ | 139♀ | |
| <i>Perlomyia collaris</i> | | 4♀ | |
| <i>Pomoleuctra andersoni</i> | 1♂ | | |
| NEMOURIDAE | | | |
| <i>Malenka bifurcata</i> | 2♂ | 1♀ | |
| <i>M. cornuta</i> | 22♂ | 13♀ | |
| <i>M. depressa</i> | 22♂ | 15♀ | |
| <i>Malenka</i> n. sp. | 1♂ | | |
| <i>Malenka</i> sp. | 1♂ | 2♀ | 8N |
| <i>Nanonemura waukeena</i> | 4♂ | 4♀ | |
| <i>Nemoura spiniloba</i> | | 1♀ | |
| <i>Podmosta delicatula</i> | 16♂ | 24♀ | |
| <i>Prostoia besametsa</i> | | 1♀ | |
| <i>Soyedina interrupta</i> | 7♂ | 3♀ | 1N |
| <i>S. nevadensis</i> | 4♂ | 3♀ | |
| <i>S. producta</i> | 84♂ | 43♀ | 1N |
| <i>Soyedina</i> sp. | | 4♀ | |
| <i>Visoka cataractae</i> | | 7♀ | |
| <i>Zapada cinctipes</i> | 2♂ | 11♀ | |
| <i>Z. columbiana</i> | | 1♀ | |
| <i>Z. frigida</i> | 13♂ | 6♀ | |
| <i>Z. oregonensis</i> | 25♂ | 34♀ | 6N |
| PELTOPERLIDAE | | | |
| <i>Sierraperla cora</i> | 14♂ | 4♀ | 78N |
| <i>S. tolowa</i> | 3♂ | | 46N |
| <i>Soliperla campanula</i> | 13♂ | 6♀ | |
| <i>S. quadrispinula</i> | 1♂ | 1♀ | 13N |
| <i>S. sierra</i> | 2♂ | | 5N |
| <i>Soliperla</i> sp. | 1♂ | | 2N |
| <i>Yoraperla mariana</i> | 16♂ | 32♀ | |
| <i>Y. nigrisoma</i> | 58♂ | 68♀ | 9N |
| <i>Y. siletz</i> | 3♂ | 2♀ | |
| <i>Yoraperla</i> sp. | | 1♀ | 7N |
| PERLIDAE | | | |
| <i>Calineuria californica</i> | 23♂ | 14♀ | 14N |
| <i>Doroneuria baumanni</i> | 1♂ | | 8N |
| <i>Hesperoperla pacifica</i> | 4♂ | 2♀ | 4N |
| PERLODIDAE | | | |
| <i>Calliperla luctuosa</i> | | 2♀ | 2E |
| <i>Cascadoperla trictura</i> | 2♂ | 2♀ | |
| <i>Chernokrilus misnomus</i> | | | 6N |
| <i>Cultus</i> sp. | 2♂ | | 4E |
| <i>C. tostonus</i> | 6♂ | | |
| <i>Diura knowltoni</i> | 4♂ | 2♀ | |
| <i>Frisonia picticeps</i> | | 29♀ | |
| <i>Isopterla bifurcata</i> | 13♂ | 1♀ | 64N |
| <i>I. fulva</i> | 39♂ | 17♀ | 6N* |
| <i>I. marmorata</i> | 3♂ | 10♀ | |
| <i>I. mormona</i> | 6♂ | 3♀ | 10N |
| <i>I. phalerata</i> | 1♂ | 1♀ | 9N |
| <i>I. quinquepunctata</i> | 21♂ | 16♀ | |
| <i>I. roguensis</i> | | 1♀ | |
| <i>I. sobria</i> | 1♂ | 6♀ | 3N |
| <i>Isopterla</i> sp. | | 6♀ | 7N |

| | | | |
|--------------------------------|-----|------|----|
| <i>I. tilasqua</i> | 5♂ | 3♀ | |
| <i>I. umpqua</i> | 1♂ | | |
| <i>Kogotus nonus</i> | 12♂ | 8♀ | |
| <i>Kogotus/Rickera</i> sp. | | | 4E |
| <i>Megarcys subtruncta</i> | 3♂ | 12♀ | 2E |
| <i>Osobenus yakimae</i> | 14♂ | 20♀ | 2N |
| <i>Rickera sorpta</i> | 9♂ | 11♀ | |
| <i>Salmoperla sylvanica</i> | 2♂ | 1♀ | |
| <i>Setvena waukeena</i> | | | 1N |
| <i>Skwala curvata</i> | | 1♀ | |
| <i>Skwala</i> sp. | | | 8E |
| <i>Susulus venustus</i> | 6♂ | 13♀ | 2N |
| PTERONARCYIDAE | | | |
| <i>Pteronarcella badia</i> | | | 2N |
| <i>Pteronarcella regularis</i> | | | 1N |
| <i>Pteronarcys californica</i> | | 2♀ | 2N |
| <i>P. princeps</i> | 10♂ | 6♀ | 7N |
| TAENIOPTERYGIDAE | | | |
| <i>Taenionema kincaidi</i> | 10♂ | 16♀ | |
| <i>T. pacificum</i> | 3♂ | 3♀ | |
| <i>T. pallidum</i> | 51♂ | 103♀ | |
| <i>T. raynorium</i> | 1♂ | 1♀ | |

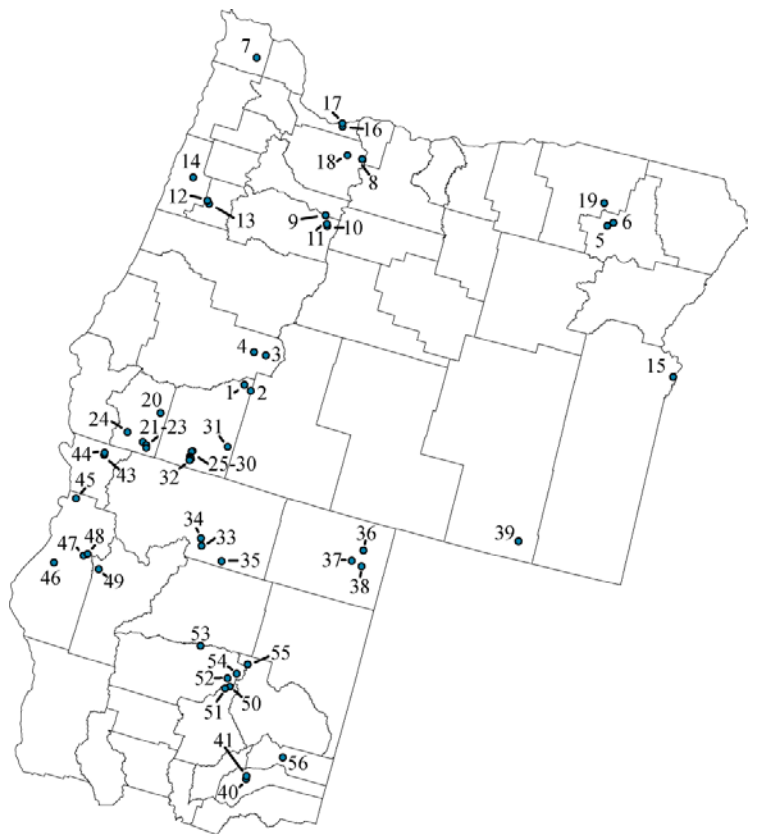


Figure 1. May 2014 *Sierraperla* Expedition site map.

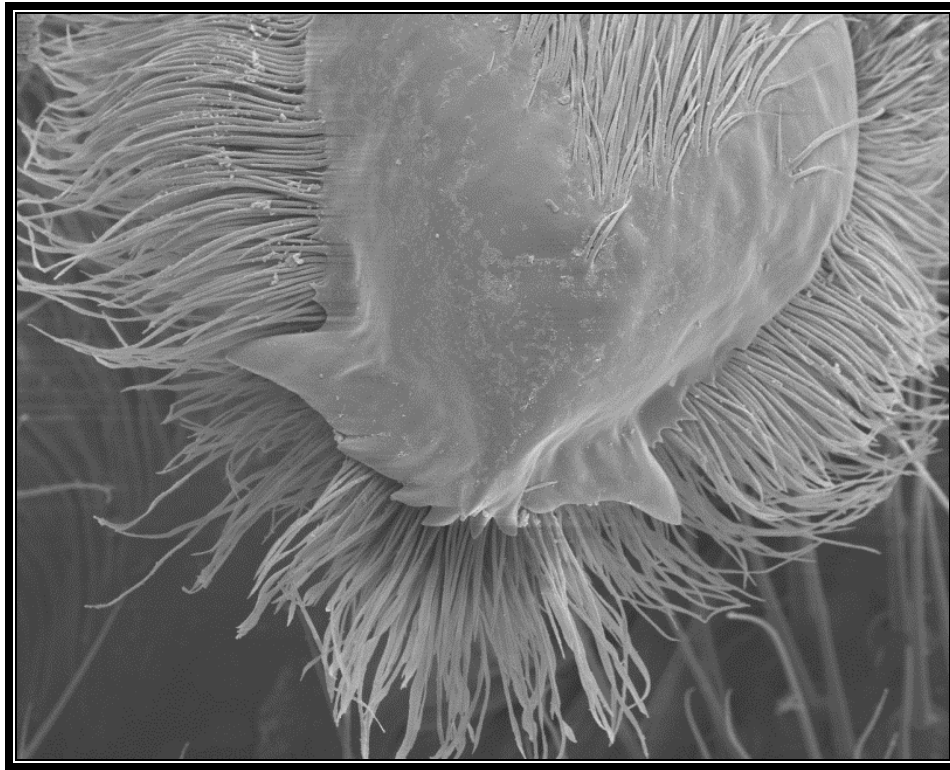


Figure 2. SEM of the epiproct of *Alloperla delicata*, Nevada Co., California, Rock Creek, 24 May 2014.

Do Upper Great Lakes National Parks Protect Stoneflies, Mayflies, and Caddisflies Better Than Surrounding Areas?

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Over the past two years we have been sampling streams, lakes, and marshes in six upper Great Lakes national park units: Sleeping Bear Dunes National Lake Shore (Michigan), Indiana Dunes NLS (Indiana), Pictured Rock NLS (Michigan), Isle Royale National Park (Michigan), Voyageurs NP (Minnesota), and St. Croix & Namekagon National Scenic Waterway (Minnesota & Wisconsin). National parks were designed to protect the flora and fauna living within their boundaries and should protect sensitive species at a greater rate than found in the region species pool. The problem is how to define that region species pool. Some have used state checklists as a species pool, but this is too coarse and in some cases a park unit might have very different habitat from that across an entire state. We draw on two sources for regional species pool data: predicted pre-European settlement distributions for 427 Midwestern, USA EPT species and a

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