Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT)

List of Freshwater Macroinvertebrate Taxa from California and Adjacent States including Standard Taxonomic Effort Levels

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1.0 Introduction

The Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT) is charged through its charter to develop standardized levels for the taxonomic identification of aquatic macroinvertebrates in support of bioassessment. This document defines the standard levels of taxonomic effort (STE) for bioassessment data compatible with the Surface Water Ambient Monitoring Program (SWAMP) bioassessment protocols (Ode, 2007) or similar procedures. The STE is based on our current understanding of macroinvertebrate taxonomy, and this document was prepared following the STE Rules (Rogers & Richards, 2006). This list includes aquatic taxa found in streams and lakes primarily in California as well as surrounding states and ecoregions. It must be emphasized that this document is grey literature, and does not supercede any peer-reviewed literature. This document is a compliation and distillation of data gleaned from the peer-reviewed literature, museum records, the input of various taxonomic experts, and the SWAMP database. Specialized references are suggested for some taxa, however this document is not a procedural guideline, but rather a list of defined, reproducible endpoints. For the latest version of the STE document,visit the link on the SAFIT website (http://safit.org/ste.html). Although tolerance values and functional feeding group information was included in earlier versions of the STE, this information has been left out of the 2006 and present versions but are available on the SAFIT website (http://safit.org/TVFFG.html).

This STE list should not be interpreted as a comprehensive list of the aquatic macroinvertebrate fauna of the southwestern United States, although such a list is being developed by SAFIT. This STE list includes the macroinvertebrate taxa encountered in bioassessment samples as of the date of this revision, together with literature records from published taxonomic literature. The higher level taxa in this list (Phylum through Order) are organized hierarchically to reflect phylogenetic relationships, while Family through Species are listed alphabetically. The higher taxonomy of the Arthropoda is currently a subject of debate. Therefore, for this version of the STE List we have maintained a more traditional presentation of the superordinal tiers of the Arthropoda.

This information will be integrated into the SWAMP database and the California Environmental Data Exchange Network (CEDEN). Any suggestions for modifications of this list should comply with the STE Rules, and be sent to the attention of Austin Brady Richards, CDFG Aquatic Bioassessment Laboratory (arichards@csuchico.edu) or D. Christopher Rogers, Kansas Biological Survey (branchiopod@gmail.com) or any member of SAFIT's Standard Taxonomic Effort committee (see STE Rules, sections 2.2 and 2.6).

For definitions of the terms used in this document, please refer to Appendix II of the Rules document.

1.1 Acknowledgments

We want to thank the SAFIT membership for their cooperation and their role with SSCWRP in formalizing SAFIT. We gratefully acknowledge SWAMP for support and funding in this endeavor. Larry Serpa, Doug Post and Jon Lee each provided detailed reviews of the master source file and STE. Joseph Furnish provided comments on the Mollusca. We especially would like to thank the following persons for reviewing sections of the STE list from the 2006 version: Allison Brigham (Lepidoptera), Eric Chapman (Haliplidae), Doug Post (Dytiscidae), John Sandberg (Plecoptera), Joe Slusark (Ephemeroptera), Cheryl B. Barr (Byrrhoidea), William D. Shepard (Byrrhoidea), John T. Polhemus (Hemiptera), David E. Ruiter (Trichoptera), Andrew Rehn (Odonata), Rosser W. Garrison (Odonata), Norman Penny (Megaloptera and Neuroptera), Brian J. Krestian (Chironomidae); Raphael Mazor, Jonathan Lee, Tom King, Robert W. Wisseman, Dave Herbst and Michael Bogan of SNARL, and Peter Ode each provided detailed general reviews. We would like to thank Chris Rosamond, John Epler, Martin Spies and Peter S. Cranston for their input on the California and Nevada chironomid fauna. We would also like to thank Teresa Richards for her assistance with the formatting of this document.

2.0 Standard Taxonomic Effort

The goal of this document is to standardize levels of taxonomic effort among labs conducting the SWAMP bioassessment protocols or similar protocols. For benthic macroinvertebrate (BMI) datasets to be compatible, taxa need to be identified to a common, reproducible level, thus SAFIT defines levels of taxonomic resolution for all labs performing the SWAMP; i.e. the standard taxonomic effort or STE).

2.1 Rules for Developing a Standard Taxonomic Effort

Earlier versions of this document were developed by the predecesor of SAFIT, the California Aquatic Macroinvertebrate Laboratory Network (CAMLnet). During the recent reorganization of CAMLnet into SAFIT, SAFIT membership identified a need to formalize the rules for standardizing the reporting of taxonomic data used in bioassessment. This discussion led to the drafting of the first version of a rules document to accompany the STE (Rogers and Richards, 2006, herein after referred to as the STE Rules). This document defines SAFIT's rules for the validity of taxonomic names and provisional taxa, their use and reporting format in bioassessment datasets. The STE Rules document also outlines the procedures and criteria for subsequent revisions of the STE list with the proposed formation of an oversight committee for the STE.

2.2 Changes from the Previous Version

This STE is revised from the 2006 version (Richards and Rogers, 2006). Since 2006, we have added newly described taxa, made necessary changes in nomenclature including synonyms, we've deleted erroneous distribution records, and added new distribution records as well as new and additional taxonomic literature pertaining to the SAFIT region. The most visible change from the previous version is the addition of Utah to the list. The list of taxa and distribution records for Utah is still incomplete and will be a focus of the next revision of the STE. Also new for the list is the addition of authorities for all taxonomic names in the list, not just species. This ties each name to the peer-reviewed literature. Excluded taxa (as listed in the STE Rules section 3.4.3) have been added to the list with specific notes that they are excluded. Although all users of this STE and the STE Rules are ultimately responsible for their own data, we have tried to make this list easier to use and the information easier to find.

2.3 The SAFIT Standard Taxonomic List

A practical level of standard effort is determined by cost-effectiveness of identification relative to effort. Obviously, cost-effectiveness is highly dependent on taxonomic skills, but it is also determined by the availability of accurate keys and peer reviewed literature, and the degree of special methodology (e.g., slide mounting) needed to identify taxa.

Some bioassessment programs use the availability of species keys to establish standard levels of effort, and for some taxonomic groups we do provide references to species keys where they exist and if they meet the requirements of the STE Rules. However, under the SWAMP, the objective is to identify all taxa to a relatively even level of taxonomic effort. At the time of the previous revision of this list, two levels of standard effort were defined. Level I roughly corresponds to genus level identifications for all groups (where possible) except for the Chironomidae which are taken only to family and monotypic taxa which may be taken to species. Level II roughly corresponds to species level identifications for most taxonomic groups and genus/species group level identification for the Chironomidae. Taxonomic levels of effort (and exceptions) are listed for each taxonomic group.

3.0 Methods and Materials

We prepared a list of the benthic macroinvertebrates relevant to the SWAMP bioassessment protocols or similar procedures. All data was compiled based upon the standards presented in the Rules document. All accessible pertinent peer-reviewed literature was reviewed for relevant taxa and distributional records.

This document is grey literature, and does not supercede any peer-reviewed literature. It is a compliation and distillation of the peer-reviewed literature, museum records, the input of various taxonomic experts, and the ABL database, as follows the standards in the Rules document.

3.1 Habitat Information

The primary focus of this list is benthic macroinvertebrates. A few non-benthic taxa have been included and are marked as such. In future versions of this list, it is hoped that guidance on the taxonomy of all aquatic and semiaquatic invertebrates can be included. Basic habitat association (lotic, lentic and estuarine) has been included for the various taxa. This section is still under construction and will be further developed in subsequent revisions.

3.2 Geographic Scope

The STE began as a guidance document for California only. As the California Aquatic Macroinvertebrate Laboratory Network (CAMLNet) evolved into SAFIT, the area of coverage increased to include the Southwest in general. The STE has been expanded to include California and adjacent states. Washington was also included since many aquatic invertebrates have distributions ranging from California to Washington in the Cascade and Coastal Ranges. Some information has been given for distributions in Baja California as well. Utah is included in this revision of the STE and work is underway to add the western sections of Colorado and New Mexico. It is hoped that future revisions of this list will flesh out these distributions and add other sections of the southwest. All distribution information has been gathered from the peer-reviewed literature, museum records and the ABL database. Thus, this list is not meant to be a checklist for any of the groups therein, but simply a summary of available distributional information. Future revisions of the STE may include distributional updates based on bioassessment surveys and should not be taken as peer-reviewed published data by itself. This document is grey literature. We also stress that identifications should not be based solely on distribution.

3.3 Abbreviations in the STE list

CA=California, OR=Oregon, WA=Washington, NV=Nevada, AZ=Arizona, UT=Utah, Baja=Baja California (at present this term doesn't distinguish between Baja California Norte and Baja California Sur); "X"=published distributional or habitat records, "?" unpublished, but known distributional or habitat records, including those validated by taxonomic experts.

3.4 Life Stage Terminology

The information in the STE list primarily deals with those life stages of invertebrates that are aquatic. Some additional information is given for the terrestrial life stages. The term "larva" (plural: larvae) has historically been applied only to the immature, pre-pupal stage of holometabolous insects. However, in recent years, the term larva has also been applied to the immature or "nymph" stage of hemimetabolous insects. Both terms may appear in this document, although the compilers of this present edition prefer to reserve the name nymph for the immatures of hemimetabolous insect orders (Ephemeroptera, Odonata, Plecoptera, Hemiptera) and use the name larva in association with the holometabolous orders (Megaloptera, Trichoptera, Lepidoptera, Coleoptera, Diptera).

4.0 Rare, Threatened and Endangered Species

Rare, threatened and endangered species are defined to include aquatic macroinvertebrate species listed as threatened or endangered under the federal Endangered Species Act (ESA) (50 CFR 17.11 for listed animals and various Federal Register notices for proposed species), the California Endangered Species Act (CESA), and the California Environmental Quality Act (CEQA). This does not cover aquatic macroinvertebrate species listed under state law in adjacent states. Rare, threatened and endangered species are afforded various levels of protection under the aforementioned laws. Any individual, private company or agency that violates these laws may be subject to substantial fines, imprisonment, or both. Inclusion of names of rare, threatened and endangered aquatic macroinvertebrates in this document and the STE list is meant to be strictly informative and in no way authorizes collecting or harming these taxa without proper permits.

Rare species are species that may be given some protection under CEQA depending upon the action being reviewed under a specific CEQA document. These species typically are not protected, however they may at any time become listed under CESA or ESA.

Threatened species are species that are partially protected under CESA and ESA. While it is illegal to collect, harm, harass, or kill threatened species, some activities may still be legal (varying depending on the species) without the requirement of permits.

Endangered species are fully protected under CESA, CEQA and ESA. It is illegal to collect, harm, harass, or kill endangered species without the appropriate state Memorandum of Understanding and/or federal 10(A) 1(a) permits.

5.0 Literature Cited

Aquatic Bioassessment Laboratory. 2003. CAMLnet list of Californian macroinvertebrate taxa and standard taxonomic effort. Revision date: 27 January 2003. California Department of Fish and Game.

Richards, A. B., and D. C. Rogers. 2006. Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT) List of Freshwater Macroinvertebrate Taxa from California and Adjacent States including Standard Taxonomic Effort Levels. Version: 28 November 2006. Accessed 14 February 2011 at URL: http://safit.org/ste.html.

Rogers, D. C. and A. B. Richards. 2006. Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT) Rules for Developing a Standard Level of Taxonomic Effort. Version 28 November 2006. Accessed 14 February 2001 at URL: http://safit.org/ste.html.

California Department of Fish and Game (DFG). June 2005. Special Animals. 53 pp.

Ode, P.R. 2007. Standard operating procedures for collecting benthic macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001. 45pp.

APPENDIX I

THE SAFIT STANDARD TAXONOMIC EFFORT LIST

Phylum: Silicea
Standard Effort Level I: Phylum
Standard Effort Level II: Phylum
Standard Taxonomic Reference: Reiswig, Frost and Ricciardi (2010)
Reviewed by:

The freshwater sponges are generally identified using Reiswig, Frost and Ricciardi (2010). They are not typically enumerated as a quantitative part of benthic samples, as they are colonial and sessile. However, their presence in samples should be noted, as most species are indicators of clean, well oxygenated water. Eernisse and Peterson (2004) showed that Porifera is paraphyletic and suggested the use of Silicea to avoid the paraphyly.

Taxonomic Hierarchy	Habitat				Distribution							Literature Cited	Comments
Phylum	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Silicea Gray, 1867	X	X	X	X	X	X	X	X	X	X	X	Reiswig, Frost and Ricciardi (2010); Eernisse and Peterson (2004)	Eernisse and Peterson showed that Porifera was paraphyletic; suggested use of Silicea to avoid the paraphyly.

Literature Cited

Eernisse, D. J., and K. J. Peterson. 2004. The history of animals. Chapter 13. [pp. 197-208]. In: J. Cracraft and M. J. Donoghue (editors), Assembling the Tree of Life. First ed. Oxford University Press, New York, New York, U.S.A.

Reiswig, H. M., T. M. Frost, and A. Ricciardi. 2010. Porifera. [pp. 91-123]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.

Phylum: Cnidaria
Standard Effort Level I: Genus
Standard Effort Level II: Genus
Standard Taxonomic Reference: Slobodkin and Bossert (2010)
Reviewed by:

Cnidarians are generally identified using Slobodkin and Bossert (2010). Fuller et al. (2011) and Mills and Sommer (1995) provide ecological information on *Cordylophora*.

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Cnidaria Hatschek, 1888							X	X	X	X	X	X	X	X	X	X	X	Slobodkin and Bossert (2010)	
	Hydrozoa Owen, 1843						X	X	X	X	X	X	X	X	X	X	X	Slobodkin and Bossert (2010)	
		Hydroida Johnston, 1836					X	X	X		X	X	X	X	X	X	X	Slobodkin and Bossert (2010)	
			Capitata Kühn, 1913				X	X	X		X	X	X	X	X	X	X	Slobodkin and Bossert (2010)	
				Hydridae Dana, 1846			X	X	X		X	X	X	X	X	X	X	Slobodkin and Bossert (2010)	
					Hydra Linnaeus, 1758		X	X	X		X	X	X	X	X	X	X	Slobodkin and Bossert (2010)	
			Anthomedusae Haeckel, 1879				X	X	X	X	X	X	X	X			X	Slobodkin and Bossert (2010)	
				Clavidae McCrady, 1859			X	X	X	X	X	X	X	X			X	Slobodkin and Bossert (2010)	
					Cordylophora Allman, 1844		X	X	X	X	X	X	X	X			X	Fuller et al. (2011); Mills and Sommer (1995); Ruiz et al. (1999)	Non-native invasive species, in brackish and coastal freshwaters, but spreading inland

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Limnomedusae Kramp, 1938				X	X	X		X	X	X		X	X	X	Slobodkin and Bossert (2010)	
				Olindiasidae Haeckel, 1879			X	X	X		X	X	X		X	X	X	Slobodkin and Bossert (2010)	
					Craspedacusta Lankester, 1880		X	X	X		X	X	X		X	X	X	Slobodkin and Bossert (2010)	
						Craspedacusta sowerbyi Lankester, 1880	X	X	X		X	X	X		X	X	X	Slobodkin and Bossert (2010)	

Literature Cited

Mills, C. E., and F. Sommer. 1995. Invertebrate introductions in marine habitats: two species of hydromedusae (Cnidaria) native to the Black Sea, *Maeotias inexspectata* and *Blackfordia virginica*, invade San Francisco Bay. Marine Biology **122**:279-288.

Ruiz, G. M., P. Fofonoff, and A. H. Hines. 1999. Non-indigenous species as stressors in estuarine and marine communities: assessing invasion impacts and interactions. Journal of Limnology and Oceanography **44**(3, part 2):950-972.

Slobodkin, L. B., and P. E. Bossert. 2010. Cnidaria. [pp. 125-142]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.

Additional Sources of Information on Cnidaria

Fuller, P., E. Maynard, & D. Raikow. 2011. *Cordylophora caspia*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL. Revision Date: 8/15/2009. Accessed 14 February 2011 at URL: http://nas.er.usgs.gov/queries/FactSheet.asp?SpeciesID=1060

Phylum: Platyhelminthes
Standard Effort Level I: Class
Standard Effort Level II: Class
Standard Taxonomic Reference: Kolasa and Tyler (2010)
Reviewed by:

Platyhelminthes are identified only to class level using Kolasa and Tyler (2010). Most characters for separating taxa are internal, and there is some confusion regarding the identity of many taxa. Many turbellarians cannot be accurately placed to order even by experts (Dr. John Holleman, personal communication).

Taxonomic Hierarchy		Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Platyhelminthes Gegenbauer, 1859		X	X	X	X	X	X	X	X	X	X	X	Kolasa and Tyler (2010)	
	Turbellaria Ehrenberg, 1821	X	X	X	X	X	X	X	X	X	X	X	Kolasa and Tyler (2010)	

Literature Cited

Kolasa, J., and S. Tyler. 2010. Turbellarians and Nemertea. [pp. 143-161]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.

Phylum: Nemertea
Standard Effort Level I: Genus
Standard Effort Level II: Genus
Standard Taxonomic Reference: Kolasa and Tyler (2010)
Reviewed by:

Freshwater nemerteans are monogeneric, and are identified using Kolasa and Tyler (2010).

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Order	Family	Genus	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Nemertea Schultze, 1851					X	X	X		X	X	X	X	X	X	X	Kolasa and Tyler (2010)	
	Enopla Schultze, 1851				X	X	X		X	X	X	X	X	X	X	Kolasa and Tyler (2010)	
		Hoplonemertea Hubrecht, 1879			X	X	X		X	X	X	X	X	X	X	Kolasa and Tyler (2010)	
			Tetrastemmatidae Hubrecht, 1879		X	X	X		X	X	X	X	X	X	X	Kolasa and Tyler (2010)	
				Prostoma Duges, 1828	X	X	X		X	X	X	X	X	X	X	Kolasa and Tyler (2010)	

Literature Cited

Kolasa, J., and S. Tyler. 2010. Turbellarians and Nemertea. [pp. 143-161]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.

Phylum: Nemata
Standard Effort Level I: excluded from benthic datasets
Standard Effort Level II: excluded from benthic datasets
Standard Taxonomic Reference: Poinar (2010)
Reviewed by:

Nematoda is now considered to be a junior synonym of Nemata Cobb, 1919 (Brusca and Brusca, 2003). Nematodes are typically left at phylum. The vast majority of freshwater nematodes are not large enough to be considered "macroinvertebrates". Typically, the only "macro" nematodes encountered in benthic samples are in the family Mermithidae, which are parasitic on dipterans and ephemeropterans. As they are parasites, they are of little ecological importance. (See STE Rules section 3.4.3)

Taxonomic Hierarchy	Habitat				Distribution							Literature Cited	Comments
Phylum	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Nemata Cobb, 1919	X	X	X	X	X	X	X	X	X	X	X	Poinar (2010)	Fresh and brackish; excluded from benthic datasets

Literature Cited

Brusca, R.C. and G.J. Brusca. 2003. Invertebrates, 2nd ed. Sinauer Associates, Sunderland, MA. 936 pp.

Poinar, G. O., Jr. 2010. Nematoda and Nematomorpha. [pp. 237-276]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.

Phylum: Nematomorpha
Standard Effort Level I: excluded from benthic datasets
Standard Effort Level II: excluded from benthic datasets
Standard Taxonomic Reference: Poinar (2010)
Reviewed by:

Nematomorphans are typically excluded from SWAMP bioassessment datasets. As they are parasites of terrestrial insects, and do not feed as free living adults, they are of little ecological importance (See STE Rules Section 3.4.3).

Taxonomic Hierarchy	Habitat				Distribution							Literature Cited	Comments
Phylum	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Nematomorpha Vejdovsky, 1886	X	X	X		X	X	X	X	X	X	X	Poinar (2010)	Excluded from benthic datasets

Literature Cited

Poinar, G. O., Jr. 2010. Nematoda and Nematomorpha. [pp. 237-276]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.

Phylum: Entoprocta
Standard Effort Level I: Genus
Standard Effort Level II: Genus
Standard Taxonomic Reference: Wood (2010)
Reviewed by:

Entoprocta are generally identified using Wood (2010). Entoprocts are not typically enumerated as a quantitative part of benthic samples, as they are colonial and sessile. However, their presence in samples should be noted, as they are non-native invasive species in the western US (Eng, 1977), and are tolerant to a variety of organic pollutants, low oxygen, and high TDS (Wood, 2010).

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Phylum	Order	Family	Subfamily	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Entoprocta Nitsche, 1870						X	X	X		X				X			Wood (2010)	
	Urnatellida Annandale, 1915					X	X	X		X				X			Eng (1977)	
		Urnatellidae Annandale, 1915				X	X	X		X				X			Eng (1977)	
				Urnatella Leidy, 1851		X	X	X		X				X			Eng (1977)	
					Urnatella gracilis Leidy, 1851	X	X	X		X				X			Eng (1977)	

Literature Cited

Eng, L.L. 1977. The freshwater entoproct *Urnatella gracilis* Leidy, in the Delta-Mendota Canal, California. Wasmann Journal of Biology **39**:56-62

Wood, T. S. 2010. Bryozoans. [pp. 437-454]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.
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Phylum: Ectoprocta
Standard Effort Level I: Class
Standard Effort Level II: Class
Standard Taxonomic Reference: Wood (2010)
Reviewed by:

Ectoprocta (formerly Bryozoa) are generally identified using Wood (2010). Ectoprocts are not typically enumerated as a quantitative part of benthic samples, as they are colonial and most taxa are sessile. However, their presence in samples should be noted, as they are indicators of clean, well oxygenated water.

Taxonomic Hierarchy		Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Ectoprocta Nitsche, 1869		X	X	X	X	X	X	X	X	X	X	X	Wood (2010)	
	Phylactolaemata Allman, 1856	X	X	X	X	X	X	X	X	X	X	X	Wood (2010)	

Literature Cited

Wood, T. S. 2010. Bryozoans. [pp. 437-454]. In: J. H. Thorp and A. P. Covich (editors), Ecology and classification of North American freshwater invertebrates, third edition, xiv + 1021 pp. Academic Press, San Diego, CA.

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Phylum: Mollusca
Standard Effort Level I: Genus
Standard Effort Level II: Genus/ Species
Standard Taxonomic Reference: Dillon (2006), Burch (1972), Nedeau et al. (2006)
Reviewed by:

The freshwater mollusks of western North America have a long and convoluted taxonomic history, with much confusion in the literature. Snails should be identified using Perez et al. (2004) and Dillon (2006). Since the 1980s most workers have followed Burch's (1982, and various iterations thereafter) book on freshwater gastropods, wherein he made many taxonomic changes. However, Burch's work was not peer reviewed, nor published in the peer reviewed literature. For that reason, we follow Hubendick (1951) for the genus *Lymnaea*, Clarke (1981) for *Valvata*, Henderson (1929) for *Juga*, and Baker (1945) for the Planorbidae and Wethington (2004) for the Physidae.

For the bivalves, the Burch (1972) keys remain the best available for the sphaericean clams. Freshwater mussels west of the continental divide are separated using Nedeau et al. (2006).

The freshwater snails, clams and mussels are ecologically significant, and their taxonomic relationships are poorly understood. Immature animals are not identifiable due to the tremendous amount of convergence in juvenile forms, and many groups cannot be identified beyond genus level without dissection. Non-native invasive species, particularly the asian clam, *Corbicula*, and the New Zealand Mudsnail, *Potamopyrgus* are ecological threats. Montana State University provides a webpage with useful information on the taxonomy and ecology of *Potamopyrgus*.

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Mollusca Linnaeus, 1758							X	X	X		X	X	X	X	X	X	X	Burch (1975); Nedeau et al. (2006)	
	Bivalvia Linnaeus, 1758						X	X	X		X	X	X	X	X	X	X	Burch (1975);	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		Nedeau et al. (2006)	
		Palaeoheterodonta Newell, 1965					X	X	X		X	X	X	X	X	X	X	Burch (1975); Nedeau et al. (2006)	
			Unionoida Stoliczka, 1871				X	X	X		X	X	X	X	X	X	X	Burch (1975); Nedeau et al. (2006)	
				Unionidae Fleming, 1828			X	X	X		X	X	X	X	X	X	X	Burch (1975); Nedeau et al. (2006)	
					Anodonta Lamarck, 1799		X	X			X	X	X	X	X	X	X	Burch (1975); Nedeau et al. (2006)	
					Gonidea Conrad, 1857		X	X			X	X	X		X			Burch (1975); Nedeau et al. (2006)	
						Gonidea angulata (Lea, 1838)	X	X			X	X	X		X			Burch (1975); Nedeau et al. (2006)	
				Margaritiferidae Haas, 1940			X	X			X	X	X	X	X	X		Burch (1975); Nedeau et al. (2006)	
					Margaritifera Schumacher, 1817		X	X			X	X	X	X	X	X		Burch (1975); Nedeau et al. (2006)	
						Margaritifera falcata (Gould, 1850)	X	X			X	X	X	X	X	X		Burch (1975); Nedeau et	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		al. (2006)	
		Heterodonta Neumayr, 1884					X	X			X	X	X	X	X	X	X		
			Veneroida Adams and Adams, 1856				X	X			X	X	X	X	X	X	X		
				Corbiculidae Gray, 1847			X	X			X	X	X	X	X	X	X		
					Corbicula Megerle von Mühlfeld, 1811		X	X			X	X	X	X	X	X	X	Hanna (1966)	Non-native invasive species
				Sphaeriidae Deshayes, 1854			X	X	X		X	X	X	X	X	X	X	Burch (1972)	
					Musculium Link, 1807		X	X	X		X	X	X	X	X	X		Burch (1972)	
						Musulium lacustre (Müller, 1774)	X	X	X		X	X	X					Burch (1972)	
						Musulium partumeium (Say, 1822)	X	X	X		X	X	X	X	X	X		Burch (1972)	
						Musulium secuirs Prime, 1851	X	X	X		X	X	X					Burch (1972)	
					Pisidium Pfeiffer, 1821		X	X	X		X	X	X	X	X	X	X	Burch (1972)	
						Pisidium casertanum (Poli, 1795)	X	X	X		X	X	X	X	X	X	X	Burch (1972)	
						Pisidium compressum Prime, 1852	X	X	X		X	X	X	X	X	X	X	Burch (1972)	
						Pisidium conventus Clessin, 1877	X	X	X				X					Burch (1972)	
						Pisidium ferrugineum Prime, 1852	X	X	X				X	X				Burch (1972)	
						Pisidium idahoense Roper, 1890	X	X	X		X		X					Burch (1972)	
						Pisidium insigne Gabb, 1868	X	X	X				X	X				Burch (1972)	
						Pisidium lilljeborgi Clessin, 1886	X	X	X		X	X	X	X				Burch (1972)	
						Pisidium nitidum Jenyns, 1832	X	X	X		X	X	X	X	X	X		Burch (1972)	
						Pisidium rotundatum Prime, 1851	X	X	X				X	X				Burch (1972)	
						Pisidium subtruncatum Malam, 1855	X	X	X		X	X	X	X				Burch (1972)	
						Pisidium ultramontanum Prime, 1865	X	X	X			X	X					Burch (1972)	
						Pisidium variabile Prime, 1852	X	X	X		X	X	X	X	X	X		Burch (1972)	
						Pisidium ventricosum Prime, 1851	X	X	X				X	X				Burch (1972)	
						Pisidium walkeri Sterki, 1895	X	X	X					X		X		Burch (1972)	
					Sphaerium Scopoli, 1777		X	X	X		X	X	X	X	X	X	X	Burch (1972)	
						Sphaerium nitidum Clessin, 1876	X	X	X				X	X				Burch (1972)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Sphaerium occidentale (Gould, 1850)	X	X	X			X	X	X				Burch (1972)	
						Sphaerium patella (Gould, 1850)	X	X	X		X	X	X					Burch (1972)	
						Sphaerium striatum (Lamarck, 1818)	X	X	X		X	X	X	X	X	X	X	Burch (1972)	
	Gastropoda Cuvier, 1797						X	X	X		X	X	X	X	X	X			
		Prosobranchia Milne-Edwards, 1848					X	X	X		X	X	X	X					
			Architaenioglossa Haller, 1892				X	X	X		X	X	X	X					
				Viviparidae Gray, 1847			X	X	X		X	X	X	X					
					Bellamya Jousseaume, 1886		X	X	X		X	X	X	X					
						Bellamya chinensis (Gray, 1817)	X	X	X		X	X	X	X	X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
						Bellamya japonica (von Martens, 1861)	X	X	X		X	X	X		X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
				Ampullariidae Gray, 1824			X	X	X		X				X	X			
					Marisa Gray, 1824		X	X	X		X				X	X			
						Marisa cornuarietis (Linnaeus, 1758)	X	X	X		X				X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
					Pomacea Perry, 1810		X	X	X		X				X	X			
						Pomacea bridgesii (Reeve, 1856)	X	X	X		X				X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
						Pomacea canaliculata (Lamarck, 1828)	X	X	X		X				X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
						Pomacea paludosa (Say, 1829)	X	X	X		X				X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
			Neotaenioglossa Ponder and Lindberg, 1997				X	X	X		X			X	X	X			
				Thiaridae Gill, 1871			X	X	X		X			X	X	X			
					Melanoides Olivier, 1904		X	X	X		X			X	X	X			

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Melanoides tuberculatus (Müller, 1774)	X	X	X		X			X	X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
					Tarebia Adams and Adams, 1854		X	X	X		X			X		X			
						Tarebia granifera (Lamarck, 1822)	X	X	X		X			X		X		Perez et al. (2004)	Non-native invasive species
			Sorbeoconcha Ponder and Lindberg, 1997				X	X			X	X	X						
				Pleuroceridae Fischer, 1885			X	X			X	X	X						
					Juga Adams and Adams, 1854		X	X			X	X	X						
						Juga acutifilosa (Stearns, 1890)	X	X			X	X	X					Perez et al. (2004); Dillon (2006)	
						Juga bulbosa (Gould, 1847)	X	X			X	X						Perez et al. (2004); Dillon (2006)	
						Juga hemphilli (Henderson, 1935)	X	X				X	X					Perez et al. (2004); Dillon (2006)	formerly listed as *Goniobasis hemphilli* Henderson, 1935
						Juga interioris (Goodrich, 1944)	X	X							X				
						Juga laurae (Goodrich, 1944)	X	X							X				
						Juga nigrina (Lea, 1856)	X	X			X	X						Perez et al. (2004); Dillon (2006)	
						Juga plicifera (Lea, 1838)	X	X			X	X	X					Perez et al. (2004); Dillon (2006)	
						Juga silicula (Gould, 1847)	X	X			X	X	X					Perez et al. (2004); Dillon (2006)	
			Hypsogastropoda Ponder & Lindberg, 1997				X	X	X	X	X	X	X	X	X	X			
				Amnicolidae Tryon, 1863			X	X			X	X	X	X	X				
					Amnicola Gould and Haldeman, 1840		X	X			X	X	X	X	X				

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Amnicola limosa (Say, 1817)	X	X			X	X	X	X	X			Perez et al. (2004)	
					Colligyrus Hershler, 1999		X	X			X	X							
						Colligyrus convexus Hershler, Frest, Liu and Johannes, 2003	X	X			X								
						Colligyrus greggi (Pilsbry, 1935)	X	X				X						Perez et al. (2004); Dillon (2006)	
				Cochliopidae Tryon, 1866			X	X	X	X	X			X	X	X			
					Eremopyrgus Hershler, 1999		X	X							X				
						Eremopyrgus eganensis Hershler, 1999	X	X							X			Perez et al. (2004)	
					Ipnobius Hershler, 2001		X	X			X								
						Ipnobius robustus (Hershler, 1989)	X	X			X							Perez et al. (2004)	
					Tryonia Stimpson, 1865		X	X	X	X	X			X	X	X		Perez et al. (2004)	
				Hydrobiidae Simpson, 1865			X	X			X	X	X	X	X	X			
					Pyrgulopsis Call and Pilsbry, 1886		X	X			X	X	X	X	X	X		Perez et al. (2004); Dillon (2006)	
				Lithoglyphidae Tryon, 1863			X	X			X	X	X	X	X				
					Fluminicola Stimpson, 1865		X	X			X	X	X	X	X			Perez et al. (2004); Dillon (2006)	
				Hypsogastropoda *Incertae sedis*			X	X			X	X	X		X	X			family associations for these genera not yet determined
					Potamopyrgus Stimpson, 1856		X	X			X			X		X			
						Potamopyrgus antipodarum (Gray, 1843)	X	X			X			X		X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
					Pristinicola Hershler, Frest, Johannes, Bowler and Thompson, 1994		X	X			X	X	X						

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Pristinicola hemphilli (Pilsbry, 1890)	X	X			X	X	X					Perez et al. (2004); Dillon (2006)	
				Assimineidae Adams and Adams, 1856			X			X	X								
					Assiminea Fleming, 1828		X			X	X								
						Assiminea californica (Tryon, 1875)	X			X	X							Perez et al. (2004)	
						Assiminea infima Berry, 1947	X			X	X							Perez et al. (2004)	
				Pomatiopsidae Stimpson, 1865			X			X	X	X	X						
					Pomatiopsis Tryon, 1862		X			X	X	X	X					Perez et al. (2004)	
			Heterostropha Fischer, 1885				X	X	X		X	X	X						
				Valvatidae Gray, 1840			X	X	X		X	X	X						
					Valvata Müller, 1774		X	X	X		X	X	X						
						Valvata humeralis Say, 1829	X	X	X		X	X	X					Perez et al. (2004); Dillon (2006)	
						Valvata tricarinata (Say, 1817)	X	X	X		X	X	X					Perez et al. (2004); Dillon (2006)	
						Valvata utahensis Call, 1844	X	X	X		X	X	X	X				Perez et al. (2004); Dillon (2006)	
						Valvata virens Tryon, 1863	X	X	X		X							Perez et al. (2004); Dillon (2006)	
		Pulmonata Cuvier in Blainville, 1814					X	X	X		X	X	X	X	X	X	X		
			Basommatophora Keferstein in Bronn, 1864				X	X	X		X	X	X	X	X	X	X		
				Lymnaeidae Rafinesque, 1815			X	X	X		X	X	X	X	X	X	X		
					Fisherola Hannibal, 1912		X	X	X			X	X						
						Fisherola nuttalli (Haldeman, 1841)	X	X	X			X	X					Perez et al. (2004); Dillon (2006)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Lanx Clessin, 1882		X	X	X		X	X	X					Henderson (1929)	
						Lanx alta (Tryon, 1869)	X	X	X		X	X						Henderson (1929)	
						Lanx hannai Walker, 1925	X	X	X		X							Henderson (1929)	Found in NW CA outside of Central Valley
						Lanx klamathensis Hannibal, 1912	X	X	X			X						Henderson (1929)	
						Lanx nuttallii (Haldeman, 1841)	X	X	X				X					Henderson (1929)	
						Lanx patelloides (Lea, 1856)	X	X	X		X	X						Perez et al. (2004); Dillon (2006)	
						Lanx subrotundatus (Tryon, 1869)	X	X	X			X						Perez et al. (2004); Dillon (2006); Henderson (1929)	
					Lymnaea Lamarck, 1799		X	X	X		X	X	X	X	X	X	X	Perez et al. (2004); Dillon (2006)	
				Physidae Fitzinger, 1833			X	X	X		X	X	X	X	X	X	X		
					Aplexa Fleming, 1820		X		X				X	X					
						Aplexa elongata (Say, 1821)	X		X				X	X				Wethington (2004); Dillon (2006)	
					Physa Draparnaud, 1801		X	X	X		X	X	X	X	X	X	X		
						Physa acuta Draparnaud, 1805	X	X	X		X	X	X	X	X	X	X	Wethington (2004); Dillon (2006)	
						Physa gyrina Say 1821	X	X	X		X	X	X	X	X	X	X	Wethington (2004); Dillon (2006)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Physa pomilia (Conrad, 1834)	X	X	X		X	X	X		X	X	X	Wethington (2004); Dillon (2006)	
						Physa zionis Pilsbry, 1926	X	X						X				Wethington (2004); Dillon (2006)	
				Ellobiidae Pfeiffer, 1854			X	X	X		X	X	X						
					Ovatella Bivona, 1832		X	X	X		X	X	X						
						Ovatella myosotis (Draparnaud, 1801)	X	X	X		X	X	X					Hanna (1966)	Non-native invasive species
				Planorbidae Rafinesque, 1815			X	X	X		X	X	X	X	X	X	X		
					Biomphalaria Preston, 1910		X	X	X							X			
						Biompholaria havanensis (Pfieffer, 1839)	X	X	X							X		Perez et al. (2004); Dillon (2006)	
					Ferrissia Walker, 1903		X	X	X		X	X		X	X			Perez et al. (2004); Dillon (2006)	Ancylidae synonymized into Planorbidae (Albrecht et al, 2006)
					Gyraulus Charpentier, 1837		X	X	X		X	X	X	X	X	X			
						Gyraulus circumstriatus (Tryon, 1866)	X	X	X		X	X	X	X	X	X		Perez et al. (2004); Dillon (2006)	
						Gyraulus crista (Linnaeus, 1758)	X	X	X		X	X	X	X	X			Perez et al. (2004); Dillon (2006)	
						Gyraulus deflectus (Say, 1824)	X	X	X		X	X	X	X	X	X		Perez et al. (2004); Dillon (2006)	
						Gyraulus parvus (Say, 1817)	X	X	X		X	X	X	X				Perez et al. (2004); Dillon (2006)	
					Helisoma Swainson, 1840		X	X	X		X	X	X	X	X	X	X		

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Helisoma anceps (Menke, 1830)	X	X	X		X	X	X	X	X	X	X	Perez et al. (2004); Dillon (2006)	
						Helisoma newberryi (Lea, 1858)	X	X	X		X	X	X					Perez et al. (2004); Dillon (2006)	
						Helisoma subcrenatum (Carpenter, 1857)	X	X	X		X	X		X				Perez et al. (2004); Dillon (2006)	Non-native invasive species
					Menetus Adams and Adams, 1855		X	X	X		X	X	X						
						Menetus opercularis (Gould, 1847)	X	X	X		X	X	X					Perez et al. (2004); Dillon (2006)	
					Micromenetus Baker, 1945		X	X	X										
						Micromenetus dilatatus (Gould, 1841)	X	X	X		X	X	X					Perez et al. (2004); Dillon (2006)	
					Promenetus Baker, 1935		X	X	X					X					
						Promenetus exacuous (Say, 1821)	X	X	X			X	X	X				Perez et al. (2004); Dillon (2006)	
						Promenetus umbilicatellus (Cockerell, 1887)	X	X	X			X	X	X				Perez et al. (2004); Dillon (2006)	
					Vorticifex Meek in Dall, 1870		X	X	X										
						Vorticifex effusa (Lea, 1856)	X	X	X		X	X						Perez et al. (2004); Dillon (2006)	
						Vorticifex solida (Dall 1870)	X	X	X		X				X			Perez et al. (2004); Dillon (2006)	may be a synonym of *V. effusa* (Lea)

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Phylum: Annelida
Standard Effort Level I: Class
Standard Effort Level II: Oligochaeta and Branchiobdella to class, Hirudinea to genus, Polychaeta to species.
Standard Taxonomic References: Kathman and Brinkhurst (1998), Govedich et al. (2010), Klemm (1972), Foster (1972)
Reviewed by:

Annelids are generally identified using Kathman and Brinkhurst (1998) or Govedich et al. (2010). Hirudinea can be identified using Govedich et al. (2010), Klemm (1972) and Klemm (1995). Polychaetes are best identified using Foster (1972). Branchiobdella are typically excluded from SWAMP bioassessment samples as they are commensals on crayfish (see STE Rules section 3.4.3).

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited	Comments
Phylum	Subphylum	Class	Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Annelida Lamarck, 1809									X	X	X		X	X	X	X	X	X	X		
		Hirudinea Lamarck, 1818							X	X	X		X	X	X	X	X	X	X		
				Arhynchobdellida Blanchard, 1894					X	X	X		X	X	X	X	X	X	X		
						Haemopidae Richardson, 1969/Hirudinidae Whitman, 1886			X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	
						Erpobdellidae Blanchard, 1894			X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	
							Dina Blanchard, 1892						X	X		X					
							Erpobdella de Blainville, 1818						X	X	X	X					
							Mooreobdella Pawlowski, 1955						X								
				Rhynchobdellida Blanchard, 1894					X	X	X		X	X	X	X	X	X	X		
						Glossiphoniidae Vailliant, 1890			X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	
							Helobdella Blanchard, 1896		X	X	X		X	X	X	X	X	X			
							Placobdella Blanchard, 1893		X	X	X						X	X			
						Piscicolidae Johnston, 1865			X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited	Comments
Phylum	Subphylum	Class	Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Branchiobdella Holt, 1965							X	X	X		X	X	X	X	X	X			Excluded from benthic datasets
		Polychaeta Grube, 1850							X	X	X	X	X	X	X				X		
				Canalipalpata Rouse and Fauchald, 1997					X	X	X	X	X	X	X				X		
						Serpulidae Johnston, 1865			X	X	X	X	X						X		
							Ficopomatus Southern, 1921		X	X	X	X	X						X		
								Ficopotamus enigmaticus (Fauvel, 1922)	X	X	X	X	X						X	Foster (1972)	Fresh and brackish
						Sabellidae Malmgren, 1867			X	X	X		X	X	X						
							Manayunkia Leidy, 1859		X	X	X		X	X	X						
								Manayunkia speciosa Leidy, 1858	X	X	X		X	X	X					Foster (1972)	
			Palpata Rouse and Fauchald, 1997						X	X	X	X	X	X	X						
				Aciculata *Rouse and Fauchald, 1997*					X	X	X	X	X	X	X						
					Phylodocida Dales, 1962				X	X	X	X	X	X	X						
						Nereididae Johnston, 1865			X	X	X	X	X	X	X						
							Lycastoides Johnson, 1903		X	X			X								
								Lycastoides alticola Johnston, 1903	X	X			X							Foster (1972)	Only known from a single mountain stream in Sierra Laguna.
							Neanthes Kinberg, 1866		X	X	X		X	X	X						
								Neanthes limnicola (Johnson, 1901)	X	X	X		X	X	X					Foster (1972)	
							Nereis Linnaeus, 1758		X	X	X	X	X	X	X						
								Nereis succinea Frey & Leuckart, 1847	X	X	X	X	X	X	X					Foster (1972)	Fresh and brackish
							Namanereis Chamberlin, 1919		X	X	X		X								
								Namanereis hawaiiensis (Johnson, 1903)	X	X	X		X							Foster (1972)	Native to Hawai'i, found in a pond in southern CA
			Scolecida Benham, 1894						X	X	X		X	X	X						

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited	Comments
Phylum	Subphylum	Class	Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Aeolosomatidae Beddard, 1895			X	X	X		X	X	X						
							Aeolosoma Ehrenberg, 1828		X	X	X		X	X	X						
	Clitellata Michaelsen, 1919								X	X	X	X	X	X	X	X	X	X	X		
		Oligochaeta Grube, 1850							X	X	X	X	X	X	X	X	X	X	X	Kathman and Brinkhurst (1998); Brinkhurst and Gelder (2001)	

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Acari: Mites
Standard Effort Level I&II: Genus (where possible)
Standard Taxonomic Reference: Smith, Cook and Smith (2010)
Reviewed by:

This section remains relatively unchanged since the previous revision of the STE. The standard text is the chapter in Thorp and Covich (Smith et al., 2010), which provides keys to mature and immature specimens. Cook (1974) is an excellent source for detailed illustrations to supplement the newer key. The information in the table below reflects material identified from benthic samples from California streams (primarily by the ABL, SNARL and Jon Lee Consulting), and should not be taken as an authoritative list. An "X" in the distribution column refers to published records, while a "?" refers to known but unpublished records.

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Acari Leach, 1817						X	X	X		X	X	X	X	X	X	X	Smith, Cook and Smith (2010), Cook (1974)	
	Sarcoptiformes Reuter, 1909					X	X	X		X	X	X	X	X	X	X	Smith, Cook and Smith (2010), Cook (1974)	
		Oribatei Dugès, 1833				X	X	X		X	X	X	X	X	X	X	Smith, Cook and Smith (2010), Cook (1974)	Oribatid mites are presently excluded from benthic datasets; this is subject to change in the future as there are some aquatic oribatids
	Trombidiformes Reuter, 1909					X	X	X		X	X	X	X	X	X	X	Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Acalyptonotidae Walter, 1911			X					X						Smith, Cook and Smith (2010), Cook (1974); Smith (1983)	
				Acalyptonotus Walter, 1911		X					X						Smith, Cook and Smith (2010), Cook (1974); Smith (1983)	
			Anisitsiellidae Koenike, 1910			X				X	X	X					Smith, Cook and Smith (2010), Cook (1974)	
				Bandakia Thor, 1913		X					X						Smith, Cook and Smith (2010), Cook (1974); Smith (1979)	
				Utaxatax Habeeb, 1964		X				X	X	X					Smith, Cook and Smith (2010), Cook (1974); Smith (1979)	
			Arrenuridae Thor, 1900			X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Arrenurus Dugés, 1834		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Athienemanniidae Viets, 1922			X				X	X	X	X				Smith, Cook and Smith (2010), Cook (1974); Smith (1992)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Chelomideopsis Romijn, 1920		X				?	X	X					Smith, Cook and Smith (2010), Cook (1974); Smith (1992)	Smith (1992) provides a key to species
				Platyhydracarus Smith, 1989		X				X	X	X	X				Smith, Cook and Smith (2010), Cook (1974); Smith (1989)	
			Aturidae Thor, 1900			X				X					X		Smith, Cook and Smith (2010), Cook (1974)	
				Aturus Kramer 1875		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Axonopsis Piersig, 1893		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Brachypoda Lebert, 1879		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Erebaxonopsis Motas and Tanasachi, 1947		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Estellacarus Habeeb, 1954		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Ljania Thor, 1898		X				?							Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Lethaxona Viets, 1932		X					X						Smith, Cook and Smith (2010), Cook (1974)	
				Phreatobrachypoda Cook, 1963		X				X	X						Smith, Cook and Smith (2010), Cook (1974)	
				Stygalbiella Cook, 1974		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Woolastookia Habeeb, 1954		X				X							Smith, Cook and Smith (2010), Cook (1974)	
			Chappuisididae Motas and Tanasachi, 1946			X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Chappuisides Szalay, 1943		X				X							Smith, Cook and Smith (2010), Cook (1974)	
			Eylaidae Leach, 1815			X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Eylais Latreille, 1796		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Feltriidae Viets, 1926			X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Feltria Koenike, 1892		X				X							Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Frontipodopsidae Viets, 1931			X				X		X					Smith, Cook and Smith (2010), Cook (1974)	
				Frontipodopsis Walter, 1919		X				X		X					Smith, Cook and Smith (2010), Cook (1974)	
			Hydrodromidae Viets, 1936			X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Hydrodroma Koch, 1837		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Hydrovolziidae Thor, 1905			X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Hydrovolzia Thor, 1905		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Hydryphantidae Thor, 1900			X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Cyclothyas Lundblad, 1941		X					X						Smith, Cook and Smith (2010), Cook (1974)	
				Partnunia Piersig, 1896		X				?	X						Smith, Cook and Smith (2010), Cook (1974)	
				Protzia Piersig, 1896		X				?							Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Thyas Koch, 1836		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Thyopsis Piersig, 1899		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Thyopsoides Smith and Cook, 1999		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Wandesia Schechtel, 1912		X				X							Smith, Cook and Smith (2010), Cook (1974)	
			Hygrobatidae Koch, 1842			X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Atractides Koch, 1837		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Corticacarus Lundblad, 1936		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Hygrobates Koch, 1837		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Mesobates Thor, 1901		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Lebertiidae Thor, 1900			X				X							Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Estelloxus Habeeb, 1963		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Lebertia Neuman, 1880		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Scutolebertia Smith, 1991		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Limnesiidae Thor, 1900			X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Kawamuracarus Uchida, 1937		X									X		Smith, Cook and Smith (2010), Cook (1974)	
				Limnesia Koch, 1836		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Neomamersa Lundblad, 1953		X									X		Smith, Cook and Smith (2010), Cook (1974)	
				Neotyrrellia Lundblad, 1938		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Tyrrellia Koenike, 1896		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Limnocharidae Grube, 1859			X				X							Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Limnochares Latreille, 1796		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Neolimnochares Lundblad, 1937		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Mideopsidae Koenike, 1910			X				?	X	X					Smith, Cook and Smith (2010), Cook (1974)	
				Mideopsis Neuman, 1880		X				?	X	X					Smith, Cook and Smith (2010), Cook (1974)	
			Momoniidae Viets, 1926			X				X	X	X					Smith, Cook and Smith (2010), Cook (1974)	
				Momonia Halbert, 1906		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Stygomomonia Szalay, 1943		X				X	X	X					Smith, Cook and Smith (2010), Cook (1974)	
			Omartacaridae Cook, 1963			X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Omartacarus Cook, 1963		X				X							Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Nudomideopsidae Smith, 1990			X					X						Smith, Cook and Smith (2010), Cook (1974), Smith (1983)	
				Neomideopsis Smith, 1983		X					X						Smith, Cook and Smith (2010), Cook (1974); Smith (1983)	
				Nudomideopsis Szalay, 1945		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Paramideopsis Smith, 1983		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Oxidae Viets, 1926			X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Frontipoda Koenike, 1891		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Oxus Kramer, 1877		X				X							Smith, Cook and Smith (2010), Cook (1974)	
			Pionidae Thor, 1900			X				X				X			Smith, Cook and Smith (2010), Cook (1974)	
				Nautarachna Moniez, 1988		X				X				X			Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Pontarachnidae Koenike, 1910			X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Pontarachna Philippi, 1840		X				X							Smith, Cook and Smith (2010), Cook (1974)	
			Sperchontidae Thor, 1900			X				?	X						Smith, Cook and Smith (2010), Cook (1974)	
				Sperchon Kramer, 1877		X				?	X						Smith, Cook and Smith (2010), Cook (1974)	
				Sperchonopsis Piersig, 1896		X				?	X						Smith, Cook and Smith (2010), Cook (1974)	
			Thermacaridae Sokolow, 1927			X				X							Smith, Cook and Smith (2010), Cook (1974)	
					Thermacarus Sokolow, 1927	X				X							Smith, Cook and Smith (2010), Cook (1974)	
			Torrenticolidae Piersig, 1902			X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Neoatractides Lundblad, 1941		X									X		Smith, Cook and Smith (2010), Cook (1974)	
				Pseudotorrenticola Walter, 1906		X				?							Smith, Cook and Smith (2010), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Subclass	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Testudacarus Walter, 1928		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Torrenticola Piersig, 1896		X				?							Smith, Cook and Smith (2010), Cook (1974)	
			Uchidastygacaridae Inamura, 1956			X				X	X						Smith, Cook and Smith (2010), Cook (1974)	
				Uchidastygacarus Inamura, 1956		X					X						Smith, Cook and Smith (2010), Cook (1974)	
				Yachatsia Cook, 1963		X				X	X						Smith, Cook and Smith (2010), Cook (1974)	
			Unionicolidae Oudemans, 1909			X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Koenikea Wolcott, 1900		X				?							Smith, Cook and Smith (2010), Cook (1974)	
				Neumania Lebert, 1879		X				X							Smith, Cook and Smith (2010), Cook (1974)	
				Unionicola Haldeman, 1842		X				?							Smith, Cook and Smith (2010), Cook (1974)	some are parasites of Mollusca

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Additional Sources of Information on Acari

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Subphylum: Crustacea
Standard Effort Level I: Genus
Standard Effort Level II: Genus/Species
Standard Taxonomic Reference: Rogers (2005)
Reviewed by:

The Crustacea are best separated using the keys in Rogers (2005) and literature cited therein. Crustaceans are important in bioassessment. Mysids, amphipods and isopods are sensitive to many pollutants and heavy metals, most crayfish and freshwater crabs are invasive species, and there are several state and federally protected species.

In Napa, Sonoma and Marin counties in California, many streams and rivers are occupied by the California Freshwater Shrimp (*Syncaris pacifica*), which is both a state and federally protected species. In temporary pools and streams in the Agate Desert area in southern Oregon, and California's Great Central Valley and the southern California coastal counties are five federally protected fairy shrimp and one federally protected tadpole shrimp. These animals are protected under the state and federal Endangered Species Acts and the California Environmental Quality Act. Any individual, private company or agency that violates these laws may be subject to substantial fines, imprisonment, or both.

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Crustacea Brünnich, 1772												X		X	X	X	X	X	X	X		
	Branchiopoda Latreille, 1817											X		X	X	X	X	X	X	X		
		Sarsostraca Tasch, 1969												X	X	X	X	X	X	X		
				Anostraca Sars, 1867								X		X	X	X	X	X	X	X	Eriksen and Belk (1999); Rogers (2002)	
					Artemiina Weekers, Murugan, Vanfleteren, Belk, and Dumont (2002)							X		X	X	X	X	X	X	X		
							Artemiidae Growchowski, 1896					X		X	X	X	X	X	X	X		
								Artemia Leach, 1819				X		X	X	X	X	X	X	X		

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Artemia franciscana Kellogg, 1906			X		X	X	X	X	X	X	X	Eriksen and Belk (1999)	Salt lakes
									Artemia monica Verrill, 1869			X		X							Eriksen and Belk (1999)	Reported only from Mono Lake
					Anostracina Weekers, Murugan, Vanfleteren, Belk, and Dumont (2002)							X		X	X	X	X	X	X	X	Eriksen and Belk (1999)	
							Branchinectidae Daday, 1910					X		X	X	X	X	X	X	X	Eriksen and Belk (1999)	
								Branchinecta Verrill, 1869				X		X	X	X	X	X	X	X	Eriksen and Belk (1999)	
									Branchinecta campestris Lynch, 1960			X		X	X	X					Rogers (2006)	Freshwater layers on salt lakes
									Branchinecta coloradensis Packard, 1874			X		X	X	X	X	X	X		Belk and Rogers (2002)	Temporary wetlands
									Branchinecta conservatio Eng, Belk and Eriksen, 1990			X		X							Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands
									Branchinecta cornigera Lynch, 1958			X			X	X						Temporary wetlands
									Branchinecta dissimilis Lynch, 1972			X		X	X						Belk and Rogers (2002)	Temporary wetlands
									Branchinecta gigas Lynch, 1937			X		X	X	X	X	X				Temporary wetlands
									Branchinecta hiberna Rogers and Fugate, 2001			X		X	X						Rogers and Fugate (2001)	Temporary wetlands

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Branchinecta kaibabensis Belk and Fugate, 2000			X		X	X						Belk and Fugate (2000)	Temporary wetlands
									Branchinecta lindahli Packard, 1883			X		X	X	X	X	X	X	X	Eriksen and Belk (1999)	Temporary wetlands
									Branchinecta longiantenna Eng, Belk and Eriksen, 1990			X		X							Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands
									Branchinecta lynchi Eng, Belk and Eriksen, 1990			X		X	X						Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands
									Branchinecta mackini Dexter, 1956			X		X	X	X	X	X		X	Eriksen and Belk (1999)	Temporary wetlands
									Branchinecta mesovallensis Belk and Fugate, 2000			X		X							Eriksen and Belk (1999)	Temporary wetlands
									Branchinecta oriena Belk and Rogers, 2002			X		X				X			Belk and Rogers (2002)	Temporary wetlands
									Branchinecta oterosanvinceti Obregon-Barboza, Maeda-Martinez, Garcia-Velazco, and Dumont 2002			X								?		Temporary wetlands
									Branchinecta packardi Pearse, 1912			X					X		X	X		Temporary wetlands
									Branchinecta paludosa (Muller, 1798)			X					X					Temporary wetlands

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Branchinecta sandiegonensis Fugate, 1993			X		X						X	Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands
							Chirocephalidae Daday, 1910					X		X	X	X	X	X	X			Temporary wetlands
								Eubranchipus Verrill, 1870				X		X	X	X			X			Temporary wetlands
									Eubranchipus bundyi Forbes, 1876			X		X	X	X	X		X		Eriksen and Belk (1999); Hill et al. (1997)	Temporary wetlands
									Eubranchipus oregonus Creaser, 1930			X		X	X						Eriksen and Belk (1999); Hill et al. (1997)	Temporary wetlands
									Eubranchipus serratus Forbes, 1976			X		X	X	X	X	X			Eriksen and Belk (1999); Hill et al. (1997)	Temporary wetlands
								Linderiella Brtek, 1964				X		X								Eriksen and Belk (1999)	Temporary wetlands
									Linderiella occidentalis (Dodds, 1923)			X		X								Eriksen and Belk (1999)	Temporary wetlands
									Linderiella santarosae Thiery and Fugate, 1994			X		X								Eriksen and Belk (1999)	Temporary wetlands
							Streptocephalidae Daday, 1910					X		X	X	X	X	X	X	X		Eriksen and Belk (1999)	Temporary wetlands
								Streptocephalus Baird, 1852				X		X	X	X	X	X	X	X		Eriksen and Belk (1999)	Temporary wetlands

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Streptocephalus dorothae Mackin, 1942			X		X			X		X	X	Eriksen and Belk (1999)	Temporary wetlands
									Streptocephalus mackini Moore, 1966			X							X	X	Eriksen and Belk (1999)	Temporary wetlands
									Streptocephalus sealii Ryder, 1879			X		X	X	X			X		Eriksen and Belk (1999)	Temporary wetlands
									Streptocephalus texanus Packard, 1871			X		X			X	X	X	X	Eriksen and Belk (1999)	Temporary wetlands
									Streptocephalus woottoni Eng, Belk and Eriksen, 1990			X		X							Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands
								Phallocryptus Birabén, 1951					X								Rogers (2003)	Temporary wetlands
									Phallocryptus sublettei (Sissom, 1976)			X					X				Rogers (2003)	Temporary wetlands
							Thamnocephalidae Packard, 1883					X		X				X	X	X		Temporary wetlands
								Thamnocephalus Packard, 1877				X		X				X	X	X		Temporary wetlands
									Thamnocephalus mexicanus Linder, 1941			X							X	X		Temporary wetlands
									Thamnocephalus platyurus Packard, 1877			X		X				X	X	X	Eriksen and Belk (1999)	Temporary wetlands
		Phyllopoda Preuss, 1951										X		X	X	X	X	X	X	X	Rogers (2005)	Temporary wetlands

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Notostraca Sars, 1867								X		X	X	X	X	X	X	X	Rogers (2001)	Temporary wetlands and temporary streams
							Triopsidae Keilhack, 1909					X		X			X	X	X	X	Rogers (2001)	Temporary wetlands and temporary streams
								Lepidurus Leach, 1819				X		X	X	X	X	X	X	X	Rogers (2001)	Temporary wetlands and temporary streams
									Lepidurus bilobatus Packard, 1883			X		X	X			X			Rogers (2001)	Temporary wetlands and temporary streams
									Lepidurus couesii Packard, 1875			X			X	X					Rogers (2001)	Temporary wetlands and temporary streams
									Lepidurus cryptus Rogers, 2001			X		X	X			X			Rogers (2001)	Temporary wetlands and temporary streams
									Lepidurus lemmoni Holmes, 1894			X		X	X	X		X	X	X	Rogers (2001)	Temporary wetlands and temporary streams

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Lepidurus packardi Simon, 1886			X		X							Rogers (2001)	Listed under the Federal Endangered Species Act; temporary wetlands and temporary streams
								Triops Schrank, 1803				X		X	X	X	X	X	X	X	Rogers (2005)	Temporary wetlands
									Triops longicaudatus (LeConte, 1846)			X		X	X	X		X	X	X	Rogers (2005)	Temporary wetlands
				Laevicaudata Linder, 1945								X		X	X	X	X	X	X	X	Martin and Belk (1988)	Temporary wetlands
							Lynceidae Baird, 1845					X		X	X	X	X	X	X	X	Martin and Belk (1988)	Temporary wetlands
								Lynceus Müller, 1776				X		X	X	X	X	X	X	X	Martin and Belk (1988)	Temporary wetlands
									Lynceus brachyurus Müller, 1776			X		X	X	X	X	X	X	X	Martin and Belk (1988)	Temporary wetlands
									Lynceus brevifrons (Packard, 1877)			X							X	X	Martin and Belk (1988)	Temporary wetlands
									Lynceus mucronatus (Packard, 1875)			X				X					Martin and Belk (1988)	Temporary wetlands
				Diplostraca Gerstaecker, 1866								X		X	X	X	X	X	X	X	Rogers (2005)	Temporary wetlands
					Spinicaudata Linder, 1945							X		X	X	X	X	X	X	X	Wootton and Mattox (1958)	Temporary wetlands
							Cyzicidae Stebbing, 1910					X		X	X	X	X	X	X	X	Wootton and Mattox (1958)	Temporary wetlands

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
								Cyzicus Audouin, 1837				X		X	X	X	X	X	X	X	Wootton and Mattox (1958)	Temporary wetlands
								Eocyzicus Daday de Deés, 1915				X		X			X	X	X	X	Wootton and Mattox (1958)	Temporary wetlands
									Eocyzicus digueti (Richard, 1895)			X		X			X	X	X	X	Wootton and Mattox (1958)	Temporary wetlands
							Leptestheriidae Daday, 1923					X		X			X	X	X	X	Martin and Cash-Clark (1993)	Temporary wetlands
								Leptestheria G.O. Sars, 1898				X		X			X	X	X	X	Martin and Cash-Clark (1993)	Temporary wetlands
									Leptestheria compleximanus (Packard, 1877)			X		X			X	X	X	X	Martin and Cash-Clark (1993)	Temporary wetlands
					Cladocera Latreille, 1829					X	X	X		X	X	X	X	X	X	X		Excluded from benthic datasets
	Maxillopoda Dahl, 1956									X	X	X	X	X	X	X	X	X	X	X		
		Branchiura Thorell, 1864								X	X	X	X	X	X	X	X	X	X	X	Cressey (1972)	Parasites; excluded from benthic datasets
				Arguloida Yamaguti, 1963						X	X	X	X	X	X	X	X	X	X	X	Cressey (1972)	Parasites; excluded from benthic datasets
							Argulidae Leach, 1819			X	X	X	X	X	X	X	X	X	X	X	Cressey (1972)	Parasites; excluded from benthic datasets

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
								Argulus Müller, 1785		X	X	X	X	X	X	X	X	X	X	X	Cressey (1972)	Parasites; excluded from benthic datasets
		Copepoda Milne-Edwards, 1840								X	X	X	X	X	X	X	X	X	X	X		Excluded from benthic datasets
	Ostracoda Latreille, 1802									X	X	X	X	X	X	X	X	X	X	X		
	Malacostraca Latreille, 1802									X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	
		Eumalacostraca Grobben, 1892								X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	
			Peracarida Calman, 1904							X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	
				Mysida Haworth, 1825						X	X	X	X	X	X	X		X			Rogers (2005)	
							Mysidae Haworth, 1825			X	X	X	X	X	X	X		X			Rogers (2005)	
								Acanthomysis Czerniavsky, 1882		X	X	X	X	X	X	X					Rogers (2005)	
									Acanthomysis aspera Ii, 1964	X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
									Acanthomysis hwanhaiensis Ii, 1964	X	X	X	X	X							Rogers (2005)	Fresh and brackish water
								Alienacanthomysis Holmquist, 1981		X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
									Alienacanthomysis macropsis (Tattersall, 1932	X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
								Deltamysis Bowman and Orsi, 1992		X	X	X	X	X							Bowman and Orsi (1992)	Fresh and brackish water
									Deltamysis homquistae Bowman and Orsi, 1992	X	X	X	X	X							Bowman and Orsi (1992)	Fresh and brackish water
								Hyperacanthomysis Fukuoka and Murano, 2000		X	X	X	X	X							Fukoka and Murano (2000)	Fresh and brackish water

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Hyperacanthomysis longirostris (Ii, 1964)	X	X	X	X	X							Fukoka and Murano (2000)	Fresh and brackish water
								Mysis Latreille, 1803		X	X	X		X	X	X		X			Rogers (2005)	alpine lakes
									Mysis diluviana Audzijonyte & Vainola, 2005	X	X	X		X	X	X		X			Rogers (2005)	alpine lakes
								Neomysis Czerniavsky, 1882		X	X	X		X	X	X					Rogers (2005)	
									Neomysis kadiakensis Ortmann, 1908	X	X	X		X	X	X					Rogers (2005)	
									Neomysis mercedis Homes, 1896	X	X	X		X	X	X					Rogers (2005)	
				Amphipoda Latreille, 1816						X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	
							Anisogammaridae Bousfield, 1977			X	X	X		X	X	X					Bousfield & Morino (1992)	
								Ramellogammarus Bousfield, 1979		X	X	X		X	X	X					Bousfield & Morino (1992)	
									Ramellogammarus californicus Bousfield and Morino, 1992	X	X	X		X							Bousfield & Morino (1992)	
									Ramellogammarus campestris Bousfield and Morino, 1992	X	X	X	X		X						Bousfield & Morino (1992)	Fresh and brackish water
									Ramellogammarus columbianus Bousfield and Morino, 1992	X	X	X	X	X	X	X					Bousfield & Morino (1992)	Fresh and brackish water
									Ramellogammarus littoralis Bousfield and Morino, 1992	X	X	X	X		X						Bousfield & Morino (1992)	Fresh and brackish water
									Ramellogammarus oregonensis (Shoemaker, 1944)	X	X	X	X	X	X	X					Bousfield & Morino (1992)	Fresh and brackish water
									Ramellogammarus ramellus (Weckel, 1907)	X	X	X	X	X	X						Bousfield & Morino (1992)	Fresh and brackish water
									Ramellogammarus setosus Bousfield and Morino, 1992	X	X	X				X					Bousfield & Morino (1992)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Ramellogammarus similimanus (Bousfield, 1961)	X	X	X			X						Bousfield & Morino (1992)	
									Ramellogammarus vancouverensis Bousfield, 1979	X	X	X	X			X					Bousfield & Morino (1992)	Fresh and brackish water
							Corophiidae Dana, 1849			X	X	X	X	X	X	X					Bousfield & Hoover (1997)	Fresh and brackish water
								Americorophium Bousfield and Hoover, 1997		X	X	X	X	X	X	X					Bousfield & Hoover (1997)	Fresh and brackish water
									Americorophium spinicorne (Stimpson, 1857)	X	X	X	X	X	X	X					Bousfield & Hoover (1997)	Fresh and brackish water
									Americorophium salmonis (Stimpson, 1857)	X	X	X	X		X	X					Bousfield & Hoover (1997)	Fresh and brackish water
									Americorophium stimpsoni (Shoemaker, 1941)	X	X	X	X	X	X						Bousfield & Hoover (1997)	Fresh and brackish water
							Crangonyctidae Bousfield, 1973			X	X			X	X	X	X	X	X	X	Rogers (2005)	
								Crangonyx Bate, 1859		X	X			X	X	X	X	X	X	X	Rogers (2005)	
								Stygobromus Cope, 1872		X	X			X	X	X	X	X	X	X	Rogers (2005)	
									Stygonyx Bousfield and Holsinger, 1989	X	X				X						Bousfield and Holsinger (1989)	
									Stygonyx courtneyi Bousfield and Holsinger, 1989	X	X				X						Bousfield and Holsinger (1989)	
							Gammaridae Latreille, 1802			X	X	X		X	X	X	X	X	X	X	Rogers (2005)	
								Gammarus Fabricius, 1775		X	X	X		X	X	X	X	X	X	X	Rogers (2005)	
							Haustoriidae Strebbing, 1906					X				X					Bousfield (1958)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
								Diporeia Bousfield, 1989				X				X					Bousfield (1958)	
									Diporeia erythrophthalma (Waldron, 1953)			X				X					Bousfield (1958)	
							Hyalellidae Bulycheva, 1957			X	X	X		X	X	X	X	X	X	X	Gonzales and Watling (2002)	
								Hyalella S.I. Smith, 1874		X	X	X		X	X	X	X	X	X	X	Gonzales and Watling (2002)	
							Talitridae Rafinesque, 1815				X	X		X	X	X	X	X	X	X	Rogers (2005)	Terrestrial to amphibious
								Arctitalitus Hurley, 1975			X	X		X	X	X	X	X	X	X	Rogers (2005)	Terrestrial to amphibious
									Arctitalitus sylvaticus (Haswell, 1879)		X	X		X	X	X	X	X	X	X	Rogers (2005)	Terrestrial to amphibious
								Talitroides Bonner, 1898			X	X		X	X	X	X	X	X	X	Rogers (2005)	Terrestrial to amphibious
									Talitroides alluaudi Chevreux, 1898		X	X		X	X	X	X	X	X	X	Morino and Ortal (1993)	Terrestrial to amphibious
									Talitroides topitotum Burt, 1934		X	X		X	X	X	X	X	X	X	Rogers (2005)	Terrestrial to amphibious
				Isopoda Latreille, 1817						X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	Fresh and brackish water
					Flabellifera Sars, 1882					X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
							Sphaeromatidae Latreille, 1825			X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
								Gnorimosphaeroma Menzies, 1954		X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Asellota Latreille, 1802					X	X	X		X	X	X	X	X			Williams (1970, 1976)	
							Asellidae Latreille, 1802			X	X	X		X	X	X		X			Williams (1970, 1976); Toft et al. (2002)	
								Asellus Geoffrey, 1764		X	X	X		X	X	X					Toft et al. (2002)	
									Asellus hilgendorfi Bouvallius, 1886	X	X	X		X	X	X					Magniez and Toft (2000); Toft et al. (2002)	Non-native invasive species
								Bowmanasellus Lewis, 2008		X				X							Lewis (2008)	
									Bowmanasellus sequoiae (Bowmann, 1975)	X				X							Lewis (2008); Bowman (1975)	known only from Lilburn Cave, Tulare Co.
								Caecidotea Packard, 1871		X	X	X		X	X	X	X	X			Williams (1970, 1972)	
									Caecidotea communis (Say, 1818)	X	X	X				X	X				Williams (1970, 1972)	
									Caecidotea occidentalis (Williams, 1970)	X	X	X		X	X	X					Williams (1970, 1972); Bowman (1974)	
									Caecidotea racovitzai (Williams)	X	X	X		X		X					Williams (1970, 1972)	Introduced in CA
									Caecidotea tomalensis (Harford, 1877)	X	X	X		X							Bowman (1973)	
								Calasellus Bowman, 1981		X	X	X		X							Bowman (1981)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Calasellus californicus (Miller, 1933)	X	X	X		X							Miller (1933); Bowman (1981)	
									Calasellus longus (Bowman, 1981)	X	X	X		X							Bowman (1981)	
								Columbasellus Lewis, Martin and Wetzer, 2003		X	X	X				X					Lewis et al. (2003)	
									Columbasellus acheron Lewis, Martin and Wetzer, 2003	X	X	X				X					Lewis et al. (2003)	
								Oregonasellus Lewis, 2008		X					X						Lewis (2008)	
									Oregonasellus elliotti Lewis, 2008	X					X						Lewis (2008)	known only from Malheur Cave, Harney Co.
								Salmasellus Bowman, 1975		X	X	X			X	X					Lewis (2001)	
									Salmasellus howarthi Lewis, 2001	X	X	X			X	X					Lewis (2001)	
							Munnidae Sars, 1897			X	X	X		X							Rogers (2005)	
					Oniscidea Latreille, 1802					X	X	X		X	X	X	X	X	X	X	Rogers (2005)	
							Ligiidae Leach, 1814			X	X	X		X	X	X	X				Rogers (2005)	
								Ligium Brandt, 1833		X	X	X					X				Rogers (2005)	
					Tanaidacea Dana, 1849					X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
							Leptochelidae Lana, 1973			X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
								Leptochelia Dana, 1849		X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water; undescribed species known

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Tanaidae Dana, 1849			X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water
								Sinelobus Sieg, 1980		X	X	X	X	X	X	X					Rogers (2005)	Fresh and brackish water; undescribed species known
			Eucarida Calman, 1904							X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	Fresh and brackish water
				Decapoda Latreille, 1802						X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	Fresh and brackish water
						Caridea Dana, 1852				X	X	X	X	X	X	X	X	X	X	X	Rogers (2005)	Fresh and brackish water
							Atyidae de Hann, 1849			X	X	X		X							Rogers (2005)	
								Syncaris Holmes, 1900		X	X	X		X							Martin and Wicksten (2004); Rogers (2005)	
									Syncaris pacifica (Holmes, 1895)	X	X	X		X							Martin and Wicksten (2004); Rogers (2005)	Listed under the Federal and California State Endangered Species Acts
									Syncaris pasadenae (Kingsley, 1897)	X	X	X		X							Martin and Wicksten (2004); Rogers (2005)	Possibly extinct

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Palaemonidae Rafinesque, 1815			X	X	X	X	X	X	X		X	X	X	Holthuis (1952); Jayachandran (2001); Rogers (2005)	
								Exopalaemon Holthuis, 1950		X	X	X	X	X	X	X					Jayachandran (2001); Rogers (2005)	Fresh and brackish water
									Exopalaemon carinicauda (Holthuis, 1950)	X			X	X							Jayachandran (2001)	Fresh and brackish water
									Exopalaemon modestus (Heller, 1862)	X	X	X		X	X	X					Jayachandran (2001)	
								Palaemon Webber, 1795		X	X	X		X	X						Holthuis (1952)	
									Palaemon macrodactylus Rathbun, 1902	X	X	X		X	X						Jayachandran (2001)	
								Palaemonetes Heller, 1869		X	X	X		X	X	X		X	X	X	Holthuis (1952)	
									Palaemonetes kadiakensis Rathbun, 1902	X	X	X		X							Holthuis (1952); Rogers (2005)	
									Palaemonetes paludosus Gibbes, 1850	X	X	X		X	X	X		X	X	X	Holthuis (1952)	
							Astacidea Latreille, 1802										X					
								Astacidae Latreille, 1802		X	X	X		X	X	X	X	X	X		Riegel (1959); Rogers (2005)	
								Pacifastacus Bott, 1950		X	X	X		X	X	X	X	X	X		Riegel (1959); Rogers (2005)	
									Pacifastacus connectens (Faxon, 1914)	X	X	X			X		X				Riegel (1959); Rogers (2005)	
									Pacifastacus fortis (Faxon, 1914)	X	X	X		X							Riegel (1959); Rogers (2005)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Pacifastacus gambelii (Girard, 1852)	X	X	X		?	X	X		X			Riegel (1959); Rogers (2005)	
									Pacifastacus lenisculus klamathensis (Stimpson, 1859)	X	X	X		X	X	X					Riegel (1959); Rogers (2005)	
									Pacifastacus lenisculus lenisculus (Dana, 1852)	X	X	X		X	X	X		X	X		Riegel (1959); Rogers (2005)	
									Pacifastacus lenisculus trowbridgii (Stimpson, 1857)	X	X	X			X	X					Riegel (1959); Rogers (2005)	
									Pacifastacus nigrescens (Stimpson, 1857)	X	X	X		X							Riegel (1959); Rogers (2005)	May be extinct
								Cambaridae Hobbs, 1942		X	X	X		X	X	X	X	X	X	X	Riegel (1959); Rogers (2005)	
									Orconectes Cope, 1872	X	X	X		X	X	X	X	X	X	X	Riegel (1959); Rogers (2005)	
									Orconectes neglectus neglectus (Faxon, 1885)	X	X	X			X		X				Riegel (1959); Rogers (2005)	
									Orconectes virilis (Hagen, 1870)	X	X	X		X			X		X		Riegel (1959); Rogers (2005)	
									Procambarus Ortmann, 1905	X	X	X		X	X		X	X	X	X	Riegel (1959); Rogers (2005)	
									Procambarus clarkii (Girard, 1852)	X	X	X		X	X		X	X	X	X	Riegel (1959); Rogers (2005)	
							Brachyura Latreille, 1802															
								Geothelphusidae Ortmann, 1893		X	X	X						X			Rogers (2005)	
									Geothelphusa Stimpson, 1858	X	X	X						X			Rogers (2005)	
									Geothelpusa dehaani (White, 1874)	X	X	X						X			Rogers (2005)	
								Grapsidae MacLeay, 1838		X	X	X	X	X							Rogers (2005)	Fresh and brackish water

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Subphylum	Class	Subclass	Superorder	Order	Suborder	Infraorder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
								Eriocheir de Haan, 1835		X	X	X	X	X							Rogers (2005)	Fresh and brackish water
									Eriocheir sinensis Milne-Edwards, 1854	X	X	X	X	X							Rogers (2005)	Fresh and brackish water
							Ocypodidae Rafinesque, 1815			X			X	X							Rogers (2005)	
								Uca Leach, 1814		X			X	X							Rogers (2005)	
									Uca crenulata (Lockington, 1877)	X			X	X							Rogers (2005)	
							Panopeidae Ortmann, 1893			X			X	X	X						Rogers (2005)	
								Rhithropanopeus Rathbun, 1898		X			X	X	X						Rogers (2005)	
									Rhithropanopeus harrisii (Gould, 1841)	X			X	X	X						Rogers (2005)	

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Additional Sources of Information on Crustacea

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Collembola: Springtails
Standard Effort Level I: Excluded from benthic datasets
Standard Effort Level II: Excluded from benthic datasets
Standard Taxonomic Reference: Christiansen and Snider (2008)
Reviewed by:

Collembolans can be identified to genus using the key in Merritt, Cummins and Berg (Christiansen and Snider, 2008) or DeWalt et al. (2010). Collembola live neustonically or near any aquatic or moist habitat including stream and pond margins, intertidal pools, watersoaked wood and carpet. Collembola are excluded from benthic datasets.

Taxon	Habitat				Distribution							Literature Cited	Comments
Class	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Collembola Lubbock, 1869		X	X	X	X	X	X		X	X	X	Christiansen and Snider (1996); Hilsenhoff (2001)	Excluded from benthic datasets

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Additional Sources of Information on Collembola

Checklist of the Collembola of the World, updated 31 January 2011. Accessed 14 February 2011 at URL: http://www.collembola.org/

Ephemeroptera: Mayflies
Standard Effort Level I: Genus
Standard Effort Level II: Species (where possible)
Standard Taxonomic Reference: Waltz and Burian (2008)
Reviewed by:

Nymphs can be identified to genus using the key in Merritt, Cummins and Berg (Waltz and Burian, 2008). Considerable reorganization of the baetid genera has taken place since the key was published (Lugo-Ortiz and McCafferty, 1998). A mayfly workshop was given by the Northwest Biological Assessment Workgroup in 2005. The manual created by Jacobus and Randolph (2005) serves as a very useful supplementary text with numerous provisional keys and unpublished distributional and habitat information for western mayflies. There are two useful websites on Ephemeroptera: Mayfly Central, hosted by Purdue University, maintains the Mayflies of North America checklist and has distributional information, and; Ephemeroptera Galactica, hosted by the Museum Collections of Aquatic Entomology at Florida A&M University, has a bibliography that offers many mayfly paper PDFs.

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Ephemeroptera Hyatt and Arms, 1891				X	X	X		X	X	X	X	X	X	X	Waltz and Burian (2008)	for keys to families and genera
	Acanthametropodidae Edmunds in Edmunds, Allen and Peters, 1963			X	X						X					
		Analetris Edmunds in Edmunds and Koss, 1972		X	X						X					
			Analetris eximia Edmunds in Edmunds and Koss, 1972	X	X						X					
	Ameletidae McCafferty, 1991			X	X			X	X	X	X	?	X			
		Ameletus Eaton, 1885		X	X			X	X	X		?	X		Zloty (1996)	Not all species described as nymphs -- best to leave identifications at *Ameletus* sp.
	Ametropodidae Bengtsson, 1913			X	X			X	X	X						
		Ametropus Albarda, 1878		X	X			X	X	X					Allen and Edmunds (1976); McCafferty	nymphs for both North American species are known and keyed in Allen and Edmunds (1976)

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
															(2001)	
			Ametropus ammophilus Allen and Edmunds, 1976	X	X			X	X	X						
			Ametropus neavei McDunnough, 1928	X	X						X					
	Baetidae Leach, 1815			X				X	X	X	X	X	X	X	Waltz and Burian (2008); Lugo-Ortiz and McCafferty (1998); Morihara and McCafferty (1979)	Morihara and McCafferty (1979) is still useful because it contains good descriptions.
		Acentrella Bengtsson, 1912		X				X	X	X		X	X	X	Jacobus and McCafferty (2006)	
			Acentrella insignificans (McDunnough, 1926)	X	X			X	X	X	X	X	X		Jacobus and McCafferty (2006)	
			Acentrella turbida (McDunnough, 1924)	X	X			X	X	X	X		X		Jacobus and McCafferty (2006)	
		Acerpenna Waltz and McCafferty, 1987		X	X			~~X~~	X							
			Acerpenna pygmaea (Hagen, 1861)	X	X				X						Meyer and McCafferty (2007)	
		Apobaetis Day, 1955		X	X			X	X						Meyer and McCafferty (2004)	Occurs in warm water streams; Tuolumne River in CA Central Valley
			Apobaetis etowah (Traver, 1935)	X	X			X	X						Meyer and McCafferty (2004)	Occurs in warm water streams; Tuolumne River in CA Central Valley

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Baetis Leach, 1815		X	X			X	X	X	X	X	X		Wiersema et al. (2004); Morihara and McCafferty (1979)	The nymphs for several species remain undescribed.
			Baetis adonis Traver, 1935	X	X			X	X							
			Baetis alius Day, 1954	X	X			X	X	X			X			
			Baetis bicaudatus Dodds, 1923	X	X			X	X	X	X					
			Baetis brunneicolor McDunnough, 1925	X	X					X						
			Baetis diablus Day, 1954	X	X			X	~~X~~							nymph stage unknown; possibly syn. of *B. tricaudatus*
			Baetis flavistriga McDunnough, 1921	X	X			X	X	X	X					
			Baetis magnus McCafferty and Waltz, 1986	X	X			X					X			
			Baetis notos Allen and Murvosh, 1987	X	X			X	X	X	X		X			
			Baetis palisadi Mayo, 1952	X	X			X								nymph stage unknown
			Baetis piscatoris Traver, 1935	X	X			X								nymph stage unknown
			Baetis tricaudatus Dodds, 1923	X	X			X	X	X	X	X	X	X		
		Baetodes Needham and Murphy, 1924		X	X				X				X		Cohen and Allen (1978); McCafferty and Provonsha (1993)	
			Baetodes alleni McCafferty and Provonsha, 1993	X	X								X		Cohen and Allen (1978); McCafferty and Provonsha (1993)	
			Baetodes arizonensis Koss, 1972	X	X								X		Cohen and Allen (1978); McCafferty and Provonsha (1993); Koss (1972)	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Baetodes bibranchius McCafferty and Provonsha, 1993	X	X				X						Cohen and Allen (1978); McCafferty and Provonsha (1993)	
			Baetodes edmundsi Koss, 1972	X	X								X		Cohen and Allen (1978); McCafferty and Provonsha (1993); Koss (1972)	
		Callibaetis Eaton, 1881		X	X	X		X	X	X	X	X				No published nymph key to species
		Camelobaetidius Demoulin, 1966		X	X			X	X	X	X	X	X		Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)	
			Camelobaetidius kickapoo McCafferty, 2000	X	X								X		Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)	
			Camelobaetidius maidu Jacobus and McCafferty, 2005	X	X			X							Jacobus and McCafferty (2005)	
			Camelobaetidius mexicanus (Traver and Edmunds, 1968)	X	X				X						Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)	
			Camelobaetidius musseri (Traver and Edmunds, 1968)	X	X							X			Lugo-Ortiz and McCafferty (1995); McCafferty and	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
															Randolph (2000)	
			Camelobaetidius warreni (Traver and Edmunds, 1968)	X	X			X	X	X	X	X			Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)	widespread species; *C. similis* Lugo-Ortiz and McCafferty is considered to be a synonym
		Centroptilum Eaton, 1869		X	X			X	X	X	X	X	X			No published nymph key to species
		Cloeodes Traver, 1938		X	X			X	X				X		Waltz and McCafferty (1987)	This key includes nymphs of all three southwestern species
			Cloeodes excogitatus Waltz & MacCafferty, 1987	X	X			X	X				X		Waltz and McCafferty (1987)	
			Cloeodes macrolamellus Waltz and McCafferty, 1987										X		Waltz and McCafferty (1987)	
			Cloeodes peninsulus Waltz and McCafferty, 1987										X		Waltz and McCafferty (1987)	
		Diphetor Waltz and McCafferty, 1987		X	X			X	X	X	X				Morihara and McCafferty (1979)	only one North American species
			Diphetor hageni (Eaton, 1885)	X	X			X	X	X	X				Morihara and McCafferty (1979)	only one North American species
		Fallceon Waltz and McCafferty, 1987		X	X			X	X	X	X	X	X			with the additions of new species in the genus, best to leave at *Fallceon*
			Fallceon eatoni (Kimmins, 1934)	X	X			X					X		McCafferty (2006)	
			Fallceon quilleri (Dodds, 1923)	X	X			X	X	X	X	X			Morihara and McCafferty (1979)	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Fallceon sonora (Allen and Murvosh, 1987)	X	X			X							Morihara and McCafferty (1979)	may be a synonym of F. eatoni (Kimmins, 1934)
			Fallceon thermophilos (McDunnough, 1926)	X	X			X							Morihara and McCafferty (1979)	*Acerpenna sulfurus* and *A. thermophilos* were both synonymized and moved to *Fallceon* in McCafferty and Meyer (2008)
		Heterocloeon McDunnough, 1925		X	X				X	X						
			Heterocloeon anoka (Daggy, 1945)	X	X				X	X					McCafferty et al. (2005); Guenther and McCafferty (2005)	Guenther and McCafferty (2005) placed this species into *Iswaeon* McCafferty and Webb (2005)
		Moribaetis Waltz and McCafferty, 1985													McCafferty (2007)	specimens found in Oak Creek, AZ
			Moribaetis mimbresaurus McCafferty, 2007	X	X								X		McCafferty (2007)	specimens found in Oak Creek, AZ
		Paracloeodes Day, 1955		X	X			X	X							only one species known in the west
			Paracloeodes minutus (Daggy, 1945)	X	X			X	X							only one species known in the west
		Plauditus Lugo-Ortiz and McCafferty, 1998		X	X			?	X						Lugo-Ortiz and McCafferty (1998)	
			Plauditus punctiventris (McDunnough, 1923)	X	X			?	X						Lugo-Ortiz and McCafferty (1998)	
		Procloeon Bengtsson, 1915		X	X			X	X	X						No published nymph key to species
		Pseudocloeon Klapalek, 1905		X	X			X	X	X	X		X		McCafferty and Waltz (1995) Lugo-Ortiz et al. (1999)	Species formerly in *Labiobaetis*

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Pseudocloeon apache (McCafferty & Waltz, 1995)	X	X			?	X	X	X		X		McCafferty and Waltz (1995) Lugo-Ortiz et al. (1999)	
			Pseudocloeon dardanum (McDunnough, 1923)	X	X					X						
			Pseudocloeon propinquum (Walsh, 1863)	X	X			X	X	X	X				McCafferty and Waltz (1995) Lugo-Ortiz et al. (1999)	
	Baetiscidae Banks, 1900			X	X										Pescador and Berner (1981)	
		Baetisca Walsh, 1863		X	X							X			Baumann and Kondratieff (2000)	
			Baetisca columbiana Edmunds, 1960	X	X					X						
			Baetisca lacustris McDunnough, 1932	X	X							X			Baumann and Kondratieff (2000)	record from Humboldt River
	Caenidae Newman, 1853			X				X	X	X	X	X	X	X		Other genera are possible in the Southwest; revision of the family by Sun and McCafferty
		Brachycercus Curtis, 1834		X							X				Sun and McCafferty (2008)	
			Brachycercus harrisella Curtis, 1834	X							X				Sun and McCafferty (2008)	
		Caenis Stephens, 1835		X				X	X	X	X	X	X	X	Provonsha (1990)	Mature nymphs may be identified to species
			Caenis amica Hagen, 1861	X				X	X	X	X		X		Provonsha (1990)	
			Caenis bajaensis Allen and Murvosh, 1983	X				X					X	X	Provonsha (1990)	
			Caenis latipennis Banks, 1907	X				X	X	X		X	X		Provonsha (1990)	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Caenis punctata McDunnough, 1931	X				X							Provonsha (1990)	
			Caenis tardata McDunnough, 1931	X												
			Caenis youngi Roemhild, 1984	X				X	X	X						
		Susperatus Sun and McCafferty, 2008		X							X					
			Susperatus prudens (McDunnough, 1931)	X												
			Susperatus tuberculatus (Soldan, 1986)	X							X					
	Ephemerellidae Klapalek, 1909			X				X	X	X					Jacobus and McCafferty (2008)	revised key in Jacobus and McCafferty (2008)
		Attenella Edmunds, 1971		X				X	X	X	X				Allen and Edmunds (1961a)	
			Attenella attenuata (McDunnough, 1925)	X	X			X							Allen and Edmunds (1961a)	
			Attenella delantala (Mayo, 1952)	X	X			X	X	X					Allen and Edmunds (1961a)	
			Attenella margarita (Needham, 1927)	X	X			X	X	X	X				Allen and Edmunds (1961a)	
			Attenella soquele (Day, 1954)	X	X			X	X	X					Allen and Edmunds (1961a)	
		Caudatella Edmunds, 1959		X	X			X	X						Jacobus (2010); Allen and Edmunds (1961b)	Jacobus (2010) provides an updated key to nymphs
			Caudatella columbiella (McDunough, 1935)	X	X			X							Jacobus (2010); Allen and Edmunds (1961b)	removed from synonymy with *Caudatella heterocaudata* (McDunnough)
			Caudatella edmundsi (Allen, 1959)	X	X			X	X	X					Jacobus (2010); Allen and Edmunds	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
															(1961b)	
			Caudatella heterocaudata (McDunnough, 1929)	X	X			X	X	X					Jacobus (2010); Allen and Edmunds (1961b)	
			Caudatella hystrix (Traver, 1934)	X	X			X	X	X					Jacobus (2010); Allen and Edmunds (1961b)	*Caudatella cascadia* (Allen and Edmunds) now a synonym
			Caudatella jacobi (McDunnough, 1939)	X	X			X	X	X					Jacobus (2010); Allen and Edmunds (1961b)	
		Drunella Needham, 1905		X	X			X	X	X	X	X	X	X	Allen and Edmunds (1962)	
			Drunella coloradensis (Dodds, 1923)	X	X			X	X	X	X	X	X	X	Allen and Edmunds (1962)	
			Drunella doddsii (Needham, 1927)	X	X			X	X	X	X	X			Allen and Edmunds (1962)	
			Drunella flavilinea (McDunnough, 1926)	X	X			X	X	X				X	Allen and Edmunds (1962)	
			Drunella grandis (Eaton, 1884)	X	X			X	X	X	X	X	X		Allen and Edmunds (1962)	
			Drunella pelosa (Mayo, 1951)	X	X			X	X	X					Allen and Edmunds (1962)	
			Drunella spinifera (Needham, 1927)	X	X			X	X	X	X				Allen and Edmunds (1962)	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Ephemerella Walsh, 1863		X	X			X	X	X	X	X	X		Allen and Edmunds (1965); Jacobus and McCafferty (2003)	
			Ephemerella alleni Jensen and Edmunds, 1966	X	X				X	X					Allen and Edmunds (1965); Jacobus and McCafferty (2003)	
			Ephemerella aurivillii (Bengtsson, 1908)	X	X			X	X	X					Allen and Edmunds (1965); Jacobus and McCafferty (2003)	
			Ephemerella dorothea Needham, 1908	X	X			X	X	X	X	X	X		Allen and Edmunds (1965); Jacobus and McCafferty (2003)	*Ephemerella infrequens McDunnough recently synonymized with E. dorothea*
			Ephemerella excrucians Walsh, 1862	X	X			X	X	X	X	X	X		Allen and Edmunds (1965); Jacobus and McCafferty (2003)	*Ephemerella inermis Eaton recently synonymized with E. excrucians*
			Ephemerella maculata Traver, 1934	X	X			X	X						Allen and Edmunds (1965); Jacobus and McCafferty (2003)	
			Ephemerella tibialis McDunnough, 1924	X	X			X	X	X	X	X	X		Allen and Edmunds (1963b); Jacobus and McCafferty (2008)	formerly *Serratella tibialis* (McDunnough)

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Ephemerella velmae Allen and Edmunds, 1963	X	X			X	X						Allen and Edmunds (1963b); Jacobus and McCafferty (2008)	formerly *Serratella velmae* (Allen and Edmunds, 1963)
			Ephemerella verruca Allen and Edmunds, 1965	X	X				X	X					Allen and Edmunds (1965); Jacobus and McCafferty (2003)	
		Eurylophella Tiensuu, 1935		X	X	X		X	X	X					Allen and Edmunds (1963a)	
			Eurylophella lodi (Mayo, 1952)	X	X	X		X	X	X					Allen and Edmunds (1963a)	
		Matriella Jacobus, 2008		X	X			X	X	X					Jacobus (2008)	
			Matriella teresa (Traver, 1934)	X	X			X	X	X					Jacobus (2008)	formerly *Serratella teresa* (Traver)
		Serratella Edmunds, 1959		X				X	X	X		X	X	X	Allen and Edmunds (1963b)	
			Serratella levis (Day, 1954)	X	X			X	X						Allen and Edmunds (1963b)	
			Serratella micheneri (Traver, 1934)	X	X			X	X	X			X	X	Allen and Edmunds (1963b)	
		Timpanoga Needham, 1927		X	X			X	X	X	X	X			Allen and Edmunds (1959)	
			Timpanoga hecuba (Eaton, 1884)	X	X			X	X	X	X	X			Allen and Edmunds (1959)	Two dubious subspecies recognized
	Ephemeridae Latreille, 1810			X				X	X	X		X			McCafferty (1975)	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Ephemera Linnaeus, 1758		X						X	X	X			McCafferty (1975)	*Ephemera compar* Hagen, 1875 from Colorado is considered to be extinct
			Ephemera simulans Walker, 1853	X					X	X	X	X			McCafferty (1975)	
		Hexagenia Walsh, 1863		X				X	X	X	X	X			McCafferty (1975)	
			Hexagenia bilineata (Say, 1824)	X						X					McCafferty (1975)	
			Hexagenia limbata (Serville, 1829)	X				X	X	X	X	X			McCafferty (1975)	
	Heptageniidae Needham in Needham and Betten, 1901			X				X			X				Wang and McCafferty (2004); Webb and McCafferty (2008)	
		Anepeorus McDunnough, 1925		X							X					
			Anepeorus rusticus McDunnough, 1925	X							X					
		Cinygma Eaton, 1885		X	X			X	X	X						nymphs cannot be reliably separated at present
		Cinygmula McDunnough, 1933		X	X			X	X	X	X		X			nymphs cannot be reliably separated at present
		Ecdyonurus Eaton, 1868		X	X			X	X	X	X	X	X		McCafferty (2004); Bednarik and Edmunds (1980)	mature nymphs may be separated using labral characters
			Ecdyonurus criddlei (McDunnough, 1927)	X	X			X	X	X	X	X	X		McCafferty (2004); Bednarik and Edmunds (1980)	species formerly in *Heptagenia,* then *Nixe*
			Ecdyonurus simplicoides (McDunnough, 1924)	X	X			?	X	X	X		X		McCafferty (2004); Bednarik and	species formerly in *Heptagenia,* then *Nixe*

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
															Edmunds (1980)	
			Epeorus Eaton, 1881	X	X			X	X	X	X	X	X	X		The key in Edmunds and Allen (1964) includes only species found in the Rocky Mts. The nymph stage is unknown for several western species.
			Heptagenia Walsh, 1863	X	X			X	X	X	X	X	X			nymphs cannot be reliably separated at present
			Ironodes Traver, 1935	X	X			X	X					X		nymphs cannot be reliably separated at present
			Leucrocuta Flowers, 1980	X	X			?	X		X					immature *Leucrocuta/Nixe/Ecdyonurus* difficult to separate
			Leucrocuta jewetti (Allen, 1966)	X	X			?	X							
			Leucrocuta petersi (Allen, 1966)	X	X						X					
			Mccaffertium Bednarik, 1979	X	X			X	X	X	X	X			Wang and McCafferty (2004)	formerly a subgenus of *Stenonema*
			Mccaffertium terminatum (Walsh, 1862)	X	X			X	X	X	X	X			Bednarik and McCafferty (1979); Wang and McCafferty (2004)	
			Nixe Flowers, 1980	X	X			X	X							immature *Leucrocuta/Nixe/Ecdyonurus* difficult to separate
			Nixe kennedyi (McDunnough, 1924)	X	X			X	X						McCafferty (2004)	nymph not described for this species
			Rhithrogena Eaton, 1881	X	X			X	X	X	X	X	X	X		nymphs cannot be reliably separated at present

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
	Isonychiidae Burks, 1953			X	X			X	X			X	X			
		Isonychia Eaton, 1871		X	X			X	X		X	X	X			Although distribution is useful for identifying *Isonychia* in the West, reliable species identifications require rearing
			Isonychia campestris McDunnough, 1931	X	X						X					
			Isonychia intermedia (Eaton, 1885)	X	X							X	X			
			Isonychia velma Needham, 1932	X	X			X	X						Day (1952)	
	Leptohyphidae Edmunds and Traver, 1954			X	X			X	X	X	X	X	X	X	Wiersema and McCafferty (2000); Allen (1978)	several new genera were erected in Wiersema and McCafferty (2000) but no species key to nymphs was included; David Baumgardner has completed his phylogeny for the family -- several genera will fall to synonymy once it is published
		Asioplax Wiersema and McCafferty, 2000		X	X			X	X		X				Wiersema and McCafferty (2000); Allen (1978)	
			Asioplax edmundsi (Allen, 1967)	X	X			X	X		X				Wiersema and McCafferty (2000); Allen (1978)	
		Homoleptohyphes Allen and Murvosh, 1987		X	X			X					X		Wiersema and McCafferty (2000); Allen (1978)	
			Homoleptohyphes dimorphus (Allen, 1967)	X	X			X					X		Wiersema and McCafferty (2000); Allen (1978)	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Homoleptohyphes mirus (Allen, 1967)	X	X								X		Wiersema and McCafferty (2000); Allen (1978)	
			Homoleptohyphes quercus (Kilgore and Allen, 1973)	X	X								X		Wiersema and McCafferty (2000); Allen (1978)	
		Leptohyphes Eaton, 1882		X	X						X		X		Baumgardner and McCafferty (2010); Wiersema and McCafferty (2000); Allen (1978)	Baumgardner and McCafferty's revision revalidates several species and provides a key to nymphs
			Leptohyphes apache Allen, 1967	X	X						X	X	X		Baumgardner and McCafferty (2010)	species revalidated
			Leptohyphes ferruginus Allen and Brusca, 1973	X	X								X		Baumgardner and McCafferty (2010)	species revalidated
			Leptohyphes lestes Allen and Brusca, 1973	X	X								X		Baumgardner and McCafferty (2010)	
			Leptohyphes zalope Traver, 1958	X	X						~~X~~		X		Baumgardner and McCafferty (2010)	
		Tricoryhyphes Allen and Murvosh, 1987		X	X								X		Wiersema and McCafferty (2000); Allen (1978)	
			Tricoryhyphes condylus (Allen, 1967)	X	X								X		Wiersema and McCafferty (2000); Allen (1978)	
		Tricorythodes Ulmer, 1920		X	X			X	X	X		X	X	X	Wiersema and McCafferty	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
															(2000); Allen (1978)	
			Tricorythodes explicatus (Eaton, 1892)	X	X			X	X	X	X	X	X	X	Wiersema and McCafferty (2000); Allen (1978)	*Tricorythodes minutus* Traver is now a jr. synonym
			Tricorythodes fictus Traver, 1935	X	X			X							Wiersema and McCafferty (2000); Allen (1978)	
		Vaccupernius Wiersema and McCafferty, 2000		X	X								X		Wiersema and McCafferty (2000); Allen (1978)	
			Vaccupernius packeri (Allen, 1967)	X	X								X		Wiersema and McCafferty (2000); Allen (1978)	
	Leptophlebiidae Banks, 1900			X				X	X	X	X	X	X	X		
		Choroterpes Eaton, 1881		X	X			X	X		X	X	X	X	McCafferty (1992)	
		Leptophlebia Westwood, 1840		X	X	X		X	X	X					Burian (2000)	
		Neochoroterpes Allen, 1974		X									X		Henry (1993)	
			Neochoroterpes kossi (Allen, 1974)	X									X		Henry (1993)	
		Paraleptophlebia Lestage, 1917		X				X	X	X	X	X	X	X		Most species undescribed as nymphs; best to leave at genus. See Edmunds and McCafferty (1996) for discussion of species with tusks.
		Thraulodes Ulmer, 1920		X	X								X		Traver and Edmunds (1967)	
			Thraulodes brunneus Koss, 1966	X	X								X		Traver and Edmunds (1967)	

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Thraulodes gonzalesi Traver and Edmunds, 1967	X	X								X		Traver and Edmunds (1967)	
			Thraulodes tenulineus Lugo-Ortiz and McCafferty, 1996	X	X								X		Traver and Edmunds (1967)	
		Traverella Edmunds, 1948		X	X					X	X	X	X		Allen (1973)	
			Traverella albertana (McDunnough, 1931)	X	X					X	X	X	X		Allen (1973)	
	Oligoneuriidae Ulmer, 1914			X							X		X		Edmunds et al. (1958)	
		Homoeoneuria Eaton, 1881		X							X					
			Homoeoneuria alleni Pescador and Peters, 1980	X							X					
		Lachlania Hagen, 1868		X							X		X		Edmunds et al. (1958)	
			Lachlania saskatchewanensis Ide, 1941	X							X		X		Edmunds et al. (1958)	
	Polymitarcyidae Banks, 1900			X				X	X	X	X	X			McCafferty (1975)	
		Ephoron Williamson, 1802		X				X	X	X	X	X			McCafferty (1975)	
			Ephoron album (Say, 1824)	X				X	X	X	X	X			McCafferty (1975)	
	Potamanthidae Albarda in Selys-Longchamps, 1888			X	X			X							McCafferty and Meyer (2007)	
		Anthopotamus McCafferty and Bae, 1990		X	X			X							McCafferty and Meyer (2007)	
			Anthopotamus verticis (Say, 1839)	X	X			X							McCafferty and Meyer (2007)	
	Pseudironidae Edmunds and Traver, 1854			X	X			X			X					
		Pseudiron McDunnough, 1931		X	X			X			X					
			Pseudiron centralis McDunnough, 1931	X	X			X			X					
	Siphlonuridae Ulmer, 1920			X				X	X	X	X	X	X	X		
		Edmundsius Day, 1953		X	X			X								

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Edmundsius agilis Day 1953	X	X			X								
		Parameletus Bengtsson, 1908		X	X					X	X					
			Parameletus columbiae McDunnough, 1938	X	X					X	X					
		Siphlonurus Eaton, 1868		X				X			X					

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Odonata: Damselflies and Dragonflies
Standard Effort Level I: Genus
Standard Effort Level II: Species (where possible)
Standard Taxonomic Reference(s): Tennessen (2008), Westfall and May (1996), Needham, Westfall and May (2000)
Reviewed by:

Updated keys to families and genera are given in the odonate chapter of Merritt, Cummins and Berg (Tennessen, 2008). Generic and species keys to adults and immatures are given for damselflies in Westfall and May (1996) and dragonflies in Needham, Westfall and May (2000). See Tennessen and Paulson's (2007) workshop manual and Rehn (2000) for more detailed ecological and distributional information on Californian and Pacific Coast odonates. Kennedy (1917) and Paulson and Garrison (1977) provided considerable distributional information for the Pacific Coast region. *Aeshna* has been revised and many species placed into the genus *Rhionaeshna* (von Ellenrieder, 2002).

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Odonata Fabricius, 1793					X	X	X		X	X	X	X	X	X	X		
	Zygoptera Selys, 1854				X	X	X		X	X	X	X	X	X	X	Westfall and May (1996)	Has keys for all damselflies found in the region
		Calopterygidae Selys, 1850			X	X			X	X	X	X	X	X	X	Westfall and May (1996)	
			Calopteryx Leach, 1815		X	X			X	X	X	X				Westfall and May (1996)	
				Calopteryx aequabilis Say, 1839	X	X			X	X	X	X				Westfall and May (1996)	Relatively intolerant of pollution; rare in Northern CA
			Hetaerina Hagen in Selys, 1853		X	X			X			X	X	X	X	Westfall and May (1996)	
				Hetaerina americana (Fabricius, 1798)	X	X			X			X	X	X	X	Westfall and May (1996)	Relatively intolerant of pollution
				Hetaerina vulnerata Hagen in Selys, 1853	X	X						X		X		Westfall and May (1996)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Coenagrionidae Kirby, 1890			X				X			X				Westfall and May (1996)	
			Amphiagrion Selys, 1876		X	X	X		X	X	X	X	X	X	X	Westfall and May (1996)	
				Amphiagrion abbreviatum (Selys, 1876)	X	X	X		X	X	X	X	X	X	X	Westfall and May (1996)	
			Apanisagrion Kennedy, 1920		X									X		Westfall and May (1996)	
				Apanisagrion lais (Brauer, 1876)	X									X		Westfall and May (1996)	
			Argia Rambur, 1842		X	X			X	X	X	X	X	X	X	Westfall and May (1996)	
				Argia agrioides Calvert, 1895	X	X			X	X				X	X	Westfall and May (1996)	
				Argia alberta Kennedy, 1918	X	X			X	X		X	X	X		Westfall and May (1996)	prefers seeps and springs
				Argia emma Kennedy, 1915	X	X			X	X	X	X	X			Westfall and May (1996)	
				Argia fumipennis (Burmeister, 1839)	X									X		Westfall and May (1996)	
				Argia hinei Kennedy, 1918	X	X			X				X	X	X	Westfall and May (1996)	
				Argia immunda (Hagen, 1861)	X	X			X				X	X		Westfall and May (1996)	
				Argia lacrimans (Hagen, 1861)	X									X		Westfall and May (1996)	
				Argia lugens (Hagen, 1861)	X	X			X	X		X		X	X	Westfall and May (1996)	
				Argia moesta (Hagen, 1861)	X	X			X			X	X	X	X	Westfall and May (1996)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Argia munda Calvert, 1902	X									X		Westfall and May (1996)	
				Argia nahuana Calvert, 1902	X	X			X	X		X	X	X	X	Westfall and May (1996)	
				Argia oenea Hagen in Selys, 1865	X									X	X	Westfall and May (1996)	
				Argia pallens Calvert, 1902	X									X		Westfall and May (1996)	
				Argia pima Garrison, 1994	X									X		Westfall and May (1996)	
				Argia plana Calvert, 1902	X									X		Westfall and May (1996)	
				Argia sabino Garrison, 1994	X									X		Westfall and May (1996)	
				Argia sedula (Hagen, 1861)	X	X	X		X				X	X		Westfall and May (1996)	
				Argia tarascana Calvert, 1902	X									X		Westfall and May (1996)	
				Argia tezpi Calvert, 1902	X									X	X	Westfall and May (1996)	
				Argia tonto Calvert, 1902	X									X		Westfall and May (1996)	
				Argia translata Hagen in Selys, 1865	X								X	X		Westfall and May (1996)	
				Argia vivida Hagen in Selys, 1865	X	X			X	X	X	X	X	X	X	Westfall and May (1996)	
			Coenagrion Kirby, 1890		X		X		X	X	X	X	X	X		Westfall and May (1996)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Coenagrion resolutum (Hagen in Selys, 1876)	X		X		X	X	X	X	X	X		Westfall and May (1996)	Uncommon in northern Sierra lakes and bogs; larvae hard to distinguish from *Enallagma* sp.
			Coenagrion Kirby, 1890/*Enallagma* Selys, 1875		X		X									Westfall and May (1996)	some specimens incompletely separable
			Enallagma Selys, 1875		X	X	X		X	X	X	X	X	X	X	Westfall and May (1996)	
				Enallagma anna Williamson, 1900	X	X			X	X		X	X	X		Westfall and May (1996)	
				Enallagma basidens Calvert, 1902	X	X			X					X		Westfall and May (1996)	
				Enallagma boreale (Selys, 1875)	X		X		X	X	X	X	X	X		Westfall and May (1996)	
				Enallagma carunculatum Morse, 1895	X	X	X		X	X	X	X	X	X	X	Westfall and May (1996)	
				Enallagma civile (Hagen, 1861)	X	X	X		X			X	X	X	X	Westfall and May (1996)	
				Enallagma clausum Morse, 1895	X	X	X		X	X	X	X	X			Westfall and May (1996)	
				Enallagma cyathigerum (Charpentier, 1840)	X		X		X	X	X	X	X	X	X	Westfall and May (1996)	
				Enallagma ebrium (Hagen, 1861)	X						X	X				Westfall and May (1996)	
				Enallagma eiseni Calvert, 1895	X										X	Westfall and May (1996)	
				Enallagma novaehispaniae Calvert, 1902	X										X	Westfall and May (1996)	
				Enallagma praevarum (Hagen, 1861)	X	X	X		X			X	X	X	X	Westfall and May (1996)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Enallagma semicirculare Selys, 1876	X									X		Westfall and May (1996)	
			Hesperagrion Calvert, 1902		X									X		Westfall and May (1996)	
				Hesperagrion heterodoxum (Selys, 1868)	X									X		Westfall and May (1996)	
			Ischnura Charpentier, 1840		X	X	X		X	X	X	X	X	X	X	Westfall and May (1996)	
				Ischnura barberi Currie, 1903	X	X	X		X			X		X		Westfall and May (1996)	
				Ischnura cervula Selys, 1876	X	X	X		X	X	X	X	X	X	X	Westfall and May (1996)	
				Ischnura damula Calvert, 1902	X							X		X		Westfall and May (1996)	
				Ischnura demorsa (Hagen, 1861)	X							X		X		Westfall and May (1996)	
				Ischnura denticollis (Burmeister, 1839)	X				X	X		X	X	X	X	Westfall and May (1996)	
				Ischnura erratica Calvert, 1895	X		X		X	X	X					Westfall and May (1996)	
				Ischnura gemina (Kennedy, 1917)	X		X		X							Westfall and May (1996)	CA endemic
				Ischnura hastata (Say, 1839)	X	X	X		X					X		Westfall and May (1996)	
				Ischnura perparva McLachlan in Selys, 1876	X	X	X		X	X	X	X	X	X		Westfall and May (1996)	
				Ischnura ramburii (Selys, 1842)	X		X		X					X	X	Westfall and May (1996)	
			Nehalennia Selys, 1850		X		X		X		X					Westfall and May (1996)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Nehalennia irene (Hagen, 1861)	X		X		X		X					Westfall and May (1996)	
			Telebasis Selys, 1865		X	X	X		X			X		X	X	Westfall and May (1996)	
				Telebasis incolumis Williamson and Williamson, 1930	X										X	Westfall and May (1996)	
				Telebasis salva (Hagen, 1861)	X	X	X		X			X		X	X	Westfall and May (1996)	Widespread but uncommon at low to middle elevations
			Zoniagrion Kennedy, 1917		X	X			X							Westfall and May (1996)	
				Zoniagrion exclamationis (Selys, 1876)	X	X			X							Westfall and May (1996)	Monotypic; CA endemic
		Lestidae Needham, 1903			X	X	X		X	X	X	X		X	X	Westfall and May (1996)	
			Archilestes Selys, 1862		X	X	X		X	X	X	X		X	X	Westfall and May (1996)	
				Archilestes californica McLachlan, 1895	X	X	X		X	X	X			X	X	Westfall and May (1996)	
				Archilestes grandis (Rambur, 1842)	X	X			X			X		X	?	Westfall and May (1996)	
			Lestes Leach, 1815		X	X	X		X	X	X		X	X		Westfall and May (1996)	
				Lestes alacer Hagen, 1861	X									X		Westfall and May (1996)	
				Lestes congener Hagen, 1861	X	X	X		X	X	X	X	X	X		Westfall and May (1996)	
				Lestes disjunctus Selys, 1862	X		X		X	X	X	X	X	X		Westfall and May (1996)	*Lestes disjunctus disjunctus* Selys
				Lestes dryas Kirby, 1890	X		X		X	X	X	X	X	X		Westfall and May (1996)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Lestes stultus Hagen, 1861	X		X		X	X						Westfall and May (1996)	
				Lestes unguiculatus Hagen, 1861	X		X		X	X	X	X	X			Westfall and May (1996)	
		Platystictidae Laidlaw, 1924												X		Westfall and May (1996); Hoekstra and Garrison (1999)	very restricted locality
			Palaemnema Selys, 1860											X		Westfall and May (1996); Hoekstra and Garrison (1999)	very restricted locality
				Palaemnema domina Calvert, 1905	X									X		Westfall and May (1996); Hoekstra and Garrison (1999)	very restricted locality
	Anisoptera Selys, 1854				X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	Has keys for all dragonflies found in the region
		Aeshnidae Selys, 1858			X	X	X		X	X	X	X	X	X		Needham, Westfall and May (2000)	
			Aeshna Fabricius, 1775		X	X	X		X			X				Needham, Westfall and May (2000)	Even late instar larvae are difficult to distinguish and should be left at genus
			Aeshna Fabricius, 1775/Rhionaeshna von Ellenrieder, 2002		X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000); von Ellenrieder (2002)	
			Rhionaeshna von Ellenrieder, 2002		X	X	X		X	X	X	X	X	X		von Ellenrieder (2002)	generic separation may require identifying to species first
			Anax Leach, 1815		X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Anax junius (Drury, 1773)	X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
				Anax walsinghami McLachlan, 1882	X	X			X			X	X	X	X	Needham, Westfall and May (2000)	
			Oplonaeschna Selys, 1883		X				X			X		X		Needham, Westfall and May (2000)	
				Oplonaeschna armata (Hagen, 1861)	X				X			X		X		Needham, Westfall and May (2000)	Only one CA record from Water Canyon in Inyo County
			Remartinia Navás, 1911		X									X		Needham, Westfall and May (2000)	
				Remartinia luteipennis (Burmeister, 1839)	X									X		Needham, Westfall and May (2000)	
		Cordulegastridae Calvert, 1893			X	X			X	X	X	X	X	X		Needham, Westfall and May (2000)	
			Cordulegaster Leach, 1815		X	X			X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Cordulegaster diadema Selys, 1868	X							X		X		Needham, Westfall and May (2000)	
				Cordulegaster dorsalis Hagen in Selys, 1858	X				X	X	X	X	X			Needham, Westfall and May (2000)	
		Corduliidae Selys, 1871			X	X	X		X	X	X	X	X			Needham, Westfall and May (2000)	Corduliids unlikely in samples collected by SWAMP protocols
			Cordulia Leach, 1815		X		X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Cordulia shurtleffii Scudder, 1861	X		X		X	X	X	X	X			Needham, Westfall and May (2000)	Northern CA ponds and lakes at higher elevations
			Epitheca Charpentier, 1840		X	X	X		X	X	X					Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Epitheca canis (McLachlan, 1886)	X	X	X		X	X	X					Needham, Westfall and May (2000)	Lakes and slower sections of Northern CA streasm
				Epitheca spinigera (Selys, 1871)	X				X	X	X					Needham, Westfall and May (2000)	as *Tetragoneuria* in some lists
			Somatochlora Selys, 1871		X		X		X	X	X	X	X			Needham, Westfall and May (2000)	boggy marshes and lakes at higher elevation in Northern CA; uncommon
				Somatochlora albicincta (Burmeister, 1839)	X				X	X	X					Needham, Westfall and May (2000)	
				Somatochlora minor Calvert, 1898	X					X	X					Needham, Westfall and May (2000)	
				Somatochlora semicircularis (Selys, 1871)	X				X	X	X	X	X			Needham, Westfall and May (2000)	
		Gomphidae Rambur, 1842			X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
			Erpetogomphus Selys, 1858		X				X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
				Erpetogomphus compositus Hagen in Selys, 1858	X	X			X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
				Erpetogomphus crotalinus (Hagen in Selys, 1854)	X									X		Needham, Westfall and May (2000)	
				Erpetogomphus designatus Hagen in Selys, 1858	X								X	X		Needham, Westfall and May (2000)	
				Erpetogomphus lampropeltis Kennedy, 1918	X				X					X		Needham, Westfall and May (2000)	
			Gomphus Leach, 1815		X	X	X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Gomphus externus Hagen in Selys, 1858	X							X				Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Gomphus graslinellus Walsh, 1862	X						X					Needham, Westfall and May (2000)	
				Gomphus kurilis (Hagen in Selys, 1858)	X	X	X		X	X	X		X			Needham, Westfall and May (2000)	Northern CA streams; rarely in lakes
				Gomphus lynnae Paulson, 1983	X					X	X					Needham, Westfall and May (2000)	
			Octogomphus Selys, 1873		X				X	X	X		X		X	Needham, Westfall and May (2000)	
				Octogomphus specularis Hagen, 1859	X				X	X	X		X		X	Needham, Westfall and May (2000)	Monotypic
			Ophiogomphus Selys, 1854		X	X			X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Ophiogomphus arizonicus Kennedy, 1917	X									X		Needham, Westfall and May (2000)	
				Ophiogomphus bison Selys, 1873	X	X			X	X		?	X			Needham, Westfall and May (2000)	
				Ophiogomphus morrisoni Selys, 1879	X	X			X	X		X	X			Needham, Westfall and May (2000)	
				Ophiogomphus occidentis Hagen, 1883	X	X			X	X	X	X	X			Needham, Westfall and May (2000)	
				Ophiogomphus severus Hagen, 1874	X				X	X	X	X	X			Needham, Westfall and May (2000)	
			Progomphus Selys, 1854		X	X			X	X		X		X		Needham, Westfall and May (2000)	
				Progomphus borealis McLachlan in Selys, 1873	X	X			X	X		X		X		Needham, Westfall and May (2000)	
			Stylurus Needham, 1897		X	X			X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Stylurus intricatus (Hagen in Selys, 1858)	X	X			X				X	X		Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Stylurus olivaceus (Selys, 1873)	X	X			X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Stylurus plagiatus (Selys, 1854)	X	X			X					X		Needham, Westfall and May (2000)	
		Libellulidae Selys, 1850			X				X			X				Needham, Westfall and May (2000)	
			Brachymesia Kirby, 1889		X		X		X					X		Needham, Westfall and May (2000)	
				Brachymesia furcata (Hagen, 1861)	X		X		X					X		Needham, Westfall and May (2000)	Southern California ponds
				Brachymesia gravida (Calvert, 1890)	X									X		Needham, Westfall and May (2000)	
			Brechmorhoga Kirby, 1894		X	X			X			X		X		Needham, Westfall and May (2000)	
				Brechmorhoga mendax (Hagen, 1861)	X	X			X			X		X		Needham, Westfall and May (2000)	Deep crenulations in labial palps make this key to Cordullidae in Merritt and Cummins
				Brechmorhoga pertinax (Hagen, 1861)	X									X		Needham, Westfall and May (2000)	stray only? Not a breeding population
			Dythemis Hagen, 1861		X									X	X	Needham, Westfall and May (2000)	
				Dythemis fugax Hagen, 1861	X									X		Needham, Westfall and May (2000)	
				Dythemis nigrescens Calvert, 1899	X									X	X	Needham, Westfall and May (2000)	
				Dythemis velox Hagen, 1861	X									X		Needham, Westfall and May (2000)	
			Erythemis Hagen, 1861		X				X	X	X	X	X	X		Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Erythemis collacata (Hagen, 1861)	X				X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Erythemis simplicicollis (Say, 1839)	X									X		Needham, Westfall and May (2000)	
				Erythemis vesiculosa (Fabricius, 1775)	X									X		Needham, Westfall and May (2000)	
			Erythrodiplax Brauer, 1868		X				?					X	X	Needham, Westfall and May (2000)	
				Erythrodiplax basifusca (Calvert, 1895)	X									X	X	Needham, Westfall and May (2000)	
				Erythrodiplax funerea (Hagen, 1861)	X				?					X		Needham, Westfall and May (2000)	
			Ladona Needham, 1897		X		X		X	X	X	X				Needham, Westfall and May (2000)	
				Ladona julia (Uhler, 1857)	X		X		X	X	X	X				Needham, Westfall and May (2000)	
			Leucorrhinia Brittinger, 1850		X		X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Leucorrhinia borealis Hagen, 1890	X						X	X				Needham, Westfall and May (2000)	
				Leucorrhinia glacialis Hagen, 1890	X		X		X	X	X		X			Needham, Westfall and May (2000)	
				Leucorrhinia hudsonica (Selys, 1850)	X		X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Leucorrhinia intacta (Hagen, 1861)	X		X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Leucorrhinia proxima Calvert, 1890	X		X		X		X	X				Needham, Westfall and May (2000)	
			Libellula Linnaeus, 1758		X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Libellula comanche Calvert, 1861	X	X			X	X		X	X	X		Needham, Westfall and May (2000)	restricted to seeps and springs
				Libellula composita (Hagen, 1873)	X	X			X	X			X	X		Needham, Westfall and May (2000)	restricted to seeps and springs
				Libellula croceipennis Selys, 1868	X	X			X				X			Needham, Westfall and May (2000)	restricted to seeps and springs
				Libellula forensis Hagen, 1861	X	X			X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Libellula luctuosa Burmeister, 1839	X				X	X	X			X		Needham, Westfall and May (2000)	
				Libellula nodisticta Hagen, 1861	X	X			X	X		X	X	X		Needham, Westfall and May (2000)	prefers seeps and springs
				Libellula pulchella Drury, 1773	X		X		X	X	X		X	X		Needham, Westfall and May (2000)	
				Libellula quadrimaculata Linnaeus, 1758	X		X		X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Libellula saturata Uhler, 1857	X	X	X		X	X		X	X	X	X	Needham, Westfall and May (2000)	
			Macrodiplax Brauer, 1868		X		X		X					X	X	Needham, Westfall and May (2000)	
				Macrodiplax balteata (Hagen, 1861)	X		X		X					X	X	Needham, Westfall and May (2000)	desert spring-fed marshes
			Macrothemis Hagen, 1868		X									X		Needham, Westfall and May (2000)	
				Macrothemis inacuta Calvert, 1898	X									X		Needham, Westfall and May (2000)	
			Orthemis Hagen, 1861		X		X		X			X	X	X		Needham, Westfall and May (2000)	
				Orthemis discolor (Burmeister, 1839)	X		X							X		Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Orthemis ferruginea (Fabricius, 1775)	X		X		X			X	X	X		Needham, Westfall and May (2000)	
			Pachydiplax Brauer, 1868		X		X		X	X	X	X	X	X		Needham, Westfall and May (2000)	monotypic
				Pachydiplax longipennis (Burmeister, 1839)	X				X	X	X	X	X	X		Needham, Westfall and May (2000)	monotypic
			Paltothemis Karsch, 1890		X	X			X			X		X	X	Needham, Westfall and May (2000)	
				Paltothemis lineatipes Karsch, 1890	X	X			X			X		X	X	Needham, Westfall and May (2000)	Deep crenulations in labial palps make this key to Cordullidae in Merritt and Cummins
			Pantala Hagen, 1861		X				X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
				Pantala flavescens (Fabricius, 1798)	X				X	X	X		X	X		Needham, Westfall and May (2000)	
				Pantala hymenaea (Say, 1839)	X				X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
			Perithemis Hagen, 1861		X		X		X					X		Needham, Westfall and May (2000)	
				Perithemis domitia (Drury, 1773)	X									X		Needham, Westfall and May (2000)	
				Perithemis intensa Kirby, 1889	X		X		X					X		Needham, Westfall and May (2000)	
				Perithemis tenera (Say, 1839)	X									X		Needham, Westfall and May (2000)	
			Plathemis Hagen, 1861		X	X	X		X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Plathemis lydia (Drury, 1773)	X	X	X		X	X	X	X	X	X		Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Plathemis subornata Hagen, 1861	X	X	X		X	X			X	X		Needham, Westfall and May (2000)	
			Pseudoloeon Kirby, 1889		X									X		Needham, Westfall and May (2000)	monotypic
				Pseudoleon superbus (Hagen, 1861)	X									X		Needham, Westfall and May (2000)	monotypic
			Sympetrum Newman, 1833		X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
				Sympetrum corruptum (Hagen, 1861)	X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
				Sympetrum costiferum (Hagen, 1861)	X		X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Sympetrum danae (Sulzer, 1776)	X		X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Sympetrum illotum (Hagen, 1861)	X	X	X		X	X	X		X			Needham, Westfall and May (2000)	
				Sympetrum internum Montgomery, 1911	X	X	X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Sympetrum madidum (Hagen, 1861)	X	X	X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Sympetrum obtrusum (Hagen, 1867)	X		X		X	X	X	X	X			Needham, Westfall and May (2000)	
				Sympetrum occidentale Bartenev, 1911	X	X	X		X	X	X		X	X		Needham, Westfall and May (2000)	three recognized subspecies
				Sympetrum pallipes (Hagen, 1874)	X	X	X		X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Sympetrum signiferum Cannings and Garrison, 1991	X									X		Needham, Westfall and May (2000)	
				Sympetrum vicinum (Hagen, 1861)	X		X		X	X	X					Needham, Westfall and May (2000)	

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Tramea Hagen, 1861		X	X	X		X	X	X	X	X	X	X	Needham, Westfall and May (2000)	
				Tramea calverti Muttkowski, 1895	X	X	X		?							Needham, Westfall and May (2000)	unpublished record for CA
				Tramea lacerata Hagen, 1861	X	X	X		X	X	X	X	X	X		Needham, Westfall and May (2000)	
				Tramea onusta Hagen, 1861	X	X	X		X			X	X	X	X	Needham, Westfall and May (2000)	
		Macromiidae Needham, 1903			X				X							Needham, Westfall and May (2000)	
			Macromia Rambur, 1842		X				X	X	X		X	X		Needham, Westfall and May (2000)	
				Macromia magnifica McLachlan in Selys, 1874	X				X	X	X		X	X		Needham, Westfall and May (2000)	Northern CA foothills and coast ranges
		Petaluridae Needham, 1901			X				X	X	X		X			Needham, Westfall and May (2000)	
			Tanypteryx Kennedy, 1917														
				Tanypteryx hageni (Selys, 1879)	X				X	X	X		X			Needham, Westfall and May (2000)	Rare and localized in seeps and springs

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Plecoptera: Stoneflies
Standard Effort Level I: Genus
Standard Effort Level II: Species (where possible)
Standard Taxonomic Reference: Stewart and Stark (2002); Stewart and Stark (2008)
Reviewed by: John B. Sandberg

Nymphs may be identified to family and genus using Stewart and Stark (2002) or the chapter in Merritt, Cummins and Berg (Stewart and Stark, 2008), which also provides keys to adults. Although species keys exist for the adults of many families and genera in the West, many nymphs remain undescribed. Early instar nymphs of Capniidae can be very difficult to identify to genus; it is recommended that only mature nymphs be identified beyond Capniidae. Many genera and species of Capniidae, Leuctridae, Nemouridae and Taeniopterygidae are underrepresented in benthic samples because they emerge during the winter months or they prefer ephemeral habitats. A current species list and distribution for stoneflies, The North American Stonefly List (Stark et al.), is currently maintained on the Illinois Natural History Survey website.

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Plecoptera Burmeister, 1839						X	X	X		X	X	X	X	X	X	X	Stewart and Stark (2008); Stewart and Stark (2002)	has keys to all families and genera in North America
	Euholognatha Zwick, 1969					X	X	X		X	X	X	X	X	X	X		
		Capniidae Klapalek, 1905				X	X			X	X	X	X	X	X	X		Nymphs notoriously difficult to separate even to genus; immature specimens are best left at Capniidae
			Bolshecapnia Ricker, 1965			X	X			X							Stewart and Stark (2002)	
					Bolshecapnia maculata (Jewett, 1954)	X	X			X								known only from CA
			Capnia Pictet, 1841			X	X			X	X	X	X	X	X	X	Nelson and Baumann (1989)	nymphs are not separable to species
			Capnura Banks, 1900			X	X			X	X	X	X	X	X			nymphs not separable to species

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Eucapnopsis Okamoto, 1922			X	X			X	X	X	X	X	X			only one North American species
					Eucapnopsis brevicauda Claassen, 1924	X	X			X	X	X	X	X	X			only one North American species
			Isocapnia Banks, 1938			X	X			X	X	X	X				Zenger and Baumann, 2004	nymphs not separable to species
			Mesocapnia Rauser, 1968			X	X			X	X	X	X		X			nymphs not separable to species
			Paracapnia Hanson, 1946			X	X			X	X	X					Stark and Baumann (2004)	nymphs not separable to species
			Utacapnia Nebeker and Gaufin, 1967			X	X			X	X	X	X	X				nymphs not separable to species
		Leuctridae Klapalek, 1905											X					
			Calileuctra Shepard and Baumann, 1995			X	X			X							Shepard and Baumann (1995)	found in intermittant streams; nymphs not separable to species
			Despaxia Ricker, 1943			X	X			X	X	X						monotypic
					Despaxia augusta (Banks, 1907)	X	X			X	X	X						monotypic
			Megaleuctra Neave, 1934			X	X			X	X	X						nymphs not separable to species
			Moselia Ricker, 1943			X	X			X	X	X		X				monotypic
					Moselia infuscata (Claassen, 1923)	X	X			X	X	X		X				monotypic
			Paraleuctra Hanson, 1941			X	X			X	X	X	X	X				nymphs not separable to species
			Perlomyia Banks, 1906			X	X			X	X	X	X					nymphs not separable to species
			Pomoleuctra Stark and Kyzar, 2000			X	X			X	X						Stark and Kyzar (2001)	formerly in *Paraleuctra;* nymphs not separable to species
		Nemouridae Newman, 1853											X					
			Amphinemura Ris, 1902			X	X						X		X			nymphs not separable to species

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Lednia Ricker, 1952			X	X			X		X					Kondratieff, Lechleitner and Zuellig (2006); Baumann and Kondratieff (2010)	nymphs inseparable except by distribution
					Lednia borealis Baumann and Kondratieff, 2010	X	X					X					Baumann and Kondratieff (2010)	Kondratieff et al. (2006) reported this species as *Lednia tumana*
					Lednia sierra Baumann and Kondratieff, 2010	X	X			X							Baumann and Kondratieff (2010)	
			Malenka Ricker, 1952			X	X			X	X	X	X	X	X	X		nymphs not separable to species; genus currently being revised, many new species likely to be described
			Nanonemoura Baumann and Fiala, 2001			X	X				X							monotypic; known only from type locality
					Nanonemoura wahkeena (Jewett, 1954)	X	X				X							monotypic; known only from type locality
			Nemoura Pictet, 1841			X	X			X								
					Nemoura spiniloba Jewett, 1954	X	X			X								only one species in western North America
			Ostrocerca Ricker, 1952			X	X			?	X	X						nymphs not separable to species; unpublished record for CA
			Podmosta Ricker, 1952			X	X			X	X	X	X	X				nymphs not separable to species
			Prostoia Ricker, 1952			X	X			X	X	X	X	X				only one species in western North America
					Prostoia besametsa (Ricker, 1952)	X	X			X	X	X	X	X				only one species in western North America
			Soyedina Ricker, 1952			X	X			X	X	X		X				nymphs not separable to species
			Visoka Ricker, 1952			X	X			X	X	X						monotypic
					Visoka cataractae (Neave, 1933)	X	X			X	X	X						monotypic

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Zapada Ricker, 1952			X	X			X	X	X	X	X			Baumann et al. (1977)	key to nymphs of three species (cinctipes, columbiana and frigida); remaining species key to oregonensis group
					Zapada cinctipes (Banks, 1897)	X	X			X		X	X	X			Baumann et al. (1977)	
					Zapada columbiana (Claassen, 1923)	X	X			X	X	X	X				Baumann et al. (1977)	
					Zapada frigida (Claassen, 1923)	X	X			X	X	X	X	X			Baumann et al. (1977)	
				Zapada oregonensis group sensu Baumann et al. (1977)						X	X	X		X			Baumann et al. (1977)	includes *Z. cordillera* (Baumann and Gaufin, 1971), *Z. haysi* (Ricker, 1952) and *Z. oregonensis* (Claassen, 1923)
					Zapada cordillera (Baumann and Gaufin, 1971)	X	X			X	X	X					Baumann et al. (1977)	*Z. oregonensis* group sensu Baumann et al. (1977)
					Zapada haysi (Ricker, 1952)	X	X			X	X	X	X	X			Baumann et al. (1977)	*Z. oregonensis* group sensu Baumann et al. (1977)
					Zapada oregonensis (Claassen, 1923)	X	X			X	X	X		X			Baumann et al. (1977)	*Z. oregonensis* group sensu Baumann et al. (1977)
		Taeniopterygidae Klapalek, 1905				X	X			X	X	X	X	X	X			
			Doddsia Needham and Claassen, 1925			X	X			X	X	X	X	X				monotypic
					Doddsia occidentalis (Banks, 1900)	X	X			X	X	X	X	X				monotypic
			Oemopteryx Klapalek, 1902			X	X			X			X					nymphs not separable to species
			Taenionema Banks, 1905			X	X			X	X	X	X	X	X		Stewart (2009)	tentative key of nymphs to species
					Taenionema californicum (Needham and Claassen, 1925)	X	X			X								
					Taenionema grinnelli (Banks, 1918)	X	X			X								

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Taenionema jacobii Stanger and Baumann, 1993	X	X								X			
					Taenionema jeanae Baumann and Nelson, 2007	X	X			X							Baumann and Nelson (2007)	
					Taenionema jewetti Stanger and Baumann, 1993	X	X				X	X						
					Taenionema kincaidi (Hoppe, 1938)	X	X			X	X	X		X				
					Taenionema oregonense (Needham and Claassen, 1925)	X	X				X	X						
					Taenionema pacificum (Banks, 1900)	X	X			X	X	X	X		X			
					Taenionema pallidum (Banks, 1902)	X	X			X	X	X	X	X				
					Taenionema raynorium (Claassen, 1937)	X	X			X								
					Taenionema uinta Stanger and Baumann, 1993	X	X				X		X	X				
					Taenionema umatilla Stanger and Baumann, 1993	X	X				X							
			Taeniopteryx Pictet, 1841			X	X			X	X	X	X					
					Taeniopteryx nivalis (Fitch, 1847)	X	X			X	X	X	X					only species in region
	Systellognatha Enderlein, 1909					X	X						X					
		Chloroperlidae Okamoto, 1912				X	X			X	X	X	X	X	X	X	Surdick (1985)	
			Alloperla Banks, 1906			X	X			X	X	X	X	X				nymphs not separable to species
			Bisancora Surdick, 1981			X	X			X	X					X		nymphs not separable to species
			Haploperla Navas, 1934			X	X			X	X	X				X		
					Haploperla chilnualna (Ricker, 1952)	X	X			X	X	X				X		only species in western North America
			Kathroperla Banks, 1920			X	X			X	X	X		X			Stark and Surdick (1987)	nymphs not separable to species
			Paraperla Banks, 1906			X	X			X	X	X	X					nymphs not separable to species
			Plumiperla Surdick, 1985			X	X			X	X	X	X	X				nymphs not separable to species
			Sasquaperla Stark and Baumann, 2001			X	X			X							Stark and Baumann (2001)	monotypic
					Sasquaperla hoopa Stark and Baumann, 2001	X	X			X							Stark and Baumann (2001)	monotypic

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Suwallia Ricker, 1943			X	X			X	X	X	X	X	X		Alexander (1999)	nymphs not separable to species
			Sweltsa Ricker, 1943			X	X			X	X	X	X	X	X		Stark and Stewart (2005)	nymphs not separable to species; 9 of 21 western species nymphs described
			Triznaka Ricker, 1952			X	X			X	X	X	X	X				nymphs not separable to species
			Utaperla Ricker, 1952			X	X						X	X				
					Utaperla sopladora Ricker, 1952	X	X						X	X				only species found in western North America
		Peltoperlidae Claassen, 1931				X	X			X	X	X		X				
			Sierraperla Jewett, 1954			X	X			X	X			X				monotypic
					Sierraperla cora (Needham and Smith, 1916)	X	X			X	X			X				monotypic
			Soliperla Ricker, 1952			X	X			X	X	X		X			Stark (1983	nymphal key includes only 4 of the 7 known species
			Yoraperla Ricker, 1952			X	X			X	X	X		X			Stark and Nelson (1994)	nymphs for all four North American species described and keyed
					Yoraperla brevis (Banks, 1907)	X	X				X						Stark and Nelson (1994)	
					Yoraperla mariana (Ricker, 1943)	X	X			X	X	X					Stark and Nelson (1994)	
					Yoraperla nigrisoma (Banks, 1948)	X	X			X	X	X		X			Stark and Nelson (1994)	
					Yoraperla siletz Stark and Nelson, 1994	X	X			X	X	X					Stark and Nelson (1994)	
		Perlidae MacLachlan, 1886				X	X			X	X	X	X	X	X			
			Acroneuria Pictet, 1841			X	X						X				Baumann, Gaufin and Surdick (1977)	
					Acroneuria abnormis (Newman, 1838)	X	X						X				Baumann, Gaufin and Surdick (1977)	
			Anacroneuria Klapalek, 1909			X	X								X			

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Anacroneuria wipukupa Baumann and Olson, 1984	X	X								X			only species found in North America
			Calineuria Ricker, 1954			X	X			X	X	X						
					Calineuria californica (Banks, 1905)	X	X			X	X	X						only species found in North America
			Claassenia Wu, 1934			X	X			X	X	X	X		X			
					Claassenia sabulosa (Banks, 1900)	X	X			X	X	X	X		X			only species found in North America
			Doroneuria Needham and Claassen, 1922			X	X			X	X	X	X	X				Utah record based on nymphs only
					Doroneuria baumanni Stark and Gaufin, 1974	X	X			X	X	X		X				*D. theodora* (Needham and Claassen) is found in BC, ID, MT and WY
			Hesperoperla Banks, 1938			X	X			X	X	X	X	X	X			mature nymphs of the two species easily separable
					Hesperoperla hoguei Baumann and Stark, 1980	X	X			X							Baumann and Stark (1980)	
					Hesperoperla pacifica (Banks, 1900)	X	X			X	X	X	X	X	X		Stewart and Stark (2002)	
		Perlodidae Klapalek, 1912				X	X			X	X	X	X	X	X	X		
			Baumannella Stark and Stewart, 1985			X	X			X							Stark and Stewart (1985)	monotypic
					Baumannella alameda (Needham and Claassen, 1925)	X	X			X							Stark and Stewart (1985)	monotypic
			Calliperla Banks, 1947			X	X			X	X	X						monotypic
					Calliperla luctuosa (Banks, 1906)	X	X			X	X	X						monotypic
			Cascadoperla Szczytko and Stewart, 1979			X	X			X	X	X					Szczytko and Stewart (1979)	monotypic
					Cascadoperla trictura (Hoppe, 1938)	X	X			X	X	X					Szczytko and Stewart (1979)	monotypic
			Chernokrilus Ricker, 1952			X	X			X	X							nymphs are not separable to species

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Chernokrilus misnomus (Claassen, 1925)	X	X			X	X						Stewart and Stark (1984); Kondratieff, Baumann and Lee (2007)	*Chernokrilus erratus* (Claassen) is now a jr. synonym
			Cosumnoperla Szczytko and Bottorff, 1987			X	X										Szczytko and Bottorff (1987)	
					Cosumnoperla hypocrena Szczytko and Bottorff, 1987	X	X			X							Szczytko and Bottorff (1987)	
					Cosumnoperla sequoia Bottorff, 2007	X	X			X							Bottorff (2007)	gives characters for nymph
			Cultus Ricker, 1952			X	X			X	X	X	X		X			
			Diura Billberg, 1820			X	X			X	X		X	X				
					Diura knowltoni (Frison, 1937)	X	X			X	X		X	X				
			Frisonia Ricker, 1943			X	X			X	X	X		X				
					Frisonia picticeps (Hanson, 1942)	X	X			X	X	X		X				
			Isogenoides Klapalek, 1912			X	X			X		X	X		X		Sandberg and Stewart (2005)	key given for nymphs to all species of *Isogenoides*
					Isogenoides colubrinus (Hagen, 1874)	X	X			X			X		X		Sandberg and Stewart (2005)	
					Isogenoides elongatus (Hagen, 1874)	X	X					X	X		X		Sandberg and Stewart (2005)	
					Isogenoides zionensis Hanson, 1949	X	X						X		X		Sandberg and Stewart (2005)	
			Isoperla Banks, 1906			X	X			X	X	X	X	X	X	X	Szczytko and Stewart (1979); Bottorff et al. (1990); Szczytko and Stewart (2002)	not all western *Isoperla* species described as nymphs

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Kogotus Ricker, 1952			X	X			X	X	X	X					immature specimens have secondary lacinial tooth which makes ID to genus difficult; immature *Kogotus* and *Rickera* difficult to separate
					Kogotus modestus (Banks, 1908)	X	X						X					
					Kogotus nonus (Needham and Claassen, 1925)	X	X			X	X	X						only species in the region
			Kogotus Ricker, 1952/*Rickera* Jewett, 1954			X	X			X	X	X						many specimens of these genera, especially early instars inseparable
			Megarcys Klapalek, 1912			X	X			X	X	X	X	X				nymphs not separable to species
			Oroperla Needham, 1933			X	X			X								monotypic
					Oroperla barbara Needham, 1933	X	X			X								monotypic
			Osobenus Ricker, 1952			X	X			X	X	X						monotypic
					Osobenus yakimae (Hoppe, 1938)	X	X			X	X	X						monotypic
			Perlinodes Needham and Claassen, 1925			X	X			X	X	X						monotypic
					Perlinodes aurea (Smith, 1917)	X	X			X	X	X						monotypic
			Pictetiella Illies, 1966			X	X					X	X				Stark and Kondratieff (2004)	Stark and Kondratieff provide characters to separate the nymphs although distribution also diagnostic
					Pictetiella expansa (Banks, 1920)	X	X						X				Stark and Kondratieff (2004)	found in scattered localities CO, UT, MT, WY, ID
					Pictetiella lechleitneri Stark and Kondratieff, 2004	X	X					X					Stark and Kondratieff (2004)	found only in Mt. Ranier, WA area
			Rickera Jewett, 1954			X	X			X	X	X		X				monotypic; immature specimens difficult to separate from *Kogotus*
					Rickera sorpta (Needham and Claassen, 1925)	X	X			X	X	X		X				monotypic
			Salmoperla Baumann and Lauck, 1987			X	X			X								monotypic
					Salmoperla sylvanica Baumann and Lauck, 1987	X	X			X								monotypic

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Setvena Ricker, 1952			X	X				X	X					Stewart and Stanger (1985)	key to nymphs of all three known species
					Setvena tibialis (Banks, 1914)	X	X				X	X						
					Setvena wahkeena Stewart and Stanger, 1985	X	X				X							
			Skwala Ricker, 1952			X	X			X	X	X	X	X	X		Zwick (1989)	nymphs of the two species are not separable
			Susulus Bottorff and Stewart, 1989			X	X			X							Bottorff et al. (1989)	monotypic
					Susulus venustus (Jewett, 1965)	X	X			X							Bottorff et al. (1989)	monotypic
		Pteronarcyidae Enderlein, 1909				X	X			X	X	X	X	X	X			
			Pteronarcella Banks, 1900			X	X			X	X	X	X	X	X		Baumann et al. (1977); Stewart and Stark (2002)	Stewart and Stark suggest that key in Baumann et al. does not work to separate nymphs of the two species
			Pteronarcys Newman, 1838			X	X			X	X	X	X	X	X		Baumann et al. (1977)	key to nymphs of both species
					Pteronarcys californica Newport, 1851	X	X			X	X	X	X		X			
					Pteronarcys princeps Banks, 1907	X	X			X	X	X	X	X				

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Additional Sources of Information on Plecoptera

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Hemiptera (Suborder Heteroptera): True Bugs
Standard Effort Level I: Genus
Standard Effort Level II: Species
Standard Taxonomic Reference(s): Polhemus (2008)
Reviewed by:

Keys to families and genera are provided in Merritt, Cummins and Berg (Polhemus, 2008). The best regional text for all families remains Menke (ed.) (1979), which gives keys to all genera and species then known to occur in California. Stonedahl and Lattin (1986) surveyed the Corixidae for Oregon and Washington. Polhemus and Polhemus (2002) discussed the distributions of aquatic bugs in the Great Basin. This revision of the STE includes only those families which are truly aquatic (all Nepomorpha, except Gelastocoridae and Ochteridae) and excludes all Gerromorpha and Leptopodomorpha. The Notonectidae and Pleidae, which are included in this list, are generally rejected from benthic datasets.

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Hemiptera Linnaeus, 1758								X	X	X	X	X	X	X	X	X	X	X		
	Heteroptera Latreille, 1810							X	X	X	X	X	X	X	X	X	X	X	Polhemus (2008); Menke et al. (1979)	Polhemus provides keys to families and genera; Menke et al. provide keys to species, many of these keys will work for the entire western US
		Gerromorpha Popov, 1971							X	X		X	X	X	X	X	X	X		
			Gerridae Leach, 1815						X	X		X	X	X	X	X	X	X		Excluded from benthic datasets
			Hebridae Amyot and Serville, 1843						X	X		X	X			X	X			Excluded from benthic datasets
			Hydrometridae Bilberg, 1820						X	X		X	X				X			Excluded from benthic datasets

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Macroveliidae McKinstry, 1942						X	X		X	X		X	X	X			Excluded from benthic datasets
			Mesoveliidae Douglas and Scott, 1867						X	X		X								Excluded from benthic datasets
			Veliidae Amyot and Serville, 1843						X	X		X	X	X	X	X	X			Excluded from benthic datasets
		Nepomorpha Popov, 1968						X	X	X		X	X	X	X	X	X			
			Belostomatidae Leach, 1815					X				X			X		X		Menke (1979)	
						Abedus Stal, 1862		X				X			X		X		Menke (1979)	
							Abedus breviceps Stal, 1862	X									X		Menke (1979)	
							Abedus herberti Hidalgo, 1935	X							X		X		Menke (1979)	
							Abedus indentatus (Haldeman, 1854)	X				X							Menke (1979)	
							Abedus ovatus Stal, 1862	X									X		Menke (1979)	
							Abedus parkeri Menke, 1966	X									X		Menke (1979)	
							Abedus vicinus Mayr, 1871	X									X		Menke (1979)	
						Belostoma Latreille, 1807		X				X	X		X	X	X		Menke (1979)	
							Belostoma bakeri Montandon, 1913	X				X	X		X	X	X		Menke (1979)	
							Belostoma confusum Lauck, 1959	X									X		Menke (1979)	
							Belostoma flumineum Say, 1832	X				X	X			X	X		Menke (1979)	
							Belostoma saratogae Menke, 1958	X				X							Menke (1979)	known only from Saratoga Spring, Death Valley, CA
							Belostoma subspinosum (Palisot, 1820)	X				X					X		Menke (1979)	
						Lethocerus Mayr, 1853		X				X	X	X	X	X	X		Goodwyn (2006)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Lethocerus americanus (Leidy, 1847)	X				X	X	X	X	X			Goodwyn (2006)	
							Lethocerus angustipes (Mayr, 1871)	X				X				X			Goodwyn (2006)	known in the U.S. only from Saratoga Spring, Death Valley, CA; also found in Mexico
							Lethocerus medius (Guerin-Meneville, 1857)	X									X		Goodwyn (2006)	
			Corixidae Leach, 1815					X	X	X	X	X	X	X	X	X	X	X	Polhemus (2008); Hungerford (1948); Lauck (1979); Stonedahl and Lattin (1986)	
				Corixinae Enderlein, 1915				X	X	X	X	X	X	X	X	X	X	X	Polhemus (2008); Hungerford (1948); Lauck (1979); Stonedahl and Lattin (1986)	
					Corixini Enderlein, 1915			X	X	X	X	X	X	X	X	X	X	X	Polhemus (2008); Hungerford (1948); Lauck (1979); Stonedahl and Lattin (1986)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Arctocorisa Wallengren, 1894		X		X		?			X				Hungerford (1948)	high elevation ponds
							Arctocorisa sutilis (Uhler, 1876)	X		X		?			X				Hungerford (1948)	unpublished record for CA
						Callicorixa White, 1873		X				X	X	X	X	X			Stonedahl and Lattin (1986)	
							Callicorixa alaskensis Hungerford, 1926	X						X	X				Stonedahl and Lattin (1986)	
							Callicorixa audeni Hungerford, 1928	X				X	X	X	X	X			Stonedahl and Lattin (1986)	
							Callicorixa scudderi Jansson, 1979	X					X	X					Stonedahl and Lattin (1986)	
							Callicorixa vulnerata (Uhler, 1861)	X				X	X	X	X				Stonedahl and Lattin (1986)	
						Cenocorixa Hungerford, 1948		X				X	X	X	X				Hungerford (1948)	
							Cenocorixa andersoni Hungerford, 1948	X					X	X					Hungerford (1948)	
							Cenocorixa bifida (Hungerford, 1926)	X						X	X				Hungerford (1948)	as *C. bifida hungerfordi* Lansbury, 1960
							Cenocorixa blaisdelli (Hungerford, 1930)	X				X		X					Hungerford (1948)	
							Cenocorixa expleta (Uhler, 1895)	X						X					Hungerford (1948)	
							Cenocorixa kuiterti Hungerford, 1948	X				X							Hungerford (1948)	
							Cenocorixa utahensis (Hungerford, 1925)	X					X	X	X	X	X		Hungerford (1948)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Cenocorixa wileyae (Hungerford, 1926)	X				X	X	X	X	X	X		Hungerford (1948)	
						Corisella Lundblad, 1928		X				X	X	X	X	X	X		Hungerford (1948)	
							Corisella decolor (Uhler, 1871)	X				X	X		X	X			Hungerford (1948)	
							Corisella edulis (Champion, 1901)	X					X		X	X	X		Hungerford (1948)	
							Corisella inscripta (Uhler, 1894)	X				X	X	X	X	X	X		Hungerford (1948)	
							Corisella tarsalis (Fieber, 1851)	X				X			X	X			Hungerford (1948)	
						Hesperocorixa Kirkaldy, 1908		X				X	X	X	X	X	X		Hungerford (1948)	
							Hesperocorixa atopodonta (Hungerford, 1927)	X					X	X					Hungerford (1948)	
							Hesperocorixa escheri (Heer, 1853)	X						X					Hungerford (1948)	dubious species?
							Hesperocorixa kennicotti (Uhler, 1897)	X						X					Hungerford (1948)	
							Hesperocorixa laevigata (Uhler, 1893)	X				X	X	X	X	X	X		Hungerford (1948)	
							Hesperocorixa nitida (Fieber, 1851)	X						X					Hungerford (1948)	
							Hesperocorixa vulgaris (Hungerford, 1925)	X				X	X	X					Hungerford (1948)	
						Morphocorixa Jaczewski, 1931		X									X		Hungerford (1948)	
							Morphocorixa lundbladi (Jaczewski, 1931)	X									X		Hungerford (1948)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Palmacorixa Abbott, 1912		X				?							Hungerford (1948)	unpublished record for CA
							Palmacorixa buenoi Abbott, 1913	X				?							Hungerford (1948)	unpublished record for CA
						Pseudocorixa Jaczewski, 1931		X									X		Hungerford (1948)	
							Pseudocorixa beameri (Hungerford, 1928)	X									X		Hungerford (1948)	
						Ramphocorixa Abbott, 1912		X									X		Hungerford (1948)	
							Ramphocorixa rotundocephala Hungerford, 1927	X									X		Hungerford (1948)	
						Sigara Fabricius, 1775		X				X	X	X	X	X	X		Hungerford (1948)	
							Sigara decoratella (Hungerford, 1926)	X						X					Hungerford (1948)	
							Sigara alternata (Say, 1825)	X					X	X		X	X		Hungerford (1948)	
							Sigara grossolineata Hungerford, 1948	X				X	X	X	X				Hungerford (1948)	
							Sigara krafti Stonedahl, 1984	X					X	X					Stonedahl (1984)	
							Sigara mckinstryi Hungerford, 1948	X				X	X	X					Hungerford (1948)	
							Sigara nevadensis (Walley, 1936)	X							X	X			Hungerford (1948)	
							Sigara omani (Hungerford, 1930)	X				X	X	X		X	X		Hungerford (1948)	
							Sigara vallis Lauck, 1966	X				X							Lauck (1979)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Sigara vandykei Hungerford, 1948	X				X		X					Hungerford (1948)	
							Sigara washingtonensis Hungerford, 1948	X				X	X	X	X	X	X		Hungerford (1948)	
						Trichocorixa Kirkaldy, 1908		X			X	X			X	X	X		Hungerford (1948)	
							Trichocorixa arizonensis Sailer, 1948	X									X		Hungerford (1948)	
							Trichocorixa calva (Say, 1832)	X				X				X	X		Hungerford (1948)	
							Trichocorixa reticulata (Guerin-Meneville, 1857)	X			X	X				X			Hungerford (1948)	
							Trichocorixa uhleri Sailer, 1948	X								X	X		Hungerford (1948)	
							Trichocorixa verticalis (Fieber, 1851)	X			X	X			X	X	X		Hungerford (1948)	
					Graptocorixini Hungerford, 1948			X				X	X		X	X	X	X	Hungerford (1948)	
						Graptocorixa Hungerford, 1930		X				X	X		X	X	X		Hungerford (1948)	
							Graptocorixa abdominalis (Say, 1832)	X							X	X	X	X	Hungerford (1948)	
							Graptocorixa californica (Hungerford, 1925)	X				X	X						Hungerford (1948)	
							Graptocorixa gerhardi (Hungerford, 1925)	X									X		Hungerford (1948)	
							Graptocorixa serrulata (Uhler, 1897)	X					X			X	X		Hungerford (1948)	
							Graptocorixa uhleri (Hungerford, 1925)	X				X				X			Hungerford (1948)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Graptocorixa uhleroidea Hungerford, 1938	X				X							Hungerford (1948)	
						Neocorixa Hungerford, 1925		X									X		Hungerford (1948)	only one species found in North America
							Neocorixa snowi Hungerford, 1925	X									X		Hungerford (1948)	only species found in North America
			Gelastocoridae Kirkaldy, 1897									X	X	X	X	X	X			Shoredwellers; excluded from benthic datasets
			Naucoridae Leach, 1815					X				X	X		X	X	X			
				Ambrysinae Usinger, 1941				X				X	X		X	X	X			
						Ambrysus Stal, 1861		X				X	X			X	X		Polhemus (1979); La Rivers (1951)	
							Ambrysus amargosus La Rivers, 1953	X								X			Polhemus (1979); La Rivers (1951)	Ash Meadows, NV; Listed under the Federal Endangered Species Act
							Ambrysus arizonus La Rivers, 1951	X								X			Polhemus (1979); La Rivers (1951)	
							Ambrysus californicus Montandon, 1897	X				X							Polhemus (1979); La Rivers (1951)	
							Ambrysus circumcinctus Montandon, 1910	X									X		Polhemus (1979); La Rivers (1951)	
							Ambrysus funebris La Rivers, 1949	X				X				X			Polhemus (1979); La Rivers (1951)	Death Valley, CA

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Ambrysus melanopterus Stal, 1862	X									X		Polhemus (1979); La Rivers (1951)	
							Ambrysus mormon Montandon, 1909	X				X	X		X	X	X		Polhemus (1979); La Rivers (1951)	
							Ambrysus occidentalis La Rivers, 1951	X				X					X		Polhemus (1979); La Rivers (1951)	
							Ambrysus pulchellus Montandon, 1897	X									X		Polhemus (1979); La Rivers (1951)	
							Ambrysus puncticollis Stal, 1876	X				X					X		Polhemus (1979); La Rivers (1951)	
							Ambrysus relictus Polhemus and Polhemus, 1994	X								X			Polhemus and Polhemus (1994)	Ash Meadows, NV
							Ambrysus thermarum La Rivers, 1953	X									X			
							Ambrysus woodburyi Usinger, 1946	X							X	X	X		Polhemus (1979); La Rivers (1951)	
				Limnocorinae Stal, 1876				X								X			Polhemus (1979); La Rivers (1951)	
							Limnocoris Stal, 1860	X								X			Polhemus (1979); La Rivers (1951)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Limnocoris moapensis (La Rivers, 1950)	X								X			Sites and Willig (1994)	Moapa Warm Springs, NV
				Naucorinae Stal, 1876				X				X				X	X		Polhemus (1979); La Rivers (1951)	
						Pelocoris Stal, 1876		X				X				X	X		Polhemus (1979); La Rivers (1951)	
							Pelocoris biimpressus Montandon, 1898	X				X				X	X		Polhemus and Sites (1995)	*P. shoshone* La Rivers, 1948 now a synonym
			Nepidae Latreille, 1802					X				X	X				X		Sites and Polhemus (1994)	
				Nepinae Douglas and Scott, 1865				X									X		Sites and Polhemus (1994)	
					Curictini Menke and Stange, 1964			X									X		Sites and Polhemus (1994)	
						Curicta Stal, 1861		X									X		Sites and Polhemus (1994)	
							Curicta pronotata Kuitert, 1949	X									X		Sites and Polhemus (1994)	
				Ranatrinae Douglas and Scott, 1865				X				X	X			X	X		Sites and Polhemus (1994)	

Taxonomic Hierarchy								Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Ranatra Fabricius, 1790		X				X	X			X	X		Sites and Polhemus (1994)	
							Ranatra brevicollis Montandon, 1910	X				X							Sites and Polhemus (1994)	
							Ranatra fusca Palisot, 1820	X				X	X			X			Sites and Polhemus (1994)	
							Ranatra montezuma Polhemus, 1976	X									X		Sites and Polhemus (1994)	known only from Montezuma's Well, AZ
							Ranatra quadridentata Stal, 1862	X				X					X		Sites and Polhemus (1994)	
			Notonectidae Latreille, 1802									X	X	X	X	X	X			Excluded from benthic datasets
			Ochteridae Kirkaldy, 1906									X					X		Polhemus (1996)	Excluded from benthic datasets
			Pleidae Fieber, 1851									X			?				Polhemus (2008)	
		Leptopodomorpha Popov, 1971										X	X	X		X	X			
			Leptopodidae Amyot and Serville, 1843									X		X		X				Excluded from benthic datasets
			Saldidae Amyot and Serville, 1843									X			X				Polhemus (2008)	Excluded from benthic datasets
	Homoptera Latreille (1810)																			Excluded from benthic datasets

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Megaloptera: Dobsonflies and Alderflies
Standard Effort Level I: Genus
Standard Effort Level II: Genus
Standard Taxonomic Reference: Flint, Evans and Neunzig (2008)
Reviewed by:

Larvae may be identified to genus using the key in Merritt, Cummins and Berg (Flint, Evans and Neunzig, 2008). Early instar corydalids are best left at family since head color patterns generally do not develop until later instars. Evans's (1972) unpublished dissertation provides a species key to western megalopteran larvae, although the key does not include one species of *Sialis* and three species of *Protochauliodes*. Keys to adults as well as distributional and ecological information may found in the sources listed below. The Bibliography of the Neuropterida website is a useful resource and provides many downloadable PDFs of Megaloptera and Neuroptera literature.

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Megaloptera Latreille, 1802				X	X	X		X	X	X	X	X	X	X		
	Corydalidae Leach, 1815			X	X			X	X	X	X	X	X	X	Flint, Evans and Neunzig (2008)	
		Corydalus Latreille, 1802		X	X			X			X	X	X	X	Contreras-Ramos (1998)	*C. cognatus* (Hagen) is a synonym of *C. texanus* Banks
			Corydalus bidenticulatus Contreras-Ramos, 1998	X	X								X		Contreras-Ramos (1998)	single record from Huachuca Mts., Miller Canyon
			Corydalus texanus Banks, 1903	X	X			X			X	X	X	X	Contreras-Ramos (1998)	
		Dysmicohermes Munroe, 1953		X	X			X	X	X					Evans (1972)	
		Neohermes Banks, 1908		X	X			X	X			X	X		Evans (1972)	
		Orohermes Evans, 1984		X	X			X	X						Evans (1972)	
			Orohermes crepusculus (Chandler, 1954)	X	X			X	X						Evans (1972)	
		Protochauliodes van der Weele, 1909		X	X			X	X	X					Evans (1972)	mostly found in intermittent streams; larvae not described for all species

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
	Sialidae Leach, 1815			X	X	X		X	X	X		X				
		Sialis Latreille, 1802		X	X	X		X	X	X	X	X			Evans (1972); Whiting (1991)	key to mature larvae, but lacking *S. bilobata*

Literature Cited

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Flint, O. S., Jr., E. D. Evans, and H. H. Neunzig. 2008. Chapter 16: Megaloptera and Aquatic Neuroptera. [pp. 425-437]. In: R. W. Merritt, K. W. Cummins and M. B. Berg (editors), An introduction to the aquatic insects of North America, fourth edition, xvi + 1158 pp. + 39 color plates. Kendall/Hunt Publishing Company, Dubuque, Iowa.

Whiting, M. F. 1991. A distributional study of *Sialis* (Megaloptera: Sialidae) in North America. Entomological News **102**(1): 50-56.

Additional Sources of Information on Megaloptera

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Evans, E. D. 1972. A study of the Megaloptera of the Pacific coastal region of the United States. Ph.D. Dissertation, Corvallis, Oregon, Oregon State University**,** 210 pp.

Neuroptera: Spongillaflies
Standard Effort Level I: Genus
Standard Effort Level II: Genus
Standard Taxonomic Reference: Flint, Evans and Neunzig (2008)
Reviewed by:

Larvae may be identified to genus using the key in Merritt, Cummins and Berg (Flint, Evans and Neunzig, 2008). Bowles (2006) provides a species key to larvae, although there is only one species in each genus found in the region. Larvae feed on and live in conjunction with freshwater sponges. Several other Neuroptera families occur in the region and their larvae occasionally show up in benthic samples. Tauber (1991) provides a key to North American Neuroptera larvae. The Bibliography of the Neuropterida website is a useful resource and provides many downloadable PDFs of Megaloptera and Neuroptera literature.

Taxonomic Hierarchy				Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Neuroptera Linnaeus, 1758				X	X	X		X	X	X			X		Flint, Evans and Neunzig (2008); Parfin and Gurney (1956); Brown (1974)	
	Sisyridae Handlirsch, 1906			X	X	X		X	X	X			X		Flint, Evans and Neunzig (2008); Parfin and Gurney (1956); Brown (1974)	
		Climacia MacLachlan, 1869		X		X		X	X						Flint, Evans and Neunzig (2008); Parfin and Gurney (1956); Brown (1974)	only one species in the region
			Climacia californica Chandler, 1953	X		X		X	X						Chandler (1953); Whaley et al. (2004)	only species in the region
		Sisyra Burmeister, 1839		X		X			X	X			X		Flint, Evans and Neunzig (2008); Parfin and Gurney (1956); Brown (1974)	only one species in the region
			Sisyra vicaria Walker, 1853	X		X			X	X			X		Grigarick (1975)	only species in the region

Literature Cited

Bowles, D. E. 2006. Spongillaflies (Neuroptera: Sisyridae) of North America with a key to the larvae and adults. Zootaxa(1357): 1-19.

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Additional Sources of Information on Neuroptera

Bibliography of the Neuropterida, version 8.00. Maintained by the Department of Entomology at Texas A&M University, updated 6 April 2009. Accessed 14 February 2011 at URL: http://lacewing.tamu.edu/Bibliography/index.html

Trichoptera: Caddisflies
Standard Effort Level I: Genus
Standard Effort Level II: Species (where possible)
Standard Taxonomic Reference: Wiggins (1996)
Reviewed by:

Keys to families and genera are given in Wiggins (1996) as well as the chapters in Merritt, Cummins and Berg (Wiggins and Currie, 2008; Morse and Holzenthal, 2008). Wiggins (2004) provides updated family keys for larvae, pupae and adults as well as providing a wealth of behavioral and ecological information. Distributional information comes from original sources. Blinn and Ruiter (2005, 2006) give a preliminary checklist for Arizona. The Trichoptera World Checklist website maintained by John C. Morse at Clemson University is a good source for information.

Larvae for many genera are not identifiable to species because some remain undescribed. Larvae and pupae can sometimes be reared to adults and thus identified to species, but only if living specimens are collected. For preserved specimens, well-developed, pharate pupae can sometimes be identified to species by using the metamorphotype method (Milne, 1938). In this case, the genitalia of a pharate pupa can be observed through the pupal cuticle and the specimen identified using keys and descriptions of the adult. DNA is also a useful tool for making larval and female associations provided specimens are preserved in 80% (or better) non-denatured ethanol and frozen or sent immediately for analysis.

There are presently 19 recognized species groups of *Rhyacophila* known from the region covered by this list. Of these, 14 species groups have at least one representative species described as larvae in the peer-reviewed literature. These citations can be found in the list under the literature cited column for each species group. Ross (1956) and Schmid (1970) assigned most of the known *Rhyacophila* species to species groups based on adult characteristics. Three as yet unpublished but disseminated works (Wold, 1973; Smith, draft key and Wisseman, draft key) have further dealt with *Rhyacophila*, illustrating or describing larvae for most of the species groups. Associative material now exists for 4 of the remaining 5 species groups, leaving only larvae from the *Rhyacophila viquaea* group as undescribed and unassociated. Since the metamorphotype method may be used to identify pupae to any of these species groups based on the adult morphology and taxonomy, all 19 species groups names have been included in this version of the STE List (see STE Rules, section 3.2.3). However, at this time we recommend not using the following species group names for larval identifications until formal descriptions appear in the peer reviewed literature: *ecosa* group, *rayneri* group, *vemna* group, *viquaea* group and *vofixa* group.

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Trichoptera Leach, 1813						X	X	X		X	X	X	X	X	X	X	Wiggins and Currie (2008); Morse and Holzenthal (2008); Wiggins (1996)	
	Spicipalpia Weaver, 1984					X	X	X		X	X	X	X	X	X	X	Wiggins (1996)	
		Glossosomatidae *Wallengren, 1891*				X	X			X	X	X	X	X	X		Wiggins (1996)	
			Agapetus Curtis, 1834			X	X			X	X	X			X		Wiggins (1996)	
			Anagapetus Ross, 1938			X	X			X	X	X					Wiggins (1996); Ruiter (2004)	
			Culoptila Mosely, 1954			X	X								X		Wiggins (1996); Blahnik and Holzenthal (2006)	
			Glossosoma Curtis, 1834			X	X			X	X	X		X	X		Wiggins (1996)	
			Protoptila Banks, 1904			X	X			X	X	X			X		Wiggins (1996)	
		Hydrobiosidae Ulmer, 1905				X	X								X		Wiggins (1996)	
			Atopsyche Banks, 1905			X	X							X	X		Wiggins (1996)	
		Hydroptilidae Stephens, 1836				X	X	X		X	X	X	X	X	X		Wiggins (1996); Blickle (1979)	except for monotypic forms, larvae not identifiable to species
			Agraylea Curtis, 1834			X	X	X		X	X	X	X				Wiggins (1996)	Primarily lotic, will sometimes be found in slow-moving sections of streams
			Alisotrichia Flint, 1964			X	X						X		X		Wiggins	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																	(1996)	
					Alisotrichia arizonica (Blickle & Denning, 1977)	X	X						X		X			
			Dibusa Ross, 1939			X	X			?							Wiggins (1996)	Based on an undescribed species collected by D.G. Denning; larvae probably similar to the eastern species *D. angata* Ross
			Hydroptila Dalman, 1819			X	X	X		X	X	X	X	X	X		Wiggins (1996)	
			Ithytrichia Eaton, 1873			X	X			X			X		X		Wiggins (1996)	
			Leucotrichia Mosely, 1934			X	X			X	X		X	X	X		Wiggins (1996)	
			Mayatrichia Mosely, 1937			X	X						X		X		Wiggins (1996)	
			Metrichia Ross, 1938			X	X								X		Wiggins (1996)	found in small springs and seeps
			Neotrichia Morton, 1905			X	X			X			X		X		Wiggins (1996)	
				Neotrichia canixa group Marshall, 1979		X	X			?					X			larvae in the *canixa* group have lateral horns on the head as illustrated in Fig 3.9g in Wiggins (1996); the ABL has seen specimens from several localities in Northern California
			Nothotrichia Flint, 1967			X	X			X							Harris and Armitage (1997)	larval association made with a metamorphotype male; the description is in progress
					Nothotrichia shasta Harris and Armitage, 1997	X	X			X							Harris and Armitage (1997)	larval association made with a metamorphotype male; the description is in progress
			Ochrotrichia Mosely, 1934			X	X			X	X	X	X	X	X		Wiggins (1996)	many undescribed species in CA alone

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Oxyethira Eaton, 1873			X	X	X		X	X	X	X		X		Wiggins (1996)	
			Palaeagapetus Ulmer, 1912			X	X			X	X	X					Wiggins (1996)	occur in cold water seeps in liverworts
			Stactobiella Martynov, 1924			X	X			X	X	X	X		X		Wiggins (1996)	occur in small, rapid streams
			Zumatrichia Mosely, 1937			X	X								X		Wiggins (1996)	occur in fast-flowing, large rivers
					Zumatrichia notosa (Ross, 1944)	X	X								X			
		Rhyacophilidae Stephens, 1836				X	X			X	X	X					Wiggins (1996)	
			Himalopsyche Banks, 1940			X	X			X	X	X					Wiggins (1996)	only one species in Nearctic
					Himalopsyche phryganea (Ross, 1941)	X	X			X	X	X						only one species in Nearctic
			Rhyacophila Pictet, 1834			X	X			X	X	X	X	X	X		Wiggins (1996)	
				Rhyacophila alberta group sensu Schmid (1970)		X	X			X	X	X	X				Schmid (1970), Smith (1968)	
				Rhyacophila angelita group sensu Schmid (1970)		X	X			X	X	X	X	X	X		Schmid (1970), Flint (1962), Smith (1968)	
				Rhyacophila betteni group sensu Schmid (1970)		X	X			X	X	X					Schmid (1970), Smith (1968)	
				Rhyacophila brunnea group sensu Smith and Manuel (1984)		X	X			X	X	X	X	X			Smith and Manuel (1984)	
				Rhyacophila coloradensis group sensu Schmid (1970)		X	X			X	X	X	X		X		Schmid (1970), Smith (1968), Peck and Smith (1977)	
				Rhyacophila ecosa group sensu Schmid (1970)		X	X			X	X	X					Schmid (1970)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Rhyacophila grandis group sensu Schmid (1970)		X	X			X	X	X					Schmid (1970), Smith (1984)	
				Rhyacophila hyalinata group sensu Schmid (1970)		X	X			X	X		X				Schmid (1970), Smith (1968)	
				Rhyacophila lieftincki group sensu Schmid (1970)		X	X			X	X	X					Schmid (1970), Smith (1984)	
					Rhyacophila arnaudi Denning, 1948	X	X			X	X	X						sole representative of *lieftincki* group in SAFIT region
				Rhyacophila nevadensis group sensu Schmid (1970)		X	X			X	X	X		X			Schmid (1970), Smith (1985)	
				Rhyacophila oreta group sensu Schmid (1970)		X	X			X	X	X	X				Schmid (1970), Smith (1968)	
				Rhyacophila rayneri group sensu Ross (1956)		X	X			X						X	Ross (1956)	larvae associated, but unpublished
					Rhyacophila rayneri Ross, 1951	X	X			X						X		only species in this group
				Rhyacophila rotunda group sensu Schmid (1970)		X	X			X			X	X	X		Schmid (1970), Smith (1968)	
				Rhyacophila sibirica group sensu Ross (1956)		X	X			X	X	X	X				Schmid (1970), Smith (1968)	
				Rhyacophila vagrita group sensu Schmid (1970)		X	X				X	X	X				Schmid (1970), Smith (1968)	
					Rhyacophila vagrita Milne, 1936	X	X				X	X	X					
				Rhyacophila vemna group sensu Schmid (1970)		X	X				X	X					Schmid (1970)	larvae unknown, most likely similar to *brunnea* group but bigger
				Rhyacophila verrula group sensu Schmid (1970)		X	X			X	X	X	X				Schmid (1970), Smith (1968)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Rhyacophila viquaea group sensu Schmid (1970)	X	X			X	X	X					Schmid (1970)	larva unknown
					Rhyacophila vofixa group sensu Schmid (1970)	X	X			X	X	X	X				Schmid (1970)	larvae associated, but unpublished
	Annulipalpia Martynov, 1924																	
		Hydropsychidae Curtis, 1835				X	X			X	X	X		X	X		Wiggins (1996)	
			Arctopsyche MacLachlan, 1868			X	X			X	X	X	X	X			Wiggins (1996); Givens and Smith (1980)	Occur in cold, fast streams; key to larvae in Givens and Smith (1980)
					Arctopsyche californica Ling, 1938	X	X			X							Givens and Smith (1980)	
					Arctopsyche grandis (Banks, 1900)	X	X			X	X	X	X	X			Givens and Smith (1980)	
					Arctopsyche ladogensis (Kolenati, 1859)	X	X						X					
			Cheumatopsyche Wallengren, 1891			X	X			X	X	X	X	X	X		Wiggins (1996)	Occur in warmer streams; relatively tolerant of pollution; larvae not presently identifiable to species
			Diplectrona Westwood, 1840			X	X			X							Wiggins (1996)	CA endemic; known from only a couple sites in Southern CA
					Diplectrona californica Banks, 1914	X	X			X								CA endemic; known from only a couple sites in Southern CA
			Homoplectra Ross, 1938			X	X			X	X						Wiggins (1996)	Occur in intermittent spring seeps, headwaters of mountain streams

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Hydropsyche Pictet, 1834			X	X			X	X	X	X	X	X		Wiggins (1996); Schefter and Wiggins (1984); Geraci, Zhou, Morse and Kjer (2010)	Some authors split this genus into *Hydropsyche* (s. str.) and *Ceratopsyche* Ross and Unzicker, 1977 (Schefter and Wiggins use the term *Hydropsyche morosa* group); Geraci et al (2010) presented DNA evidence to show that *Ceratopsyche* is not a good genus.
			Macrostemum Kolenati, 1859			X	X						X					
					Macrostemum zebratum (Hagen, 1861)	X	X						X					
			Parapsyche Betten 1934			X	X			X	X	X		X			Wiggins (1996); Givens and Smith (1980)	Occur in small, cold streams; only two of the five known western species described as larvae
			Smicridea MacLachlan, 1871			X	X			X					X		Wiggins (1996)	Often abundant in southwestern streams
		Philopotamidae Stephens, 1829				X	X			X	X		X	X	X		Wiggins (1996)	
			Chimarra Stephens, 1829			X	X			X	X		X	X	X		Wiggins (1996)	
			Dolophilodes Ulmer, 1909			X	X			X	X	X		X			Wiggins (1996)	larvae not separable from *Sisko* at this time
			Dolophilodes Ulmer, 1909/Sisko Ross 1956			X	X			X	X	X	X	X			Blahnik (2005)	larvae inseparable between these two genera at this time
			Sisko Ross, 1956			X	X				X						Blahnik (2005)	larvae unassociated; 2 species removed from *Dolophilodes*
			Wormaldia MacLachlan, 1865			X	X			X	X	X	X	X	X		Wiggins (1996)	
		Polycentropodidae Ulmer, 1903				X	X	X		X	X	X			X		Wiggins (1996)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Nyctiophylax Brauer, 1865			X	X	X			X						Wiggins (1996)	some authors use genus *Paranyctiophylax* for North American species
					Nyctiophylax moestus Banks, 1911	X	X	X			X							Occur in lakes and slow-moving sections of streams
			Polycentropus Curtis, 1835			X	X	X		X	X	X	X		X		Wiggins (1996); Wiggins (1973)	Wiggins (1973) reported *Polycentropus* in temporary pools
			Polyplectropus Ulmer, 1905			X	X								X		Wiggins (1996)	Occur in small, cool streams
					Polyplectropus charlesi (Ross, 1941)	X	X								X			
		Psychomyiidae Walker, 1852				X	X			X	X	X	X		X		Wiggins (1996)	
			Psychomyia Latreille, 1829			X	X			X	X	X	X		X		Wiggins (1996)	
			Tinodes Curtis, 1834			X	X			X	X		X	X	X		Wiggins (1996)	Larvae probably occur only in lotic waters where they build silken tubes of sand, often near the stream margin
		Xiphocentronidae Brauer, 1870 Ross, 1949				X	X								X		Wiggins (1996)	
			Cnodocentron Schmid, 1982			X	X								X		Wiggins (1996); Moulton and Stewart (1997)	
					Cnodocentron yavapai Moulton and Stewart, 1997	X	X								X		Wiggins (1996); Moulton and Stewart (1997)	The type locality is a small, spring-fed stream with a dense canopy; larvae build silken tubes on rocks
	Integrapalpia Martynov, 1924					X	X	X		X	X	X	X	X	X	X		
		Apataniidae Wallengren, 1886				X	X	X		X	X	X	X	X	X		Wiggins (1996)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Allomyia Banks, 1916			X	X			X	X	X	X	X			Wiggins (1996)	cold springs, Sierra Nevada Mts.
			Apatania Kolenati, 1848			X	X	X									Wiggins (1996)	larvae in far North or at high elevations may live in lakes; only 1 of the 4 species described as larvae
			Moselyana Denning, 1949			X	X				X	X					Wiggins (1996)	monotypic; larvae live in seeps
					Moselyana comosa (Denning, 1949)	X	X				X	X					Wiggins (1996)	monotypic; larvae live in seeps
			Pedomoecus Ross, 1947			X	X			X	X	X					Wiggins (1996)	monotypic
					Pedomoecus sierra Ross, 1947	X	X			X	X	X					Wiggins (1996)	monotypic
		Brachycentridae Ulmer, 1903				X	X			X	X	X	X	X	X			
			Amiocentrus Ross, 1938			X	X			X	X		X	X			Wiggins (1996)	monotypic
					Amiocentrus aspilus (Ross, 1938)	X	X			X	X		X	X			Wiggins (1996)	monotypic
			Brachycentrus Curtis, 1834			X	X			X	X	X	X	X	X		Wiggins (1996); Flint (1984)	larvae are identifiable to species
					Brachycentrus americanus (Banks, 1899)	X	X			X	X	X	X		X		Flint (1984)	
					Brachycentrus echo (Ross, 1947)	X	X			X			X				Flint (1984)	
					Brachycentrus occidentalis Banks, 1911	X	X			X	X	X	X	X	X		Flint (1984)	
			Eobrachycentrus Wiggins, 1965			X	X				X	X					Wiggins (1996)	monotypic
					Eobrachycentrus gelidae Wiggins, 1965	X	X				X	X					Wiggins (1996)	monotypic
			Micrasema MacLachlan, 1876			X	X			X	X	X	X		X		Wiggins (1996); Chapin (1978)	
		Calamoceratidae Ulmer, 1905				X	X			X	X						Wiggins (1996)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Heteroplectron MacLachlan, 1871			X	X			X	X						Wiggins (1996)	larvae live in slower moving waters with woody debris
					Heteroplectron californicum MacLachlan, 1871	X	X			X	X						Wiggins (1996)	larvae live in slower moving waters with woody debris
			Phylloicus Müller, 1880			X	X								X		Wiggins (1996)	2 species found in AZ; no species key for larvae
		Goeridae Ulmer, 1903				X	X			X	X	X					Wiggins (1996)	
			Goera Stephens, 1829			X	X			X	X						Wiggins (1996)	one species in Western North America
					Goera archaon Ross, 1947	X	X			X	X							one species in Western North America
			Goeracea Denning, 1968			X	X				X	X					Wiggins (1996); Wiggins (1973)	key to larvae and pupae of both species
					Goeracea genota (Ross, 1941)	X	X				X	X					Wiggins (1996)	
					Goeracea oregona Denning, 1968	X	X			X	X						Wiggins (1996)	
			Lepania Ross, 1941			X	X				X	X					Wiggins (1996)	monotypic
					Lepania cascada Ross, 1941	X	X				X	X					Wiggins (1996)	monotypic
		Helicopsychidae Ulmer, 1906				X	X	X		X	X	X	X		X		Wiggins (1996); Johanson (2002)	
			Helicopsyche von Siebold, 1856			X	X	X		X	X	X	X		X		Wiggins (1996); Johanson (2002)	larvae not adequately separable to species
		Lepidostomatidae Ulmer, 1903				X	X	X					X				Wiggins (1996); Weaver	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																	(1988)	
			Lepidostoma Rambur, 1842			X	X	X		X	X	X	X	X	X		Wiggins (1996); Weaver (1988)	
		Leptoceridae Leach, 1815				X	X	X		X	X	X	X	X			Wiggins (1996)	
			Ceraclea Stephens, 1829			X	X	X		X	X	X		X			Wiggins (1996); Resh (1976); Morse (1975)	some species feed on freshwater sponges
			Mystacides Berthold, 1879			X	X	X		X	X	X	X				Wiggins (1996); Yamamoto and Wiggins (1964)	Yamamoto and Wiggins provided a larval key to species
					Mystacides alafimbriata Hill-Griffin, 1912	X				X	X	X	X					
					Mystacides interjecta (Banks, 1914)	X				?								unconfirmed record for CA; *Mystacides longicornis* (Linnaeus, 1758) is a junior synonym
					Mystacides sepulchralis (Walker, 1852)	X				X								
			Nectopsyche Müller, 1879			X	X	X		X	X	X	X	X	X		Wiggins (1996)	larvae of Western species are incompletely separable
			Oecetis MacLachlan, 1877			X	X	X		X	X		X		X		Wiggins (1996); Floyd (1995)	
			Triaenodes MacLachlan, 1865			X	X	X			X	X	X		X		Wiggins (1996); Glover (1996)	Holzenthal and Andersen (2004) consider *Ylodes* as a subgenus of *Triaenodes*
		Limnephilidae Kolenati, 1848				X	X			X	X	X	X	X	X		Wiggins (1996)	monotypic
			Allocosmoecus Banks, 1943			X	X			X	X	X					Wiggins (1996)	monotypic

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Allocosmoecus partitus Banks, 1943	X	X			X	X	X					Wiggins (1996)	monotypic
			Amphicosmoecus Schmid, 1955			X	X			X	X		X				Wiggins (1996)	monotypic
					Amphicosmoecus canax (Ross, 1947)	X	X			X	X		X		X			monotypic
			Anabolia Stephens, 1837			X	X								X			
					Anabolia bimaculata (Walker, 1852)	X	X						X		X			
			Asynarchus MacLachlan, 1880			X	X	X		X	X	X	X				Wiggins (1996)	
			Chyranda Ross, 1944			X	X			X	X	X	X	X			Wiggins (1996)	monotypic
					Chyranda centralis (Banks, 1900)	X	X			X	X	X	X	X				monotypic
			Clistoronia Banks, 1916			X		X		X	X	X	X		X		Wiggins (1996)	Larvae live in ponds and lakes at higher elevations
			Clostoeca Banks, 1943			X		X		X	X	X					Wiggins (1996)	monotypic; larvae live in small seepage areas
					Clostoeca disjuncta (Banks, 1914)	X		X		X	X	X					Wiggins (1996)	monotypic; larvae live in small seepage areas
			Crenophylax Ruiter and Nishimoto, 2007			X	X								X		Ruiter and Nishimoto (2007)	
					Crenophylax sperryi (Banks, 1943)	X	X								X		Ruiter and Nishimoto (2007)	moved from *Limnephilus sperryi* (Banks)
			Cryptochia Ross, 1950			X	X			X							Wiggins (1996); Wisseman and Anderson (1987)	Larvae live in small, cold spring streams at or above water's edge
			Desmona Denning, 1954			X	X	X		X	X	X					Wiggins (1996); Wiggins and Wisseman (1990)	Larvae live in small streams and seepage areas

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Dicosmoecus MacLachlan, 1875			X	X	X		X	X	X	X	X			Wiggins (1996); Wiggins and Richardson (1982)	Larvae may be identified to species using Wiggins and Richardson (1982)
					Dicosmoecus atripes (Hagen, 1875)	X	X	X		X	X	X	X	X			Wiggins and Richardson (1982)	
					Dicosmoecus gilvipes (Hagen, 1875)	X	X	X		X	X	X	X	X			Wiggins and Richardson (1982)	
					Dicosmoecus pallicornis Banks, 1943	X	X	X		X				X			Wiggins and Richardson (1982)	
			Ecclisocosmoecus Schmid, 1964			X	X				X	X					Wiggins (1996); Ross (1950)	Only one North American species
					Ecclisocosmoecus scylla (Milne, 1935)	X	X				X	X					Wiggins (1996); Ross (1950)	Only one North American species
			Ecclisomyia Banks, 1907			X	X			X	X	X	X	X			Wiggins (1996)	
			Eocosmoecus Wiggins and Richardson, 1989			X	X				X	X					Wiggins (1996); Wiggins and Richardson (1989)	Two species occur in Western North America, both described as larvae
					Eocosmoecus frontalis (Banks, 1943)	X	X				X	X					Wiggins (1996)	
					Eocosmoecus schmidi (Wiggins, 1975)	X	X					X					Wiggins (1996)	
			Glyphopsyche Banks, 1904			X	X	X		X	X	X					Wiggins (1996)	Three species occur in US; only one in SAFIT region

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Glyphopsyche irrorata (Fabricius, 1781)	X	X	X		X	X	X					Wiggins (1996)	
			Grammotaulius Kolenati, 1848			X	X	X			X		X				Wiggins (1996)	Found in ponds and small streams
					Grammotaulius betteni Hill-Griffin, 1912	X	X	X			X						Wiggins (1996)	Found in ponds and small streams
					Grammotaulius lorettae Denning, 1941	X	X	X					X				Wiggins (1996)	Found in ponds and small streams
			Halesochila Banks, 1907			X		X		?	X	X					Wiggins (1996)	monotypic; unpublished record for CA
					Halesochila taylori (Banks, 1904)	X		X		?	X	X					Wiggins (1996)	monotypic; unpublished record for CA
			Hesperophylax Banks, 1916			X	X	X		X	X	X	X	X	X		Wiggins (1996); Parker and Wiggins (1985)	larvae described for all but one Western species (*H. minutus*)
			Homophylax Banks, 1900			X	X			X	X	X	X	X			Wiggins (1996)	Larvae easily confused with *Psychoglypha*
			Hydatophylax Wallengen, 1891			X	X			X	X	X	X				Wiggins (1996); Schmid (1950); Ruiter (1999)	the Utah population has likely been extirpated
					Hydatophylax hesperus (Banks, 1914)	X	X			X	X	X	X				Wiggins (1996); Schmid (1950); Ruiter (1999)	the Utah population has likely been extirpated
			Lenarchus Martynov, 1914			X		X		X	X	X	X	X			Wiggins (1996)	
			Limnephilus Leach, 1815			X	X	X		X	X	X	X		X		Wiggins (1996)	
			Nemotaulius Banks, 1906			X		X			X		X				Wiggins (1996)	only one Nearctic species

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Nemotaulius hostilis (Hagen, 1873)	X		X			X		X					only one Nearctic species
			Onocosmoecus Banks, 1943			X	X	X		X	X	X	X	X			Wiggins (1996)	
			Philarctus MacLachlan, 1880			X	X	X			X						Wiggins (1996)	only one North American species
					Philarctus bergrothi McLachlan, 1880	X	X	X			X							only one North American species
			Philocasca Ross, 1941			X	X					X					Wiggins (1996)	
			Pseudostenophylax Martynov, 1909			X	X			X	X						Wiggins (1996)	only one species in western North America
					Pseudostenophylax edwardsi (Banks, 1920)	X	X			X	X							only one species in western North America
			Psychoglypha Ross, 1944			X	X			X	X	X	X				Wiggins (1996)	larvae may be confused with *Homophylax*
			Psychoronia Banks, 1916			X							X					
					Psychoronia costalis (Banks, 1901)	X							X					
			Pycnopsyche Banks, 1905			X	X					X					Wiggins (1996)	
					Pycnopsyche guttifer (Walker, 1852)	X	X					X						only species in SAFIT region
		Odontoceridae Wallengren, 1891				X	X			X					X		Wiggins (1996)	
			Marilia Müller, 1880			X	X			X					X		Wiggins (1996)	
			Namamyia Banks, 1905			X	X			X	X						Wiggins (1996)	monotypic
					Namamyia plutonis Banks, 1905	X	X			X	X							monotypic
			Nerophilus Banks, 1899			X	X			X	X						Wiggins (1996)	monotypic
					Nerophilus californicus (Hagen, 1861)	X	X			X	X							monotypic
			Parthina Denning, 1954			X	X			X	X				X		Wiggins (1996)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Phryganeidae Leach, 1815				X	X	X		X	X	X	X				Wiggins (1996); Wiggins (1998)	Wiggins (1998) reviews larvae and adults for the family
			Agrypnia Curtis, 1835			X	X	X		X	X	X	X				Wiggins (1996)	
			Banksiola Martynov, 1924			X	X	X		X	X		X				Wiggins (1996)	transcontinental; but only species known in western North America
					Banksiola crotchi Banks, 1943	X	X	X		X	X		X					
			Phryganea Linnaeus, 1758			X		X		X	X		X				Wiggins (1996)	
					Phryganea cinerea Walker, 1852	X		X		X	X		X					
			Ptilostomis Kolenati, 1859			X	X	X				X					Wiggins (1996)	
					Ptilostomis ocellifera (Walker, 1852)	X	X	X				X						
			Yphria Milne, 1934			X	X			X	X						Wiggins (1996)	monotypic
					Yphria californica (Banks, 1907)	X	X			X	X							monotypic
		Rossianidae Gall, 1996				X	X					X					Wiggins (1996)	small, cold mountain streams
			Goereilla Denning, 1968			X	X					X					Ruiter (1999)	
					Goereilla baumanni Denning, 1971	X	X					X					Ruiter (1999)	
			Rossiana Denning, 1953			X	X					X					Wiggins (1996)	small, cold mountain streams
					Rossiana montana Denning, 1953	X	X					X					Wiggins (1996)	small, cold mountain streams
		Sericostomatidae Stephens, 1836				X	X			X	X				X		Wiggins (1996)	
			Agarodes Banks, 1899			X	X						X				Wiggins (1996)	
					Agarodes hesperus (Banks, 1914)	X	X						X				Wiggins (1996)	
			Gumaga Tsuda, 1938			X	X			X	X		X		X		Wiggins (1996)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Uenoidae Iwata, 1927				X	X			X	X	X		X	X		Wiggins (2005)	
			Farula Milne, 1936			X	X			X	X	X					Wiggins (2005)	small, cold mountain streams
			Neophylax MacLachlan, 1871			X	X			X	X	X	X	X			Vineyard et al. (2005); Wiggins (2004)	larvae may be identified to species
					Neophylax occidentis Banks, 1924	X	X			X	X		X	X				
					Neophylax rickeri Milne, 1935	X	X			X	X	X						
					Neophylax smithi Vineyard and Wiggins, 1987	X	X					X						
					Neophylax splendens Denning, 1948	X	X			X	X	X	X					
			Neothremma Dodds and Hisaw, 1925			X	X			X	X	X	X				Wiggins (2004)	small to medium turbulent mountain streams
			Oligophlebodes Ulmer, 1905			X	X			X	X	X	X		X		Wiggins (2004)	small, turbulent mountain streams

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Lepidoptera: Moths and Butterflies
Standard Effort Level I: Genus for *Parapoynx* and *Petrophila*, otherwise Order
Standard Effort Level II: Genus for *Parapoynx* and *Petrophila*, otherwise Order
Standard Taxonomic Reference: Solis (2008)
Reviewed by:

Larvae of *Parapoynx* and *Petrophila* may be identified to genus using the key in Merritt, Cummins and Berg (Solis, 2008). This key and others for aquatic Lepidoptera should be used with caution for specimens collected in bioassessment samples. Careful collecting of Lepidoptera larvae to preserve case integrity and to record host-plant association is required to eliminate accidentals (e.g., terrestrial or riparian taxa). The key presented in Stehr and Martinat (1987) is a more complete guide to the families of North American Lepidoptera.

Taxonomic Hierarchy					Habitat				Distribution							Literature Cited	Comments
Order	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Lepidoptera Linnaeus, 1758					X	X	X		X	X	X		X	X	X	Solis (2008); Stehr and Martinat (1987)	
	Pyralidae Latreille, 1802				X	X	X		X	X	X		X	X	X		
		Parapoynx Hübner, 1825			X	X			X								
		Petrophila Guilding, 1830			X	X	X		X	X	X		X	X	X		

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Coleoptera: Beetles
Standard Effort Level I: Genus
Standard Effort Level II: Species (where possible)
Standard Taxonomic Reference: White and Roughley (2008), Larson et al. (2000) (Dytiscidae), Shepard (2002) (Elmidae)
Reviewed by: Eric G. Chapman (Haliplidae), Doug Post (Dytiscidae)

Aquatic beetles (larvae and adults) can generally be identified to genus using the keys in Merritt, Cummins and Berg (White and Roughley, 2008). Adults can be identified to genus using the keys in Arnett and Thomas (2001) and Arnett et al. (2002). Although designed for the Florida beetle fauna, Epler (1999) is a useful resource. Larson et al. (2000) should be used for all generic dytiscid identifications. For specimens from the Southwest, other supplementary references may be required for species identifications. Post (2005) put together an excellent guide to California dytiscids. Challet and Brett (1998) is very useful for dytiscid distributions within California. An undescribed elmid genus, which is being described by Cheryl Barr, is known to occur throughout the Pacific Northwest. Shepard (1993) gives some habitat and ecological information for this genus. Brown (1972a) is still the best source for elmid species keys. The keys in White and Roughley (2008) for the Chrysomelidae, Staphylinidae and Curculionidae should be used with caution since each of these families have very few truly aquatic representatives – none benthic – but many terrestrial genera. The inclusion of these genera in White and Roughley (2008) for these families makes the assumption that the specimens being keyed are definitely aquatic, thus excluding the possibility of accidental terrestrials. This caveat also applies to a number of other families that have riparian or strictly terrestrial adults.

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Coleoptera Linnaeus, 1758							X	X	X		X	X	X	X	X	X	X	White and Roughley (2008)	Keys for families and genera
	Myxophaga Crowson, 1955						X				X				X	X			
		Hydroscaphidae LeConte, 1874					X				X				X	X			found in thin films of water

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Hydroscapha LeConte, 1874		X				X				X	X		Maier, Ivie, Johnson and Maddison (2010)	found in thin films of water; Maier et al. (2010) described a new species from Idaho and suggest that many other undescribed species may be found in the Western USA
						Hydroscapha natans LeConte, 1874	X				X				X	X		Shepard (2003)	found in thin films of water
		Microsporidae Crotch, 1873									X					X		Shepard (2003)	shoredwellers
					Sphaerius Waltl, 1838						X					X		Shepard (2003)	shoredwellers
	Adephaga Schellenberg, 1806						X	X			X	X	X	X	X	X	X		
		Amphizoidae LeConte, 1853					X	X			X	X	X	X	X	X		Kavanaugh (1986)	
					Amphizoa LeConte, 1854		X	X			X	X	X					Kavanaugh (1986)	
						Amphizoa insolens LeConte, 1853	X	X			X	X	X					Kavanaugh (1986)	
						Amphizoa lecontei Matthews, 1872	X	X				X	X	X	X	X		Kavanaugh (1986)	
						Amphizoa striata Van Dyke, 1927	X	X				X	X					Kavanaugh (1986)	
		Carabidae Latreille, 1802									X	X	X	X	X	X	X		Many species are riparian; only two listed as "semi-aquatic"
				Omophronini Bonelli, 1810							X	X	X	X		X			
					Omophron Latreille, 1802						X							Benschoter and Cook (1956)	Shoredwellers; excluded from benthic datasets
				Pogonini Laporte, 1834															
					Thalassotrechus van Dyke, 1918						X								Excluded from benthic datasets
						Thalassotrechus barbarae (Horn, 1892)					X								intertidal dweller; *Thalassotrechus nigripennis* van Dyke, 1918 is a junior synonym

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Dytiscidae Leach, 1815							X	X	X		X	X	X	X	X	X	X	Larson et al. (2000); Post (2005); Challet and Brett (1998)	Larson et al. (2000) should be considered as the standard text for this family.
	Copelatinae Van den Branden, 1885						X		X		X	X				X		Larson et al. (2000)	
		Copelatus Erichson, 1832					X		X		X	X				X		Larson et al. (2000)	
			Copelatus chevrolati renovatus Guignot, 1952				X		X		X					X		Larson et al. (2000)	
				Copelatus glyphicus (Say, 1823)			X		X		X	X						Larson et al. (2000)	
	Hydrotrupinae Roughley, 2000						X	X			X	X						Larson et al. (2000)	monotypic; Pacific Coast of CA and OR; also Sierra Nevada Mts.
		Hydrotrupes Sharp, 1882					X	X			X	X						Larson et al. (2000)	monotypic; Pacific Coast of CA and OR; also Sierra Nevada Mts.
			Hydrotrupes palpalis Sharp, 1882				X	X			X	X						Larson et al. (2000)	monotypic; Pacific Coast of CA and OR; also Sierra Nevada Mts.
	Laccophilinae Bedel, 1881						X		X		X	X	X	X	X	X		Larson et al. (2000); Zimmerman (1970)	
		Laccophilus Leach, 1817					X		X		X	X	X	X	X	X		Larson et al. (2000); Zimmerman (1970)	
			Laccophilus biguttatus Kirby, 1837				X		X		X			X				Larson et al. (2000); Zimmerman (1970)	
			Laccophilus fasciatus terminalis Sharp, 1882				X		X		X			X				Larson et al. (2000); Zimmerman	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		(1970)	
						Laccophilus horni van den Branden, 1885	X									X		Larson et al. (2000); Zimmerman (1970)	
						Laccophilus maculosus decipiens LeConte, 1852	X		X		X	X	X	X	X			Larson et al. (2000); Zimmerman (1970)	
						Laccophilus maculosus shermani Leech, 1944	X									X		Larson et al. (2000); Zimmerman (1970)	
						Laccophilus mexicanus atristernalis Crotch, 1873	X				X	X		X	X			Larson et al. (2000); Zimmerman (1970)	
						Laccophilus mexicanus mexicanus Aube, 1838	X				X			X		X		Larson et al. (2000); Zimmerman (1970)	
						Laccophilus oscillator Sharp, 1882	X									X		Larson et al. (2000); Zimmerman (1970)	
						Laccophilus pictus Laporte de Castelnau, 1835	X									X	X	Larson et al. (2000); Zimmerman (1970)	
						Laccophilus quadrilineatus quadrilineatus Horn, 1871	X				X					X		Larson et al. (2000); Zimmerman (1970)	
						Laccophilus salvini Sharp, 1882	X									X		Larson et al. (2000); Zimmerman (1970)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Laccophilus sonorensis Zimmerman, 1970	X				X					X		Larson et al. (2000); Zimmerman (1970)	
						Laccophilus vacaensis Young, 1953	X									X		Larson et al. (2000); Zimmerman (1970)	
			Hydroporinae Erichson, 1837				X				X	X	X		X	X	X	Larson et al. (2000)	
				Laccornini Wolfe and Roughley, 1990			X	X				X	X					Larson et al. (2000)	
					Laccornis Gozis, 1914		X	X				X	X					Larson et al. (2000)	
						Laccornis pacificus Leech, 1940	X	X				X	X					Larson et al. (2000)	
				Methlini Van den Branden, 1885			X				X							Larson et al. (2000)	
					Celina Aubé, 1837		X				X							Larson et al. (2000)	
						Celina occidentalis Young, 1979	X				X							Larson et al. (2000)	
				Hydrovatini Sharp, 1882			X				X							Larson et al. (2000)	
					Hydrovatus Motschulsky, 1853		X				X							Larson et al. (2000)	
						Hydrovatus brevipes Sharp, 1882	X				X			X				Larson et al. (2000)	
						Hydrovatus davidis Young, 1956	X				X							Larson et al. (2000)	
				Hyphydrini Sharp, 1882			X		X		X		X			X		Larson et al. (2000)	
					Desmopachria Babington, 1841		X		X		X		X			X		Larson et al. (2000)	
						Desmopachria convexa (Aube, 1838)	X		X				X					Larson et al. (2000)	
						Desmopachria dispersa (Crotch, 1873)	X				X							Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Desmopachria latissima (LeConte, 1851)	X				X							Larson et al. (2000)	
						Desmopachria mexicana Sharp, 1882	X				X					X		Larson et al. (2000)	
						Desmopachria portmanni (Clark, 1862)	X									X		Larson et al. (2000)	
				Bidessini Sharp, 1882			X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	
					Liodessus Guignot, 1939		X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	
						Liodessus obscurellus (LeConte, 1852)	X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	widespread in the West
						Liodessus saratogae Miller, 1998	X				X							Larson et al. (2000)	Death Valley, CA
					Neoclypeodytes Young, 1967		X				X	X			X	X	X	Miller (2001); Larson et al. (2000)	
						Neoclypeodytes amybethae Miller, 2001	X									X		Miller (2001); Larson et al. (2000)	
						Neoclypeodytes challeti Miller, 2001	X										X	Miller (2001); Larson et al. (2000)	
						Neoclypeodytes cinctellus (LeConte, 1852)	X	X			X				X	X	X	Miller (2001); Larson et al. (2000)	
						Neoclypeodytes fryii (Clark 1862)	X									X	X	Miller (2001); Larson et al. (2000)	
						Neoclypeodytes haroldi Miller, 2001	X									X		Miller (2001); Larson et al. (2000)	
						Neoclypeodytes leachi (Leech, 1948)	X				X	X						Miller (2001); Larson et al. (2000)	
						Neoclypeodytes ornatellus (Fall, 1917)	X		X		X	X						Miller (2001); Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Neoclypeodytes pictodes (Sharp, 1882)	X				X							Miller (2001); Larson et al. (2000)	
						Neoclypeodytes plicipennis (Crotch, 1873)	X				X					X		Miller (2001); Larson et al. (2000)	
						Neoclypeodytes quadripustulatus (Fall, 1917)	X				X							Miller (2001); Larson et al. (2000)	
						Neoclypeodytes roughleyi Miller, 2001	X				X							Miller (2001); Larson et al. (2000)	
					Uvarus Guignot, 1939		X	X			X	X		X		X	X	Larson et al. (2000)	
						Uvarus amandus (LeConte, 1852)	X	X						X		X		Larson et al. (2000)	
						Uvarus subtilis (LeConte, 1852)	X	X			X	X		X		X	X	Larson et al. (2000)	
				Hydroporini Erichson, 1837			X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	
					Hydroporus Clairville, 1806		X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	
						Hydroporus axillaris LeConte, 1851	X	X			X	X	X	X				Larson et al. (2000)	
						Hydroporus carri Larson, 1975	X	X				X		X				Larson et al. (2000)	
						Hydroporus despectus Sharp, 1882	X		X		X		X	X				Larson et al. (2000)	
						Hydroporus fortis LeConte, 1851	X		X		X	X	X		X			Larson et al. (2000)	
						Hydroporus fuscipennis Schaum, 1868	X		X				X	X				Larson et al. (2000)	
						Hydroporus geniculatus Thomson, 1854	X							X					
						Hydroporus klamathensis Larson and Roughley, 2000	X				X	X						Larson et al. (2000)	
						Hydroporus leechi Gordon, 1981	X		X		X							Larson et al.	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		(2000)	
						Hydroporus longiusculus Gemminger & Harold, 1868	X				X	X	X		X	X		Larson et al. (2000)	
						Hydroporus mannerheimi Balfour-Browne, 1944	X		X		X	X	X					Larson et al. (2000)	
						Hydroporus notabilis LeConte, 1850	X					X		X				Larson et al. (2000)	
						Hydroporus occidentalis Sharp, 1882	X		X		X		X	X				Larson et al. (2000)	
						Hydroporus pervicinus Fall, 1923	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Hydroporus signatus Mannerheim, 1853	X						X					Larson et al. (2000)	
						Hydroporus simplex Gordon, 1981	X		X		X							Larson et al. (2000)	
						Hydroporus sinuatipes Fall, 1923	X		X		X	X	X					Larson et al. (2000)	
						Hydroporus striola (Gyllenhal, 1827)	X						X					Larson et al. (2000)	
						Hydroporus subpubescens LeConte, 1852	X		X		X	X	X					Larson et al. (2000)	
						Hydroporus tademus Leech, 1949	X		X		X	X	X					Larson et al. (2000)	
						Hydroporus tenebrosus LeConte, 1850	X		X				X	X	X			Larson et al. (2000)	
						Hydroporus transpunctatus Chandler, 1941	X		X		X		X	X		X		Larson et al. (2000)	
						Hydroporus tristis (Paykull, 1798)	X		X			X	X					Larson et al. (2000)	
						Hydroporus zackii Larson and Roughley, 2000	X		X						X			Larson et al. (2000)	springs in Ash Meadows, Nye Co.
					Hydrocolus Roughley and Larson, 2000		X						X	X				Larson et al. (2000)	
						Hydrocolus paugus (Fall, 1923)	X						X	X				Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Hygrotus Stephens, 1828		X		X		X	X	X	X	X	X		Larson et al. (2000), Miller, Wolfe and Biström (2006)	Miller et al. (2006) have shown this genus to be paraphyletic thus it will likely be split into at least 2 genera *(Hygrotus* and *Coelambus)*
						Hygrotus acaroides (LeConte, 1855)	X					X						Larson et al. (2000)	
						Hygrotus artus Fall, 1919	X				X							Larson et al. (2000)	
						Hygrotus bruesi (Fall, 1928)	X					X		X	X			Larson et al. (2000)	
						Hygrotus collatus (Fall, 1919)	X				X				X	X		Larson et al. (2000)	
						Hygrotus curvipes (Leech, 1938)	X				X							Larson et al. (2000)	
						Hygrotus dissimilis Gemminger and Harold, 1868	X		X			X						Larson et al. (2000)	
						Hygrotus femoratus (Fall, 1901)	X									X		Larson et al. (2000)	known from 2 males from NM and AZ; may be synonym of *H. nubilis* (LeConte)
						Hygrotus fontinalis Leech, 1966	X				X							Larson et al. (2000)	
						Hygrotus fraternus (LeConte, 1852)	X				X					X	X	Larson et al. (2000)	
						Hygrotus hydropicus (LeConte, 1852)	X				X	X					X	Larson et al. (2000)	
						Hygrotus impressopunctatus (Schaller, 1783)	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Hygrotus infuscatus (Sharp, 1882)	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Hygrotus intermedius (Fall, 1919)	X		X		X	X	X					Larson et al. (2000)	
						Hygrotus lutescens (LeConte, 1852)	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Hygrotus marklini (Gyllenhal, 1813)	X		X					X		X		Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Hygrotus masculinus (Crotch, 1874)	X		X		X	X	X	X	X			Larson et al. (2000)	
						Hygrotus nigrescens (Fall, 1919)	X		X		X	X	X	X	X			Larson et al. (2000)	
						Hygrotus nubilis (LeConte, 1855)	X		X							X		Larson et al. (2000)	
						Hygrotus obscureplagiatus (Fall, 1919)	X		X		X	X	X					Larson et al. (2000)	
						Hygrotus patruelis (LeConte, 1855)	X		X		X			X	X			Larson et al. (2000)	
						Hygrotus pedalis (Fall, 1901)	X				X							Larson et al. (2000)	
						Hygrotus picatus (Kirby, 1837)	X		X				X	X				Larson et al. (2000)	
						Hygrotus sayi Balfour-Browne, 1944	X		X		X	X	X	X	X			Larson et al. (2000)	
						Hygrotus semivittatus (Fall, 1919)	X		X		X	X	X		X	X		Larson et al. (2000)	
						Hygrotus sharpi (van den Branden, 1885)	X				X					X	X	Larson et al. (2000)	
						Hygrotus thermarum (Darlington, 1928)	X				X	X			X			Larson et al. (2000)	
						Hygrotus tumidiventris (Fall, 1919)	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Hygrotus turbidus (LeConte, 1855)	X		X		X	X	X					Larson et al. (2000)	
						Hygrotus unguicularis (Crotch, 1874)	X		X		X	X	X	X				Larson et al. (2000)	
						Hygrotus wardii (Clark, 1862)	X									X		Larson et al. (2000)	
					Nebrioporus Régimbart, 1906		X		X				X	X				Larson et al. (2000)	
						Nebrioporus macronychus (Shirt and Angus, 1992)	X		X				X	X				Larson et al. (2000)	
					Neoporus Guignot, 1931		X	X	X			X	X			X		Larson et al. (2000)	
						Neoporus arizonicus (Fall, 1917)	X	X	X							X		Larson et al.	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		(2000)	
						Neoporus dimidiatus (Gemminger and Harold, 1868)	X		X							X		Larson et al. (2000)	
						Neoporus undulatus (Say, 1823)	X		X			X	X					Larson et al. (2000)	
					Oreodytes Seidlitz, 1887		X	X	X		X	X	X	X	X	X		Larson et al. (2000); Zimmerman (1985)	
						Oreodytes abbreviatus (Fall, 1923)	X				X							Larson et al. (2000); Zimmerman (1985)	
						Oreodytes alaskanus (Fall, 1926)	X		X				X					Larson et al. (2000); Zimmerman (1985)	
						Oreodytes angustior (Hatch, 1928)	X	X				X	X					Larson et al. (2000); Zimmerman (1985)	
						Oreodytes congruus (LeConte, 1878)	X	X			X	X	X	X	X			Larson et al. (2000); Zimmerman (1985)	
						Oreodytes crassulus (Fall, 1923)	X	X			X	X	X	X				Larson et al. (2000); Zimmerman (1985)	
						Oreodytes humboltensis Zimmerman, 1985	X				X							Larson et al. (2000); Zimmerman (1985)	
						Oreodytes laevis (Kirby, 1837)	X		X				X					Larson et al. (2000); Zimmerman (1985)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Oreodytes obesus cordillerensis Larson, 1990	X	X			?		X	X				Larson et al. (2000); Zimmerman (1985)	formerly *O. rivalis* (Gyllenhal)
						Oreodytes obesus obesus (LeConte, 1866)	X	X			X	X						Larson et al. (2000); Zimmerman (1985)	formerly *O. rivalis* (Gyllenhal)
						Oreodytes picturatus (Horn, 1883)	X	X			X	X	X		X			Larson et al. (2000); Zimmerman (1985)	
						Oreodytes quadrimaculatus (Horn, 1883)	X	X			X	X	X		X			Larson et al. (2000); Zimmerman (1985)	
						Oreodytes rhyacophilus Zimmerman, 1985	X				X							Larson et al. (2000); Zimmerman (1985)	
						Oreodytes scitulus bisulcatus (Fall, 1923)	X	X			X							Larson et al. (2000); Zimmerman (1985)	
						Oreodytes scitulus scitulus (LeConte, 1855)	X	X			?			X				Larson et al. (2000); Zimmerman (1985)	
						Oreodytes sierrae Zimmerman, 1985	X				X							Larson et al. (2000); Zimmerman (1985)	
						Oreodytes snoqualmie (Hatch, 1933)	X		X				X					Larson et al. (2000); Zimmerman (1985)	
						Oreodytes subrotundus (Fall, 1923)	X				X							Larson et al. (2000);	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		Zimmerman (1985)	
					Sanfilippodytes Franciscolo, 1979		X	X	X		X	X				X		Larson et al. (2000)	*Sanfilippodytes* currently undergoing revision; best to leave specimens at genus
						Sanfilippodytes adelardi (Rochette, 1983)	X				X							Larson et al. (2000)	
						Sanfilippodytes barbarae (Fall, 1932)	X				X							Larson et al. (2000)	
						Sanfilippodytes barbarensis (Wallis, 1933)	X				X							Larson et al. (2000)	
						Sanfilippodytes belfragei (Sharp, 1882)	X				X							Larson et al. (2000)	
						Sanfilippodytes bidessoides (Leech, 1941)	X				X							Larson et al. (2000)	
						Sanfilippodytes corvallis (Fall, 1923)	X					X						Larson et al. (2000)	
						Sanfilippodytes hardyi (Sharp, 1882)	X				X							Larson et al. (2000)	
						Sanfilippodytes kingi (Clark, 1862)	X									X		Larson et al. (2000)	
						Sanfilippodytes latebrosus (LeConte, 1852)	X				X							Larson et al. (2000)	
						Sanfilippodytes malkini (Hatch, 1951)	X				X	X						Larson et al. (2000)	
						Sanfilippodytes pacificus (Fall, 1923)	X						?					Larson et al. (2000)	unconfirmed record for WA
						Sanfilippodytes palliatus (Horn, 1883)	X				X							Larson et al. (2000)	
						Sanfilippodytes rossi (Leech, 1941)	X				X							Larson et al. (2000)	
						Sanfilippodytes setifer Roughley & Larson, 2000	X		X		X							Larson et al. (2000)	
						Sanfilippodytes terminalis (Sharp, 1882)	X	X			X							Larson et al. (2000)	
						Sanfilippodytes veronicae (Rochette, 1983)	X				X							Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Sanfilippodytes vilis (LeConte, 1852)	X				X							Larson et al. (2000)	
						Sanfilippodytes williami (Rochette, 1986)	X				X					X		Larson et al. (2000)	
						Stictotarsus Zimmermann, 1919	X	X	X		X			X		X	X	Larson et al. (2000); Zimmerman (1975, 1982); Angus (2010)	Angus (2010) erected Boreonectes to include the "griseostriatus group" of species. This includes 8 species in this list. Further work is necessary to refine this list and place the remaining species into possibly additional new genera.
						Stictotarsus aequinoctialis (Clark, 1862)	X		X					X		X		Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus coelamboides (Fall, 1923)	X				X							Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus corvinus (Sharp, 1887)	X									X		Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus decemsignatus (Clark, 1862)	X									X		Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus deceptus (Fall, 1932)	X	X			X						X	Larson et al. (2000); Zimmerman (1975, 1982)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Stictotarsus dolerosus (Leech, 1945)	X				X							Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus eximius (Motschulsky, 1859)	X				X							Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus expositus (Fall, 1923)	X				X							Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus funereus (Crotch, 1873)	X				X							Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus griseostriatus (DeGeer, 1774)	X		X		X	X	X	X	X	X		Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus panaminti (Fall, 1923)	X				X							Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus roffi (Clark, 1862)	X									X		Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus spenceri (Leech, 1945)	X							X				Larson et al. (2000); Zimmerman (1975, 1982)	
						Stictotarsus spectabilis (Zimmerman, 1982)	X									X		Larson et al. (2000); Zimmerman (1975, 1982)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Stictotarsus striatellus (LeConte, 1852)	X		X		X	X	X	X	X	X	X	Larson et al. (2000); Zimmerman (1975, 1982)	
					Stygoporus Larson and Labonte, 1994							X						Larson et al. (2000)	monotypic; stygobiontic
						Stygoporus oregonensis Larson and Labonte, 1994						X						Larson et al. (2000)	monotypic; stygobiontic
			Colymbetinae Erichson, 1837				X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	
				Agabini Thomson, 1867			X	X	X		X	X	X	X	X	X	X	Larson et al. (2000), Nilsson (2000)	Nilsson (2000) has rearranged the species within this group, moving many species between *Agabus* and *Ilybius* as well as using the generic concepts of *Ilybiosoma* and *Platambus.* He did not create a revised key. We suggest leaving the list as presented in Larson et al. (2000) until a new North American key is devised.
					Agabinus Crotch, 1873		X	X			X	X	X	X				Larson et al. (2000)	
						Agabinus glabrellus (Motschulsky, 1859)	X	X			X	X	X	X				Larson et al. (2000)	
						Agabinus sculpturellus Zimermann, 1919	X	X			X	X						Larson et al. (2000)	
					Agabus Leach, 1817		X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	
						Agabus ambiguus (Say, 1823)	X	X					X					Larson et al. (2000)	
						Agabus ajax Fall, 1922	X							X				Larson et al. (2000)	
						Agabus ancillus Fall, 1922	X		X			X	X					Larson et al.	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		(2000)	
						Agabus antennatus Leech, 1939	X							X				Larson et al. (2000)	
						Agabus anthracinus Mannerheim, 1852	X		X		X		X	X				Larson et al. (2000)	
						Agabus apache Young, 1981	X		X							X		Larson et al. (2000)	
						Agabus approximatus Fall, 1922	X	X			X	X		X	X	X		Larson et al. (2000)	
						Agabus austinii Sharp, 1882	X	X			X	X	X	X	X			Larson et al. (2000)	
						Agabus austrodiscors Larson, 1996	X	X			X							Larson et al. (2000)	
						Agabus bifarius (Kirby, 1837)	X		X				X					Larson et al. (2000)	
						Agabus bjorkmanae Hatch, 1939	X	X			X	X	X	X	X			Larson et al. (2000)	
						Agabus brevicollis LeConte, 1857	X	X			X							Larson et al. (2000)	
						Agabus canadensis Fall, 1922	X		X				X					Larson et al. (2000)	
						Agabus confertus LeConte, 1861	X	X			X	X	X					Larson et al. (2000)	
						Agabus cordatus (LeConte, 1853)	X	X						X		X		Larson et al. (2000)	
						Agabus discors LeConte, 1861	X		X		X	X	X					Larson et al. (2000)	
						Agabus disintegratus (Crotch, 1873)	X		X		X	X		X	X	X		Larson et al. (2000)	
						Agabus erichsoni Gemminger and Harold, 1868	X		X		X			X				Larson et al. (2000)	
						Agabus euryomus Larson, 1996	X		X		X	X						Larson et al. (2000)	
						Agabus griseipennis LeConte, 1859	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Agabus hoppingi Leech, 1942	X	X			X							Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Agabus hypomelas Mannerheim, 1843	X		X		X	X	X	X				Larson et al. (2000)	
						Agabus ilybiiformis (Zimmermann, 1928)	X	X			X	X						Larson et al. (2000)	
						Agabus jimzim Larson, 1996	X									X		Larson et al. (2000)	
						Agabus klamathensis Larson & Leech, 1989	X	X			X	X						Larson et al. (2000)	
						Agabus kootenai Larson, 1991	X		X		X	X	X	X				Larson et al. (2000)	
						Agabus lineelus LeConte, 1861	X		X		X							Larson et al. (2000)	
						Agabus lugens LeConte, 1852	X	X			X	X		X				Larson et al. (2000)	
						Agabus lutosus LeConte, 1853	X		X		X	X	X				X	Larson et al. (2000)	
						Agabus minnesotensis Wallis, 1933	X	X						X	X			Larson et al. (2000)	
						Agabus morosus LeConte, 1852	X	X			X	X						Larson et al. (2000)	
						Agabus obliteratus nectris Leech, 1942	X	X				X	X					Larson et al. (2000)	
						Agabus obliteratus obliteratus LeConte, 1859	X	X			X			X	X	X		Larson et al. (2000)	
						Agabus oblongulus Fall, 1922	X		X			X	X					Larson et al. (2000)	
						Agabus obsoletus LeConte, 1858	X	X			X				X			Larson et al. (2000)	
						Agabus pandurus Leech, 1942	X	X			X							Larson et al. (2000)	
						Agabus perplexus Sharp, 1882	X	X			X	X	X					Larson et al. (2000)	
						Agabus pisobius Leech, 1949	X		X				X					Larson et al. (2000)	
						Agabus punctulatus Aube, 1838	X		X		X	X	X	X		X		Larson et al. (2000)	
						Agabus regularis (LeConte, 1852)	X				X						X	Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Agabus roguus Larson, 1997	X	X				X						Larson et al. (2000)	Curry Co., OR
						Agabus rumppi Leech, 1964	X	X			X				X			Larson et al. (2000)	
						Agabus sasquatch Larson, 1991	X		X		X				X			Larson et al. (2000)	
						Agabus semipunctatus (Kirby, 1837)	X		X				X					Larson et al. (2000)	
						Agabus semivittatus LeConte, 1852	X	X			X			X	X	X		Larson et al. (2000)	
						Agabus seriatus (Say, 1823)	X	X			X	X	X	X	X	X		Larson et al. (2000)	
						Agabus smithi Brown, 1930	X					X	X					Larson et al. (2000)	
						Agabus strigulosus (Crotch, 1873)	X		X		X	X	X	X	X			Larson et al. (2000)	
						Agabus tristis Aube, 1838	X		X		X	X	X	X		X		Larson et al. (2000)	
						Agabus vandykei Leech, 1942	X		X		X	X						Larson et al. (2000)	
						Agabus vancouverensis Leech, 1937	X		X				X					Larson et al. (2000)	
						Agabus versimilis Brown, 1932	X		X			X	X	X				Larson et al. (2000)	
						Agabus walsinghami (Crotch, 1873)	X	X			X	X	X					Larson et al. (2000)	
					Ilybius Erichson, 1832		X		X		X	X	X	X	X	X		Larson et al. (2000); Larson (1987)	
						Ilybius angustior (Gyllenhal, 1808)	X		X					X		X		Larson et al. (2000); Larson (1987)	
						Ilybius biguttulus (German, 1824)	X		X					X				Larson et al. (2000); Larson (1987)	
						Ilybius fraterculus LeConte, 1862	X		X		X	X	X	X	X	X		Larson et al. (2000); Larson (1987)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Ilybius picipes (Kirby, 1837)	X		X				X					Larson et al. (2000); Larson (1987)	
						Ilybius quadrimaculatus Aube, 1838	X		X		X	X	X					Larson et al. (2000); Larson (1987)	
						Ilybius subaeneus Erichson, 1837	X		X					X				Larson et al. (2000); Larson (1987)	
				Colymbetini Erichson, 1837			X	X	X		X	X	X	X	X	X		Larson et al. (2000)	
					Colymbetes Clairville, 1806		X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Colymbetes crotchi Sharp, 1882	X		X		X							Larson et al. (2000)	
						Colymbetes densus LeConte, 1859	X		X		X	X						Larson et al. (2000)	two recognized subspecies with possible intergrades
						Colymbetes incognitus Zimmerman, 1981	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Colymbetes sculptilis Harris, 1829	X		X					X				Larson et al. (2000)	
						Colymbetes strigatus LeConte, 1851	X		X		X							Larson et al. (2000)	
					Rhantus Dejean, 1833		X	X	X		X	X	X	X	X	X		Larson et al. (2000); Zimmerman (1975)	
						Rhantus anisonychus Crotch, 1873	X				X			X				Larson et al. (2000); Zimmerman (1975)	
						Rhantus atricolor (Aube, 1838)	X									X		Larson et al. (2000); Zimmerman (1975)	
						Rhantus binotatus (Harris, 1828)	X				X	X	X	X	X	X		Larson et al. (2000); Zimmerman	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		(1975)	
						Rhantus consimilis Motschulsky, 1859	X		X		X	X	X	X	X			Larson et al. (2000); Zimmerman (1975)	
						Rhantus gutticollis (Say, 1834)	X	X			X	X	X	X	X	X		Larson et al. (2000); Zimmerman (1975)	
						Rhantus sericans Sharp, 1882	X		X		X	X	X	X				Larson et al. (2000); Zimmerman (1975)	
						Rhantus sinuatus (LeConte, 1862)	X		X				X					Larson et al. (2000); Zimmerman (1975)	
						Rhantus suturellus (Harris, 1828)	X		X				X					Larson et al. (2000); Zimmerman (1975)	
						Rhantus wallisi Hatch, 1953	X		X		X	X	X					Larson et al. (2000); Zimmerman (1975)	
				Coptotomini Van den Branden, 1885			X				X	X	X	X	X			Larson et al. (2000)	
					Coptotomus Say, 1834		X		X		X	X	X	X	X			Larson et al. (2000)	
						Coptotomus longulus longulus LeConte, 1852	X		X		X	X	X	X	X			Larson et al. (2000)	
			Dytiscinae Leach, 1815				X	X	X		X	X	X	X	X	X	X	Larson et al. (2000)	
				Dytiscini Leach, 1817			X				X	X	X	X	X	X		Larson et al. (2000)	
					Dytiscus Linnaeus, 1758		X		X		X	X	X	X	X	X		Larson et al. (2000)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Dytiscus alaskanus Balfour-Browne, 1944	X		X				X	X				Larson et al. (2000)	
						Dytiscus circumcinctus Ahrens, 1811	X		X				X					Larson et al. (2000)	
						Dytiscus cordieri Aube, 1838	X		X		X	X	X					Larson et al. (2000)	
						Dytiscus dauricus Gebler, 1832	X		X		X	X	X	X	X	X		Larson et al. (2000)	
						Dytiscus habilis Say, 1834	X		X							X		Larson et al. (2000)	
						Dytiscus hatchi Wallis, 1950	X		X		X	X	X					Larson et al. (2000)	
						Dytiscus hybridus Aube, 1838	X		X			X						Larson et al. (2000)	
						Dytiscus marginicollis LeConte, 1845	X		X		X	X	X	X	X	X		Larson et al. (2000)	
				Hydaticini Sharp, 1882			X		X		X	X	X	X				Larson et al. (2000)	
					Hydaticus Leach, 1817		X		X		X	X	X	X				Larson et al. (2000)	
						Hydaticus aruspex Clark, 1864	X		X		X	X	X	X				Larson et al. (2000)	
				Acilini Thomson, 1867			X		X		X	X	X	X	X			Larson et al. (2000)	
					Acilius Leach, 1817		X		X		X	X	X	X	X			Bergsten&Miller (2006)	
						Acilius abbreviatus Mannerheim, 1843	X		X		X	X	X	X	X			Bergsten&Miller (2006)	
					Graphoderus Dejean, 1833		X		X		X		X	X				Larson et al. (2000)	
						Graphoderus liberus (Say, 1825)	X		X		?		X					Larson et al. (2000)	CA record unpublished
						Graphoderus occidentalis Horn, 1883	X		X		X	X	X	X				Larson et al. (2000)	
						Graphoderus perplexus Sharp, 1882	X		X		X		X	X				Larson et al. (2000)	
					Thermonectus Dejean, 1837		X		X		X	X		X		X		Larson et al.	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																		(2000)	
						Thermonectus intermedius Crotch, 1873	X		X		X	X		X				Larson et al. (2000)	
						Thermonectus marmoratus Hope, 1832	X	X			X			X				Larson et al. (2000)	
						Thermonectus nigrofasciatus nigrofasciatus Aube, 1838	X		X							X		Larson et al. (2000)	
						Thermonectus sibleyi Goodhue-McWilliams, 1981	X		X							X		Larson et al. (2000)	
				Eretini Crotch, 1873			X				X			X		X		Larson et al. (2000)	
					Eretes LaPorte, 1833		X				X			X		X		Larson et al. (2000)	
						Eretes sticticus (Linnaeus, 1767)	X				X			X		X		Miller (2002)	
				Cybistrini Sharp, 1882			X		X		X				X			Larson et al. (2000)	
					Cybister Curtis, 1827		X		X		X			X	X			Larson et al. (2000)	
						Cybister ellipticus LeConte, 1851	X		X		X							Larson et al. (2000)	
						Cybister explanatus LeConte, 1851	X		X		X			X	X			Larson et al. (2000)	
		Gyrinidae MacLeay, 1825					X	X	X		X	X	X	X	X	X	X		adults not benthic and so are excluded from benthic sets
			Gyrininae Régimbart				X	X	X		X	X	X	X	X	X	X		
				Enhydrini Régimbart			X	X	X		X					X	X		
					Dineutus MacLeay, 1825		X	X	X		X					X	X	Leech and Chandler (1956); Wood (1962)	no recent published key for North American species
				Orectochilini Régimbart, 1882			X	X			X					X			
					Gyretes Brullé, 1835		X	X			X					X		Babin (2004)	
				Gyrinini Régimbart			X	X	X		X	X	X	X	X	X		Oygur and Wolfe (1992)	
					Gyrinus Müller, 1764		X	X	X		X	X	X	X	X	X		Oygur and Wolfe (1992)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Haliplidae Aube, 1836					X		X		X	X	X	X	X	X	X	Leech and Chandler (1956)	the species keys in Usinger are the still the most recent
					Apteraliplus Chandler, 1943		X		X		X	X	X						vernal pools only; this genus may be sunk under *Haliplus* at some point
						Apteraliplus parvulus (Roberts, 1913)	X		X		X	X	X						vernal pools only; this genus may be sunk under *Haliplus* at some point
					Brychius Thomson, 1859		X				X			X				Mousseau and Roughley (2007)	
						Brychius hornii Crotch, 1873	X				X	X		X				Mousseau and Roughley (2007)	*B. albertanus* Carr 1928 now jr. synonym of *B. hornii*
						Brychius pacificus Carr, 1928	X				X							Mousseau and Roughley (2007)	
					Haliplus Latreille, 1802		X				X			X			X		
						Haliplus concolor LeConte, 1852	X				X	X	X				X		
						Haliplus cylindricus Roberts, 1913	X				X					X			
						Haliplus distinctus Wallis, 1933	X				X			X				Kenner (2005)	
						Haliplus dorsomaculatus Zimmermann, 1924	X				X	X							
						Haliplus eremicus Wells, 1989	X								X	X		Wells (1989)	possibly a synonym of *H. mimeticus* Matheson
						Haliplus gracilis Roberts, 1913	X				X	X	X						
						Haliplus leechi Wallis, 1933	X				X	X	X	X					
						Haliplus longulus LeConte, 1859	X				X	X	X					Kenner (2005)	
						Haliplus mimeticus Matheson, 1912	X				X							Leech (1957)	
						Haliplus robertsi Zimmermann, 1924	X				X	X	X	X		X			
						Haliplus rugosus Roberts, 1913	X				?						X		records probably only for Baja and not CA
						Haliplus subguttatus Roberts,	X				X	X	X					Leech (1964)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						1913													
						Haliplus tumidus LeConte, 1880	X									X		van Vondel and Spangler (2008)	
					Peltodytes Régimbart, 1878		X				X			X			X	Leech and Chandler (1956)	
						Peltodytes callosus (LeConte, 1852)	X	X	X		X	X	X	X	X		X	Leech and Chandler (1956)	
						Peltodytes dispersus Roberts, 1913	X	X	X		?			X		X			unconfirmed record for CA
						Peltodytes mexicanus (Wehncke, 1883)	X									X		van Vondel and Spangler (2008)	
						Peltodytes simplex (LeConte, 1852)	X	X	X		X				X		X	Leech and Chandler (1956)	
		Noteridae Thomson, 1860					X		X		X							Leech (1970)	
					Suphisellus Crotch, 1873		X		X		X							Leech (1970)	
						Suphisellus bicolor (Say, 1831)	X		X		X							Leech (1970)	
	Polyphaga Emery, 1886						X	X			X	X	X	X	X	X	X		
		Chrysomelidae Latreille, 1802									X								Excluded from benthic datasets
		Curculionidae Latreille, 1801									X								Excluded from benthic datasets
		Dryopidae Billberg, 1820					X				X	X	X	X	X	X		Brown (1972a)	larvae are primarily terrestrial; occasionally in headwater seeps
					Dryops Oliver, 1791		X	X			X					X		Brown (1972a)	riparian; seldomly taken in benthic samples
						Dryops arizonensis Schaeffer, 1905	X	X			X					X		Brown (1972a)	
					Helichus Erichson, 1847		X	X			X	X	X	X	X	X	X	Brown (1972a); Nelson (1989)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Helichus columbianus Brown, 1931	X	X			X	X	X		X	X	X	Brown (1972a); Nelson (1989); Nelson (1981)	
						Helichus striatus LeConte, 1852	X	X			X	X	X	X	X	X		Brown (1972a); Nelson (1989)	
						Helichus suturalis LeConte, 1852	X	X			X					X	X	Brown (1972a); Nelson (1989)	
						Helichus triangularis Musgrave, 1935	X	X								X		Brown (1972a); Nelson (1989)	
					Postelichus Nelson, 1989		X	X			X			X		X	X	Brown (1972a); Nelson (1989)	
						Postelichus confluentus (Hinton, 1935)	X	X								X		Brown (1972a); Nelson (1989)	
						Postelichus immsi (Hinton, 1937)	X	X			X			X		X		Brown (1972a); Nelson (1989)	
						Postelichus productus (LeConte, 1852)	X	X			X						X	Brown (1972a); Nelson (1989)	
		Elmidae Curtis, 1830					X	X	X		X	X	X	X	X	X	X	Shepard (2002); White and Roughley (2008); Brown (1972a)	Shepard's updated generic key to elmid adults includes *Xenelmis* but not the undescribed genus known to occur in the Pacific Northwest; a manuscript describing 3 species from this new genus has been submitted for publication by Cheryl Barr as of 1/23/2011
			Larainae Boving and Craighead, 1930				X	X	X		X	X	X	X					
				Laraini LeConte, 1861			X	X	X		X	X	X	X				Spangler (1987)	
					Lara LeConte, 1852		X	X	X		X	X	X	X					adults usually terrestrial, may be taken in benthic samples

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Lara avara LeConte, 1852	X	X	X		X			X				Brown (1972a)	
						Lara gehringi Darlington, 1929	X	X	X		X	X	X					Brown (1972a)	may be a synonym of *Lara avara*
			Elminae Curtis, 1830				X	X	X		X	X	X		X	X	X		
				Elmini Curtis, 1830			X	X	X		X	X	X		X	X	X		
					Ampumixis Sanderson, 1954		X	X			X	X							monotypic
						Ampumixis dispar (Fall, 1925)	X	X			X	X							monotypic
					Atractelmis Chandler, 1954		X	X			X	X							monotypic
						Atractelmis wawona Chandler, 1954	X	X			X	X							monotypic
					Cleptelmis Sanderson, 1954		X	X			X	X		X				Shepard (1998)	monotypic
						Cleptelmis addenda (Fall, 1907)	X	X			X	X	X	X				Shepard (1998)	monotypic
					Cylloepus Erichson, 1847		X	X								X			
						Cylloepus abnormis (Horn, 1870)	X	X								X		Brown (1972a)	
						Cylloepus parkeri Sanderson, 1953	X	X								X		Brown (1972a)	
					Dubiraphia Sanderson, 1954		X	X	X		X					X			
						Dubiraphia brunnescens (Fall, 1925)	X	X	X		X							Brown (1972a)	Lake Co., Clear Lake
						Dubiraphia giulianii (van Dyke, 1949)	X	X	?		X							Brown (1972a); Shepard (1993)	may be a synonym of *Dubiraphia brunnescens*
					Heterelmis Sharp, 1882		X	X			X					X	X		
						Heterelmis glabra (Horn, 1870)	X	X								X		Brown (1972b)	
						Heterelmis obesa Sharp, 1882	X	X			X					X		Brown (1972b)	
						Heterelmis stephani Brown, 1972	X	X								X		Brown (1972b)	
					Heterlimnius Hinton, 1935		X	X			X	X	X	X					
						Heterlimnius corpulentus (LeConte, 1874)	X	X			X		X	X				Brown (1972a)	
						Heterlimnius koebelei (Martin, 1927)	X	X			X	X	X					Brown (1972a)	
					Hexacylloepus Hinton, 1940		X	X								X			unpublished records for AZ
					Huleechius Brown, 1981		X	X								X	X	Brown (1981)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Huleechius marroni Brown, 1981	X	X									X	Brown (1981)	
						Huleechius marroni carolus Brown, 1981	X	X								X		Brown (1981)	
					Macrelmis Motschulsky, 1859		X	X								X		Brown (1972a)	
						Macrelmis moestus (Horn, 1870)	X	X								X		Brown (1972a)	may be a synonom of *Macrelmis texanus* Schaeffer, 1911
					Microcylloepus Hinton, 1935		X	X			X			X		X			there are unpublished records of additional species in the SW
						Microcylloepus formicoideus Shepard, 1990	X	X			X							Shepard (1990)	occurs in Death Valley only
						Microcylloepus moapus fraxinus La Rivers, 1949	X	X							X			Brown (1972a)	warm springs in SE Nevada
						Microcylloepus moapus moapus La Rivers, 1949	X	X							X			Brown (1972a)	warm springs in SE Nevada
						Microcylloepus similis (Horn, 1870)	X	X			X			X		X		Shepard (1993)	widespread in the West
						Microcylloepus thermarum (Darlington, 1928)	X	X							X			Brown (1972a)	warm springs in NW Nevada
					Narpus Casey, 1893		X	X			X	X	X	X		X		Brown (1972a)	
						Narpus angustus Casey, 1893	X	X			X	X	X					Brown (1972a)	
						Narpus arizonicus (Brown, 1930)	X	X								X		Brown (1972a)	
						Narpus concolor (LeConte, 1881)	X	X			X	X	X	X				Brown (1972a)	
					Neocylloepus Brown, 1970		X	X								X		Shepard (2002); White and Roughley (2008)	undetermined species
					Neoelmis Musgrave, 1935		X	X								X		Shepard (2002); White and Roughley (2008)	undetermined species
					Optioservus Sanderson, 1954		X	X			X	X	X	X	X	X		Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Optioservus canus Chandler, 1954	X	X			X							Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid
						Optioservus castanipennis (Fall, 1925)	X	X						X				Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid
						Optioservus divergens (LeConte, 1874)	X	X			X			X	X	X		Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid
						Optioservus heteroclitus White, 1978	X	X			X							Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid
						Optioservus quadrimaculatus (Horn, 1870)	X	X			X	X	X	X	X			Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid
						Optioservus seriatus (LeConte, 1874)	X	X			X	X		X				Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid
					Ordobrevia Sanderson, 1953		X	X			X	X						Shepard (2002); White and Roughley (2008)	only one species in North America
						Ordobrevia nubifera (Fall, 1901)	X	X			X	X						Shepard (2002); White and Roughley (2008)	only one species in North America
					Rhizelmis Chandler, 1954		X	X			X	X						Shepard (2002); White and Roughley (2008)	monotypic
						Rhizelmis nigra Chandler, 1954	X	X			X	X						Shepard (2002); White and Roughley (2008)	monotypic

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Stenelmis Dufour, 1835		X	X			X	X	X		X	?		Shepard (2002); White and Roughley (2008)	*S. occidentalis* is the only species occurring outside of Nevada springs
						Stenelmis calida Chandler, 1949	X	X							X			Schmude (1999)	Key designed for *Stenelmis* of the Nevada springs, but will serve for the West in general
						Stenelmis lariversi Schmude, 1999	X	X							X			Schmude (1999)	Key designed for *Stenelmis* of the Nevada springs, but will serve for the West in general
						Stenelmis moapa LaRivers, 1949	X	X							X			Schmude (1999)	Key designed for *Stenelmis* of the Nevada springs, but will serve for the West in general
						Stenelmis occidentalis Schmude and Brown, 1991	X	X				X			X	?		Schmude (1999)	Key designed for *Stenelmis* of the Nevada springs, but will serve for the West in general
					Xenelmis Hinton, 1936		X	X								X		Shepard (2002); Brown (1985); Brown (1981)	
						Xenelmis sandersoni Brown, 1985	X	X								X		Shepard (2002); Brown (1985); Brown (1981)	only species from the USA; larvae still not included in generic keys, but easily identifiable
				Macronychini Steffan, 1961			X	X			X	X	X	X	X	X	X		
					Zaitzevia Champion, 1923		X	X			X	X	X	X	X	X	X	Brown (1972a); Brown (2001)	
						Zaitzevia parvula (Horn, 1870)	X	X			X	X	X	X	X	X	X	Brown (2001)	
						Zaitzevia posthonia Brown, 2001	X	X			X	X	X						

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Epimetopidae Zaitzev, 1908					X									X		van Tassel (2002)	
					Epimetopus Lacordaire, 1854		X									X		van Tassel (2002)	
		Eulichadidae Crowson, 1973					X				X							Brown (1972a)	formerly placed in the Ptilodactylidae; adults terrestrial
					Stenocolus LeConte, 1853		X				X							Brown (1972a)	adults terrestrial
						Stenocolus scutellaris LeConte, 1853	X				X							Brown (1972a)	adults terrestrial
		Georissidae Laporte, 1840									X							Shepard (2003)	shoredwellers; excluded from benthic datasets; some authors consider this a subfamily of Hydrophilidae
		Heteroceridae MacLeay, 1825									X	X	X	X	X	X		Pacheco (1964); Pacheco (1978); Shepard (1993)	Excluded from benthic datasets; larvae and adults shoredwellers; Pacheco (1964) revised the family describing many new genera but few authors follow his classification. The Pacheco names are given in the comments column.
		Hydraenidae Mulsant, 1844					X	X	X		X	X	X	X	X	X	X		
			Hydraeninae d'Orchymont, 1919				X	X	X		X	X	X	X	X	X	X		
				Hydraenini Perkins, 1980			X	X	X		X	X	X	X	X	X	X		
					Hydraena Kugelann, 1794		X	X	X		X	X	X	X	X	X	X	Perkins (1980); Perkins (2001)	Found along stream margins, also some lentic situations
						Hydraena alternata Perkins, 1980	X	X								X		Perkins (1980)	Known from extreme southeastern AZ
						Hydraena arenicola Perkins, 1980	X	X	X		X	X						Perkins (1980)	
						Hydraena arizonica Perkins, 1980	X	X								X		Perkins (1980)	
						Hydraena bituberculata Perkins, 1980	X	X								X		Perkins (1980)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Hydraena californica Perkins, 1980	X	X			X							Perkins (1980)	
						Hydraena circulata Perkins, 1980	X	X			X	X	X	X		X	X	Perkins (1980)	
						Hydraena leechi Perkins, 1980	X	X								X		Perkins (1980)	
						Hydraena mignymixys Perkins, 1980	X	X			X							Perkins (1980)	
						Hydraena nigra Hatch, 1965	X	X			X	X		X	X			Perkins (1980)	
						Hydraena occidentalis Perkins, 1980	X	X	X		X	X	X					Perkins (1980)	
						Hydraena pacifica Perkins, 1980	X	X	X		X	X	X	X	X			Perkins (1980)	
						Hydraena petila Perkins, 1980	X	X			X							Perkins (1980)	
						Hydraena sierra Perkins, 1980	X	X			X	X						Perkins (1980)	
						Hydraena tuolumne Perkins, 1980	X	X			X							Perkins (1980)	
						Hydraena vandykei d'Orchymont, 1923	X	X			X							Perkins (1980)	
						Hydraena yosemitensis Perkins, 1980	X	X			X							Perkins (1980)	
					Limnebius Leach, 1815						X	X	X	X		X	X	Perkins (1980); Perkins (2001)	
						Limnebius alutaceous (Casey, 1886)					X	X	X					Perkins (1980); Perkins (2001)	
						Limnebius arenicolus Perkins, 1980					X	X					X	Perkins (1980); Perkins (2001)	
						Limnebius leechi Perkins, 1980					X							Perkins (1980); Perkins (2001)	Coastal Ranges
						Limnebius piceus (Horn, 1872)					X						X	Perkins (1980); Perkins (2001)	
						Limnebius sinuatus Sharp, 1882										X		Perkins (1980); Perkins (2001)	
						Limnebius utahensis Perkins, 1980								X				Perkins (1980); Perkins (2001)	
			Ochthebiinae Perkins, 1980				X	X	X	X	X	X	X	X	X	X	X		

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Gymnocthebius d'Orchymont, 1943							X	X				X	X	Perkins (1980); Perkins (2001)	
						Gymnochthebius falli Perkins, 1980										X		Perkins (1980); Perkins (2001)	
						Gymnochthebius fossatus (LeConte, 1855)										X		Perkins (1980); Perkins (2001)	
						Gymnochthebius laevipennis (LeConte, 1878)					X	X					X	Perkins (1980); Perkins (2001)	
						Gymnochthebius oppositus Perkins, 1980											X	Perkins (1980); Perkins (2001)	
					Neochthebius d'Orchymont, 1932						X	?	?					Perkins (1980); Perkins (2001)	intertidal, found in rock crevises from CA to BC
						Neochthebius vandykei (Knisch, 1924)					X	?	?					Perkins (1980); Perkins (2001)	intertidal, found in rock crevises from CA to BC
					Ochthebius Leach, 1815		X	X	X		X	X	X	X	X	X	X	Perkins (1980); Perkins (2001)	dwellers of stream and pond margins
						Ochthebius apache Perkins, 1980	X									X			
						Ochthebius arenicolus Perkins, 1980	X				X	X					X		
						Ochthebius arizonicus Perkins, 1980	X									X			
						Ochthebius aztecus Sharp, 1887	X	X			X	X		X	X				
						Ochthebius biinicisus Perkins, 1980	X	X		X	X	X							
						Ochthebius bisinuatus Perkins, 1980	X				X	X	X						
						Ochthebius borealis Perkins, 1980	X	X	X		X	X	X		X		X		
						Ochthebius brevipennis Perkins, 1980	X		X		X	X	X						
						Ochthebius californicus Perkins, 1980	X				X				X				
						Ochthebius costipennis Fall, 1901	X				X								
						Ochthebius crassalus Perkins,	X				X								

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						1980													
						Ochthebius crenatus Hatch, 1965	X				X	X							
						Ochthebius cribricollis LeConte, 1850	X		X		X	X	X		X				
						Ochthebius discretus LeConte, 1878	X	X			X	X	X	X	X		X		
						Ochthebius gruwelli Perkins, 1980	X	X	X		X						X		
						Ochthebius interruptus LeConte, 1852	X	X	X	X	X	X	X				X		
						Ochthebius lecontei Perkins, 1980	X						X	X	X				
						Ochthebius leechi Wood and Perkins, 1978	X	X			X								
						Ochthebius lineatus LeConte, 1852	X				X	X	X	X	X	X	X		
						Ochthebius madrensis Perkins, 1980	X	X								X			
						Ochthebius marinus (Paykull, 1798)	X				X	X	X	X	X				
						Ochthebius martini Fall, 1919	X	X			X								
						Ochthebius mimicus Brown, 1933	X					X	X						
						Ochthebius orbus Perkins, 1980	X				X	X							
						Ochthebius pacificus Perkins, 1980	X				X	X	X		X				
						Ochthebius puncticollis LeConte, 1852	X	X			X			X		X	X		
						Ochthebius recticulus Perkins, 1980	X				X								known only from Wilbur Hot Springs, CA
						Ochthebius rectus LeConte, 1878	X		X	X	X	X	X		X	X			
						Ochthebius rectusalus Perkins, 1980	X		X	X	X		X				X		
						Ochthebius richmondi Perkins, 1980	X				X		X						
						Ochthebius sculptoides Perkins, 1980	X	X			X	X		X	X				
						Ochthebius sculptus LeConte,	X	X	X		X	X					X		

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						1878													
						Ochthebius sierrensis Perkins, 1980	X				X								
						Ochthebius similis Sharp, 1882	X	X								X			
						Ochthebius spanglerorum Wood and Perkins, 1978	X							X					
						Ochthebius tubus Perkins, 1980	X	X			X					X	X		
						Ochthebius uniformis Perkins, 1980	X		X		X	X	X						
		Hydrophilidae Latreille, 1802					X	X	X		X	X	X	X	X	X	X	Smetana (1988); Leech and Chandler (1956)	Smetana's keys are more recent, but do not cover the SW USA
					Ametor Semenov, 1900		X	X			X	X	X					Smetana (1988); Leech and Chandler (1956)	
						Ametor latus (Horn, 1873)	X	X			X	X	X					Smetana (1988); Leech and Chandler (1956)	
						Ametor scabrosus (Horn, 1873)	X	X			X	X	X					Smetana (1988); Leech and Chandler (1956)	
					Anacaena Thomson, 1859		X	X	X		X							Leech and Chandler (1956)	
						Anacaena limbata (Fabricius, 1792)	X	X	X		X							Smetana (1988); Leech and Chandler (1956)	This name probably represents a species complex
						Anacaena signaticollis (Fall, 1924)	X				X							Leech and Chandler (1956)	
					Berosus Leach, 1817		X				X							Miller (1965a); van Tassel (1963); Leech and Chandler (1956)	van Tassel's (1966) revision of *Berosus* remains unpublished; species keys should be used with caution

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Berosus fraternus LeConte, 1855	X				X					X		Leech and Chandler (1956)	*B. californicus* now a synonym
						Berosus hatchi Miller, 1965	X					X	X					Miller (1965a)	
						Berosus infuscatus LeConte, 1855	X				X					X		Leech and Chandler (1956)	
						Berosus ingeminatus d'Orchymont, 1946	X				X							Leech and Chandler (1956)	
						Berosus maculosus Mannerheim, 1853	X				X							Leech and Chandler (1956)	
						Berosus metalliceps Sharp, 1882	X				X							Leech and Chandler (1956)	
						Berosus notapeltatus van Tassell, 1963	X									X		van Tassell (1963)	
						Berosus oregonensis Miller, 1965	X					X						Miller (1965a)	
						Berosus punctatissimus LeConte. 1852	X				X					X		Leech and Chandler (1956)	
						Berosus sayi Hansen, 1999	X				X							Leech and Chandler (1956)	*Berosus striatus* is a junior synonym
						Berosus stylifera Horn 1873	X				X					X		Leech and Chandler (1956)	
						Chaetarthria Stephens, 1833	X				X							Miller (1974)	
						Chaetarthria bicolor Sharp, 1882	X				X					X		Miller (1974)	
						Chaetarthria hespera Miller, 1974	X				X			X		X		Miller (1974)	
						Chaetarthria leechi Miller, 1974	X				X							Miller (1974)	
						Chaetarthria magna Miller, 1974	X				X							Miller (1974)	
						Chaetarthria nigrella (LeConte, 1861)	X				X		X					Miller (1974)	
						Chaetarthria ochra Miller, 1974	X				X					X		Miller (1974)	
						Chaetarthria pallida (LeConte, 1861)	X				X	X		X	X	X		Miller (1974)	
						Chaetarthria punctulata Sharp, 1882	X				X					X	X	Miller (1974)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Chaetarthria pusilla Sharp, 1882	X				X					X	X	Miller (1974)	
						Chaetarthria spinata Miller, 1974	X				X							Miller (1974)	
						Chaetarthria truncata Miller, 1974	X				X							Miller (1974)	
						Chaetarthria utahensis Miller, 1974	X							X				Miller (1974)	
					Crenitis Bedel, 1881		X	X	X		X	X	X		X	X		Miller (1965); Smetana (1988)	
						Crenitis alticola (Fall, 1924)	X	?	?		X	X	X			X		Miller (1965)	
						Crenitis dissimilis (Horn, 1873)	X				X							Miller (1965); Smetana (1988)	
						Crenitis malkini Miller, 1965	X	X				X						Miller (1965); Smetana (1988)	
						Crenitis morata (Horn, 1890)	X		X		X							Smetana (1988)	
						Crenitis palpalis Miller, 1965	X				X	X						Miller (1965)	
						Crenitis paradigma (d'Orchymont, 1942)	X		X			X	X					Smetana (1988)	
						Crenitis rufiventris (Horn, 1873)	X		X		X					X		Smetana (1988)	
						Crenitis seriellus (Fall, 1924)	X				X								
						Crenitis snoqualmie Miller, 1965	X	?				X	X					Miller (1965)	
					Cymbiodyta Bedel, 1880		X	X	X		X	X	X		X	X	X	Smetana (1974)	
						Cymbiodyta acuminata Fall, 1924	X						X					Smetana (1974)	
						Cymbiodyta arizonica Smetana, 1974	X									X		Smetana (1974)	
						Cymbiodyta columbiana Leech, 1948	X	X	X		X	X	X					Smetana (1974)	
						Cymbiodyta dorsalis (Motschulsky, 1859)	X	X	X		X	X	X	X	X	X	X	Smetana (1974)	
						Cymbiodyta fraterculus (Sharp, 1882)	X									X		Smetana (1974)	
						Cymbiodyta howdeni Smetana, 1974	X									X		Smetana (1974)	
						Cymbiodyta imbellis (LeConte, 1861)	X	X	X		X	X						Smetana (1974)	
						Cymbiodyta leechi Miller, 1964	X				X	X	X					Smetana (1974)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Cymbiodyta minima Notman, 1919	X					X	X					Smetana (1974)	
						Cymbiodyta occidentalis Smetana, 1974	X	?	X		X							Smetana (1974)	
						Cymbiodyta pacifica Leech, 1948	X	X	X		X	X	X					Smetana (1974)	
						Cymbiodyta pseudopacifica Smetana, 1974	X				X							Smetana (1974)	
						Cymbiodyta puella Smetana, 1974	X	X	X		X							Smetana (1974)	
						Cymbiodyta punctatostriata (Horn, 1873)	X	X	?		X							Smetana (1974)	
						Cymbiodyta seriata Smetana, 1974	X	X								X		Smetana (1974)	
						Cymbiodyta vindicata Fall, 1924	X						X					Smetana (1974)	
					Enochrus Thomson, 1859		X	X	X		X	X	X		X	X	X	Gundersen (1978); Gundersen (1977)	
						Enochrus aridus Gundersen, 1977	X				X					X		Gundersen (1978); Gundersen (1977)	
						Enochrus californicus (Horn, 1890)	X		X		X	X	X	X			X	Gundersen (1978); Gundersen (1977)	
						Enochrus carinatus carinatus (LeConte, 1855)	X				X							Gundersen (1978); Gundersen (1977)	
						Enochrus carinatus fucatus (Horn, 1873)	X									X		Gundersen (1978); Gundersen (1977)	
						Enochrus cristatus (LeConte, 1855)	X				X	X	X	X	X	X	X	Gundersen (1978); Gundersen (1977)	
						Enochrus cuspidatus (LeConte, 1878)	X				X	X			X			Gundersen (1978); Gundersen (1977)	
						Enochrus diffusus (LeConte, 1855)	X				X	X	X	X	X			Gundersen (1978); Gundersen (1977)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
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						Enochrus fimbriatus (Melsheimer, 1844)	X				X			X	X			Gundersen (1978); Gundersen (1977)	as *E. perplexus* (LeConte, 1855) in some lists
						Enochrus hamiltoni Leech, 1950	X	X	X		X	X	X	X	X			Gundersen (1978); Gundersen (1977)	Several different color morphs exist
						Enochrus ochraceus (Melsheimer, 1844)	X		X		X							Gundersen (1978); Gundersen (1977)	
						Enochrus piceus piceus Miller, 1964	X				X	X	X	X	X	X		Gundersen (1978); Gundersen (1977)	
						Enochrus piceus glabrus Gundersen, 1977	X									X		Gundersen (1978); Gundersen (1977)	
						Enochrus pygmaeus pectoralis (LeConte, 1855)	X				X			X	X	X	X	Gundersen (1978); Gundersen (1977)	
						Enochrus pygmaeus pygmaeus (Fabricius, 1792)	X				X					X	X	Gundersen (1978); Gundersen (1977)	
					Helochares Mulsant, 1844		X				X								
						Helochares normatus (LeConte, 1861)	X				X								as *H. maculicollis* Mulsant, 1844
					Hemiosus Sharp, 1882		X	X								X		van Tassell (1964)	recorded from Gila River, AZ
						Hemiosus exilis (LeConte, 1851)	X	X								X		van Tassell (1964)	recorded from Gila River, AZ
					Hydrochara Berthold, 1827		X				X		X	X	X	X	X	Smetana (1980); Leech and Chandler (1956)	
						Hydrochara lineata LeConte, 1855	X				X			X	X	X	X	Smetana (1980); Leech and Chandler (1956)	
						Hydrochara obtusata (Say, 1823)	X						X					Smetana (1980)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Hydrochara rickseckeri Horn, 1895	X				X							Smetana (1980); Leech and Chandler (1956)	Listed as a species of concern; may become federally listed
					Hydrobius Leach, 1815		X				X								
						Hydrobius fuscipes (Linnaeus, 1758)	X				X								
					Hydrophilus Geoffrey, 1762		X				X							Leech and Chandler (1956)	
						Hydrophilus insularis Laporte, 1840	X				X							Leech and Chandler (1956)	
						Hydrophilus triangularis Say, 1823	X		X		X							Leech and Chandler (1956)	
					Laccobius Erichson, 1837		X				X								
						Laccobius acutipenis Miller, 1965	X				X							Cheary (1971)	
						Laccobius agilis Randall, 1838	X				X	X	X	X					
						Laccobius borealis Cheary, 1971	X				X	X	X	X	X			Cheary (1971)	
						Laccobius bruesi Cheary, 1971	X				X							Cheary (1971)	
						Laccobius californicus d'Orchymont,1942	X				X	X	X						
						Laccobius carri d'Orchymont, 1942	X				X	X		X	X				
						Laccobius chandleri Cheary, 1971	X							X				Cheary (1971)	
						Laccobius columbianus Miller, 1965	X							X				Cheary (1971)	
						Laccobius ellipticus LeConte, 1855	X				X	X	X		X		X		
						Laccobius hardyi Cheary, 1971	X							X		X	X	Cheary (1971)	
						Laccobius insolitus d'Orchymont, 1942	X				X								
						Laccobius leechi Cheary, 1971	X				X					?		Cheary (1971)	
						Laccobius mexicanus d'Orchymont, 1942	X				X			X		X	X	Cheary (1971)	
						Laccobius nevadensis Miller, 1965	X				X	X			X			Miller (1965b)	
						Laccobius occidentalis Cheary, 1971	X				X							Cheary (1971)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
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						Laccobius oregonensis Cheary, 1971	X					X						Cheary (1971)	
						Laccobius pacificus Miller, 1965	X				X	X	X					Miller (1965b)	
						Laccobius piceus Fall, 1921	X				X							Cheary (1971)	
						Laccobius tridentipenis Cheary, 1971	X				X							Cheary (1971)	
						Laccobius truncatipenis Miller, 1965	X				X	X	X					Miller (1965b)	
					Paracymus Thompson, 1867		X				X							Wooldridge (1966)	*P. securus* not in this key, but all US species are
						Paracymus communis Wooldridge, 1966	X				X					X		Wooldridge (1966)	
						Paracymus confusus Wooldridge, 1966	X									X		Wooldridge (1966)	
						Paracymus elegans (Fall, 1901)	X				X							Wooldridge (1966)	
						Paracymus ellipsis (Fall, 1910)	X				X					X		Wooldridge (1966)	
						Paracymus restrictus Wooldridge, 1966	X				X							Wooldridge (1966)	
						Paracymus securus Wooldridge, 1975	X										X	Wooldridge (1975)	
						Paracymus subcupreus (Say, 1825)	X				X							Wooldridge (1966)	
						Paracymus tarsalis Miller, 1963	X				X							Wooldridge (1966)	
					Tropisternus Solier, 1834		X				X							Leech and Chandler (1956)	
						Tropisternus californicus (LeConte, 1855)	X				X	X					X	Leech and Chandler (1956)	
						Tropisternus columbianus Brown, 1931	X	X	X		X	X	X				X	Leech and Chandler (1956)	
						Tropisternus ellipticus (LeConte, 1855)	X		X		X	X	X	X	X	X	X	Leech and Chandler (1956)	
						Tropisternus lateralis (Fabricius, 1775)	X	X	X		X	X	X	X	X	X	X	Leech and Chandler (1956)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
						Tropisternus obscurus Sharp, 1882	X										X	Leech and Chandler (1956)	
						Tropisternus orvus Leech, 1945	X				X	X			X			Leech and Chandler (1956)	
						Tropisternus salsamentus Fall, 1901	X				X	X					X	Leech and Chandler (1956)	
						Tropisternus sublaevis (LeConte, 1855)	X				X			X	X	X	X	Leech and Chandler (1956)	
		Helophoridae Thomson, 1859					X				X	X	X	X	X	X	X	Smetana (1985)	some authors consider this as a subfamily of Hydrophilidae
					Helophorus Fabricius, 1775		X				X	X	X	X	X	X	X	Smetana (1985)	
		Hydrochidae Thomson, 1859					X												some authors consider this as a subfamily of Hydrophilidae
					Hydrochus Leach, 1817		X				X	X	X			X	X		Hellman (1975) revised the genus, describing a number of new species for North America. This work remains unpublished and the new names, two of which are found in AZ, remain unavailable.
		Lampyridae Latreille, 1817							X										larvae are shoredwellers, not truly aquatic; excluded from benthic datasets
					Pyractomena Dejean, 1833				X										emergent vegetation of ponds and marshes
		Limnichidae Erichson, 1846									X	X	X	X	X	X		Wooldridge (1975, 1986); Shepard (1993)	larvae and adults shoredwellers; excluded from benthic datasets

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
		Lutrochidae Kasap and Crowson, 1975					X	X								X		Brown (1972a); Brown and Murvosh (1970)	adults terrestrial; excluded from benthic datasets
		Psephenidae Lacordaire, 1854					X	X			X	X	X		X	X	X	Brown (1972a); Shepard (1993)	
			Eubriinae Lacordaire, 1857				X	X			X	X						Brown (1972a); Shepard (1993)	
					Acneus Horn, 1880		X	X			X	X						Brown (1972a); Shepard (1993)	larvae not separable to species
			Eubrianacinae Jacobson, 1913				X	X			X	X			X			Brown (1972a); Shepard (1993)	
					Eubrianax Kiesenwetter, 1874		X	X			X	X			X			Brown (1972a); Shepard (1993)	
						Eubrianax edwardsii (LeConte, 1874)	X	X			X	X			X			Brown (1972a); Shepard (1993)	only one species in Nearctic Region
			Psepheninae Lacordaire, 1854				X	X			X	X	X		X	X		Brown (1972a); Brown and Murvosh (1974)	
					Psephenus Haldeman, 1853		X	X			X	X	X		X	X		Brown (1972a); Brown and Murvosh (1974)	larvae to genus, except *P. falli* Casey which is widespread outside of AZ
		Ptilodactylidae Laporte, 1836					X				X				X			Brown (1972a)	adults terrestrial; larvae found mainly in seeps and headwater streams
					Anchycteis Horn, 1880		X				X				X			Brown (1972a)	adults terrestrial; larvae found mainly in seeps and headwater streams
						Anchycteis velutina Horn, 1880	X				X				X			Brown (1972a)	adults terrestrial; larvae found mainly in seeps and headwater streams

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Araeopidius Cockerell, 1906		X				X							Lawrence (1991)	adults terrestrial; larvae found mainly in seeps and headwater streams
						Araeopidius monochus LeConte, 1874	X				X							Lawrence (1991)	adults terrestrial; larvae found mainly in seeps and headwater streams
		Scirtidae Fleming, 1821					X		X		X	X	X	X		X		Tetrault (1967)	adults terrestrial and excluded from benthic datasets; larvae to genus only; all lentic, some lotic in slower microhabitats
					Cyphon Paykull, 1799		X		X		X	X	X	X				Tetrault (1967)	many undescribed species including some in the SAFIT region
					Elodes Latreille, 1796		X		X		X	X	X		X			Tetrault (1967)	
					Herthania Klausnitzer, 2006		X		X		X	X	X	X	X			Klausnitzer (2006)	genus erected for several *Cyphon* species, including two in the SAFIT region; larvae undescribed but probably inseparable from *Cyphon*
					Prionocyphon Redtenbacher, 1858		X		X							X		Leech and Chandler (1956)	Leech and Chandler in Usinger (1956) reported this genus from Western AZ; as no other papers have corroborated this record, it is likely an error.
					Scirtes Illiger, 1807		X		X		X					X		Tetrault (1967)	
		Scarabaeidae Latreille, 1802							X		X							Rogers (1997)	Excluded from benthic datasets
			Aphodiinae Leach, 1815						X		X							Rogers (1997)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
					Aphodius Illiger, 1798				X		X							Rogers (1997)	
						Aphodius alternatus Horn, 1887			X		X							Rogers (1997)	surface dweller in some vernal pools
		Staphylinidae Latreille, 1802									X	X	X	X	X	X	X		Excluded from benthic datasets

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Diptera: True Flies
Standard Effort Level I: Genus (where possible) -- Chironomidae to family
Standard Effort Level II: Genus/species (where possible) -- Chironomidae to genus or species group (where noted)
Standard Taxonomic Reference: Merritt, Cummins and Berg (2008)
Reviewed by:

Keys to families and genera are given in Merritt, Cummins and Berg (Courtney and Merritt, 2008 – larvae; Merritt and Webb, 2008 – pupae and adults; Byers and Gelhaus, 2008 – Tipulidae; Adler and Currie, 2008 – Simuliidae; Wallace and Walker, 2008 – Culicidae; Ferrington, Berg and Coffman, 2008 – Chironomidae). Stone et al. (1983) is a good source for distributional information. See also McAlpine et al. (1981, 1987, 1989) for additional keys, illustrations, biological and phylogenetic information and bibliographic references for all Diptera families. The Simuliidae have recently been revised for North America (Adler et al., 2004) When identifying chironomids, it may be helpful to have a number of additional texts at hand including Wiederholm (1983), Wiederholm (1986), and Epler (2001). The latter text, although designed for use in North and South Carolina, is well illustrated and has up-to-date keys for many Nearctic genera. It also contains useful information on the hazards of midge larva identification including ecology, nomenclature, slide-mounting, and quality assurance.

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
Diptera Latreille, 1817										X	X	X	X	X	X	X	X	X	X	X	Courtney and Merritt (2008); Merritt and Webb (2008)	keys to families and genera
	Nematocera Berthold, 1827									X	X	X		X	X	X	X	X	X	X		
		Tipulomorpha Brues, Melander, Carpenter and Morton, 1954								X	X	X		X	X	X	X	X	X	X		
			Tanyderidae Osten Sacken, 1880							X	X			X	X		X				Alexander (1967)	
							Protanyderus Osten Sacken, 1859			X	X			X	X		X				Alexander (1967)	only genus in western USA

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Tipulidae Latreille, 1802							X	X			X	X	X	X	X	X	X	Byers and Gelhaus (2008), Gelhaus (2000)	also a number of terrestrial forms; Gelhaus key identifies many of these
				Limoniinae Speiser, 1909						X	X			X	X	X	X	X	X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Antocha Osten Sacken, 1859			X	X			X	X	X					Byers and Gelhaus (2008), Gelhaus (2000)	
									Antocha monticola Alexander, 1917	X	X			X	X	X					Byers and Gelhaus (2008), Gelhaus (2000)	only species known from Western US
							Cryptolabis Osten Sacken, 1859			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	larvae are often confused with *Limnophila*
							Dicranota Zetterstedt, 1838			X	X			X	X	X	X				Byers and Gelhaus (2008), Gelhaus (2000)	
							Erioptera Meigen, 1800			X	X			X	X	X	X	X	X		Byers and Gelhaus (2008), Gelhaus (2000)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Gonomyia Meigen, 1818			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Hesperoconopa Alexander, 1948			X	X			X	X	X	X				Byers and Gelhaus (2008), Gelhaus (2000)	
							Hexatoma Latreille, 1809			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Limnophila Macquart, 1834			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Limonia Meigen, 1800			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Molophilus Curtis, 1833			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Ormosia Rondani, 1856			X	X			X	X	X	X				Byers and Gelhaus (2008), Gelhaus (2000)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Paradelphomyia Alexander, 1936			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Pedicia Latreille, 1809			X	X			X	X	X	X				Byers and Gelhaus (2008), Gelhaus (2000)	
							Pilaria Sintenis, 1889			X	X				X	X					Byers and Gelhaus (2008), Gelhaus (2000)	
							Pseudolimnophila Alexander, 1919			X	X			X			X				Byers and Gelhaus (2008), Gelhaus (2000)	
							Rhabdomastix Skuse, 1890			X	X			X	X	X	X		X		Byers and Gelhaus (2008), Gelhaus (2000)	
							Ulomorpha Osten Sacken, 1869			X	X			X	X	X					Byers and Gelhaus (2008), Gelhaus (2000)	
				Tipulinae Latreille, 1802						X	X			X	X	X	X	X	X	X	Byers and Gelhaus (2008), Gelhaus (2000)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Holorusia Loew, 1863			X	X			X	X	X			X		Byers and Gelhaus (2008), Gelhaus (2000)	monotypic
									Holorusia hespera Arnaud and Byers, 1990	X	X			X	X	X			X		Byers and Gelhaus (2008), Gelhaus (2000), Arnaud and Byers (1990)	monotypic
							Prionocera Loew, 1844			X	X			X	X						Byers and Gelhaus (2008), Gelhaus (2000), Arnaud and Byers (1990)	
									Prionocera oregonica Alexander, 1943	X	X			X	X						Byers and Gelhaus (2008), Gelhaus (2000), Arnaud and Byers (1990)	
							Tipula Linnaeus, 1758			X	X			X	X	X	X	X	X	X	Byers and Gelhaus (2008), Gelhaus (2000)	
		Blephariceromorpha Rohdendorf, 1961								X	X			X	X	X	X	X				
			Blephariceridae Schiner, 1862							X	X			X	X	X	X	X			Courtney and Merritt (2008); Hogue (1973)	Hogue provides keys to mature larvae, pupae and adults

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Blepharicerinae Schiner, 1862						X	X			X	X	X	X	X			Hogue (1973)	
					Blepharicerini Loew, 1862					X	X			X	X	X	X	X			Hogue (1973)	
							Agathon Röder, 1890			X	X			X	X	X		X			Hogue (1973)	
									Agathon comstocki (Kellogg, 1903)	X	X			X	X	X		X			Hogue (1973)	
									Agathon doanei (Kellogg, 1900)	X	X			X							Hogue (1973)	
									Agathon elegantulus von Röder, 1890	X	X			X	X	X		X			Hogue (1973)	
									Agathon aylmeri group sensu Hogue, 1970	X	X			X		X		X	X		Hogue (1973); Hogue (1987)	these species were transfered from *Dioptopsis* to *Agathon* in Hogue (1987); some or all still appear under *Dioptopsis* in some lists
									Agathon arizonica (Alexander, 1958)	X	X			X					X		Hogue (1973); Hogue (1987)	*Agathon alpina* (Hogue, 1966) is a junior synonym
									Agathon aylmeri (Garrett, 1923)	X	X			X		X					Hogue (1973); Hogue (1987)	
									Agathon dismalea (Hogue, 1970)	X	X			X	X			X			Hogue (1973); Hogue (1987)	
									Agathon markii (Garrett, 1925)	X	X			X		X					Hogue (1973); Hogue (1987)	
									Agathon sequoiarum (Alexander, 1952)	X	X			X		X					Hogue (1973); Hogue (1987)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Bibiocephala Osten Sacken, 1874			X	X			X	X		X				Hogue (1973)	
									Bibiocephala grandis Osten Sacken, 1874	X	X			X	X		X				Hogue (1982)	*Bibiocephala nigripes* is a junior synonym
							Blepharicera Macquart, 1843			X	X			X	X		X				Hogue (1973)	
									Blepharicera jordani (Kellogg, 1903)	X	X			X	X						Hogue (1973)	
									Blepharicera kalmiopsis Jacobson and Courtney, 2009	X	X			X	X						Jacobson and Courtney (2009); Hogue (1973)	
									Blepharicera micheneri (Alexander, 1959)	X	X			X							Hogue (1973)	
									Blepharicera ostensackeni (Kellogg, 1903)	X	X			X	X						Hogue (1973)	
									Blepharicera zionensis Alexander, 1959	X	X			X	X		X					
							Philorus Kellog, 1903			X	X			X							Hogue (1973)	
									Philorus californicus Hogue, 1964	X	X			X							Hogue (1973)	
									Philorus jacinto Hogue, 1966	X	X			X							Hogue (1973)	
									Philorus vanduzeei Alexander, 1966	X	X			X							Hogue (1973)	
									Philorus yosemite (Osten Sacken, 1877)	X	X			X							Hogue (1973)	
			Deuterophlebiidae Edwards, 1922							X	X			X	X	X	X				Courtney (1990)	
							Deuterophlebia Edwards, 1922			X	X			X	X	X	X				Courtney (1990)	all species keyed
									Deuterophlebia coloradensis Pennak, 1945	X	X			X	X	X	X				Courtney (1990)	
									Deuterophlebia inyoensis Kennedy, 1960	X	X			X	X	X					Courtney (1990)	Mono County
									Deuterophlebia nielsoni Kennedy, 1958	X	X			X							Courtney (1990)	Mono & Tuolumne Counties

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Deuterophlebia personata Courtney, 1990	X	X			X	X	X					Courtney (1990)	
									Deuterophlebia shasta Wirth, 1951	X	X			X	X						Courtney (1990)	Siskiyou & El Dorado Counties
									Deuterophlebia vernalis Courtney, 1990	X	X					X					Courtney (1990)	
		Psychodomorpha Henning, 1968								X	X			X	X	X			X	X		
			Psychodidae Bigot, 1854							X	X			X	X	X			X	X		
							Maruina Müller, 1895			X	X			X	X	X					Hogue (1973)	
									Maruina lanceolata (Kincaid, 1899)	X	X			X	X	X				X	Hogue (1973)	2 other spp. Known from eastern Colorado
							Psychoda Latreille, 1796			X	X			X	X	X			X			
							Pericoma Walker, 1856/*Telmatoscopus* Eaton, 1904			X	X			X	X	X			X	X		larvae of these genera incompletely separable
		Ptychopteromorpha Wood and Borkent, 1986								X	X			X	X	X	X	X	X			
			Ptychopteridae Brauer, 1869							X	X			X	X	X	X	X	X			found in seeps or stream margins
							Bittacomorpha Westwood, 1835			X	X	X		X	X	X			X			rarely shows up in benthic samples; larvae inseparable
							Bittacomorphella Alexander, 1916			X	X			X	X	X		X				rarely shows up in benthic samples; larvae inseparable
							Ptychoptera Meigen, 1800			X	X	X		X	X	X	X	X	X			most commonly encountered of the three genera (in benthic samples)
		Culicomorpha Henning, 1948												X	X	X	X	X	X	X		

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
			Ceratopogonidae Grassi, 1900							X	X			X	X	X	X	X	X	X	Courtney and Merritt (2008); Glukova (1979)	A number of additional genera may be encountered in benthic samples; larvae and pupae in need of revision
				Ceratopogoninae Grassi, 1900						X	X			X	X	X	X	X	X	X		
							Alluaudomyia Kieffer, 1913			X	X			X								
							Bezzia Kieffer, 1899/*Palpomyia* Meigen, 1818			X	X			X		X		X				
							Ceratopogon Meigen, 1800			X	X			X	X							
							Culicoides Latreille, 1809			X	X			X	X	X		X	X	X		
							Monohelea Kieffer, 1917			X	X			X					X			
							Nilobezzia Kieffer, 1921			X	X			X								
							Probezzia Kieffer, 1906			X	X			X					X			
							Serromyia Meigen, 1818			X	X			X								
							Sphaeromias Curtis, 1829			X	X			X								
							Stilobezzia Kieffer, 1901			X	X			X					X			
				Dasyheleinae Lenz, 1934						X	X			X					X	X		
							Dasyhelea Kieffer, 1911			X	X			X					X	X		
				Forcipomyiinae Lenz, 1934						X	X			X	X	X			X	X		
							Atrichopogon Kieffer, 1906			X	X			X		X						
							Forcipomyia Meigen, 1818			X	X			X	X	X			X	X		
			Chaoboridae Cook, 1965									X		X	X	X						
							Chaoborus Lichtenstein, 1800					X		X	X	X						
							Eucorethra Underwood, 1903			X	X			X	?	?						occasionally found in benthic samples; associated with cold springs
									Eucorethra underwoodi Underwood, 1903	X	X			X	?	?						occasionally found in benthic samples; associated with cold springs

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Mochlonyx Loew, 1844					X		X	X							
			Chironomidae Macquart, 1838							X	X			X	X	X	X	X	X	X		
				Chironominae Macquart, 1838						X	X			X	X	X	X	X	X	X		
					Chironomini Macquart, 1838					X	X			X	X	X	X	X	X	X		
							Apedilum Townes, 1945			X	X			X				X	X			
							Chernovskiia Saether, 1977			X	X			X								
									Chernovskiia orbicus (Townes, 1945)	X	X			X								
							Chironomus Meigen, 1803			X	X			X	X	X	X	X	X			
							Cladopelma Kieffer, 1921			X	X			X								
							Cryptochironomus Kieffer, 1918			X	X			X		X					Saether (2009)	Saether's larval key includes all species in SAFIT region
							Cryptotendipes Lenz, 1941			X	X			X								
							Cyphomella Saether, 1977			X	X								X			
									Cyphomella gibbera Saether, 1977	X	X								X			
							Demeijerea Kruseman, 1933			X	X				X		X					
									Demeijerea brachialis (Coquillett, 1901)	X	X				X		X					
							Demicryptochironomus Lenz, 1941			X	X			X								
							Dicrotendipes Kieffer, 1913			X	X			X	X	X	X	X	X			
							Endochironomus Kieffer, 1918			X	X			X	X	X					Grodhaus (1987)	
									Endochironomus nigricans (Johannsen, 1905)	X	X			X	X	X						
							Endotribelos Grodhaus, 1987			X	X			X							Grodhaus (1987)	
									Endotribelos hesperium (Sublette, 1960)	X	X			X								
							Glyptotendipes Kieffer, 1913			X	X			X	X	X	X					
							Goeldichironomus Fittkau, 1965			X	X			X								
							Harnischia Kieffer, 1921			X	X			X			X				Sublette (1960)	
									Harnischia curtilamellata (Malloch, 1915)	X	X			X							Sublette (1960)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Kiefferulus Goetghebuer, 1922			X	X			X	X							
							Lauterborniella Thienemann and Bause in Bause, 1913			X	X			X								monotypic
									Lauterborniella agrayloides (Kieffer, 1911)	X	X			X								monotypic
							Microchironomus Kieffer, 1918			X	X			X								
									Microchironomus nigrovittatus (Malloch, 1915)	X	X			X								
							Microtendipes Kieffer, 1915			X	X			X	X	?					Wiederholm (1983)	two species groups recognized
								Microtendipes pedellus group sensu Pinder and Reiss (1983)		X	X			X	X	?					Wiederholm (1983)	
								Microtendipes rydalensis group sensu Pinder and Reiss (1983)		X	X			X							Wiederholm (1983)	
							Nilothauma Kieffer, 1921			X	X			X								
							Pagastiella Brundin, 1949			X	X			X								
							Parachironomus Lenz, 1921			X	X			X								
							Paracladopelma Harnisch, 1923			X	X			X								
									Paracladopelma alphaeus (Sublette, 1960)	X	X			X								
							Paralauterborniella Lenz, 1941			X	X			X								monotypic
									Paralauterborniella nigrohalteris (Malloch, 1915)	X	X			X								monotypic
							Paratendipes Kieffer, 1911			X	X			X					?			
							Phaenopsectra Kieffer, 1921			X	X			X	X	X			X			
							Polypedilum Kieffer, 1912			X	X			X	X	X		X	X			
							Robackia Saether, 1977			X	X			X							Wiederholm (1983); Epler (2001)	two species, easily separable
									Robackia claviger (Townes, 1945)	X	X					X					Wiederholm (1983); Epler (2001)	
									Robackia demeijeri (Kruseman, 1933)	X	X			X							Wiederholm (1983); Epler (2001)	
							Sergentia Kieffer, 1922			X	X			X		X	X	X				

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Sergentia albescens (Townes, 1945)	X	X			X		X	X	X				
							Stenochironomus Kieffer in Kieffer and Thienemann, 1919			X	X			X	X	X						
							Stictochironomus Kieffer in Kieffer and Thienemann, 1919			X	X			X								
							Synendotendipes Grodhaus, 1987			X	X			X							Grodhaus (1987)	
									Synendotendipes luski Grodhaus, 1987	X	X			X								
							Tribelos Townes, 1945			X	X			X							Grodhaus (1987)	
							Xenochironomus Kieffer, 1921			X	X			X								
									Xenochironomus xenolabis (Kieffer, 1916)	X	X			X								only species known from North America
					Pseudochironomini Saether, 1977					X	X			X								
							Pseudochironomus Malloch, 1915			X	X			X		X	X	X				
									Pseudochironomus richardsoni Malloch, 1915	X	X			X		X	X	X				
					Tanytarsini Goetghebuer, 1937					X	X			X			X					
							Caladomyia Säwedal, 1981			X				X							Lothrop and Mulla (1995); Sawedahl (1981)	Sawedahl (1981) has larval figures; likely synonymous with Tanytarsus according to Peter Cranston
									Caladomyia pistra Sublette and Sasa, 1994	X				X							Lothrop and Mulla (1995)	
							Cladotanytarsus Kieffer, 1921			X	X			X					X			
							Constempellina Brundin, 1947			X	X			X								
							Micropsectra Kieffer, 1909			X	X			X			X		X			
							Micropsectra Kieffer, 1909/Tanytarsus Wulp, 1874			X	X			X			X		X			for immature or indeterminate larvae with long lauterborn stalks
							Paratanytarsus Thienemann and Bause in Bause, 1913			X	X			X								
									Paratanytarsus grimmii (Schneider, 1885)	X	X			?		?					Langton et al. (1988)	parthenogenetic with apparently world-wide distribution

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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							Rheotanytarsus Thienemann and Bause in Bause, 1913			X	X			X								
									Rheotanytarsus hamatus Sublette and Sasa, 1994	X	X								X		Sublette, Stevens and Shannon (1998)	
							Stempellina Thienemann and Bause in Bause, 1913			X	X			X								
							Stempellinella Brundin, 1947			X	X			X								may be synonymous with *Zavrelia*
							Sublettea Roback, 1975			X	X			X								
									Sublettea coffmani (Roback, 1975)	X	X			X								
							Tanytarsus Wulp, 1874			X	X			X								*Nimbocera* now a synonym of *Tanytarsus*
							Zavrelia Kieffer in Bause, 1913			X	X			X								
				Diamesinae Kieffer, 1923						X	X											
					Boreoheptagyini Brundin, 1966					X	X											
							Boreoheptagyia Brundin, 1966			X	X			?		X						
									Boreoheptagyia lurida (Garrett, 1925)	X	X			?		X						
					Diamesini Kieffer, 1923					X	X			X	X	X	X	X	X			
							Diamesa Meigen in Gistl, 1835			X	X			X	X	X	X	X	X			
							Pagastia Oliver, 1959			X	X			?			X					
									Pagastia partica (Roback, 1957)	X	X						X					
							Potthastia Kieffer, 1922			X	X			?								
								Potthastia gaedii group sensu Oliver, 1983		X	X			?								
								Potthastia longimana group sensu Oliver, 1983		X	X			?								
							Protanypus Kieffer, 1906			X	X			?								unpublished record but verified by Peter Cranston
							Pseudodiamesa Goetghebuer, in Goetghebuer and Lenz, 1939			X	X			X	X							
							Sympotthastia Pagast, 1947			X	X			X	X							
									Sympotthastia diastena (Sublette, 1964)	X	X			X	X							

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
				Orthocladiinae Edwards, 1929						X												
							Acricotopus Kieffer, 1921			X				?								
							Brillia Kieffer, 1913			X	X											
							Bryophaenocladius Thienemann, 1934			X	X						X					
							Cardiocladius Kieffer, 1912			X	X			X				X	X			
							Chaetocladius Kieffer, 1911			X	X				X							
							Chasmatonotus Loew, 1864							X	X	X						
							Clunio Haliday, 1855							X								inter tidal
									Clunio californiensis Hashimoto, 1974					X								inter tidal
							Corynoneura Winnertz, 1846			X	X			?			X					
									Corynoneura diara (Roback, 1957)	X	X						X					
							Cricotopus Wulp, 1874			X	X			X			X					
								Cricotopus bicinctus group sensu Cranston et al., 1983		X	X			X								
								Cricotopus trifascia group sensu Cranston et al., 1983		X	X			X								
									Cricotopus nostocicola Wirth, 1957	X	X			X	X						Wirth (1957); Ashe and Murray (1980)	found in blue-green alga *Nostoc*
							Diplocladius Kieffer in Kieffer and Thienemann, 1908			X	X			?								ABL has larvae from Lake Davis project
							Doithrix Saether and Sublette, 1983			X	X			X								
							Epoicocladius Zavrel in Šulc and Zavrel, 1924															
							Eretmoptera Kellog, 1900							X								inter tidal; larvae unknown
									Eretmoptera browni Kellogg, 1900					X								inter tidal; larvae unknown
							Eukiefferiella Thienemann, 1926			X	X			X					X		Bode (1983); (Epler 2001)	*E. similis* group sensu Bode, 1983 is *Cardiocladius*
									Eukiefferiella brehmi group sensu Bode, 1983	X	X			X							Bode (1983); (Epler	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
																					2001)	
									Eukiefferiella brevicalcar group sensu Bode, 1983	X	X			X							Bode (1983); (Epler 2001)	
									Eukiefferiella claripennis group sensu Bode, 1983	X	X			X					X		Bode (1983); (Epler 2001)	
									Eukiefferiella cyanea group sensu Bode, 1983	X	X				?						Bode (1983); (Epler 2001)	
									Eukiefferiella coerulescens group sensu Bode, 1983	X	X			X					X		Bode (1983); (Epler 2001)	
									Eukiefferiella devonica group sensu Bode, 1983	X	X			X							Bode (1983); (Epler 2001)	
									Eukiefferiella gracei group sensu Bode, 1983	X	X			X							Bode (1983); (Epler 2001)	
									Eukiefferiella pseudomontana group sensu Bode, 1983	X	X			X							Bode (1983); (Epler 2001)	
								Euryhapsis Oliver, 1981		X	X			X								
								Georthocladius Strenzke, 1941		X	X			X								
								Gymnometriocnemus Goetghebuer, 1932		X	X			?								
								Heleniella Gowin, 1943		X	X			X								
								Heterotanytarsus Spärck, 1923		X	X			?								
								Heterotrissocladius Spärck, 1923		X	X			X								
									Heterotrissocladius marcidus group sensu Cranston et al., 1983	X	X			X								
									Heterotrissocladius subpilosus group sensu Cranston et al., 1983	X	X											

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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							Hydrobaenus Fries, 1830			X	X			X			X					
							Krenosmittia Thienemann and Krüger, 1939			X	X			X								
							Limnophyes Eaton, 1875			X	X			X	X				X			
							Lopescladius Oliveira, 1967			X	X			?								
							Mesocricotopus Brundin, 1956			X	X			?								unpublished record but verified by Peter Cranston
							Metriocnemus Wulp, 1874			X	X			X								
							Nanocladius Kieffer, 1913			X	X			X								
							Oliveiriella Wiedenbrug and Fittkau, 1997			X	X								X		Krestian, Kosnicki, Spindler, Stringer and Epler (2009)	
							Onconeura Andersen and Saether, 2005			X	X								X		Krestian, Kosnicki, Spindler, Stringer and Epler (2009)	
							Orthocladius Wulp, 1874			X	X			X	X	X	X	X	X			genus except for *O. (Symposiocladius) lignicola* (Kieffer, 1915)
									Orthocladius lignicola (Kieffer, 1915)	X	X			X	X							
							Orthocladius complex			X	X			X	X	X	X	X	X	X		equivalent to *Cricotopus/Orthocladius* used by some labs; *Orthocladius* complex is used to trap other genera such as *Paratrichocladius* which is very difficult to separate
							Parachaetocladius Wülker, 1959			X	X			X								

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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							Paracladius Hirvenoja 1973			X	X								X			
							Parakiefferiella Thienemann, 1936			X	X			X								
							Parametriocnemus Goetghebuer, 1932			X	X			X								
							Paraphaenocladius Thienemann in Spärck, 1924			X	X			X					X			
							Paratrichocladius Santos Abreu, 1918			X	X			X			X					
							Parorthocladius Thienemann, 1935			X	X				X							unnamed species
							Platysmittia Saether, 1982			X	X			?								larva from Lake Davis project
							Psectrocladius Kieffer, 1926			X	X			X			X					
							Pseudorthocladius Goetghebuer, 1932			X	X			X								
							Pseudosmittia Goetghebuer, 1932			X	X			X					X			
							Psilometriocnemus Saether, 1969			X	X			X								
							Rheocricotopus Thienemann and Harnisch, 1932			X	X			X								
							Rheosmittia Brundin in Cranston and Saether, 1986			X	X			X								
							Smittia Holmgren, 1869			X	X			X			X					
							Symbiocladius Kieffer, 1925				X			X			X					phoretic on mayflies
							Synorthocladius Thienemann, 1935			X	X			X								
							Tempisquitoneura Epler, 1995			X	X						X	X	X		Lester, Krestian and Epler (2003); Krestian et al. (2009)	larvae phoretic on Corydalidae
									Tempisquitoneura merrillorum Epler, 1995	X	X						X	X	X		Lester, Krestian and Epler (2003); Krestian et al. (2009)	larvae phoretic on Corydalidae
							Tethymyia Wirth, 1949							X								inter tidal
							Thalassosmittia Strenzke and Remmert, 1957							?								inter tidal
							Thienemanniella Kieffer, 1911			X	X			X								

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Tokunagaia Saether, 1973			X	X			?								ABL has larvae from Lake Davis project
							Tvetenia Kieffer, 1922			X	X			X					X		Bode (1983)	
								Tvetenia bavarica group sensu Bode, 1983		X	X			X							Bode (1983)	
								Tvetenia discoloripes group sensu Bode, 1983		X	X			X					X		Bode (1983)	
							Xylotopus Oliver, 1982			X	X						X					
									Xylotopus par (Coquillett, 1901)	X	X						X					only species known from North America
							Zalutschia Lipina, 1939			X	X						X					
									Zalutschia xethis (Roback, 1957)	X	X						X					
				Podonominae Thienemann, 1937						X	X										Brundin (1983); Brundin (1986)	found in headwater streams
					Boreochlini Brundin, 1966					X	X										Brundin (1983); Brundin (1986)	
							Boreochlus Edwards in Edwards and Thienemann, 1938			X	X			X		X					Brundin (1983); Brundin (1986)	larvae are inseparable to species
							Paraboreochlus Thienemann, 1939			X	X			X							Brundin (1983); Brundin (1986)	ABL has a pupa from Lake Davis area; confirmed by Peter Cranston
					Podonomini Thienemann, 1937					X	X										Brundin (1983); Brundin (1986)	
							Parochlus Enderlein, 1912			X	X			X	?	?					Brundin (1983); Brundin (1986)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Parochlus kiefferi (Garrett, 1925)	X	X			X	?	?					Brundin (1983); Brundin (1986)	only species known from North America
				Prodiamesinae Saether, 1976						X	X			?							Saether (1983); Saether (1986)	
							Monodiamesa Kieffer, 1922			X	X			?							Saether (1983); Saether (1986)	
							Odontomesa Pagast, 1947			X	X			?							Saether (1983); Saether (1986)	
							Prodiamesa Kieffer, 1906			X	X			?							Saether (1983); Saether (1986)	
				Tanypodinae Thienemann and Zavřel, 1916						X	X			X	X	X	X	X	X	X		
					Coelotanypodini Roback, 1982					X	X			?								
							Clinotanypus Kieffer, 1913			X	X			X								
					Macropelopiini Fittkau, 1962					X	X			X	X	X	X			X		
							Alotanypus Roback, 1971			X	X			X		X	X			X		
							Apsectrotanypus Fittkau, 1962			X	X			X	X	X		X	X			
							Bilyjomyia Niitsuma and Watson, 2009			X	X			X	X	X		X	X		Nitsuma and Watson (2009)	new genus erected for *Apsectrotanypus algens* (Coquillet)
									Bilyjomyia algens (Coquillett, 1902)	X	X			X	X	X		X	X		Nitsuma and Watson (2009)	formerly *Apsectrotanypus algens* (Coquillet)
							Brundiniella Roback, 1978			X	X			X	X	X	X					monotypic
									Brundiniella eumorpha (Sublette, 1964)	X	X			X	X	X	X					monotypic
							Derotanypus Roback, 1971			X	X			X	X	X	X	X				

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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									Derotanypus aclines (Sublette, 1964)	X	X			X	X	X	X	X				
							Macropelopia Thienemann in Thienemann and Kieffer, 1916			X	X			?								
							Psectrotanypus Kieffer, 1909			X	X			X	X	X	X	X				
							Radotanypus Fittkau and Murray, 1985			X	X			X	X							
					Natarsiini Roback and Moss, 1978					X	X			X								
							Natarsia Fittkau, 1962			X	X			X								
					Pentaneuriini Fittkau, 1962					X	X			X	X	X		X	X			
							Ablabesmyia Johannsen, 1905			X	X			X	X	X	X	X	X			
							Conchapelopia Fittkau, 1957			X	X			X	X	X	?		X			Thienemannimyia group
							Hayesomyia Murray and Fittkau, 1985			X	X			X		X						Thienemannimyia group
							Helopelopia Roback, 1971			X	X			?								Thienemannimyia group; ABL has a pupa from Lake Davis
							Krenopelopia Fittkau, 1962			X	X			?	X							
							Labrundinia Fittkau, 1962			X	X			X					X			
							Larsia Fittkau, 1962			X	X			X								
							Meropelopia Roback, 1971			X	X			X								Thienemannimyia group
							Monopelopia Fittkau, 1962			X	X			X								
							Nilotanypus Kieffer, 1923			X	X			X					X			
							Paramerina Fittkau, 1962			X	X			X	X	X	X					
							Pentaneura Philippi, 1865			X	X			X	X	X			X			
							Reomyia Roback, 1986			X	X				X							
							Rheopelopia Fittkau, 1962			X	X			?								Thienemannimyia group; Peter Cranston has reared specimens from CA

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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						Thienemannimyia group Fittkau, 1962				X	X			X	X	X		X	X			includes *Arctopelopia, Conchapelopia, Hayesomyia, Helopelopia, Meropelopia, Rheopelopia, Thienemannimyia*
							Thienemannimyia Fittkau, 1957			X	X			X	X	X		X	X			Thienemannimyia group
							Xenopelopia Fittkau, 1962			X	X			X								
							Zavrelimyia Fittkau, 1962			X	X			X	X	X						
					Procladiini Roback, 1971					X	X											
							Djalmabatista Fittkau, 1968			X	X			?								ABL has larvae from several CA localities
							Procladius Skuse, 1889			X	X			X	X	X	X	X	X			
					Tanypodini Kieffer, 1906					X	X											
							Tanypus Meigen, 1803			X	X						X					
				Telmatogetoninae Brundin, 1966																		intertidal
							Telmatogeton Schiner, 1866															intertidal
			Culicidae Stephens, 1829							X	X	X		X	X	X	X	X	X	X		
							Aedes Meigen, 1818					X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Aedes aegypti (Linneaus, 1762)			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Aedes cinereus Meigen, 1918			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

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Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Aedes vexans (Meigen, 1830)			X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
							Anopheles Meigen, 1818				X	X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Anopheles earlei Vargus, 1943			X					X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Anopheles franciscanus McCracken, 1904		X	X		X	X		X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Anopheles freeborni Aitken, 1939		X	X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Anopheles hermsi Barr and Guptavanij, 1989		X	X		X							Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Anopheles judithae Zavortnik, 1969		X	X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Anopheles occidentalis Dyar and Knab, 1906		X	X		X	X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Anopheles punctipennis (Say, 1823)		X	X		X	X	X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

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Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Culex Linnaeus, 1758					X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex anips Dyar, 1916			X		X						X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex apicalis Adams, 1903			X		X	X		X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex arizonensis Bohart, 1948			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex boharti Brookman and Reeves, 1950			X		X	X	X		X		X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex coronator Dyar and Knab, 1906			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex erythrothorax Dyar, 1907			X		X			X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex interrogator Dyar and Knab, 1906			X		X					X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex pipiens pipiens Linneaus, 1758			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

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Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Culex quinquefasciatus Say, 1823			X		X			X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex reevesi Wirth, 1948			X		X							Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex restuans Theobald, 1901			X		X	X		X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex salinarius Coquillett, 1904			X			X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex stigmatosoma Dyar, 1907			X		X	X	X		X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex tarsalis Coquillett, 1896			X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex territans Walker, 1856			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culex thriambus Dyar, 1921			X		X			X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culiseta Felt, 1904			X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Culiseta impatiens (Walker, 1848)			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culiseta incidens (Thompson, 1869)			X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culiseta inornata (Williston, 1893)			X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culiseta minnesotae Barr, 1957			X			X	X	X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culiseta morsitans (Theobald, 1901)			X			X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Culiseta particeps (Adams, 1903)			X		X	X	X		X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
							Coquillettidia Dyar, 1905					X		X	X	X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Coquillettidia peturbans (Walker, 1856)			X		X	X	X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
							Ochlerotatus Lynch Arribálzaga, 1891					X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Ochlerotatus aboriginis (Dyar, 1917)			X		X	X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus aloponotum (Dyar, 1917)			X			X	X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus bicristatus (Thurman and Winkler, 1950)			X		X							Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus burgeri (Zavortnik)			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus campestris (Dyar and Knab, 1907)			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus cataphylla (Dyar, 1916)			X		X	X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus clivis (Lanzaro and Eldridge, 1992)			X		X							Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus communis (DeGeer, 1776)			X		X	X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus deserticola (Zavortnik, 1969)			X		X							Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

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									Ochlerotatus dorsalis (Meigen, 1830)			X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus epactius (Dyar and Knab, 1908)			X		X			X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus excrucians (Walker, 1856)			X			X		X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus fitchii (Felt and Young, 1904)			X		X	X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus flavescens (Müller, 1764)			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus hendersoni (Cockerell, 1918)			X					X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus hexodontus Dyar, 1916			X		X	X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus impiger (Walker, 1848)			X			X	X	X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus implicatus (Vockeroth, 1954)			X		X	X	X	X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

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									Ochlerotatus increpitus (Dyar, 1916)			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus intrudens (Dyar, 1919)			X			X	X	X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus japonicus japonicus (Theobald, 1901)			X				X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus melanimon (Dyar, 1924)			X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus monticola (Belkin and McDonald, 1957)			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus muelleri (Dyar, 1920)			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus nevadensis Chapman and Barr, 1964			X			X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus nigromaculatus (Ludlow, 1906)			X		X	X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus niphadopsis (Dyar and Knabb, 1917)			X		X	X		X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

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									Ochlerotatus papago (Zavortnik, 1970)			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus provocans (Walker, 1848)			X			X	X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus pullatus (Coquillett, 1904)			X		X	X		X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus purpureipes (Aitken, 1941)			X		X					X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus schizopinax (Dyar, 1929)			X		X	X		X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus sierrensis (Ludlow, 1905)			X		X	X		X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus sollicitans sollicitans (Walker, 1856)			X		X					X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus sollicitans idahoensis (Theobald, 1903)			X			X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus squamiger (Coquillett, 1902)			X		X						X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

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									Ochlerotatus sticticus (Meigen, 1838)			X		X	X	X	X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus taeniorhynchus (Wiedemann, 1821)			X		X					X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus tahoensis (Dyar, 1916)			X		X							Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus thelcter (Dyar, 1918)			X		X					X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus trivittatus (Coquillett, 1902)			X					X		X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus varipalpus (Coquillett, 1902)			X					X		X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus ventrovittus (Dyar, 1916)			X		X	X		X		X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Ochlerotatus washinoi (Lanzaro and Eldridge, 1992)			X		X	X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
							Orthopodomyia Theobald, 1904					X		X	X		X		X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Orthopodomyia kummi Edwards, 1939			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Orthopodomyia signifera (Coquillett, 1896)			X		X	X		X		X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
							Psorophora Robineau-Desvoidy, 1827					X		X			X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Psorophora columbiae (Dyar and Knab, 1906)			X		X				X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Psorophora discolor (Coquillett, 1903)			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Psorophora howardii Coquillett, 1901			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Psorophora signipennis (Coquillett, 1904)			X		X			X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
							Toxorhynchites Theobald, 1901					X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Toxorhynchites moctezuma Dyar and Knab, 1906			X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
							Uranotaenia Lynch Arribálzaga, 1891					X		X				X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
									Uranotaenia anhydor anhydor Dyar, 1907			X		X				X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus
			Dixidae Schiner, 1868							X	X	X		X	X	X			X		Cook (1983)	
							Dixa Meigen, 1818			X	X			X		X			X		Cook (1983)	
							Dixella Dyar and Shannon, 1924			X	X	X		X	X	X					Cook (1983)	
							Meringodixa Nowell, 1951			X	X			X							Cook (1983)	
									Meringodixa chalonensis (Nowell, 1951)	X	X			X							Cook (1983)	
			Simuliidae Newman, 1834							X	X			X	X	X	X	X	X	X	Adler et al. (2004)	
				Parasimuliinae Smart, 1945						X	X			X	X	X					Adler et al. (2004)	streams in coniferous forests dominated by western hemlock
							Parasimulium Malloch, 1914			X	X			X	X	X					Adler et al. (2004)	streams in coniferous forests dominated by western hemlock; larvae not separable to species
									Parasimulium species "A", Adler, Currie and Wood, 2004	X	X				X						Adler et al. (2004)	streams in coniferous forests dominated by western hemlock; larva unknown
									Parasimulium crosskeyi Peterson, 1977	X	X				X	X					Adler et al. (2004)	streams in coniferous forests dominated by western hemlock; larva indistinguishable from *P. stonei*

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Parasimulium furcatum Malloch, 1914	X	X			X	X	X					Adler et al. (2004)	streams in coniferous forests dominated by western hemlock; larva unknown
									Parasimulium melanderi Stone, 1963	X	X					X					Adler et al. (2004)	known from 1 specimen from WA and 2 from British Columbia; larva unknown; possibly subterranean
									Parasimulium stonei Peterson, 1977	X	X			X	X	X					Adler et al. (2004)	streams in coniferous forests dominated by western hemlock; larva indistinguishable from *P. crosskeyi*
				Simuliinae Newman, 1834						X	X			X	X	X	X	X	X		Adler et al. (2004)	
					Prosimuliini Enderlein, 1921					X	X			X	X	X	X	X	X		Adler et al. (2004)	
							Twinnia Stone and Jamnback, 1955			X	X			X	X	X	X				Adler et al. (2004)	headwater streams; impoundment outflows
									Twinnia hirticornis Wood, 1978	X	X			X	X						Adler et al. (2004)	headwater streams; impoundment outflows
									Twinnia nova (Dyar and Shannon, 1927)	X	X					X	X				Adler et al. (2004)	headwater streams; impoundment outflows
							Helodon Enderlein, 1921			X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Helodon pleuralis (Malloch, 1914)	X	X					X					Adler et al. (2004)	
									Helodon clavatus (Peterson, 1970)	X	X					X					Adler et al. (2004)	
									Helodon beardi Adler, Currie and Wood, 2004	X	X			X	X				X		Adler et al. (2004)	

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									Helodon chaos Adler, Currie and Wood, 2004	X	X			X	X	X					Adler et al. (2004)	
									Helodon diadelphus Adler, Currie and Wood, 2004	X	X				X	X					Adler et al. (2004)	
									Helodon mccreadiei Adler, Currie and Wood, 2004	X	X			X	X	X					Adler et al. (2004)	
									Helodon newmani Adler, Currie and Wood, 2004	X	X			X	X						Adler et al. (2004)	
									Helodon onchyodactylus (Dyar & Shannon, 1927)	X	X			X	X	X	X				Adler et al. (2004)	
									Helodon protus Adler, Currie and Wood, 2004	X	X				X	X					Adler et al. (2004)	
									Helodon susanae (Peterson, 1970)	X	X			X	X	X	X				Adler et al. (2004)	
									Helodon trochus Adler, Currie and Wood, 2004	X	X							X			Adler et al. (2004)	
							Prosimulium Roubaud, 1906			X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Prosimulium caudatum Shewell, 1959	X	X			X	X	X					Adler et al. (2004)	
									Prosimulium constrictistylum Peterson, 1970	X	X							X			Adler et al. (2004)	
									Prosimulium davesi Peterson and Defoliart, 1960	X	X				X	X	X				Adler et al. (2004)	
									Prosimulium dicentum Dyar and Shannon, 1927	X	X			X	X	X					Adler et al. (2004)	
									Prosimulium dicum Dyar and Shannon, 1927	X	X			X	X	X			X		Adler et al. (2004)	
									Prosimulium doveri Sommerman, 1962	X	X					X					Adler et al. (2004)	
									Prosimulium esselbaughi Sommerman, 1964	X	X			X	X	X		X			Adler et al. (2004)	
									Prosimulium exigens Dyar and Shannon, 1927	X	X			X	X	X	X	X	X		Adler et al. (2004)	

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									Prosimulium flaviantennus (Stains and Knowlton, 1940)	X	X			X			X		X		Adler et al. (2004)	
									Prosimulium formosum Shewell, 1959	X	X			X	X	X			X		Adler et al. (2004)	
									Prosimulium frohnei Sommerman, 1958	X	X			X							Adler et al. (2004)	
									Prosimulium fulvithorax Shewell, 1959	X	X			X	X	X					Adler et al. (2004)	
									Prosimulium fulvum (Coquillett, 1902)	X	X			X	X	X	X				Adler et al. (2004)	
									Prosimulium idemai Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	
									Prosimulium imposter Peterson, 1970	X	X			X	X				X		Adler et al. (2004)	
									Prosimulium longirostrum Adler, Currie and Wood, 2004	X	X				X						Adler et al. (2004)	
									Prosimulium minifulvum Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	
									Prosimulium rusticum Adler, Currie and Wood, 2004	X	X								X		Adler et al. (2004)	
									Prosimulium secretum Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	
									Prosimulium shewelli Peterson and Defoliart, 1960	X	X			X			X				Adler et al. (2004)	
									Prosimulium travisi Stone, 1952	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Prosimulium uinta Peterson and Defoliart, 1960	X	X								X		Adler et al. (2004)	
									Prosimulium unicum (Twinn, 1938)	X	X								X		Adler et al. (2004)	
					Simuliini Newman, 1834					X	X			X	X	X	X	X	X		Adler et al. (2004)	
							Greniera Doby and David, 1959			X	X			X	X	X	X				Adler et al. (2004)	rarely encountered

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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									Greneria "species F", Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	rarely encountered
									Greneria humeralis Currie, Adler and Wood, 2004	X	X			X	X	X					Adler et al. (2004)	rarely encountered
									Greneria denaria (Davies, Peterson and Wood, 1962)	X	X					X	X				Adler et al. (2004)	rarely encountered
							Stegopterna Enderlein, 1930			X	X			X	X	X	X	X	X		Adler et al. (2004)	shallow mountain streams
									Stegopterna acra Currie, Adler and Wood, 2004	X	X			X			X	X	X		Adler et al. (2004)	shallow mountain streams
									Stegopterna permutata (Dyar and Shannon, 1927)	X	X			X		X					Adler et al. (2004)	shallow mountain streams
									Stegopterna xantha Currie, Adler and Wood, 2004	X	X			X	X	X					Adler et al. (2004)	shallow mountain streams
							Tlalocomyia Wygodzinsky and Diaz Najera, 1970			X	X			X	X	X			X		Adler et al. (2004)	shallow mountain streams, seeps
									Tlalocomyia andersoni Currie, Adler and Wood, 2004	X	X			X	X						Adler et al. (2004)	shallow mountain streams, seeps
									Tlalocomyia osbornii (Stains and Knowlton, 1943)	X	X			X	X	X			X		Adler et al. (2004)	shallow mountain streams, seeps
									Tlalocomyia ramifera Currie, Adler and Wood, 2004	X	X				X	X					Adler et al. (2004)	shallow mountain streams, seeps
									Tlalocomyia stewarti (Coleman, 1953)	X	X			X							Adler et al. (2004)	shallow mountain streams, seeps
							Gigantodax Enderlein, 1925			X	X								X		Adler et al. (2004)	small, high-elevation springs
									Gigantodax adleri Moulton, 1996	X	X								X		Adler et al. (2004)	small, high-elevation springs
							Metacnephia Crosskey, 1969			X	X			X			X				Adler et al. (2004)	high elevation lake outlets and streams
									Metacnephia coloradensis Peterson and Kondratieff, 1995	X	X			X							Adler et al. (2004)	high elevation lake outlets and streams
									Metacnephia jeanae (Defoliart and Peterson, 1960)	X	X			X			X				Adler et al. (2004)	high elevation lake outlets and streams

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Metacnephia villosa (Defoliart and Peterson, 1960)	X	X			X			X				Adler et al. (2004)	high elevation lake outlets and streams
							Simulium Latreille, 1802			X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium anduzei Vargas and Diaz Najera, 1948	X	X								X		Adler et al. (2004)	
									Simulium apricarium Adler, Currie and Wood, 2004	X	X			X			X		X		Adler et al. (2004)	
									Simulium argus Wiliston, 1893	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium baffinense Twinn, 1936	X	X						X				Adler et al. (2004)	
									Simulium balteatum Adler, Currie and Wood, 2004	X	X			X	X	X					Adler et al. (2004)	
									Simulium bivittatum Malloch, 1914	X	X				X	X	X		X		Adler et al. (2004)	
									Simulium brevicercum Knowlton and Rowe, 1934	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									*Simulium bricenoi V*argas, Martinez Palacios and Diaz Najera, 1946	X	X								X		Adler et al. (2004)	
									Simulium canadensis Hearle,1932	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium canonicolum (Dyar and Shannon, 1927)	X	X						X	X	X		Adler et al. (2004)	
									Simulium carbunculum Adler, Currie and Wood, 2004	X	X			X			X	X	X		Adler et al. (2004)	
									Simulium chromatinum Adler, Currie and Wood, 2004	X	X								X		Adler et al. (2004)	
									Simulium chromocentrum Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	
									Simulium clarum (Dyar and Shannon, 1927)	X	X			X							Adler et al. (2004)	
									Simulium conicum Adler, Currie and Wood, 2004	X	X			X	X	X					Adler et al. (2004)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	UT	NV	AZ	Baja		
									Simulium craigi Stone and Snoddy, 1969	X	X			X			X		X		Adler et al. (2004)	
									Simulium curiei Adler and Wood, 1991	X	X			X	X	X	X		X		Adler et al. (2004)	
									Simulium decorum Walker, 1948	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium defoliarti Stone and Peterson, 1958	X	X			X	X	X					Adler et al. (2004)	
									Simulium donovani Vargas, 1943	X	X			X	X			X	X		Adler et al. (2004)	
									Simulium encisoi Vargas and Diaz Najera, 1949	X	X			X				X	X		Adler et al. (2004)	
									Simulium exculatum Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	
									Simulium freemani Vargas and Diaz Najera, 1949	X	X						X		X		Adler et al. (2004)	
									Simulium griseum Coquillett, 1898	X	X			X			X		X		Adler et al. (2004)	
									Simulium hechti Vargas, Martinez Palacios and Diaz Najera, 1946	X	X			X	X	X		X	X		Adler et al. (2004)	
									Simulium hippovorum Malloch, 1914	X	X			X	X	X		X	X		Adler et al. (2004)	
									Simulium hunteri Malloch, 1914	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium infernale Adler, Currie and Wood, 2004	X	X			X			X				Adler et al. (2004)	
									Simulium iriartei Vargas, Martinez Palacios and Diaz Najera, 1946	X	X								X		Adler et al. (2004)	
									Simulium irritatum Lugger, 1897	X	X						X				Adler et al. (2004)	
									Simulium jacumbae Dyar and Shannon, 1927	X	X			X	X	X		X	X		Adler et al. (2004)	
									Simulium joculator Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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									Simulium longithallum Diaz Najera and Vulcano, 1962	X	X								X		Adler et al. (2004)	
									Simulium meridionale Riley, 1887	X	X			X				X			Adler et al. (2004)	
									Simulium merritti Adler, Currie and Wood, 2004	X	X						X				Adler et al. (2004)	
									Simulium modicum Adler, Currie and Wood, 2004	X	X			X		X					Adler et al. (2004)	
									Simulium mysterium Adler, Currie and Wood, 2004	X	X			X							Adler et al. (2004)	
									Simulium nebulosum Currie and Adler, 1986	X	X			X	X	X					Adler et al. (2004)	
									Simulium negativum Adler, Currie and Wood, 2004	X	X						X	X			Adler et al. (2004)	
									Simulium notatum Adams, 1904	X	X								X		Adler et al. (2004)	
									Simulium paynei Vargas, 1942	X	X								X		Adler et al. (2004)	
									Simulium petersoni Stone and Defoliart, 1959	X	X			X	X		X	X			Adler et al. (2004)	
									Simulium pilosum (Knowlton and Rowe, 1934)	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium piperi Dyar and Shannon, 1927	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium pugetense (Dyar and Shannon, 1927)	X	X			X	X	X					Adler et al. (2004)	
									Simulium quadratum (Stains and Knowlton, 1943)	X	X			X		X	X				Adler et al. (2004)	
									Simulium rostratum (Lundstrom, 1911)	X	X				X	X					Adler et al. (2004)	
									Simulium saxosum Adler, Currie and Wood, 2004	X	X			X	X	X					Adler et al. (2004)	
									Simulium silvestre (Rubtsov, 1956)	X	X			X	X	X					Adler et al. (2004)	

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									Simulium tescorum Stone and Boreham, 1965	X	X			X	X	X		X	X		Adler et al. (2004)	
									Simulium twinni Stains and Knowlton, 1940	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium tribulatum Lugger, 1897	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium vandalicum Dyar and Shannon, 1927	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium venator Dyar and Shannon, 1927	X	X			X	X		X	X			Adler et al. (2004)	
									Simulium venustum Say, 1823	X	X			X					X		Adler et al. (2004)	
									Simulium virgatum Coquillett, 1902	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium vittatum Zetterstadt, 1838	X	X			X	X	X	X	X	X		Adler et al. (2004)	
									Simulium wyomingense Stone and Defoliart, 1959	X	X			X	X		X				Adler et al. (2004)	
									Simulium zephyrus Adler, Currie and Wood, 2004	X	X				X	X					Adler et al. (2004)	
			Thaumaleidae Bezzi, 1913							X	X			X							Wirth and Stone (1956)	second genus *Trichothaumalea* is found in British Columbia
									Thaumalea Ruthe, 1831	X	X			X							Wirth and Stone (1956)	
	Brachycera Zetterstedt, 1842													X	X	X	X	X	X	X		
		Tabanomorpha Hennig, 1948								X	X			X	X	X	X	X	X	X		
			Athericidae Stuckenberg, 1973							X	X			X							Webb (1977)	
									Atherix Meigen, 1844	X	X			X							Webb (1977)	

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									Atherix pachypus Bigot, 1887	X	X			X							Webb (1977)	Three species known from the USA. *A. pachypus* is the name used for the western species
			Oreoleptidae Zloty, Sinclair and Pritchard, 2005							X	X			?	?						Zloty, Sinclair and Pritchard (2005)	unpublished records for Oregon, California
							Oreoleptis Zloty, Sinclair and Pritchard, 2005			X	X			?	?						Zloty, Sinclair and Pritchard (2005)	unpublished records for Oregon, California
									Oreoleptis torrenticola Zloty, Sinclair and Pritchard, 2005	X	X			?	?						Zloty, Sinclair and Pritchard (2005)	unpublished records for Oregon, California
			Pelecorhynchidae Enderlein, 1922							X	X			X	X	X						
							Bequaertomyia Brennan, 1935			?	?			X	?	?						unknown biology; possibly not aquatic
							Glutops Burgess, 1878			X	X			X	X	X						
			Stratiomyidae Giebel, 1856							X	X			X	X	X		X	X	X		
							Caloparyphus James, 1939			X	X			X	X	X			X		Sinclair (1989)	early instars inseparable from *Euparyphus*
							Caloparyphus James, 1939/*Euparyphus* Gerstäcker, 1857			X	X			X							Sinclair (1989)	use this name for all early instars of *Caloparyphus* and *Euparyphus*
							Euparyphus Gerstäcker, 1857			X	X			X	X	X			X		Sinclair (1989)	spiracular stalk doesn't develop until final instar
							Hedriodiscus Enderlein, 1914/*Odontomyia* Meigen, 1932			X	X			X	X	X			X			
							Myxosargus Brauer, 1882			X	X			X					X			
							Nemotelus Geoffrey, 1762			X	X			X	X	X		X		X		
							Stratiomys Geoffrey, 1762			X	X			X	X	X						

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			Tabanidae Latreille, 1802											X							Courtney and Merritt (2008); Middlekauff and Lane (1980)	also many terrestrial genera
							Apatolestes Williston, 1885			X	X			X	X	X			X	X		
							Atylotus Osten Sacken, 1876/*Tabanus* Linnaeus, 1758			X	X			X	X	X			X			incompletely separable, except by habitat; most specimens from lotic habitats will be *Tabanus*
							Chrysops Meigen, 1800			X	X			X	X	X		X	X			
							Haematopota Meigen, 1800			X	X			X								
							Hybomitra Enderlein, 1922			X	X			X	X	X			X			
							Silvius Meigen, 1820			X	X			X	X	X		X				
							Tabanus Linnaeus, 1758															see note for *Atylotus/Tabanus*
		Asilomorpha Rohdendorf, 1961								X	X			X								
			Empididae Latreille, 1804							X	X			X	X	X						only a few genera are aquatic
				Clinocerinae Collin, 1928						X	X			X		X						
							Clinocera Meigen, 1800			X	X			X		X						
							Roederiodes Coquillett, 1901			X	X			X								feed on simuliid pupae
							Trichoclinocera Collin, 1941			X	X			?								
							Wiedemannia Zetterstedt, 1838			X	X			?		X						feed on simuliid pupae
				Empidinae Latreille, 1804						X	X			X	X	X						
							Oreogeton Schiner, 1860			X	X			X	X	X						feed on simuliid larvae
				Hemerodromiinae Schiner, 1862						X	X			X	X	X						
							Chelifera Macquart, 1823/*Metachela* Coquillet, 1903			X	X			X	X	X					MacDonald and Harkrider (1999)	larvae are inseparable at this time

Taxonomic Hierarchy										Habitat				Distribution							Literature Cited	Comments
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							Hemerodromia Meigen, 1822			X	X			X	X	X						
							Neoplasta Coquillett, 1895			X	X			X	X	X					MacDonald and Harkrider (1999)	
			Dolichopodidae Latreille, 1809							X	X			X	X	X		X	X			larvae and pupae should be identified to family
		Muscomorpha Crampton, 1944								X	X			X	X	X		X	X	X		
			Canacidae Enderlein, 1935											X								intertidal dwellers
			Phoridae Curtis, 1833																			larvae and pupae should be identified to family
			Syrphidae Latreille, 1802							X	X	X		X	X	X		X	X	X		larvae and pupae should be identified to family
			Sciomyzidae Fallén, 1820							X	X	X		X	X	X		X	X	X		larvae and pupae should be identified to family
			Ephydridae Zetterstedt, 1837							X	X	X		X	X	X		X	X	X	Courtney and Merritt (2008)	The key in Merritt, Cummins and Berg is incomplete. Larvae should be left at family unless reared or identified using a more complete key.
			Muscidae Latreille, 1802							X	X	X		X	X	X		X	X	X		larvae and pupae should be identified to family

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