

Macroinvertebrate Indicators of Streamflow Duration

A Field Guide to Accompany the Macroinvertebrate Scoring Portion of the Oregon Streamflow Duration Assessment Method

Prepared for the U.S. Army Corps of Engineers & U.S. Environmental Protection Agency by
The Xerces Society for Invertebrate Conservation
www.xerces.org

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EPHEMEROPTERA: MAYFLIES

Larvae (nymphs): elongated body, may be cylindrical or flattened, 3-20 mm (0.1-0.8 in.); tip of abdomen with three (sometimes two) long slender cerci (“tails”); developing forewing pads visible; plate-like, feathery, or fringed gills at sides of abdomen; some types have larger fore-gills that form a shield like cover over other gills; conspicuous eyes; slender antennae



Heptageniidae
(flathead mayfly)



Ephemerellidae
(spiny crawler mayfly)



Isonychiidae
(brush-legged mayfly)



Leptophlebiidae
(prong gill mayfly)



Ephemeridae
(common burrower mayfly)



Baetidae
(small minnow mayfly)



Caenidae
(little squaregill mayfly)

MOLLUSCA: MUSSELS & SNAILS

Freshwater mussels, Margaritiferidae (*Margaritifera* spp), Unionidae (*Anodonta* & *Gonidea* spp.): bivalved shell with two oblong halves; can reach >15 cm (6 in.); more common in larger rivers with softer substrate



Gonidea angulata
(western ridged mussel)



Anodonta nuttalliana
(winged floater)



Margaritifera falcata
(western pearlshell)

Juga snails: dark reddish-brown to black shell, smooth or ridged; pale lines may spiral with coils; 10-30 mm (0.4-1.2 in.)



PLECOPTERA: STONEFLIES

Larvae (nymphs): elongate, slightly flattened body with “roachlike” appearance; 5-35 mm (0.2-1.4 in.); long slender antennae; two pairs of wing pads visible on older larvae; tip of abdomen has two “tails” (cerci); fingerlike or filamentous gills may be visible on bases of the legs, thorax, or underside of abdomen



Pteronarcyidae
(giant stonefly)



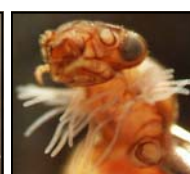
Perlidae (golden stonefly)



Capniidae (snowfly)



Nemouridae
(forestfly)



Peltoperlidae
(roachfly)

TRICHOPTERA: CADDISFLIES

Larvae: elongate, caterpillar-like body; antennae reduced & inconspicuous; no wing pads; tip of abdomen has pair of short, clawed, anal prolegs, but no “tails” (cerci); 2-40 mm (0.08-1.6 in.); filamentous gills may be present in some types; some are free-living & spin silken nets, others build elongated, cylindrical, coiled, or saddle-shaped portable cases from stones, twigs, leaves, & other organic material; cases may persist in dry channels



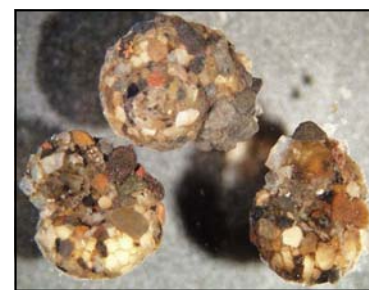
Glossosomatidae
(saddle case-maker)



Limnephilidae
(Northern caddisfly)



Hydropsychidae
(net-spinning caddisfly)



Helicopsychidae
(snail case-maker)



Philopotamidae
(finger-net caddisfly)



Rhyacophilidae
(green rockworm)



Leptoceridae
(longhorned case-maker)

COLEOPTERA: AQUATIC BEETLES

Larvae: body shapes vary; most types elongated, cylindrical, some dome-shaped; may have long filaments at the sides or tip of abdomen; well-developed, tough head and mouthparts; no wing pads; 2-70 mm (0.08-2.8 in.)

Adults: body shapes vary; often oval and slightly flattened, some types cylindrical; forewings form hard smooth shiny covers (elytra) when folded, meet in straight line down the back, covering membranous hindwings and most of abdomen; legs may be flattened or fringed with swimming hairs; 1-40 mm (0.04-1.6 in.)



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Dytiscidae (predaceous diving beetle, **adult** (top) & **larva**)



Gyridae (whirligig beetle, **larva** (left) & **adult**)



Psephenidae (water penny, **larvae**)



Hydrophilidae (water scavenger beetle, **adult**)



Elmidae (riffle beetle, **larva** and **adults**)



Haliplidae (crawling water Beetle, **adult**)

ODONATA: DRAGONFLIES & DAMSELFLIES

Larvae (nymphs): dragonflies = stout, cylindrical to flattened body; abdomen ends in 3 short stiff points; **damsel flies** = slender elongated body with 3 flattened leaf-like gills at tip of abdomen; both have large eyes, wing pads, long extendable "lower lip" (labium) that masks the lower part of head when not in use



Gomphidae (clubtail dragonfly)



Calopterygidae (broadwinged damselfly)



Libellulidae (skimmer dragonfly)



Aeshnidae (darnier dragonfly)



Macromiidae (river skimmer dragonfly)



Coenagrionidae (narrowwinged damselfly)



Cordulegastridae (spiketail dragonfly)



Lestidae spreadwing damselfly

HEMIPTERA: AQUATIC TRUE BUGS

Larvae (nymphs) & **adults**: body slender, oval to elongate, may be flattened; 1-65 mm (0.04-2.6 in.); cone- or needle-like beak arises from front of head, folded under body when not in use; have developing wing pads (nymphs) or wings (adults); **adult** forewings thickened & leathery at the base, membranous at the tips, cross at tips when folded; legs may be flattened like oars or fringed with swimming hairs



Gerridae (water strider, nymph)



Nepidae (water scorpion, adult)



Belostomatidae
(giant water bug, nymph)



Notonectidae
(backswimmer, adult)



Corixidae
(water boatman, adult)

DIPTERA: AQUATIC & SEMI-AQUATIC TRUE FLIES



Chironomidae (non-biting midge, pupa & larvae)



Tipulidae (crane fly, larvae)



Dixidae (dixid midge, larva)



Athericidae (watersnipe fly, larva)



Ceratopogonidae (biting midge, larva)



Culicidae (mosquito, larva)



Blepharicidae (netwinged midge, larva)

ADDITIONAL GROUPS OF AQUATIC INVERTEBRATES



Class Oligochaeta
(aquatic earthworm)



Subclass Hirudinea
(leeches)



Order Isopoda (aquatic sowbug)



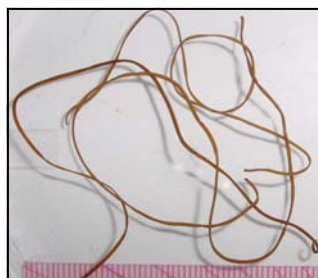
Order Decapoda (crayfish)



Order Amphipoda (scud, side swimmer)



Class Turbellaria
(flatworms)



Phylum Nematomorpha
(horsehair worm)



Order Megaloptera, Family Corydalidae
(dobsonfly/fishfly larva, left) & **Family Sialidae**
(alderfly larvae, right)

To read the complete report, "Macroinvertebrates as Indicators of Stream Duration", visit www.xerces.org/aquatic-invertebrates/
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