# **SPECIES FACT SHEET**

## <u>Common Name</u>: Haddock's Rhyacophilan Caddisfly <u>Scientific Name</u>: *Rhyacophila haddocki* Denning 1968

Synonyms: Phylum: Arthropoda Class: Insecta Order: Trichoptera Family: Rhyacophilidae

Type Locality: Gravel Creek, Mary's Peak, Benton County, Oregon, July 30, 1666, James Haddock, col. Gravel Creek is more commonly known as Parker Creek.

# OR/WA BLM and FS Region 6 Units where Suspected or Documented:

BLM:	Mary's Peak Resource Area
	Myrtlewood Resource Area
	Salem District.
	Coos Bay District
USFS:	Siuslaw National Forest.
	Siskiyou National Forest.

#### **Description:**

Adult caddisflies resemble small moths with wings held tent-like over their back when at rest. They have long hair-like antennae and lack the coiled mouthparts that moths and butterflies have. The adult wings are covered by hairs. The forewings are usually darker and stronger. Adult *Rhyacophila haddocki* are 11 mm in length and light yellowish in color. The wings are yellowish with dark colored veins and an irregular pattern of dark markings (see photograph in Technical Description Appendix).



Adult Caddisfly (NC State 2005).

#### Life History:

*Rhyacophila* is a large genus of primitive caddisflies that live in cool, running freshwater throughout the northern hemisphere. Species in this genus are usually associated with small, cool or cold montane streams where their diversity is greatest. Fifty species of *Rhyacophila* have been recorded from Oregon, 28 from Marys Peak in Benton County (Wisseman 1991).

Larvae of this genus are free-living and largely carnivorous. This group of caddisflies does not construct a case until just prior to pupation. Cases are typically a crude shelter of small stones tied together and attached to the substrate with strands of silk. Within the case the larva spins a brown, parchment-like cocoon (Anderson 1976). The pupal stage develops require several weeks to several months to develop. They develop more slowly in cold temperatures (Wisseman 1991).



*Rhyacophila fuscula* larva. Drawing from Wiggins 1977.

*Rhyacophila haddocki* larvae and pupae probably require cool, well aerated microsites which are free of excessive accumulations of fine sediments to develop. Pupae occur on the underside of cobbles found at the base of riffles, cascades, or bedrock chutes (Wisseman 1991).

Closely related species of *Rhyacophila* need 2 years to complete their life cycle. Larvae in these species grow slowly and pupation does not occur until the spring – early summer of their second year. Some species overwinter as third or fourth instar larvae, in which pupation occurs in late May – June with adult emergence in late July – early August (Dobrin and Giberson 2003). Adults of *Rhyacophila haddocki* have been collected on July 30 and August 9, providing the only information on the flight season for this species.

The non-feeding adults typically perch during the day on riparian vegetation near the larval habitats. Adults live for several weeks, dispersing, mating, and laying eggs before dying. Female *Rhyacophila* enter the water to attach their eggs to submerged objects (Usinger 1963). Some species of this genus lay eggs singly in damp wood near the stream waterline (Wisseman 1991).

#### Range, Distribution, and Abundance:

*Rhyacophila haddocki* Denning 1968 is known from one locality on Mary's Peak, Benton County, OR (Sec29 T12S R7W) and one locality on the Siskiyou National Forest in Curry County, OR, SW <sup>1</sup>/<sub>4</sub> Sec8 T33S R14W (Giersch 2002, Baumann pers. com. 2005). Abundance is estimated to be low at any locality for any of the life stages (Wisseman 1991).



Distribution map for Rhyacophila haddocki Denning 1968.

Because this species has been collected at two sites of great distance from each other, it is possible it also occurs at sites in between where suitable habitat exists. However caddisflies have been extensively collected and studied in Oregon and this species has not been found at other localities. This raises the possibility that the species distribution may relict of a once more widespread population that has been fragmented by tolerance-exceeding disturbances, either natural or anthropogenic that led to extirpation of the species in portions of its range.

#### Habitat Associations:

As a group, Rhyacophilidae are a characteristic element of the fauna of cool mountain streams. Rhyacophilid species tend to have small geographic ranges, usually restricted to one or two high mountains. Larvae of *Rhyacophila* species live in a wide range of running-water habitats (Wiggins 1977).

*Rhyacophila haddocki* has been collected from a small mountain stream at the Mary's Peak locality and from a large, wet seep on the Siskiyou National Forest in Curry County, Oregon (Giersch 2002). The Marys Peak

site is in the subalpine zone (~3,400 to 3,600 feet elevation) predominantly composed of old growth noble fir (*Abies procera*) and Western Hemlock (*Tsuga heterophylla*). The stream here is about 1 m wide with depths of around 10 cm, of moderate gradient, and densely shaded by the forest canopy. The stream is perennial, fed by cold-water springs with discharge relatively stable year-round. Microhabitats include runs and glides with deep, well-aerated gravel and coarse sand, occasional cobble riffles, and cascade steps formed by large bole-wood. Coniferous detritus is common and some pools are formed by debris jams. Moss and liverworts can be found growing in dense patches on the larger gravel and cobbles and along the stream margins. The banks of the stream have a dense cover of herbaceous vegetation (Wisseman 1991).



Marys Peak locality map for Rhyacophila haddocki Denning 1968.

The Elk River site in Curry County is within the boundaries of the Siskiyou National Forest (~ 200 to 400 feet elevation). The adult specimens were collected near a large seep that joins the Elk River, about 1.5 miles above the Elk River Fish Hatchery. The area consists of very steep, rugged terrain and dense vegetation The watershed is composed of

a hardwood/conifer mixture of Douglas-fir (Pseudotsuga menziesii), western hemlock (Tsuga heterophylla), Port-Orford-cedar (Chamaecyparis lawsoniana), Jeffrey pine (Pinus jeffreyi), sugar pine (Pinus lambertiana), western white pine (Pinus monticola), Sitka spruce (Picea sitchensis), tanoak (Lithocarpus densiflorus), red alder (Alnus rubra), madrone (Arbutus menziesii), myrtle (Umbellularia californica), live oak (Quercus chrysolepis), chinkapin (Castanopsis chrysophylla), and bigleaf maple (Acer macrophyllum). The understory will normally consist of huckleberry (Vaccinium sp.), salal (Gaultheria shallon), rhododendron (Rhododendron macrophyllum), vine maple (Acer circinatum), willow (Salix sp.), and many others (USDA FS 1998).



Elk River Locality Map showing collection sites.

#### <u>Threats:</u>

- (1) Destruction of small creeks by roads and other construction.
- (2) Silt from upslope erosion that covers rocks and fills interstitial spaces and also inhibit respiration of larvae and pupae.
- (3) Overcollecting by amateur or professional entomologists.

- (4) Hikers and campers trampling stream habitat and riparian vegetation.
- (5) Clear-cutting that leads to exposure of stream and riparian habitats to direct solar radiation that may warm the water or change the composition and nature of riparian vegetation.

#### **Conservation Considerations:**

Macroinvertebrate communities are known to respond to timber harvest and subsequent forest regeneration (Cole et al. 2003). A recent study found that macroinvertebrate densities in headwater streams were inversely correlated with stand age (IBID). This may be due to greater solar radiation that increases primary production. These streams exhibited higher dominance by a few taxa, generally those regarded as tolerant to disturbance. The influence of disturbance on *Rhyacophila haddocki* Denning 1968 is not documented.

#### Other pertinent information:

Holotype and allotype are deposited in the California Academy of Sciences, Golden Gate Park, San Francisco, CA. The species was named in honor of the collector, James Haddock, then a graduate student at the University of California.

#### Survey Protocol:

Because population densities of any life stage of *Rhyacophila haddocki* are likely to be low in any watershed, extensive collections are necessary to be certain of the species absence. Adult males are needed for positive identification of the species. Adults can be collected with sweep nets from streamside vegetation, UV light traps, or with emergence traps. Optimal sampling periods for adults should occur during the adult flight season, beginning in early July to the end of August (known flight period is July 30 to August 9 on Marys Peak). Sampling weekly during the flight season along streams where the species habitats occur would provide a good chance of yielding adults if they are present. Limited sampling would not be sufficient to ascertain with certainty the absence of the species. Taxonomic expertise is required to identify the species. Specimens should be stored in vials containing 70-80% ethyl alcohol.

Pupae of *Rhyacophila haddocki* may be collected from beneath cobbles in areas of more rapid water flow at the base of riffles, cascades, and bedrock chutes. Pupae can be reared to adults with proper care. Consult an expert entomologist for details. Larval and pupal specimens can be preserved in vials containing 70-80% ethyl alcohol.

As with any sampling of unique or rare habitats, care should be taken to limit the amount of disturbance. Overcollecting can lead to extinction of populations of low density in small, isolated localities and should be limited. Expert participation in sampling would enhance the success of surveys and could help prevent accidental or excessive disturbance or overcollecting.

## <u>Population/Occurrence Delineation (NatureServe 2005)</u> Minimum Criteria for an Occurrence:

Occurrences are based on some evidence of historical presence or current presence of single or multiple specimens (including nymphs or adults) at a given location with potentially recurring existence. Evidence is derived from reliable published observation or collection data; unpublished, though documented (i.e. government or agency reports, web sites, etc.) observation or collection data; or museum specimen information. A photograph may be accepted as documentation of an element occurrence provided that the photograph shows diagnostic features that clearly delineate the species from other species with similar features. Sight records, though valuable, should not be accepted as the basis for new element occurrences. Instead, such records should be utilized to further study an area to verify the element occurrence in that area.

# Separation Barriers:

Within catchments there are likely no significant barriers to movement of adults between microhabitats, with even extensive sections of inappropriate waterway or major obstructions to flow being readily traversed by adults during dispersal following emergence. **Separation Distance for Unsuitable Habitat:** 1 km

# Separation Distance for Suitable Habitat: 1 km

# Separation Justification:

Caddisflies (Order Trichoptera) are a relatively large group of aquatic insects in North America (1350 species) (Wiggins, 1996) and can be found in most freshwater habitats including spring streams, seepage areas, rivers, lakes, marshes, and temporary pools. They have succeeded in exploiting a broader range of habitats and food materials than mayflies (Order Ephemeroptera), dragonflies and damselflies (Order Odonata), or stoneflies (Order Plecoptera) (Wiggins and Mackay, 1978). Adult caddisflies resemble moths (Order Lepidoptera) but larvae resemble caterpillars (also Order Lepidoptera) 2-40 millimeters long (McCafferty, 1981) with five larval instars (rarely six or seven) (Peckarsky et al., 1990).

Caddisflies are often grouped ecologically by the type (if any) of case they build and occupy as nymphs. Free-living forms (families Rhyacophilidae and Hydrobiosidae) have larvae that move actively about with no case until just before pupation. They tend to occupy cool running waters and

sometimes in transient streams. Saddle-case makers (family Glossosomatidae) build portable cases that they carry around while on the substrate and occupy running waters and occasionally wave-swept lake shorelines. Purse-case makers (family Hydroptilidae) are free-living until the final instar when a purse-shaped case is built (portable in most genera). Purse-case makers occupy all types of permanent habitats. Netretreat-makers) (families spinners (also called Philopotamidae, Psychomyiidae, Ecnomidae, Xiphocentronoidae, Polycentropodidae, and Hydropsychidae) build fixed retreat cases often with capture nets and are dependent on flowing water, although some live along active shorelines. Tube-case makers (families Phryganeidae, Brachycentridae, Limnephilidae, Uenoidae. Lepidostomatidae, Beraeidae. Sericostomatidae, Odontoceridae. Molannidae, Helicopsychidae, Calamoceratidae, and Leptoceridae) build portable tubular cases of various shapes and materials and are either lotic or lentic (Wiggins, 1996). Wiggins and Mackay (1978) found caddisfly distributions separated by trophic category as related to stream resource availability in Eastern streams; and to a lesser degree in Western streams. Shredders predominated in upstream habitats in relation to grazers and collectors, but the proportion of shredders became smaller downstream. Groups have also been separated ecologically into lotic-erosional (running water riffles), lotic-depositional (running water pools and margins), lenticlimnetic (standing water), lentic-littoral (standing water, shallow shore areas), lentic-profundal (standing water, basin), and beach zone (Wallace and Anderson, 1996). For the purpose of occurrence separation, however, the same genera or species often occur across habitats making such habitat classifications impractical.

Regardless of habitat, caddisfly adults tend to remain near the emergence site (LaFontaine, 1981) where oviposition occurs. Although dispersal flights are common especially from temporary habitats, such flights are short and only occur immediately following emergence (unlike some Coleoptera and Hemiptera that also disperse additionally in autumn to overwinter) (Cummins and Merritt, 1996). Separation distances (unsuitable and suitable) have been set at the minimum one kilometer.

#### ATTACHMENTS:

- 1) BLM Distribution Maps
- 2) List of Pertinent References/Literature
- 3) Original Published Description

Denning, D.G. 1968. New Species and notes of Western Trichoptera. Journal of the Kansas Entomological Society 41:63-69.

#### 4) Technical Description

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# **BLM Distribution Maps**



BLM Resource Areas and localities where *Rhyacophila haddocki* Denning is found.



BLM Districts/USFS Forests and localities where *Rhyacophila haddocki* Denning has found.

#### References

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#### Technical Description:

Adult Male: Length 11 mm. General color light yellowish, wing yellowish with dark colored veins and an irregular pattern of dark markings. Head, antennae, thorax and legs pale yellow. The general appearance is one of fragility. Sternum 6 and 7 with a short, acuate mesal process, setae sparse. Dorsum of sternum 8, from lateral aspect, produced caudad as a short flat lobe; from dorsal aspect, lobes ovate, contiguous, emarginated. Ninth sternum and lateral portion wide, tergum narrowed to a very thin band. Lateral lobes of tenth tergum, lateral aspect, produced directly caudad, expanded distally to a rounded apex; ventral lobe very lightly sclerotized, apex large, rounded, attached to base of dorsal lobe as a sclerotized apodeme; from dorsal aspect, mesal portion semimembranous, lateral lobes gradually convergent, somewhat leaflike, distal margin truncate bearing a few whitish setae. Basal segment of clasper short, quadrate; apical segment short, ventrodistal lobe wide, ovate, dorsal margin less than half length of ventral; from ventral aspect, ventral lobes curved mesad. Base of aedeagus bearing a sinuate, slender tubular lobe, directed dorsad; central portion narrow laterally, apex broadly triangular, bearing a short acuminate lateral arm, from ventral aspect, curved slightly mesad; apical portion sinuous, apex curved dorsad and bearing an acute curved spine; seen from ventral aspect, lateral arms convex.

**Adult Female:** Length 11 mm. General color and characteristics identical to male. Sternum 7 with a sclerotized ridge bearing a blunt mesal process, sternum 6 with a faint sclerotized line and a short inconspicuous mesal lobe. Remainder of abdomen typically telescopic with no modifications. One pair if internal apodemes extends from segment 7 to segment 8, and a second pair from eighth segment to segment 10.



FIG. 2. Rhyacophila haddocki, male, lateral aspect; 2A, eighth tergum, dorsal view; 2B, ninth and tenth tergum, dorsal view; 2C, aedeagus, lateral view; 2D, aedeagus, ventral view.



Wing of adult *Rhyacophila haddocki* Denning 1968. Photo from Giersch 2002.

This delicate-appearing species differs from other described species in having developed a lateral extension of the eighth tergum, in the ninth tergum narrowed to a thin band, in the short claspers and peculiar aedeagus.