

## SPECIES FACT SHEET

**Scientific Name:** *Juga hemphilli maupinensis* (Henderson 1935)

**Common Name:** Purple-lipped juga

Phylum: Mollusca

Class: Gastropoda

Order: Neotaenioglossa

Family: Semisulcospiridae

### **Taxonomic Note:**

The taxonomy of this species remains unresolved. *Juga hemphilli maupinensis*, unlike conspecifics, was not considered in taxonomic publications by Turgeon *et al.* (1998) or Burch (1982; 1989). Frest and Johannes (2006) suggest revision to a separate species, yet report the taxon as *Juga (Juga) hemphilli maupinensis*.

Additionally, past genetic analysis by Lee *et al.* (2006), based on incorrectly identified museum voucher specimens, suggested reassignment of the related subspecies *Juga hemphilli dallesensis* (and therefore the *Juga hemphilli* conspecifics) to the genus *Elimia*. However, Foighil *et al.* (2009) conducted an additional analysis and determined that *Juga hemphilli* is indeed most closely related to other western *Juga* and should not be reassigned to the genus *Elimia*. Turgeon *et al.* (1998) do not recognize any subspecies of *Juga hemphilli*.

### **Conservation Status:**

Global Status: G2T1 (May 2009)

National Status: United States (N1) (June 2000)

State Status: Oregon (S1)

(NatureServe 2015)

IUCN Red List: NE – Not evaluated

### **Technical Description:**

This subspecies was originally described as *Goniobasis hemphilli maupinensis* (Henderson 1935). Burch (1982; 1989) revised other *hemphilli* subspecies from the genus *Goniobasis* to *Juga* to reflect the distribution of taxa west of the Continental Divide, although he did not explicitly mention *hemphilli maupinensis*.

**Adult:** *Juga* is a genus of medium-sized, aquatic, gilled snails traditionally treated as part of the subfamily Semisulcospirinae within the Pleuroceridae family, although the Semisulcospirinae subfamily was recently elevated to family level based on morphological and molecular evidence (Strong and Köhler

2009). The Pleuroceridae and Semisulcospiridae families both differ from the Hydrobiidae family in that the males lack a verge (male copulatory organ). The genus *Juga* is distinct from related pleurocerid snails based on reproductive anatomy and egg mass characters (Taylor 1966), as well as features of the ovipositor pore, radula, midgut, kidney, and pallial gonoduct (Strong and Frest 2007). Members of this genus have a tall, conic shell-shape and thick, heavy shells which are commonly decollate (apex degraded or broken). The operculum is present, and they are gill breathing and dioecious (separate sexes) (Henderson 1935).

Members of the species *Juga hemphilli* are distinct from other Pacific Northwest *Juga* based on the presence of costae (rounded ridges on the shell surface) or spiral cords on early whorls only (Dillon 2006). The purple-lipped juga is large-sized (23-27mm, possibly as large as 28-35mm prior to decollation), narrow conic, with raised plicae on early whorls, remaining whorls flat-sided and smooth; nacre light purple (Henderson 1935; Frest and Johannes 2006). This subspecies is larger in size than others, is yellow with two narrow brown bands, and has light purple nacre, though specimens of this species in museum collections that have been stored in alcohol may have nacre that appears white (Frest and Johannes 1995; Frest and Johannes 2006).

Egg mass: The *Juga* egg mass generally consists of thick finger-like, elongate, rather weakly coherent gelatinous aggregations, often several centimeters in length and 2 to 4 cm in width, with hundreds to thousands of moderately loosely packed, quite small (< 1 mm) eggs, with individual egg boundaries not very apparent, and without regular arrangement of eggs. The fresh egg mass deteriorates roughly a month after deposition, when the embryos begin to acquire shells and hatch (Frest and Johannes 2006).

### **Life History:**

*Juga* snails are characterized as rasper-grazers, feeding on both algae and detritus, such as dead alder leaves (Furnish 1989, Allan 1995). Individuals in the *Juga* genus may live for 5 to 7 years, reaching sexual maturity in 3 years and continuing to grow (Furnish 1990). Adults in this genus are gonochoristic (as opposed to hermaphroditic). Reproduction is iteroparous (individuals are capable of having offspring many times), and most *Juga* species appear to breed and lay eggs once a year as adults (Frest and Johannes 2006). The same egg-laying localities are utilized year after year if undisturbed. There is no veliger stage, and juvenile snails emerge from eggs (Frest and Johannes 2006). Knowledge specific to this subspecies' life history is not extensive.

### **Range, Distribution, and Abundance:**

Range: According to Frest and Johannes (1995), the purple-lipped juga was probably historically widespread in the Deschutes River drainage (the type

locality is the Deschutes River near Maupin), including major tributaries, in Wasco, Sherman, and Jefferson Counties, Oregon. Today it is generally restricted to the lower Deschutes River, including parts of the Deschutes Wild and Scenic River corridor and lands on the Warm Springs Indian Reservation (Frest and Johannes 1995).

Distribution: This subspecies has been documented in the Deschutes River in three reaches, ranging from river mile 97.4 to 6.3. It is also documented in the Warm Springs River. A record for *Juga hemphilli* at the mouth Willow Creek at Lake Simtustus (USNM 905120) has been included as a possible record for this subspecies, given the location and the known distribution of this and other subspecies.

BLM/Forest Service Land: This subspecies was documented on Prineville District BLM, in the Lower Deschutes WSR and the Deschutes Resource Area, approximately 27 years ago. More recent surveys (Eisner, pers. comm.) have not located this species. This subspecies is suspected on the Columbia River Gorge NSA in Oregon, as it occurs near the mouth of the Deschutes River, and it is suspected on the Mt. Hood National Forest, given this subspecies' occurrence in the Lower Deschutes subbasin.

Abundance: Records from Frest and Johannes in the Deschutes and Warm Springs rivers describe populations as “sizeable,” “substantial,” and “large,” and there is one observation of 10 individuals (OR/WA BLM 2015). No abundance estimates have been made for this subspecies, but according to NatureServe (2015), *Juga hemphilli* is experiencing a decline of 10-30%.

### **Habitat Associations:**

The genus *Juga* grazes on rock surfaces and deciduous leaf litter for periphyton, with seasonal migrations both upstream and downstream (Duncan 2008; Frest and Johannes 1995).

The purple-lipped juga is found in cold, well-oxygenated riffles of large streams. It is apparently more tolerant of siltation and slack water than some *Juga*, and epiphytic algae and aquatic macrophytes are generally rare or absent. This species is somewhat sensitive to physical disturbance and dislodgment (Frest and Johannes 1995).

The egg masses of *Juga* are most often found in loose (non-cemented) but stable cobble substrate, with free and fairly vigorous flow through at least the upper substrate layers (Frest and Johannes 2006). The egg masses are affixed by a narrow basal stalk to the underside of a firm surface, generally a cobble or boulder, although other stabilized hard substrate objects, such as sunken logs, may also be used (Frest and Johannes 2006).

### **Threats:**

Frest and Johannes (1995) noted that this subspecies appears to be absent now from the more impacted upper reaches of the Deschutes system and identified increasing human usage of the Deschutes Wild and Scenic River as a major concern, as this subspecies appears to be sensitive to repeated disturbance. They also noted that any factors tending to downgrade water quality, including nutrient enhancement, would negatively impact this taxon. This subspecies occurs on multiple grazing allotments currently flagged for improvement of “current unsatisfactory resource(s) condition” (BLM 2015). Nonindigenous species are also linked to gastropod imperilment (Johnson *et al.* 2013), and many records exist for the invasive New Zealand mudsnail (*Potamopyrgus antipodarum*) in the Deschutes Basin (USGS 2015). This species was recommended by Frest and Johannes (1995) for federal listing as “endangered.”

### **Conservation Considerations:**

Inventory: Significant range extensions or the identification of large numbers of additional sites are considered very unlikely by Frest and Johannes (1995). As most records of this species date from the 1980s, surveys at known sites will provide valuable information about the current status, range, and population characteristics of this species. Comparing records of nonindigenous aquatic species to known *Juga hemphilli maupinensis* sites will also provide valuable information for conservation and management.

Management: In areas managed for multiple purposes, avoid or minimize conversion of habitat, whether directly or indirectly through impacts to water quality (temperature, dissolved oxygen) or water quantity. Activities that result in siltation, sedimentation, or reduced flow may also impact this species’ habitat, and populations may be especially affected by activities that disturb the stream banks and bed. As this species is distributed in patchy populations, these activities may inordinately affect species’ occurrence and distribution. Nonpoint source pollution, including urban or agricultural runoff and pesticides, may also reduce water quality. Limit these impacts where possible and monitor their effects. If insecticide or herbicide use is planned for areas where this species occurs, evaluate the toxicity of these compounds to mollusks and if necessary, assess alternatives to their use. Management actions taken on lands upslope from rivers and creeks where this species is documented or suspected may affect populations through impacts to aquatic habitat.

### **Version 2:**

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Date: March 2015

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ISSSSP, FS/BLM  
Date: May 2015

**Version 1:**

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December 2009

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FS/BLM Conservation Planning Coordinator  
May 2010

**ATTACHMENT 1: References**

**ATTACHMENT 2: List of pertinent or knowledgeable contacts**

**ATTACHMENT 3: Map of subspecies' distribution**

**ATTACHMENT 4: Photograph of this species**

**ATTACHMENT 5: Aquatic Gastropod Survey Protocol, including specifics for this subspecies**

**ATTACHMENT 1: References**

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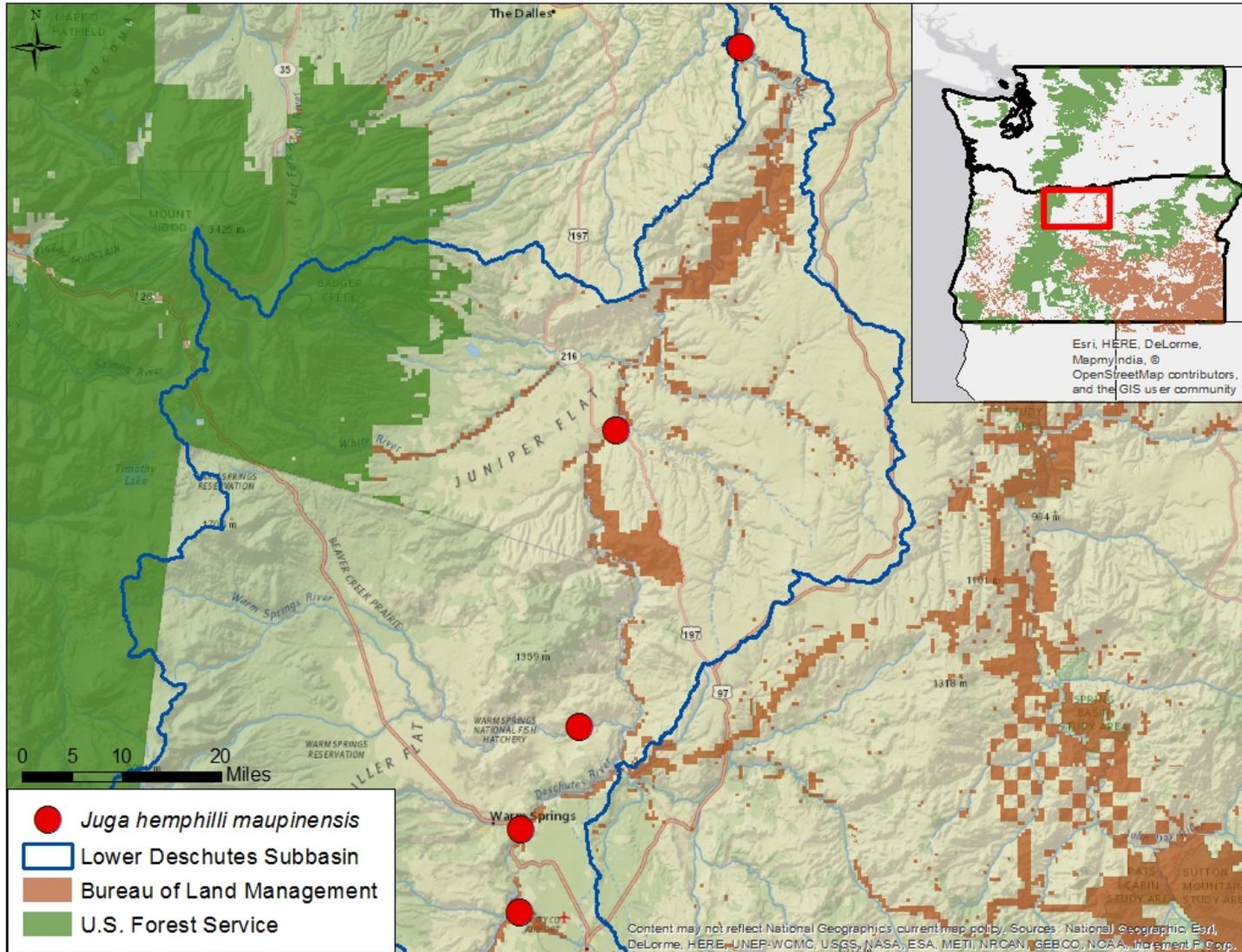
**ATTACHMENT 2: List of pertinent or knowledgeable contacts**

Ed Johannes, Deixis Consultants

Tom Burke, retired

Joe Furnish, USFS PSW Regional Office

### ATTACHMENT 3: Map of subspecies' distribution



**ATTACHMENT 4: Photograph of this species**



*Juga hemphilli hemphilli* shell (length = 17.6 mm) from collection at Oak Creek (Dillon 1989). Note that there are important differences in nacre and periostracum characteristics among subspecies, and this image is not representative of all subspecies. In particular, the periostracum is yellow and the nacre is light purple in *Juga hemphilli maupinensis*. Photograph by Robert T. Dillon, used with permission.

**ATTACHMENT 5: Aquatic Gastropod Survey Protocol, including specifics for this subspecies:**

**Taxonomic group:**

Aquatic Gastropoda

**How:**

Please refer to the following documents for detailed mollusk survey methodology:

1. General collection and monitoring methods for aquatic mollusks (pages 64-71):

Frest, T.J. and E.J. Johannes. 1995. Interior Columbia Basin mollusk species of special concern. Final report: Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA. Contract #43-0E00-4-9112. 274 pp. plus appendices.

2. Standard survey methodology that can be used by field personnel to determine presence/absence of aquatic mollusk species in a given waterbody, and to document species locations and habitats in a consistent format:

Duncan, N. 2008. Survey Protocol for Aquatic Mollusk Species: Preliminary Inventory and Presence/Absence Sampling. Version 3.1. Portland, OR. Interagency Special Status/Sensitive Species Program. U.S. Department of Interior, Bureau of Land Management, Oregon/Washington and U.S. Department of Agriculture, Forest Service, Region 6. 52 pp. [Available at: <http://www.fs.fed.us/r6/sfpnw/issssp/species-index/fauna-invertebrates.shtml>].

**Species-specific survey details, including:**

1. Identification features
2. Historic and current distribution
3. Federal Units where species is suspected or documented
4. Areas where surveys are recommended
5. Habitat where surveys should take place
6. Commonly associated mollusk species
7. General survey method and instructions (e.g. time of year)

*Juga hemphilli maupinensis*

The purple-lipped juga is found in cold, well-oxygenated riffles of large streams in the Lower Deschutes subbasin. According to Frest and Johannes (1995), this subspecies was probably historically widespread in the Deschutes River

drainage (the type locality is the Deschutes River near Maupin), including major tributaries, in Wasco, Sherman, and Jefferson Counties, Oregon. Surveys are recommended in typical habitat of good quality, with a priority on areas where land or aquatic management actions may impact this species. Surveys should focus on revisiting known sites to evaluate current population status, as many sites have not been surveyed since the 1980s, and Frest and Johannes (1995) believe it unlikely that numerous new sites will be found. In particular, estimates of abundance at sites would improve understanding of these populations. In addition, surveys should be completed in areas where this species is suspected to occur.

Surveys for this subspecies have been conducted in late summer (August) and fall (September and October). Because this subspecies inhabits swift-flowing water, surveys for this subspecies may be technically difficult or unsafe in periods of high water or flow. Generally, surveys could be conducted from late August to early October, but conditions may vary seasonally and depend on recent weather events. Caution should be taken when conditions are sub-optimal. Dip net and hand collection are suggested collection methods for this species.

The purple-lipped juga is distinguished from other *Juga* by its larger size (23-27mm), yellow coloration with two narrow brown bands, and light purple nacre (Henderson 1935; Frest and Johannes 1995; Frest and Johannes 2006).

Common associates are the shortface lanx (*Fisherola nuttalli*), *Fluminicola* sp., and the bulb juga (*Juga (Oreobasis) bulbosa*) (Frest and Johannes 1995). In shallow or silty habitats, other associates include *Physella* sp. and less commonly *Fossaria* and *Stagnicola* spp. (Frest and Johannes 2006).