

SPECIES FACT SHEET

Scientific Name: *Megomphix hemphilli*

Common Name: Oregon Megomphix

Phylum: Mollusca

Order: Neotaenioglossa

Class: Gastropoda

Superfamily: Acavoidea

Family: Megomphicidae

Conservation Status:

Global Status (2008): G3

National Status (United States): N3

State Statuses: Oregon (S3), Washington (S1)
(NatureServe 2013)

Technical Description:

This taxon belongs to a genus of land snails in the family Megomphicidae. This very small family is represented in the Pacific Northwest by just two genera, *Polygrella* and *Megomphix*. The *Megomphix* genus is characterized by having small to medium sized shells (9 to 20 mm wide), ivory to amber-white with age and somewhat translucent with a slight greenish-yellow tint when fresh (Burke 2013). The *Megomphix* shell-form is a dextral (right hand) spiral, meaning if the side of the shell is viewed and the dorsal side is up, then the aperture or “mouth” will be on the right side (Applegarth 2000). When holding shells in this position, the outer part of the mouth of a *Megomphix* shell will be close to the horizontal axis of the shell, while that of a similar haplotrematid shell is more distinctly below the horizontal axis. This character can also be described as a relative flatness of the bottom of a *Megomphix* shell. The shells are discoidal in shape. The aperture is fairly wide, the lips simple and the basal margin somewhat flattened (Burke 2013). The spire is very low (nearly flat, with the dorsal side like a low dome) and there is a large umbilicus (deep recess on the ventral side) (Applegarth 2000, Burke 2013). The umbilicus of this species is roughly a third of the total diameter (Applegarth 2000). The generic name *Megomphix* is based on the Greek word roots *meg* (large) and *omphal* (navel). Shell sculpturing in this genus is lacking except for smooth growth wrinkling (Burke 2013).

Megomphix hemphilli is described in Burke (2013) as follows:

A medium-sized white snail; the shell is white with a light greenish tint, smooth and glossy without striations, and with low, smooth growth-wrinkles. With 5¼ to 6 whorls its shell measures 13.5 to 20.0 mm across and about 6.8 to 8.5 mm high. Size of the whorls increase regularly but slowly to the last whorl, which is more than twice as wide as the adjacent penultimate whorl. The spire is nearly flat; the aperture is wider than

high and somewhat flattened basally; the lip is simple and sharp. The umbilicus is contained about 4½ times in the shell width (Burke 2013).

Larger measurements for this species in Branson (1977), and repeated in Frest & Johannes (1999), are to be disregarded as they are based on misidentified specimens of haplotrematid snails (Applegarth 2000). Shells of this species seldom exceed the diameter of a penny (19 mm). Further details on characteristics of the shell and live body of this species are available in Applegarth (2000).

Megomphix hemphilli is very similar in appearance to two other *Megomphix* species, although the ranges of the three species do not overlap. (*Megomphix hemphilli* is known from western Washington and Oregon, while *M. lutarius* inhabits the Blue Mountains of eastern Washington and Oregon, and *M. californicus* is known from scattered locations in the Coast Range of northern California (Applegarth 2000; Burke 2013).) Within its range, *M. hemphilli* is sometimes difficult to distinguish from shells of certain haplotrematid snails (family Haplotrematidae), especially those of immature *Haplotrema vancouverense* and *Ancotrema hybridum*. Both *Haplotrema* and *Ancotrema* species have a wider, more open umbilicus, a more roundly arched basal lip margin, and shell sculpturing that is lacking in *Megomphix hemphilli*. The range of *Microphysula cookei* overlaps with that of *M. hemphilli* in Washington, but only juvenile *Megomphix* might be confused with *Microphysula*. *Microphysula* species are much smaller, with a thin shell and a relatively narrow aperture (Burke 2013).

Life History:

Reproduction in *M. hemphilli* is presumed to be similar to that of other land snails, *i.e.* hermaphroditic and capable of self-fertilization but exhibiting cross-fertilization (copulation between two individuals) as the norm (Applegarth 2000). In this way, deleterious inbreeding via self-fertilization is generally avoided, but remains a possible alternative if a mate is not available (Burke *et al.* 2005). In general, a land snail will mate and exchange gametes with another individual of its kind, and then both will lay eggs in cool, damp subsurface sites where the eggs can incubate in a location that is relatively safe from predation and desiccation (Applegarth 2000). Land snails do not tend their eggs or young; there is no larval stage, and newborn snails look like miniature adults (the innermost part of the shell develops within the egg) (Applegarth 2000). For *M. hemphilli*, the appearance and number of eggs have not been reported. The potential longevity of this species is unknown but may be as little as two years (T. Frest *in* Applegarth 2000).

In general, terrestrial gastropods may be herbivores, predators, scavengers, or omnivores (Burke 2013). Little is known regarding the specific feeding habits of

this species, or other *Megomphix* species. Another member of the Megomphicidae family, *Polygyrella polygyrella*, is presumed to feed by scraping algae, yeast, bacteria and diatoms from rock, wood, and plant surfaces (Duncan 2008).

Range, Distribution, and Abundance:

This species is known only from Oregon and Washington, where it is found at lower elevations in the Willamette Valley and Puget Trough, from Douglas County, Oregon, north to Thurston County, Washington (Burke 2013). The vast majority of known records and habitat observations of this species have been acquired as a result of mollusk surveys done to meet the requirements of the Northwest Forest Plan (Applegarth 2000).

This species is relatively common in Oregon, where it is known from hundreds of sites in Clatsop, Clackamas, Columbia, Coos, Douglas, Lane, Linn, Marion, Multnomah, Tillamook, Washington, and Yamhill Counties (NRIS 2013, GeoBOB 2013, Deixis 2013, GBIF 2013, ANSP 2013, Harvard 2013). The majority of known records are from Lane and Douglas Counties. Frest & Johannes (1999) also describe this species as being present in Curry, Josephine, and Jackson Counties; however, according to Applegarth (2000), the species is not known from southwestern Oregon, and these listings are in error.

This species is rare in Washington, where it is known from a small number of scattered sites in Cowlitz, Grays Harbor, Lewis, and Thurston Counties (Burke 2013, *pers. comm.*, Applegarth 2000, Richart 2013, *pers. comm.*, Pearce 2013, *pers. comm.*, GBIF 2013). Known records are from low elevations in the southwestern part of the state, from Olympia (type locality and most northern locality), through Toledo, and south to the Columbia River, including one location at Oakville in a side valley on the west side of the Puget Trough (Applegarth 2000). In addition, this species has been observed in the Willapa Hills of Washington in recent years (Richart 2013, *pers. comm.*).

A large number of Washington records listed in the literature for this species (*e.g.*, Frest and Johannes reports) have since been determined to be incorrect. Specifically, Branson (1977) claimed to have found this species at 14 locations on the Olympic Peninsula, including in the Olympic National Forest and Olympic National Park. In addition, Branson (1980) reported this species at three locations in Mount Baker-Snoqualmie National Forest. The collections on which those reports were based were recently reexamined, and all of the specimens previously identified as *Megomphix hemphilli* are actually examples of immature haplotrematid snails (Applegarth 2000, Applegarth 2013, *pers. comm.*). Another record for *M. hemphilli* near Yakima, Washington is reported in Eyerdam (1934), and rejected in Applegarth (2000). The absence of *M. hemphilli* in the Branson collections explains why the shell size, geographic range,

elevational range, and ecological situations of the snails reported as *M. hemphilli* by Branson (1977, 1980) were inconsistent with information for this species from other sources. The Forest Service NRIS database (NRIS, 2013) indicates one site of *M. hemphilli* from the Cascade Range of Washington State on the Gifford Pinchot National Forest. The location of the site (close to 1900 ft.) makes the identification of the specimen associated with this site suspect, as all other locations in Washington state are below 500 ft. in elevation. The voucher for the specimen associated with this site has been located, and an initial re-assessment of the identification shows the species has some similarities to *M. hemphilli*, but also some notable differences (Young 2014, *pers. comm.*). A further review of the specimen by additional taxa experts is planned for later in 2014, early 2105. In the remainder of the Washington Cascades and the Olympics, there are no known sites reported (Applegarth 2000, NRIS 2013).

Forest Service/BLM lands: In Oregon, there are numerous (>2000) records of this species on federal lands. The species is Documented on the Coos Bay, Eugene, Roseburg, Medford, and Salem BLM Districts and on Siuslaw, Umpqua, Mount Hood, and Willamette National Forests. It is suspected to occur on the Rogue River-Siskiyou National Forest, and on the Columbia River Gorge National Scenic Area (Applegarth 2000, NatureServe 2013, Duncan 2003, GeoBOB 2013, NRIS 2013).

In Washington, this species is relatively rare, and has not been Documented on any Forest Service or BLM land. Duncan (2003) lists the species as Suspected on Gifford Pinchot (Cowlitz Valley Ranger District) and Olympic National Forests (Hood Canal Ranger District), however, there is controversy surrounding these designations. Known records, as well as the distribution map provided in Burke (2013), indicate this species has a low-elevation distribution from Olympia to the Columbia River that does not include any National Forest or BLM land (Applegarth 2000, Burke 2013, NRIS 2013, Applegarth 2013, *pers. comm.*, Richart 2013, *pers. comm.*). According to Forest Service biologist, Mitch Wainwright (2013, *pers. comm.*), the most likely habitat for this species on Washington Forest Service land is in the Cowlitz Valley Ranger District of the Gifford Pinchot, where bigleaf maple trees are prevalent. However, extensive terrestrial mollusk surveys in this District have not revealed this species, despite finding an abundance of other rare snails (e.g., *Cryptomastix devia*), and it is very unlikely that even the lowest elevation sites of this district (around 1000 ft.) are low enough for *M. hemphilli* (Wainwright 2013, *pers. comm.*, Applegarth 2013, *pers. comm.*). Similarly, this species has not been encountered during terrestrial mollusk surveys that took place in drainages of the Hood Canal Ranger District (Olympic National Forest) prior to several timber sales in recent years (Piper 2013, *pers. comm.*). Most of the land in this District is at elevations higher than this species is known to occur in Washington (Piper 2013, *pers. comm.*). According to regional *Megomphix* expert

John Applegarth (2013, *pers. comm.*), this species occurs at the lowest elevation sites in Washington (the floor of the Puget Trough) and should not be listed as Suspected on either the Gifford Pinchot or the Olympic National Forest Washington. It appears that this species utilizes higher elevation sites only at lower latitudes, for example in southern Oregon, where the climate is warmer, low elevation sites are drier, and the species may need to occupy higher elevation habitat in order to find appropriate moisture conditions (Applegarth 2013, *pers. comm.*).

Abundance: *M. hemphilli* seems to have a discontinuous (patchy) distribution across its range, and is one of the least abundant snail species where it is present (Applegarth 2000). Evidence for a patchy distribution can be found in two years of exploratory surveys in the BLM Eugene District where the species is relatively common; during the course of these surveys, *M. hemphilli* was found at 26 sites (roughly a third of the 75 sites that were surveyed), and represented about 7.7% of the snails (65 of 842 individuals) at those 26 sites. When the results from all 75 sites were combined, *M. hemphilli* shells were about 4% (65 of 1577 shells) (Applegarth 2000). Rangewide, the relative abundance of this species is much lower than can be found in the Eugene District. Across its range, *M. hemphilli* is usually the least common of the larger land snails (*i.e.*, snails with shells larger than 1 cm in diameter when mature) (Applegarth 2000). The vast majority of known sightings of this species have been of just one specimen. Twenty-two shells is the highest recorded abundance of this species at any given site (NRIS 2013, Harvard 2013, GBIF 2013, ANSP 2013, Deixis MolluskDB 2012, GeoBOB 2013).

Habitat Associations:

Megomphix hemphilli occurs at low to moderate elevations across its range (Applegarth 2000). In Washington, all known records are at low elevations (below 150 m (500 ft.)). In Oregon, most known records are at mid-elevations, between 150-450 meters (500-1500 ft.), although records as high as 774 meters (2540 feet) have been recorded in southern Oregon (Applegarth 2000). In the southern portions of its range in Oregon, low elevation sites may be too dry to support this species. All known locations are below the zone of seasonally persistent snow pack.

In addition to elevation, topography also seems to be important in the distribution of this snail. Most occupied sites are on well-shaded slopes and terraces, and many are near streams (Applegarth 2000). Rocky ridges and slopes that are remote from streams and have a relatively thin mantle of soil generally do not favor either this snail or the bigleaf maple, a tree species with which it is closely associated (see below). Similarly, *M. hemphilli* is generally absent from active and recently active flood plains. This species has been found on slopes of all aspects, but seem to be more often found on north-facing slopes (Applegarth 2000).

The distribution of *M. hemphilli* is closely associated with the distribution of the bigleaf maple (*Acer macrophyllum*), a large deciduous tree native to the western North America. Although the species occurs in coniferous/hardwood forests, the more the canopy consists of bigleaf maple, the more likely *M. hemphilli* will be present and locally concentrated (Applegarth 2000). Unusually large or multiple-stemmed bigleaf maples, or clumps of bigleaf maples, seem to provide the most favorable habitat (Applegarth 2000). This species also seems to associate positively with *Polystichum munitum* (sword ferns) and *Corylus* sp. (hazel bushes), but no association is apparent with either *Gaultheria shallon* (salal) or *Mahonia aquifolium* (Oregon grape) (Applegarth 2000; Burke 2013). It usually occurs in situations that are shaded by a nearly closed canopy and often where there is additional shade provided by sword ferns, bushes, or rotten logs. It is generally reported that this snail appears absent from pure coniferous stands (Frest & Johannes 1999), although the recent records from the Willapa Hills in Washington appear to reflect a habitat expansion for this species. According to Richart (2013, *pers. comm.*), the habitat in the Willapa Hills is a managed *Pseudotsuga menziesii* forest without *A. macrophyllum* present, much different than the *Acer*/mixed lowland forest previously reported for this species in Washington.

The microhabitat of *M. hemphilli* consists of soft forest floor substrate, where it occurs within the mat of decaying vegetation under *Polystichum munitum* (sword ferns), *Corylus* sp. (hazel bushes), and *Acer macrophyllum* (bigleaf maples) (Applegarth 2000, Burke 2013). Except for a few empty shells, all examples of *M. hemphilli* have been found under some form of cover (Applegarth 2000). When not in association with bigleaf maples, this species is found under rotten logs (particularly those elevated off of the ground). Damp rotten logs, typically of hardwoods and conifers (except cedars), may provide shelter during seasonal drought and stand-replacing fires, and they may function as dispersal corridors between areas with bigleaf maples (Applegarth 2000).

Other land snails and slugs with which this species commonly co-occurs include *Monadenia fidelis*, *Ancotrema sportella*, *A. hybridum*, *Prophysaon andersoni*, *P. coeruleum*, *Nearctula rowelli*, *Trilobopsis*, *Vespericola*, *Hemphillia* sp., *Cryptomastix germana*, *Punctum*, *Pristiloma*, and *Haplotrema vancouverense* (Deixis MolluscDB 2012).

Threats:

Across its range, *Megomphix hemphilli* is considered a rare species associated with both old growth forests and riparian areas (Frest & Johannes 1999). Any activities that disturb the terrain structure, overstory, plant community, litter composition/abundance, or moisture levels pose threats to this taxon.

Extensive surveys in Oregon suggest that *M. hemphilli* populations are in decline or disappear in response to local loss of bigleaf maples and woody debris. In areas with a history of frequent fires or logging, this snail seems to be absent or is surviving in small colonies near streams or rotten logs (Applegarth 2000). Frest & Johannes (1999) note that the species is threatened by logging and grazing in low to moderate elevation old growth forests in southwestern Washington and western Oregon, and road building and urbanization in riparian corridors across its range.

Applegarth (2000) identified the primary threats to this species as follows: isolating or losing additional populations; further loss of habitat to support the species across the landscape (especially big-leaf maples, associated leaf litter and coarse woody debris); predation; competition from exotic mollusks; high intensity fire; and inappropriate use of chemicals (*e.g.*, in forest or roadside management).

Conservation Considerations:

Inventory: In Washington, this species is currently known from very small numbers at very few sites, and better knowledge of the population status at documented and potential sites is critical in evaluating this species overall status and management needs in the state. Note, however, that since most experts agree that this species is not suspected to occur on Forest Service or BLM land in Washington (Applegarth 2000, Burke 2013, Applegarth 2013, *pers. comm.*), additional surveys on these agency lands are not high priority at this time.

Management: In Washington, where the species is known from very few sites, manage new and known sites to reduce the impacts of logging and other activities on this species. Selective timber harvest that retains many bigleaf maples and large quantities of woody debris may favor this species (Applegarth 2000). Habitat protection focusing on maintaining/restoring appropriate environmental conditions may be necessary at some sites; such conditions include stands of mixed conifer, bigleaf maple and sword ferns or hazel bushes where available; uncompacted moist, cool, soils; leaf mold formed in part by bigleaf maple, hazel or sword ferns; and large and small woody debris (both conifer and hardwood) (Applegarth 2000). At known sites: minimize disturbance of the forest floor litter, duff, and woody debris. Maintain the existing canopy of trees within a large enough area to favorably moderate fluctuations of temperature and humidity on the site. Conserve the naturally occurring diversity of plant species, especially bigleaf maple trees (oldest preferred), hazel bushes, and sword ferns to provide a supply of logs and suitable leaf mold. Maintain important cover and microhabitats by conserving dead and downed woody debris. Avoid prescribed burning within key habitat areas, and protect habitat from wildfire by fuels management in adjacent areas. Monitor known populations to determine the impacts of management activities,

natural disturbances, and vegetative succession on this species' habitats and populations.

Research: A number of research questions were identified by Applegarth (2000), including: Are there certain fungi or other food species on which this mollusk depends? Do rotten logs function as dispersal corridors and refuges? What stand size should ensure local persistence of this mollusk? To what extent do local populations of this species normally fluctuate? How discontinuous (patchy) is the distribution of the species? What factors may influence recolonization of a site by snails of this species from adjacent populations? To what extent is this species attracted to unburned slash piles? What is the response of this species to fire of various intensities and in various seasons? Is this species likely to survive fire or deforestation if rotten logs are present? What are the effects of herbicides and other chemicals used in forest management?

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Date: 20 November 2013

Edited by: Sarina Jepsen, Xerces Society

Date: 4 December 2013

Final edits by: Rob Huff, FS/BLM ISSSSP

Date: 21 November 2014

ATTACHMENTS:

- (1) **References**
- (2) **List of pertinent or knowledgeable contacts**
- (3) **Map of Species Distribution**
- (4) **Photographs of Species**
- (5) **Terrestrial Gastropod Survey Protocol, including specifics for this species**

ATTACHMENT 1: References:

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<http://clade.ansp.org/malacology/collections/index.html>. (Last accessed June 2013).

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Richart, Casey. 2013. San Diego State University. Personal communication with Sarah Foltz Jordan, Xerces Society.

Young, Tiffany. 2014. Wildlife Biologist, Willamette National Forest. Personal communication with Rob Huff, FS/BLM.

Wainwright, Mitch. 2013. Wildlife Biologist, Gifford Pinchot National Forest. Personal communication with Sarah Foltz Jordan, Xerces Society.

ATTACHMENT 2: List of pertinent, knowledgeable contacts:

John Applegarth, Private Consultant, Eugene, Oregon.

Tom Burke, Private Consultant, Olympia, Washington.

Ed Johannes, Deixis Consultants, Seattle-Tacoma, Washington.

Susan Piper, Wildlife Biologist, Olympic National Forest, Washington.

Casey Richart, Researcher, San Diego State University, San Diego, California.

Mitch Wainwright, Wildlife Biologist, Gifford Pinchot National Forest, Washington.

ATTACHMENT 4: Photographs of Species



Megomphix hemphilli live snail. Photograph by Stephen Dowlan, used with permission.



Megomphix hemphilli live snail. Photograph by Stephen Dowlan, used with permission.

ATTACHMENT 5: Terrestrial Gastropod Survey Protocol, including specifics for this species:

Survey Protocol

Taxonomic group:

Terrestrial Gastropoda

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

1. General collection and monitoring methods for aquatic and terrestrial 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. Pre-disturbance surveys for terrestrial mollusk species, the objective of which is to establish whether a specific mollusk is present in proposed project areas with a reasonable level of confidence, and to document known sites discovered during surveys:

Duncan, N., Burke, T., Dowlan, S. and P. Hohenlohe. 2003. **Survey protocol for survey and manage terrestrial mollusk species from the Northwest Forest Plan.** Version 3.0. U.S. Department of Interior, Bureau of Land Management, Oregon/Washington and U.S. Department of Agriculture, Forest Service, Region 6, U.S. Fish and Wildlife Service. 70 pp. [Available on ISSSSP intranet site].

Species-specific Survey Details:

Megomphix hemphilli

Where: *Megomphix hemphilli* is known only from Oregon and Washington, where it is found at lower elevations in the Willamette Valley and Puget Trough, from Douglas County, Oregon, north to Thurston County, Washington (Burke 2013).

This species is scarce in Washington, known from very small numbers at very few, highly fragmented sites (Applegarth 2013, *pers. comm.*, Burke 2013, *pers. comm.*). Better knowledge of the population status at documented and potential Washington sites is critical in evaluating this species' overall status and management needs in the state. Note, however, that since most experts agree that this species is not suspected to occur on Forest Service or BLM land in

Washington (Applegarth 2000, Burke 2013, Applegarth 2013, *pers. comm.*), additional surveys on these agency lands are not high priority at this time.

Habitat: *Megomphix hemphilli* is known from low- to mid-elevation moist conifer/hardwood forests, usually with an abundance of bigleaf maple trees (Duncan 2003, Applegarth 2000). This species may also be present in the absence of bigleaf maple, especially at moist sites where deciduous shrubs, coarse woody debris, rotten logs or stumps, and large sword ferns provide abundant cover. The microhabitat of *M. hemphilli* consists of soft forest floor substrate, where it occurs within the mat of decaying vegetation under sword ferns, hazel bushes, and bigleaf maples (Applegarth 2000, Burke 2013). Except for a few empty shells, all examples of *M. hemphilli* have been found under some form of cover (Applegarth 2000). When not in association with bigleaf maples, this species is found under rotten logs (particularly those elevated off of the ground), another habitat feature that seems to be important to the local occurrence and survival of this species. For more detailed habitat information, see the Habitat section of the Species Fact Sheet, above.

When: Most known records of this species are from fall, winter, spring, and early summer (i.e., November through June), when the weather is most suitable (cool and moist) for finding active snails and slugs. A general Forest Service survey protocol for terrestrial land snails recommends surveys be conducted only at temperatures greater than 5 °C and when the soil is moist to the touch (Dunk *et al.* 2002). Often, mollusk activity at the project area is the best determining factor for assessing the suitability of environmental conditions at the site (Duncan *et al.* 2003).