

FY2009 ISSSP Surveys for Salamander Slug [aka Axetail Slug] (*Gliabates oregonius*) in the Upper Blue River drainage of the McKenzie River Ranger District, Willamette National Forest. Authored by Joe Doerr and Tiffany Young, Wildlife Biologists, Willamette National Forest, 10/20/2009.

In 2008, the salamander slug (*Gliabates oregonius*), also known as the axetail slug, was added to the sensitive species list for the Bureau of Land Management and the Forest Service in the Pacific Northwest. This species was first described as *Gliabates oregonia* from specimens collected in north-central Lane County (Webb 1959). The scientific name was subsequently changed to *Gliabates oregonius* by other researchers (Tom Burke personal communication). *Gliabates oregonius* is classified a S1 species endemic to Oregon and confirmed from a handful of locations in the Cascade and Coast Ranges within the Willamette River drainage. The mollusk is reported associated with conifer and leaf litter in Douglas-fir (*Psuedotsuga menziesii*) and western hemlock (*Tsuga heterophylla*) forest habitat. Due to its apparent low abundance and association with forest habitat, there is considerable potential for negative impacts from silvicultural activities, such as logging, fuel treatments and prescribed burning. There is a management need to better understand the abundance and distribution of this species.

Following its inclusion on the sensitive species list, biologists on the McKenzie River Ranger District reviewed previous mollusk surveys conducted under the “Survey and Manage Program”. In their review they found a high number of reported detections of axetail slugs in the upper portion of the Blue River drainage. The reports showed detections of 139 individuals at 86 locations during surveys in the fall of 1998 and the spring of 1999 connected with a timber sale planned in that area. For an S1 species, this high detection rate is noteworthy. However, *Gliabates oregonius* was not a “Survey and Manage” species at the time. Some specimens were sent to regional experts, but identification was unclear. No specimens were vouchered and the locations were not entered into the corporate GIS wildlife database.

Except for underburning in one unlogged stand, the planned timber sale where the axetail slugs were reportedly found has not yet been implemented. In fall 2009 this ISSSP project was initiated to resurvey a sample of the reported locations in the Blue River drainage, obtain voucher specimens, confirm identification of any suspected *Gliabates* found, and document locations of any confirmed salamander slugs or other sensitive species in NRIS Wildlife.

Methods:

The 86 “axetail” locations from 1998–1999 were plotted on a map and labeled sequentially by location. Every third location was selected systematically for resurveying, thus distributing the resampling effort geographically among points. The general location of these sites with reference to the Willamette National forest is shown in the attached map. Ninety-two percent of the 1998–1999 reported locations were from fall surveys so mollusk surveys in this project were conducted in fall 2008 rather than in spring. Each location surveyed was located from GPS coordinates (and in a few cases from the remains of 10-year-old survey flagging). A one-hour mollusk search was done in the most likely habitat in the vicinity of the location (generally within a 1-acre area surrounding the GPS location) following Duncan et al. 2003. Each one-hour survey consisted of two 20-minute intensive searches of conifer needle and deciduous leaf litter

plus 20 minutes of walk-about spot searching in likely habitat for a total search time of one hour/site. A training session was held with Nancy Duncan, BLM mollusk expert, on October 15, 2008. Field conditions were found to be too dry at that time for successful detection of mollusks, but searching techniques, identification from photos, and field protocols were reviewed. Surveys with adequate moisture conditions were conducted from November 5–23, 2008, by Forest Service wildlife personnel. Tiffany Young, Ruby Seitz, Shane Kamrath, Chad Marks-Fife, Juan Carlos Valarezo, and Joe Doerr participated in the November surveys. A field form for reporting fauna and habitat observation is shown in Appendix 1.

Results:

Detections occurred throughout the November surveys, including the first and last days surveyed so all surveys conducted that month were considered valid. Twenty six of the 28 systematically selected sites were surveyed in November. Of the remaining two sites, one was not surveyed because snow blocked access and the other was surveyed in October but was not resurveyed in November due to lack of time. Salamander slugs were detected at 11 of the 26 selected sites (42%) with a total of 27 individuals found during the one-hour searches.

Ten of the other previous locations that were not systematically selected were also resurveyed in November. Salamander slugs were detected at 4 of these locations. Since this detection rate (40%) was close to the rate at the systematically selected sites, both data were combined. Overall, we detected salamander slugs at 15 of 36 sites (42%) where they had been reported found in 1998–1999 and located a total of 34 individuals.

Incidentally we surveyed 2 other nearby sites in the Blue River drainage and had no detections. Tiffany Young surveyed 1 site in the adjacent Canyon Creek drainage on the Sweet Home Ranger District to the north and detected three individuals. Canyon Creek is part of the South Santiam River watershed.

Initially our intent was to also survey for the Oregon slender salamander (*Batrachoseps wrightorum* [BAWR]). The microhabitat for the salamander slug (see below) was too different to allow for both species to be adequately searched in a single hour. We therefore concentrated on the mollusk and searched for salamanders only incidentally by uncovering suitable woody debris that was obvious and in close proximity to the other survey effort. A total of four BAWR were detected at a 3 sites.

Fourteen voucher specimens were collected. These were sent to Tom Burke, William Leonard, and Lyle Chichester for verification. From external appearance the mollusks match the description of *Gliabates oregonius*. Internal examinations by Lyle Chichester have not matched many of the characteristics described by Webb (1959) [Tom Burke personal communication]. *G. oregonius* is the only species of *Gliabates* and there are no readily apparent look-alikes. If the individuals are not *oregonius*, then it is possible they represent a previously undescribed species. While this taxonomic dilemma is being resolved, this report will refer to the individuals as *Gliabates oregonius*.

The *Gliabates oregonius* individuals found in this study had the following characteristics:

- Clear white translucent head with brown antennae.
- Body translucent with brown striation.

- Slightly papillose mantle and tail. This “bumpiness” is more texture than true papillose.
- Slightly papillose tail. Tail shows more of a reticulation than papillose.
- Mantle is $\frac{3}{4}$ of body length.
- Tail is $\frac{1}{4}$ of body length.
- Slight notch at the junction of the tail and the mantle.
- The size range of individuals was 0.4 to 2 cm in total length.

The slugs were found in conifer stands in the western hemlock series dominated by Douglas-fir with a vine maple (*Acer circinatum*) understory. Areas where vine maple leaves had fallen and formed a cover to hold moisture in a Douglas-fir needle litter/duff layer seemed to be the preferred microhabitat for *Gliabates oregonius*. Places where down wood had created pockets for leaf litter and moisture to collect also seemed to be selected by *Gliabates oregonius*. Most specimens found in 2008 were located in a very moist Douglas-fir needle litter/duff layer approximately 1 inch below the surface, between the current year’s needle layer and the compacted layer of previous years, with a vine maple leaf layer on the top. *Gliabates oregonius* detections in the Blue River watershed were in stands from 40 to 120 years of age and in one late-successional forest that had been underburned two growing seasons prior to surveying. The Canyon Creek stand where *Gliabates oregonius* was found was 30 years of age. *Gliabates oregonius* were detected at elevations ranging from 3000 to 4100 feet and throughout the geographic area searched in the upper Blue River watershed.

An average of 2.1 individuals (range 1–7) was found at sites where detections were made (n=16). The median number found at these occupied sites was 1.5 with a mode of 1 (Table 1).

Discussion:

We believe that our results reflect a relatively good abundance of *Gliabates oregonius* within our project area. Descriptions of the axetail slugs by the observers conducting the 1998–1999 surveys and the number of individuals found at a sample of these sites in 2008 support the conclusion that the past detections are valid. Both the 2008 surveys and the previous 1998–1999 detections will be entered into the NRIS Wildlife database. Our results suggest that *Gliabates oregonius* occupy a broad range of age classes in Douglas-fir forest and we postulate that they are closely associated with microsites defined by specific leaf and needle litter and moisture conditions.

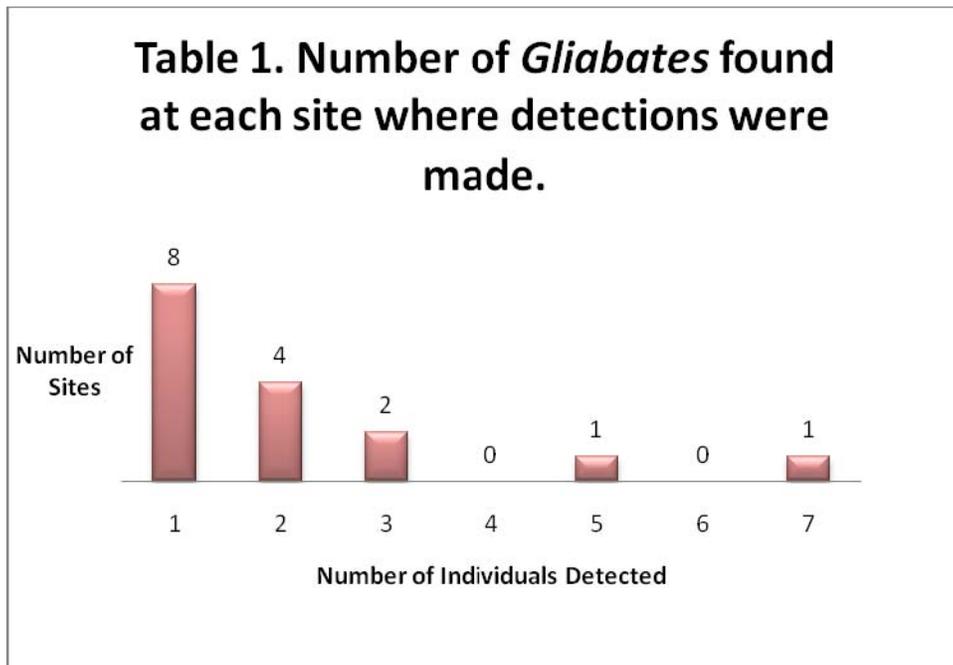
Since multiple surveys were not conducted at single sites, we cannot estimate the probability of false absences (i.e. not detecting the species when it is present). Therefore we are uncertain if the 60% of resurveyed sites where *Gliabates oregonius* were not found are unoccupied.

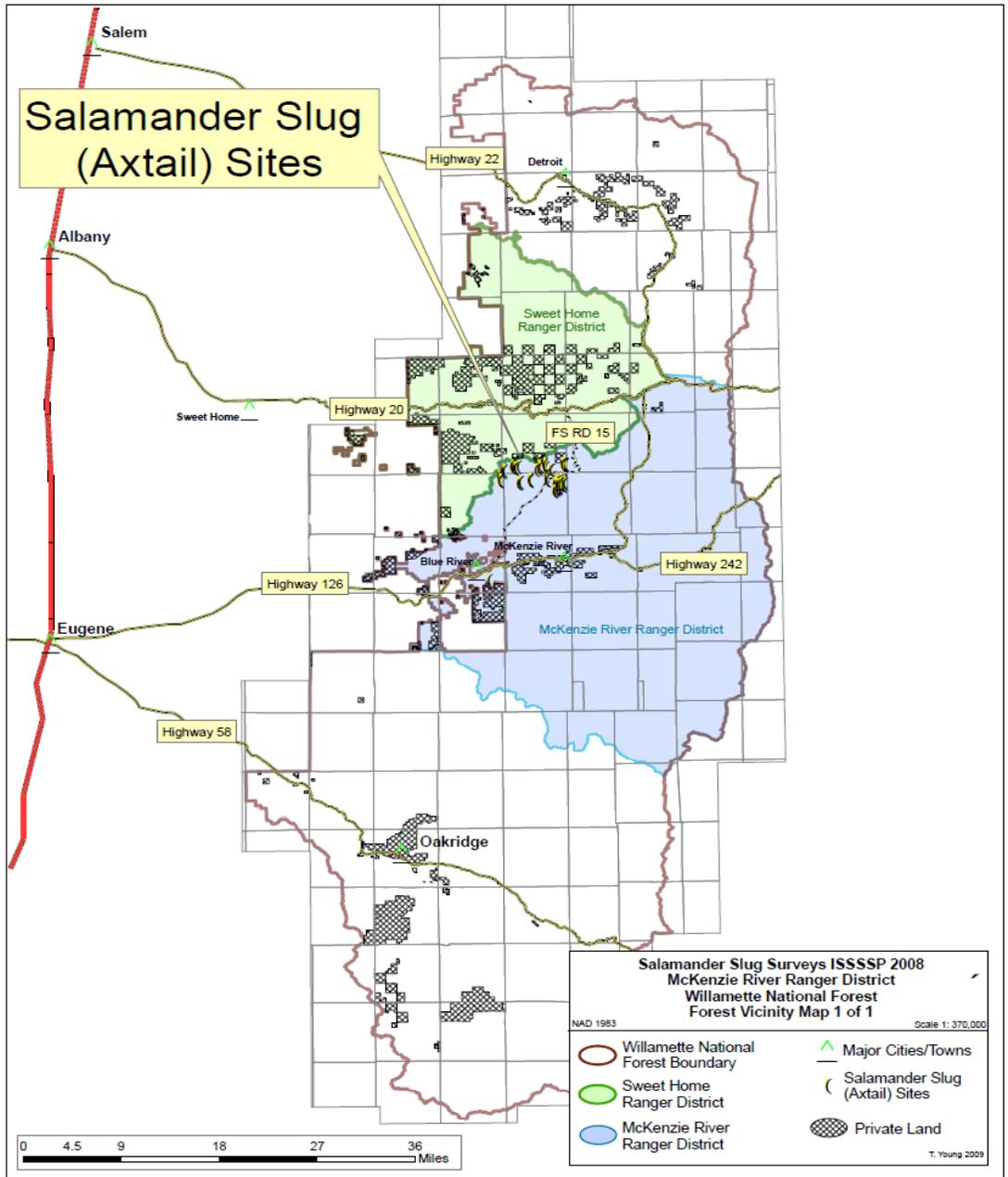
Only one of the sites resurveyed in 2008 had received any silvicultural management activity since 1998. The one site had received a prescribed underburn in spring 2007 that greatly reduced the leaf litter and duff layer. *Gliabates oregonius* was detected at this site in 2008, providing a single case documenting the mollusk persisting after this treatment.

Literature Cited

Duncan, N., T. Burke, S. Dowlan, and P. Hohenlohe. 2003. Survey Protocol for survey and manage terrestrial mollusk species from the Northwest Forest Plan. Version 3.0. Bureau of Land Management, Roseburg, Oregon.

Webb, G. R. 1959. Two new northwestern slugs, *Udosarx lyrata*, and *Gliabates oregonia*. *Gastropodia* 1(3): 22–23.





R. 02 E

R. 08 E

106 S

126 S

Appendix 1. NRIS Wildlife Survey Form used for the 2008 surveys.

Surveys (circle one if options shown) **Bold** indicates NRIS mandatory field.

Survey Name				Survey Protocol			
Data Source: FS / Non-FS		Date:		Start Time:		End Time:	
Primary Surveyor			Qual		Data Steward		
Target Species:			Detected? Yes / No		Status		
Local ID (Veg Stand)			Reference (Geographic Location, Sale Name/unit, etc.)				
Associated Site Name(s)					Associated Observation? Yes / No		
Comments							

Sites (circle one if options shown) **Bold** indicates NRIS mandatory field.

Site Name				Established: Date			Time	
Category: Administrative / Biological / Use Area				Site Type				
For Biological Sites Only		Origin: Artificial / Natural		Origin Method: Direct / Other / Reported / Unknown		History: New / Unknown		
Originator				Qualification				
Legal: Township	S	Range	E	Section	¼ S	1/16 S		
Site	Easting			Northing		Datum		
Site	Easting			Northing		Datum		
Site	Easting			Northing		Datum		
Site	Easting			Northing		Datum		
Comments								

Visits (circle one if options shown) **Bold** indicates NRIS mandatory field.

Start: Date		Time		End: Date		Time	
Site Status			Site Condition: NA / Unknown / Unuseable / Useable			Data Source: FS / Non-FS	
Visitor		Qual		Visitor		Qual	
Visitor		Qual		Visitor		Qual	
Comments							

Habitat/Environmental Conditions (circle one if options shown) NRIS – enter in Comments field (optional).

Stand Structure: Multiple Canopies / One Canopy / Two Canopy / Other							
Stand Age		Seral Stage: Pioneer / Early (20-39 yrs) / Mid (40-79 yrs) / Late (80-200 yrs)					
Percent Cover		Overstory			Understory		
Slope		Aspect		Elevation		Fire Presence? Yes No	
Air Temp		Soil Temp		Soil Moisture		Dry Wet Moist RH (%)	
Precipitation: Dry / Fog / Mist / Rain / Sleet-Hail / Snow		Light Index: Full Sun / Full Shade / Partial Shade		Wind: Calm / Gusty / Light / Moderate / Windy (15+ mph)			
Comments							

OBSERVATIONS:**Activity:**

Basking
 Bedding
 Begging
 Birthing
 Brooding Young
 Copulation
 Courtship
 Dead
 Feeding
 Fighting
 Foraging
 Grooming
 Hunting Incubating
 Licking Minerals
 Migrating
 Moving
 Pair Formation
 Other
 Resting
 Roosting
 Territorial Behavior
 Unknown
 Wallowing
Age:
 Adult
 Chick
 Egg
 Egg Mass
 Fledgling
 Juvenile
 Larva
 Metamorph
 Nestling
 Subadult
 Tadpole
 Unknown
 Young
Gender:
 Female
 Hermaphrodite
 Male
 Unknown

Group Type:

Family Type
 Group
 Not Applicable
 Pair
 Single
 Unknown

Observation Method:

Aural
 Camera Set
 Capture
 Check Station
 Electronic Detection
 Excrement
 Found Dead Image
 Other
 Radio Telemetry
 Shell
 Track
 Visual
 Visual and Aural
 Voucher Specimen

Observer Quals:

Experienced
 Limited Experience
 No Experience
 Taxon Expert
 Unknown

Reproduction Status:

Failed Reproduction
 Non-reproducing
 Not Applicable
 Reproducing
 Unknown

SITES:**Admin Site Type:**

Management Area
 Other
 Sample Area
 Sample Point
 Survey Inference Area

Bio Site Condition:

Not Applicable
 Unknown
 Unusable
 Usable

Bio Site Type:

Bridge
 Burrow or Den
 Cave
 Cavity
 Cliff
 Log
 Mineral Lick
 Nest
 Opening or Clearing
 Other Scrape or Rub
 Snag Trail
 Tree
 Wallow

Origin:

Artificial
 Natural

Origin Method:

Direct
 Other
 Reported
 Unknown

Originator Quals:

Experienced
 Limited Experience
 No Experience
 Unknown

Site Category:

Administrative
 Biological
 Use Area

SURVEYS:**Primary Surveyor**

Quals:
 Experienced
 Limited Experience
 No Experience
 Unknown

Protocol:

Basic
 Formal
 Protocol

Survey Status:

Active
 Cancelled
 Completed
 Inactive
 Pre-Survey

VISITS:**Admin, Bio, Use Area****Site Condition:**

Not Applicable
 Unknown
 Unusable
 Usable

Admin Site Status:

Active
 Closed Inactive
 Not Applicable
 Retired
 Retired, Later Reinstated
 Unknown

Bio Site Status:

Active
 Inactive
 Not Applicable
 Non-Extant
 Not Found
 Retired
 Retired, Later Reinstated
 Unknown

Use Area Site Status:

In Use
 Non-Extant

Not Applicable

Not in Use

Retired

Retired, Later Reinstated

Unknown

Use Area Site Type:

Breeding
 Calving or Fawning
 Critical Habitat (FWS)
 Fen
 Foraging
 Individual Territory
 Migration Route
 Other
 Population or Herd
 Boundary
 Potential Habitat
 Security
 Summer Range
 Winter Range
 Yearlong Range

Bio Site Use:

Basking or Loafing
 Hibernating
 Hive
 Marking
 Migratory
 Other
 Perch or roost
 Plucking
 Reproducing
 Seasonal
 Shelter
 Unknown

Visitor Quals:

Experienced
 Limited Experience
 No Experience
 Unknown