



Land Mollusk Fauna of Montana

Biogeography, Conservation Status, and Prospects



Thanks for the Support

Region 1 USFS: Fred Samson, Beth Hahn

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Land Mollusks of Montana

- Montana: surveys, distribution patterns, conservation status
- Regional context: species richness and conservation status patterns
- Future work and information needs

Focal Habitats for Surveys



Talus



Old Growth Moist/Mesic Forest



Limestone Outcrop

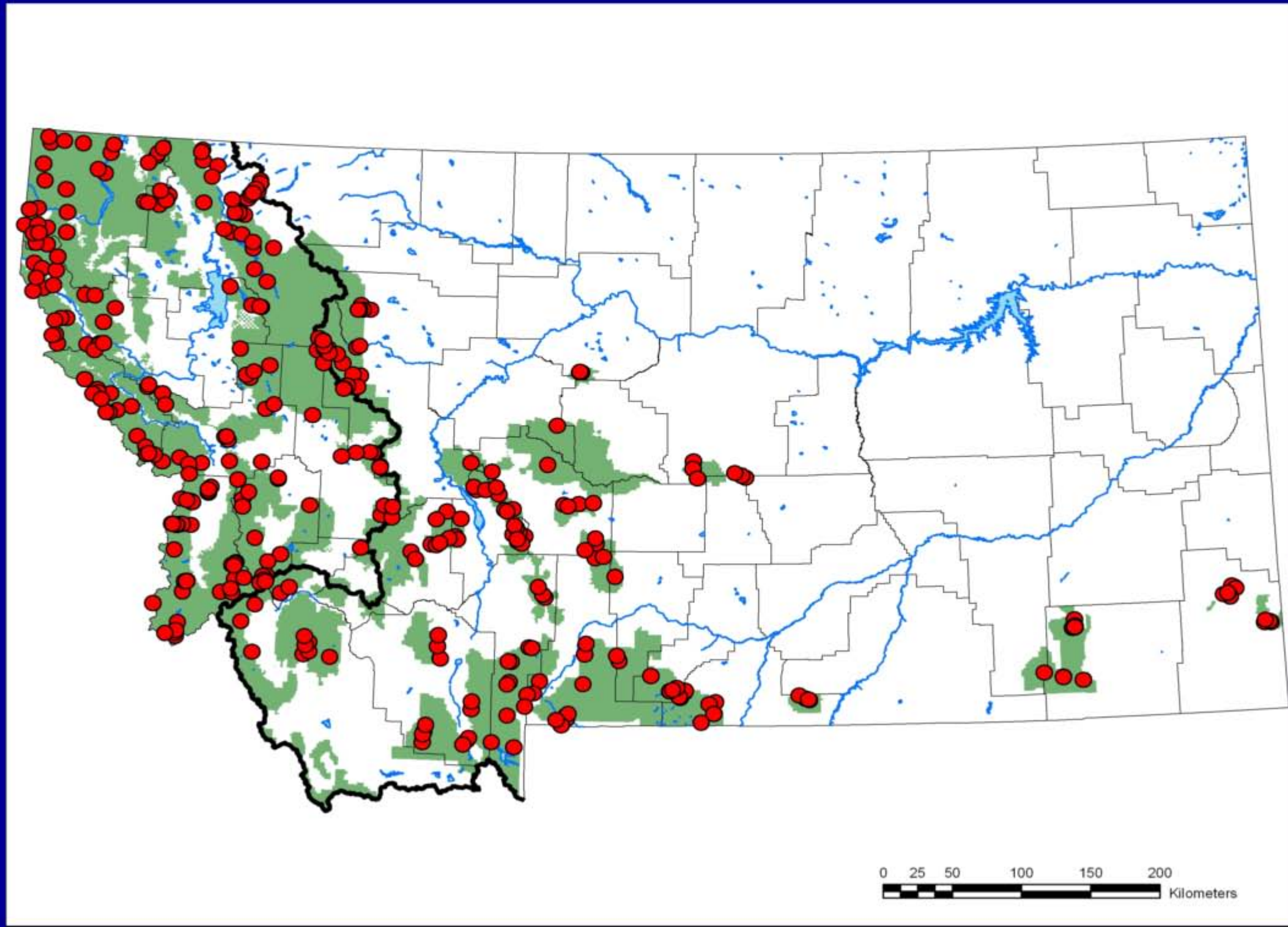


Riparian with Rock Outcrops

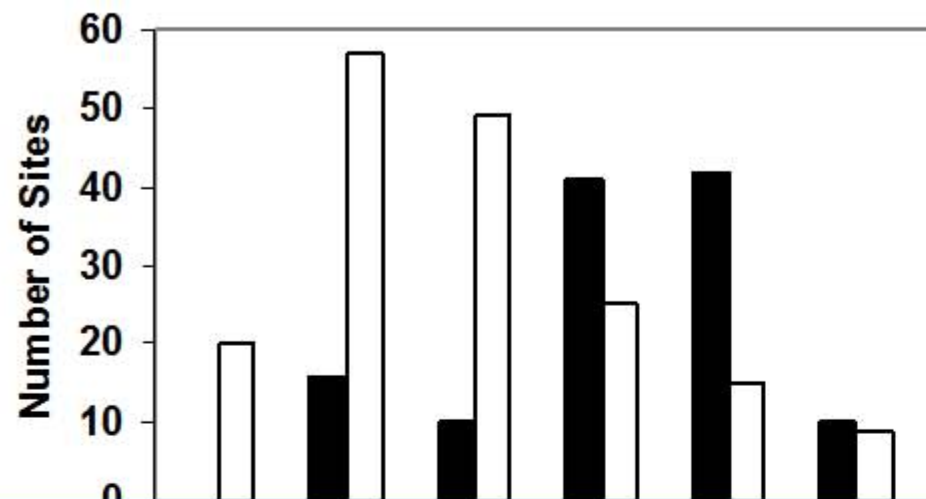


Cottonwood/Aspen Stands

Montana Surveys: 2005-2009



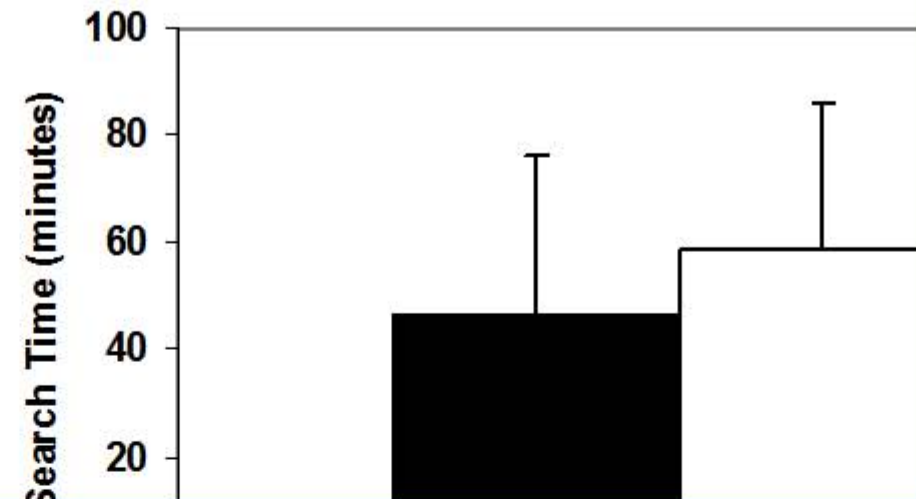
Elevational Distribution of Survey Sites



Approximately 350 sites surveyed during 2005-2009

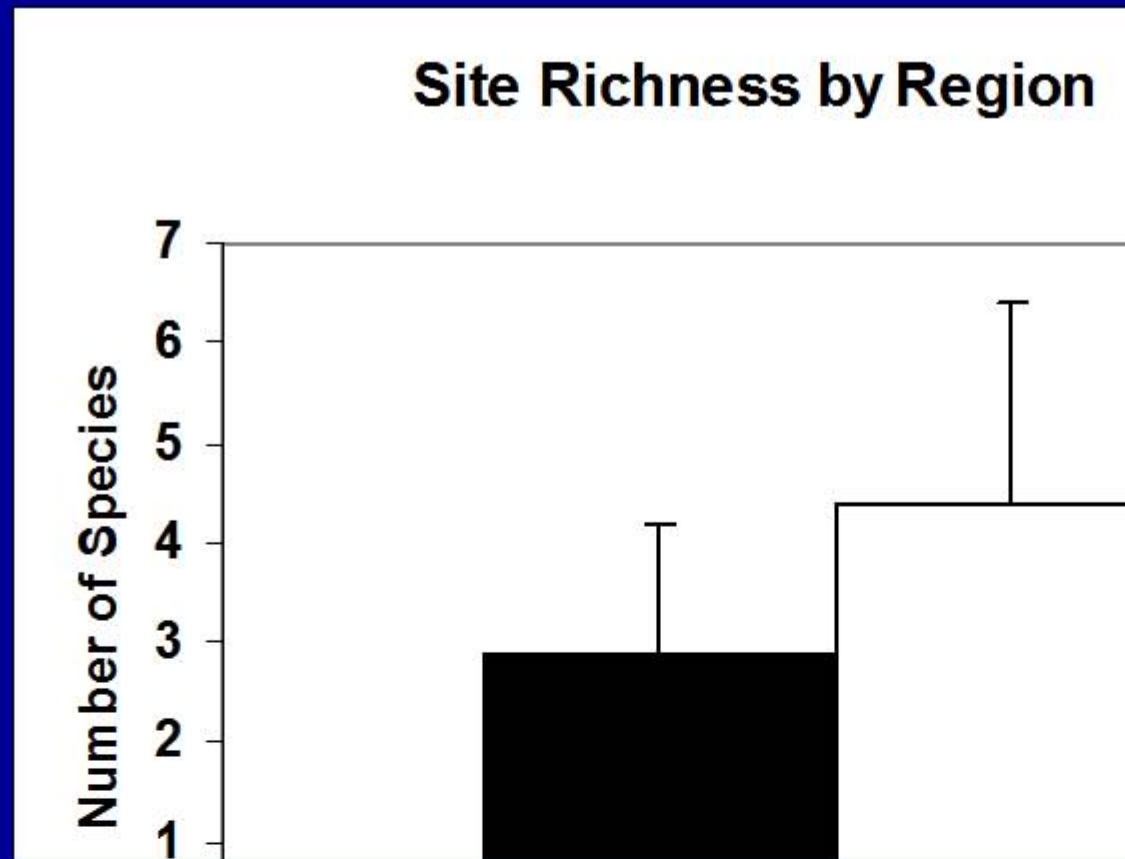
Elevation ranged from 1900-8750 feet

Survey Effort by Region



East = 46.3 ± 30 min
West = 58.8 ± 26.8 min

Two-sample T-test:
 $t = 3.76, P < 0.001$

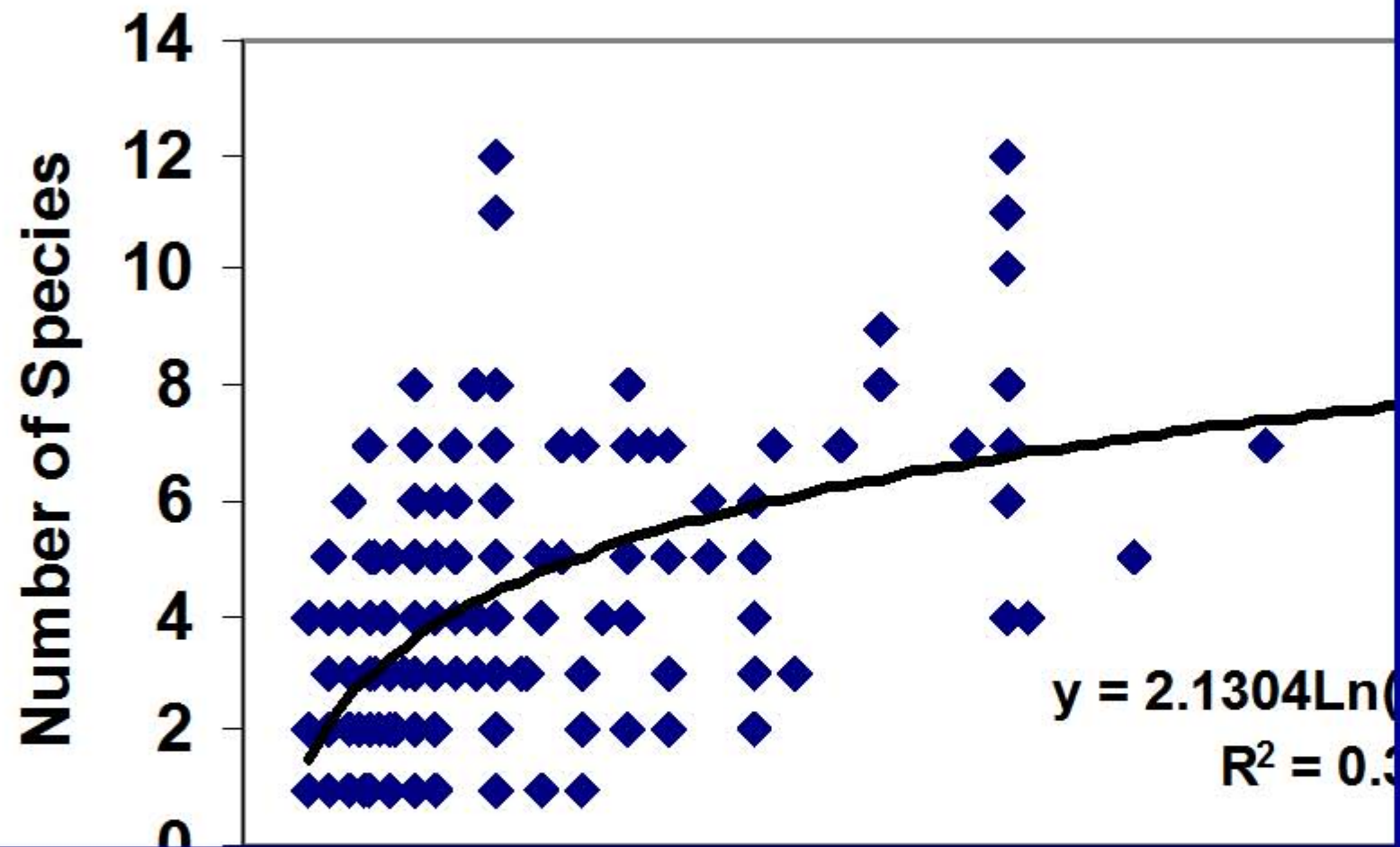


East: per site range = 1 to 7 species

West: per site range = 1 to 13 species

Wilcoxon Rank Sum Test: $P < 0.0001$

Site Species Richness and Search Effort

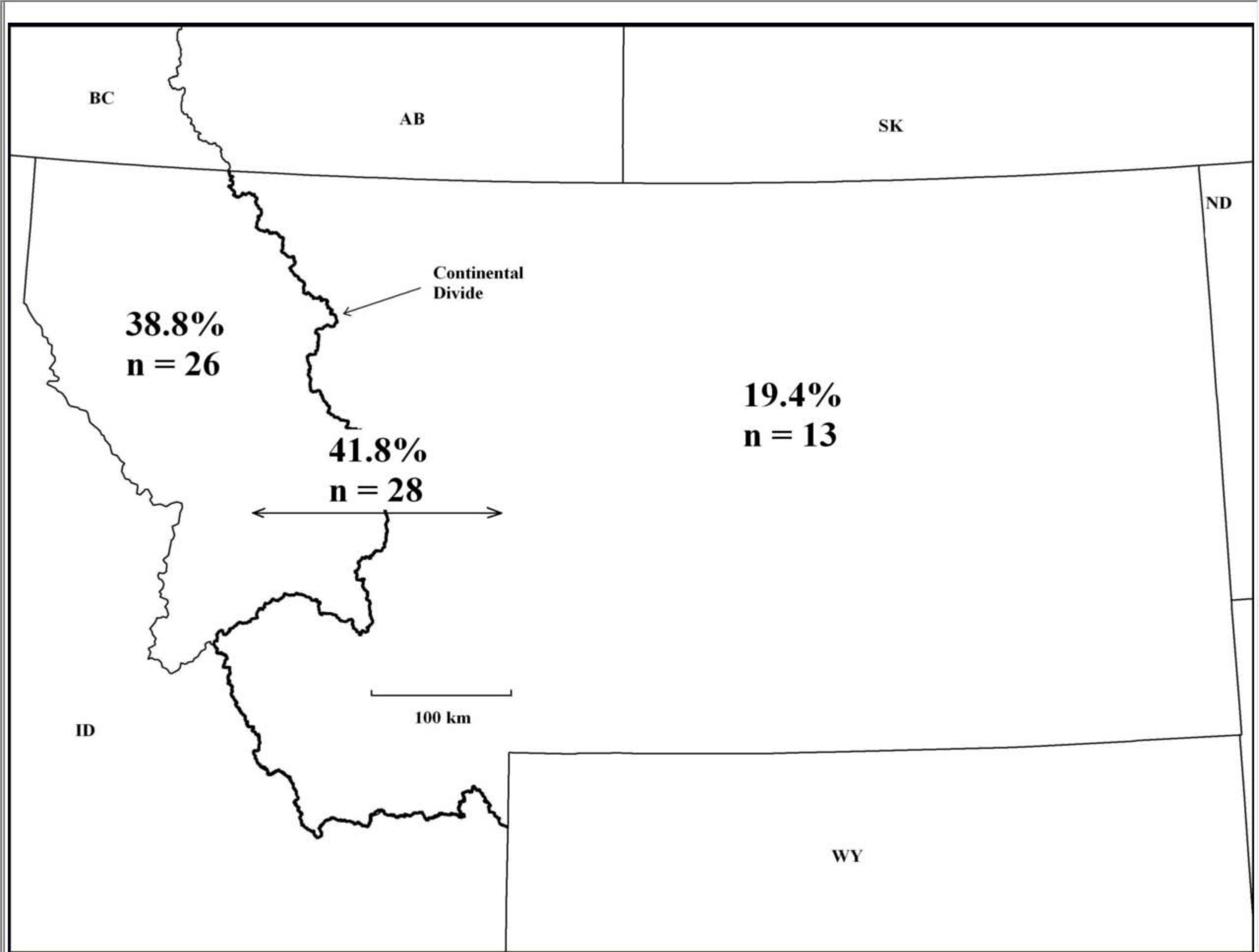


Land Mollusk Fauna of Montana

Two Mollusk Biogeographic Provinces
(about 67 native species: 58 snails, 9 slugs)

1) **Washingtonian** (west of Continental Divide)

2) **Rocky Mountain** (east of Continental Divide)



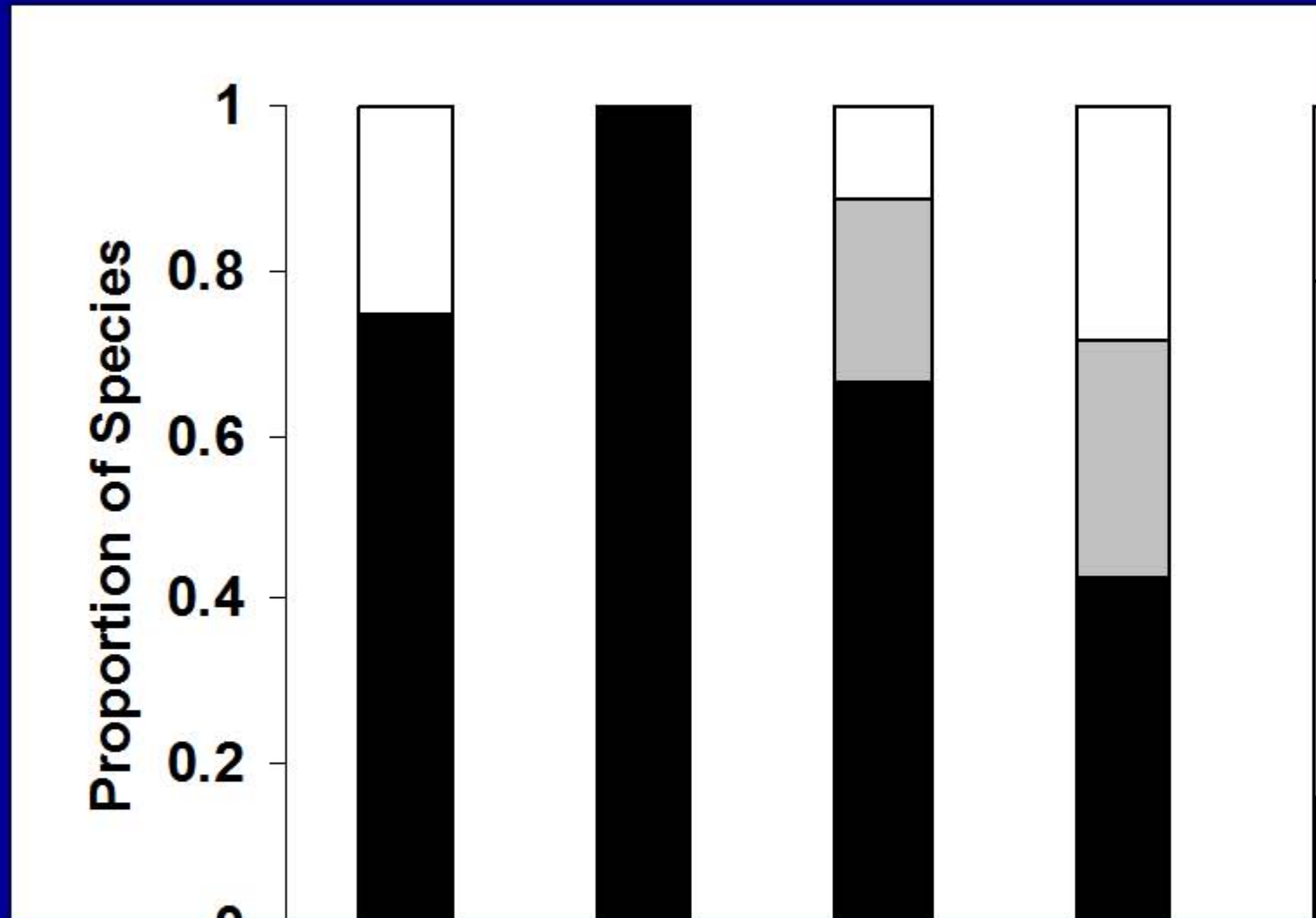
Global (G) Rank Definitions

- G1:** at high risk (= IUCN Red List Critically Endangered or Endangered)
- G2:** at risk (= IUCN Vulnerable)
- G3:** potentially at risk (= IUCN Near Threatened)
- G4:** apparently secure (= IUCN Least Concern)
- G5:** common (= IUCN Least Concern)

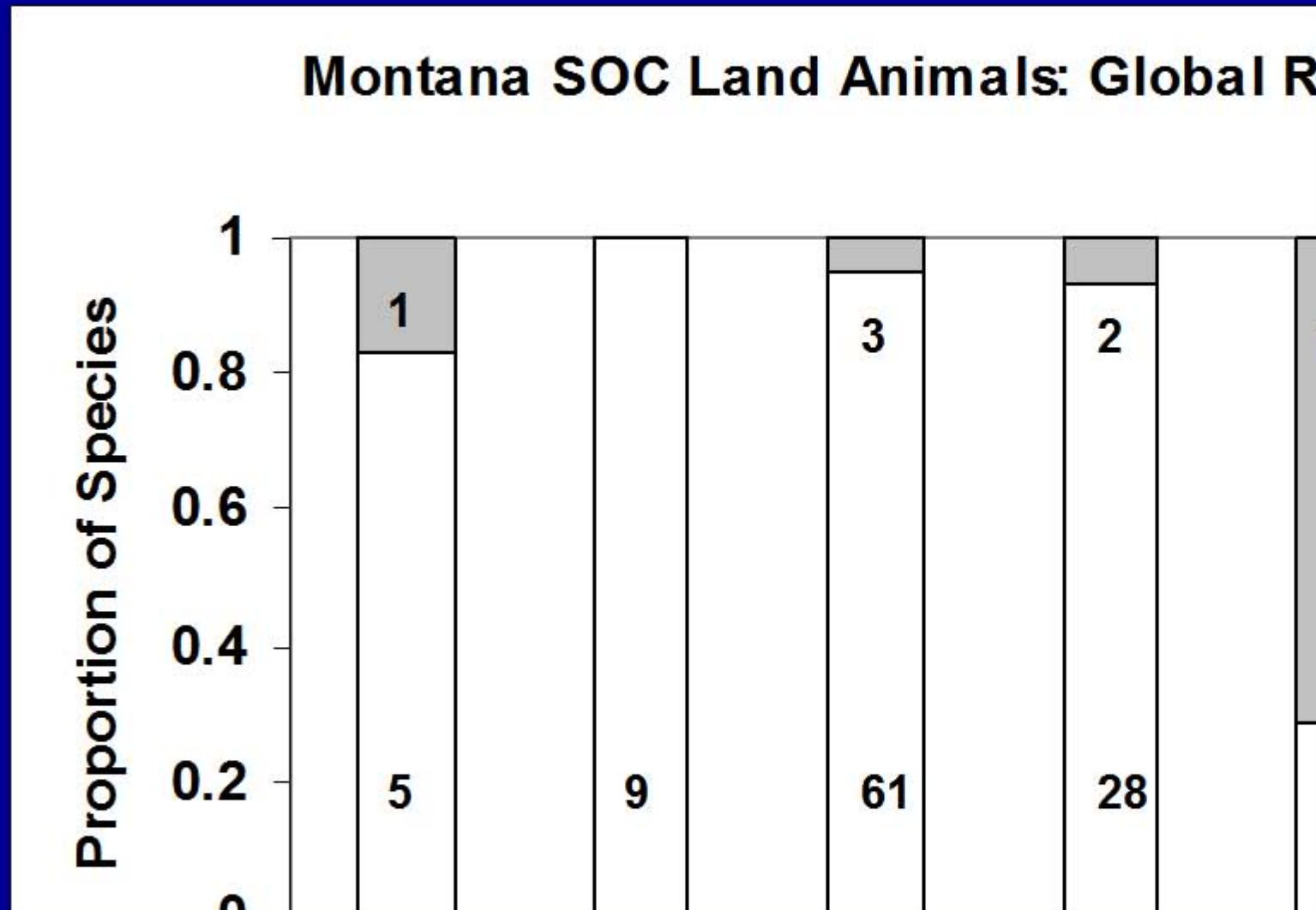
Montana Native Land Mollusks

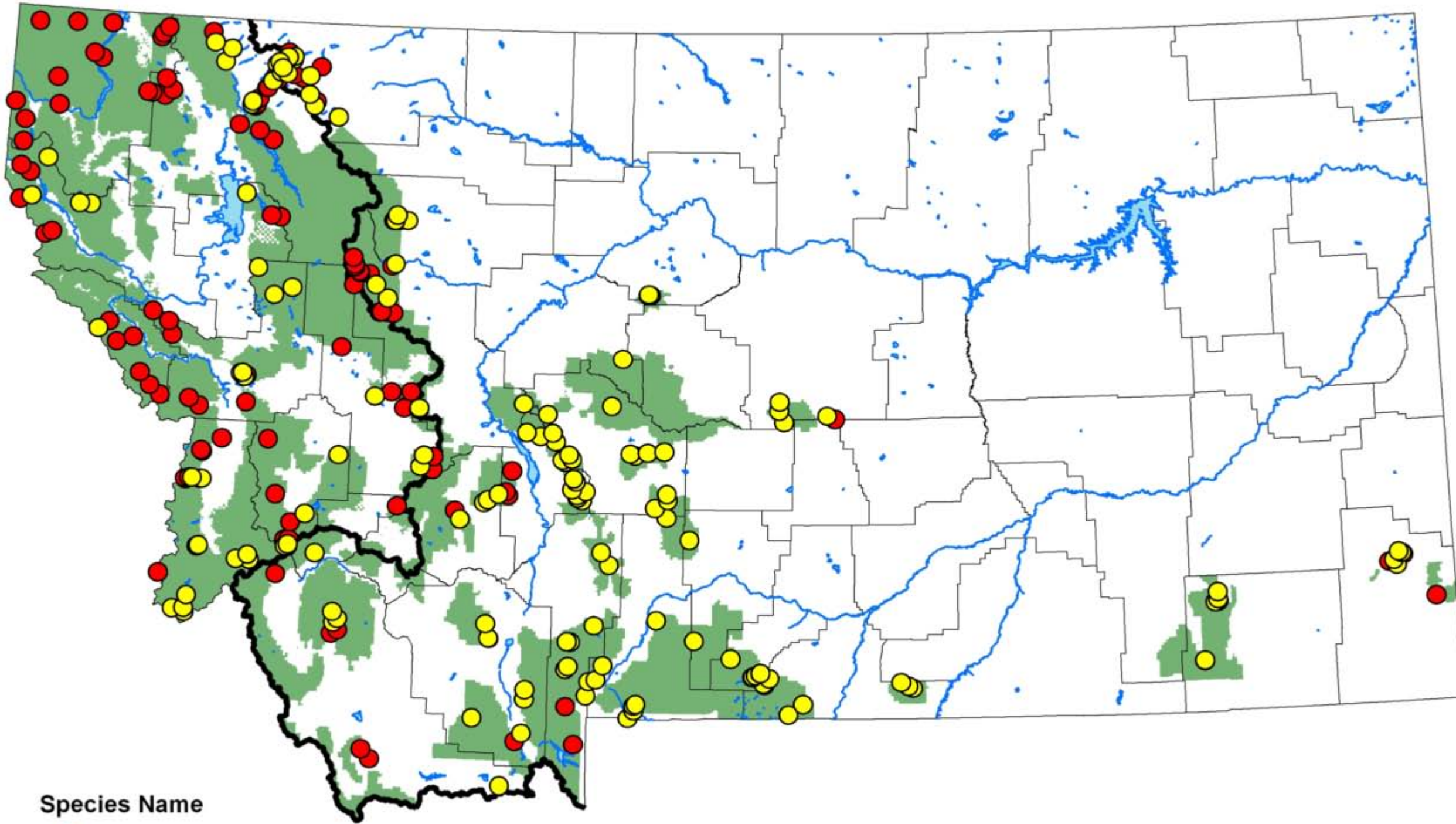
One-sample Proportion Test (corrected): distribution of G1 to G3:

$$Z = 2.91, P = 0.0037$$



Global Ranks of Montana SOC Land Animals





Species Name

- *Euconulus fulvus*
- *Vitrina pellucida*





Euconulus fulvus

Brown Hive

(G5)

Elevation range (feet):

2210 - 8255



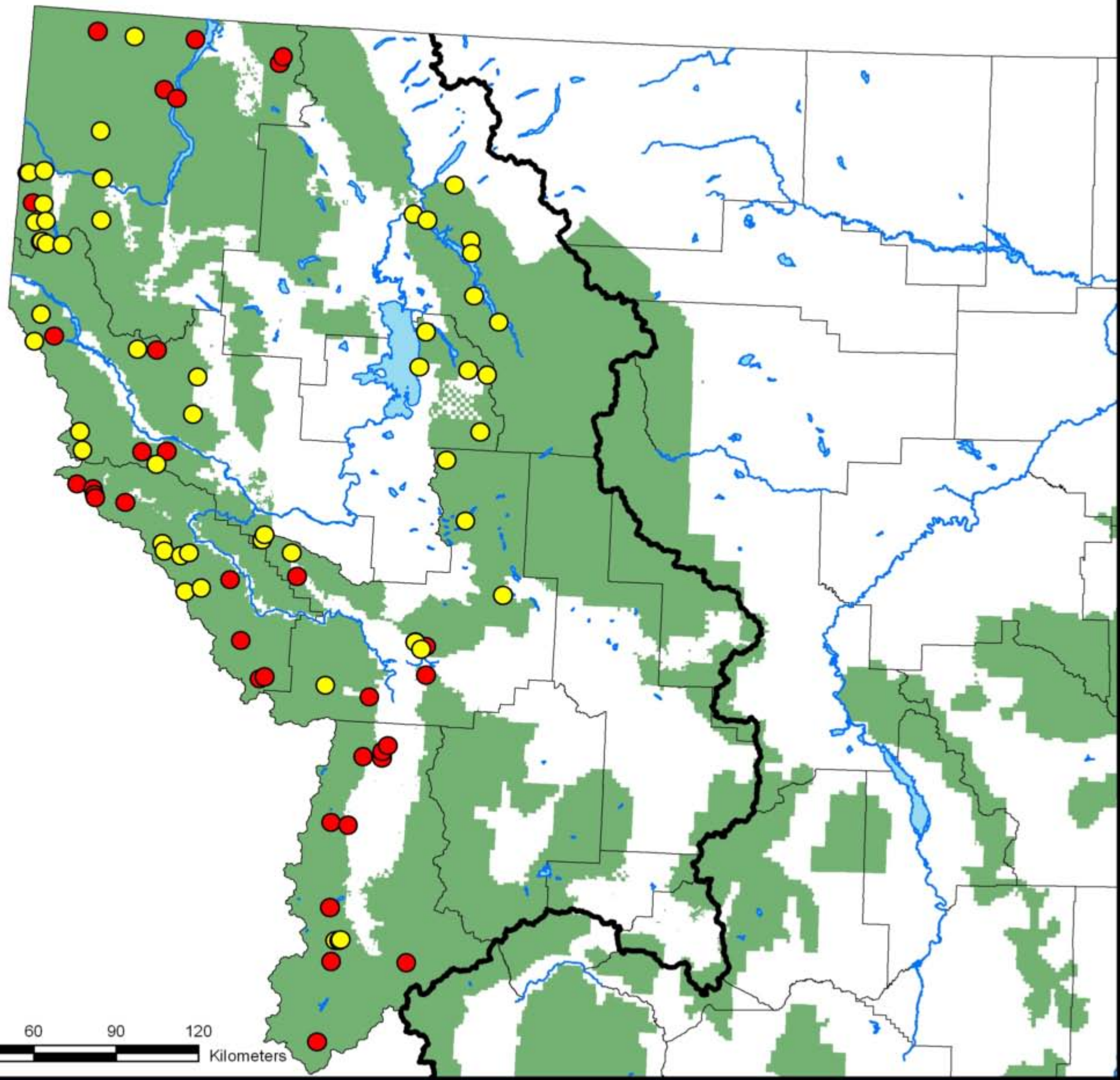
Vitrina pellucida

Western Glass-snail

(G5)

Elevation range (feet):

2750 - 8740



Species Name

- *Allogona ptychophora*
- *Prophysaon humile*





Allogona ptychophora
Idaho Forestsnail
(G5)

Elevation range (feet):
2550 - 5735



Prophysaon humile
Smoky Taildropper
(G3)

Elevation range (feet):
2215 - 5635

Land Mollusks Endemic to Montana



Discus brunsoni

Lake Disc

(G1)

Elevation range (feet):

3500-3600



Oreohelix alpina

Alpine Mountainsnail

(G1)

Elevation range (feet):

7100 - 9400

Land Mollusks Endemic to Montana



Oreohelix amariradix

Bitterroot Mountainsnail

(G1G2)

Elevation range (feet):

3450-4590

Oreohelix carinifera

Keeled Mountainsnail

(G1)

Elevation range (feet):

4010 - 5630

Land Mollusks Endemic to Montana



Oreohelix elrodi

Carinate Mountainsnail
(G1)

Elevation range (feet):
3500 - 8000

Distribution of Montana Native Slugs

One Sample Proportion Test (corrected):

$Z = 2.00, P = 0.046$

Species	GRank	East	West
<i>Derocerus laeve</i>	5	x	x
<i>Hemphillia camelus</i>	4		x
<i>Hemphillia danielsi</i>	2,3		x
<i>Kootenaia burkei</i>	2		x
<i>Magnipelta mycophaga</i>	3		x
<i>Prophysaon andersoni</i>	5		x
<i>Prophysaon humile</i>	3		x
<i>Udosarx lyrata</i>	2		x
<i>Zacoleus idahoensis</i>	3,4		x

Montana Survey Highlights

Native Taxa New to Montana

Hemphillia camelus (G4)

Kootenaia burkei (G2)

Prophyaon andersoni (G5)

Zoogenetes harpa (G5)

Native Taxa GRank Changes

Hemphillia camelus: G3G4 to G4

Hemphillia danielsi: G1G3 to
G2G3

Kootenaia burkei: G1G2 to G2

Magnipelta mycophaga: G2G3 to
G3

Polygyrella polygyrella: G2G3 to
G3

Prophyaon humile: G2 to G3

Radiodiscus abietum: G3 to G4

Regional Context: Primary Checklist Sources

Montana: Brunson unpublished list (circa 1968), MTNHP surveys (2005-2009)

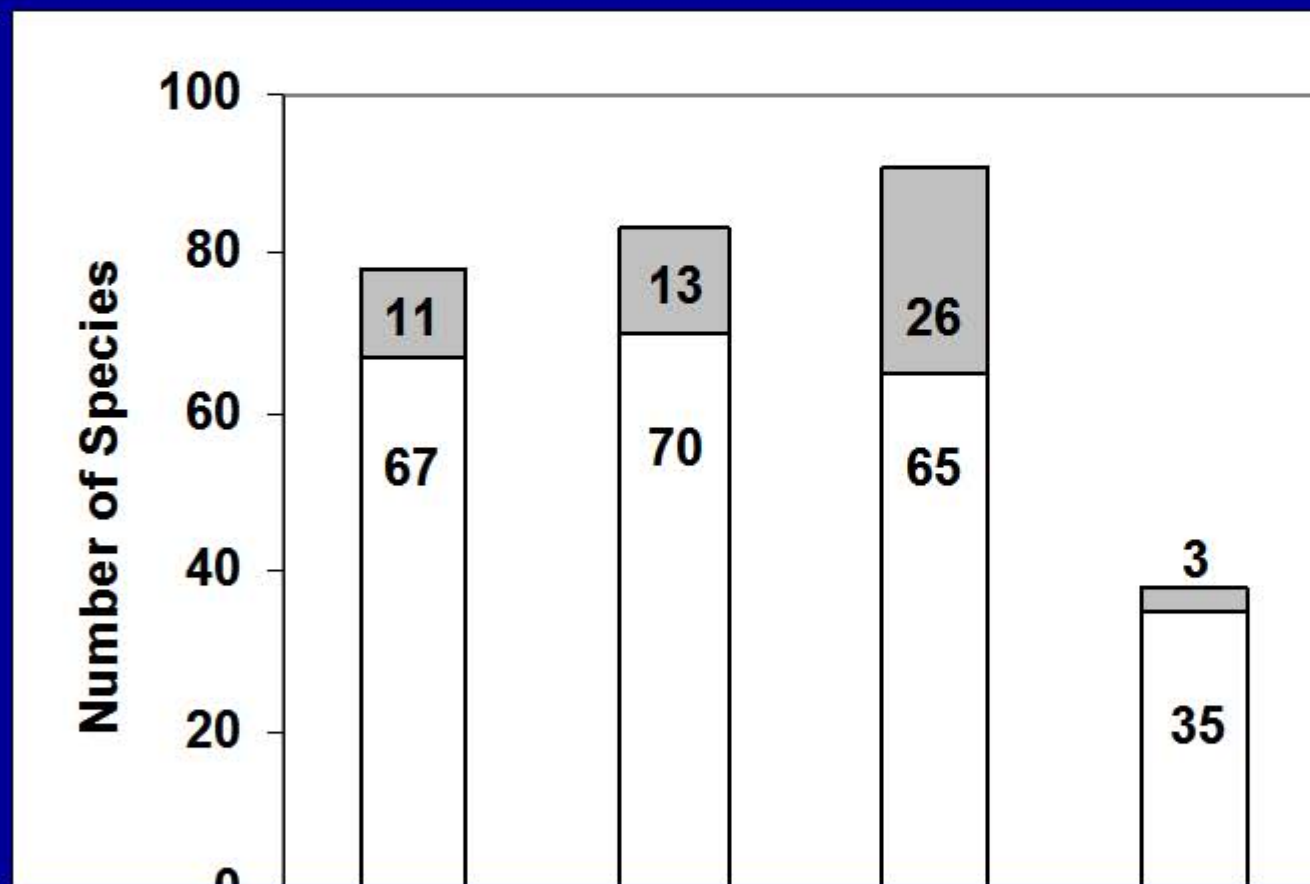
Idaho: Frest and Johannes 2001. An annotated checklist of Idaho land and freshwater mollusks. *Journal of the Idaho Academy of Science* 36:1-51.

British Columbia: Forsyth 2004. Land snails of British Columbia. *British Columbia Provincial Museum*. 188 pp.

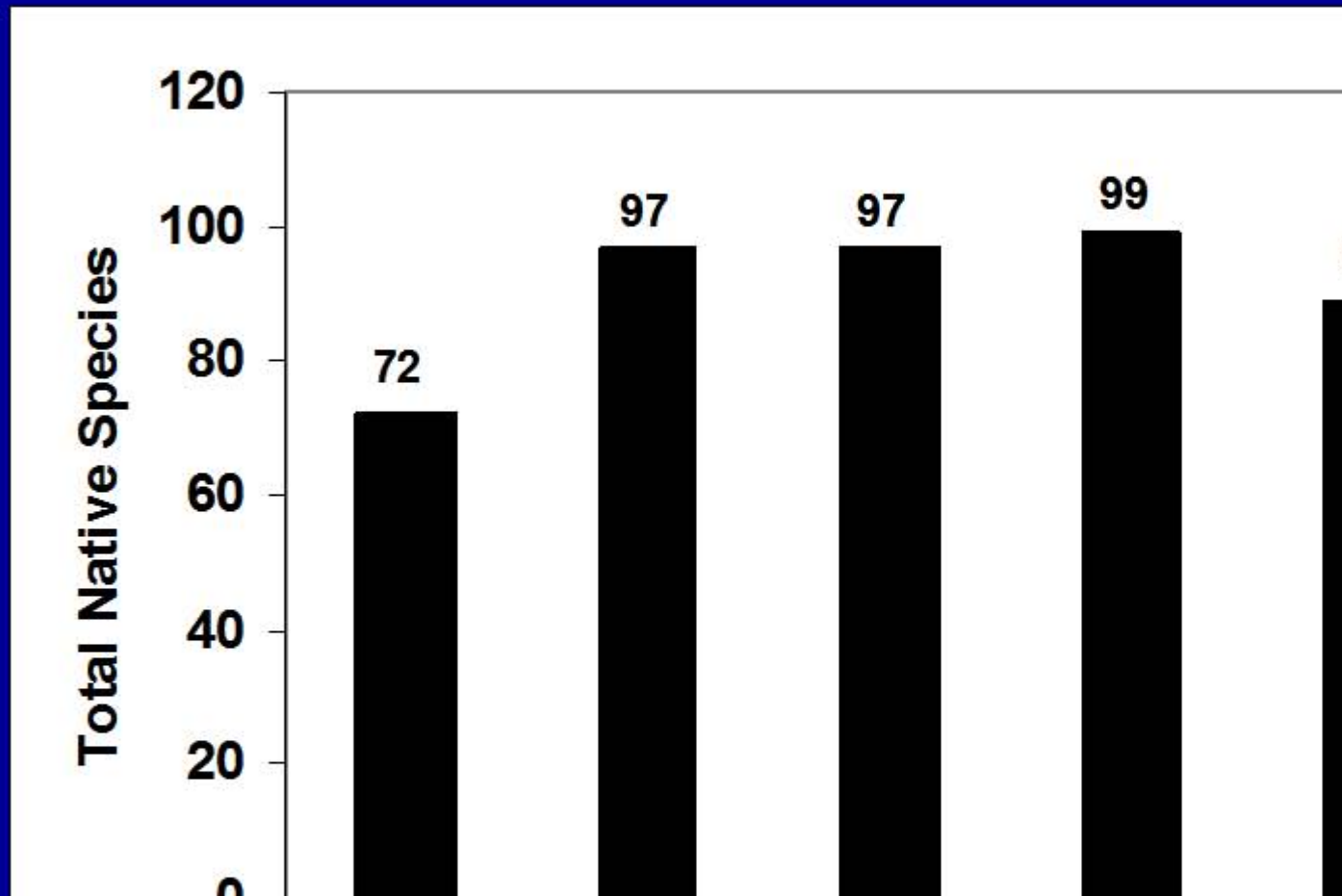
Wyoming: Beetle 1989. Checklist of recent Mollusca of Wyoming, USA. *Great Basin Naturalist* 49:637-645.

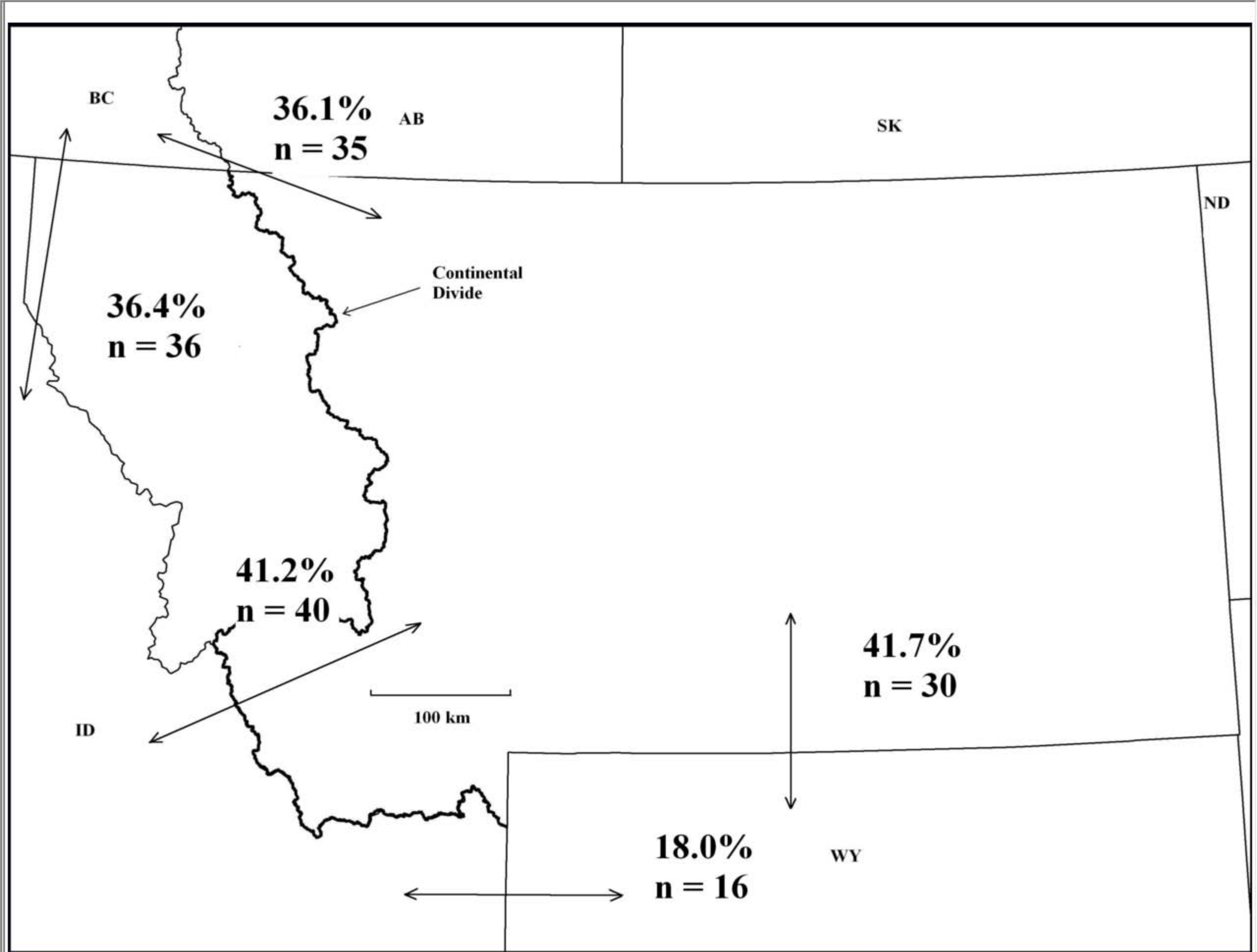
Regional Context: Land Mollusk Faunas

151 total species, 124 native species
only 13 native species present in all geopolitical units



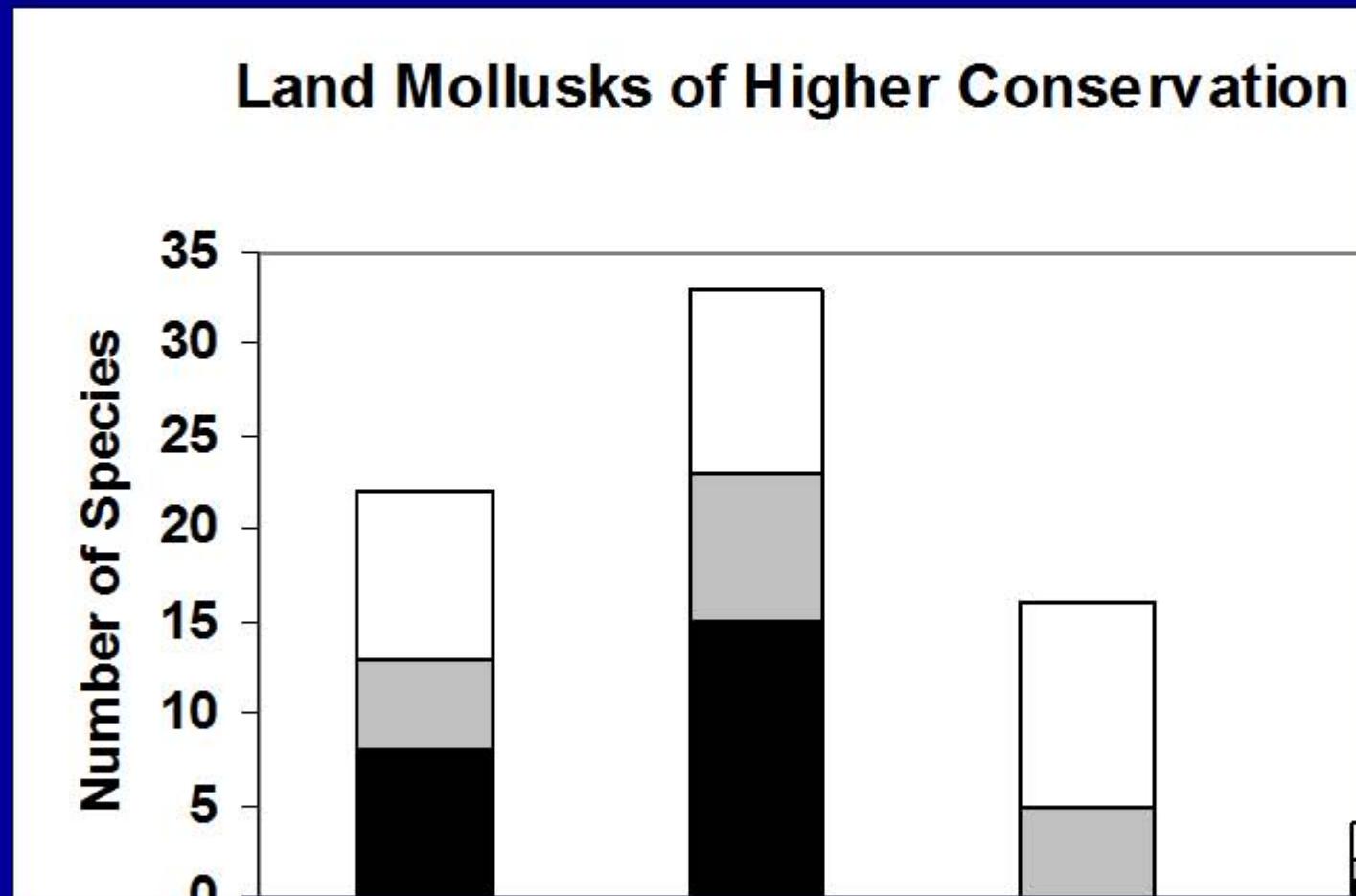
Regional Context: Native Land Mollusk Species





Regional Context: Global Ranks

(G1 = 22, G2 = 13, G3 = 21)



Data Priorities

Additional surveys: fill distribution gaps esp. for G1 – G3s, “island” mountain ranges, non-USFS public lands

Phylogeographic/genetic studies: coastal-interior sister taxa (like amphibians), *Oreohelix* complex,
“island” mountain range fauna

Response to environmental alterations: fire, timber harvest, climate, non-natives