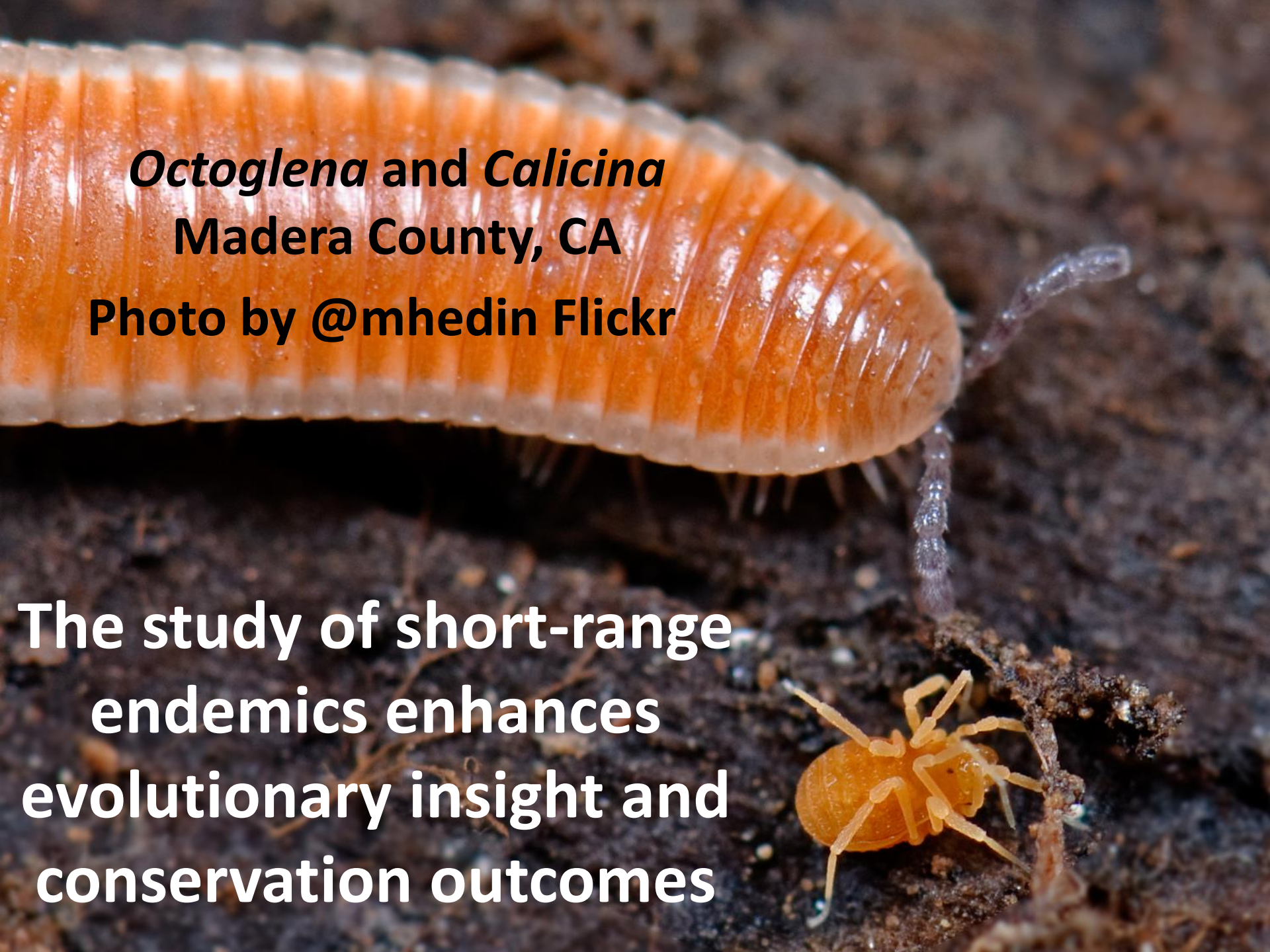




**Casey H. Richart, Ph.D.**  
**San Diego State University**  
**Santa Barbara Botanic Garden**

**The study of short-range  
endemics enhances  
evolutionary insight and  
conservation outcomes**





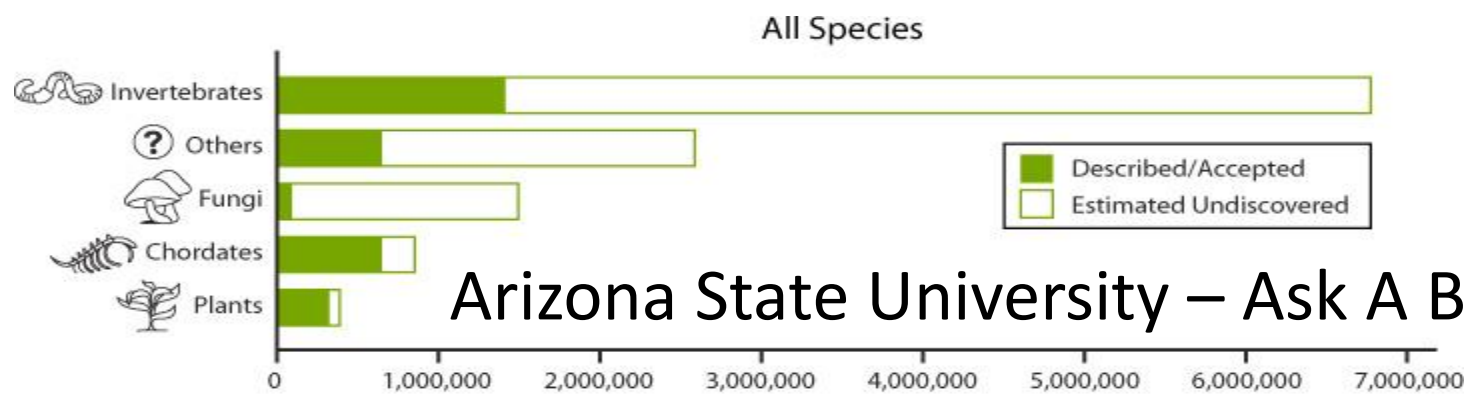
***Octoglena* and *Calicina***

**Madera County, CA**

**Photo by @mhedin Flickr**

**The study of short-range  
endemics enhances  
evolutionary insight and  
conservation outcomes**





## Arizona State University – Ask A Biologist

*Glyptostoma newberryanum*

San Diego Chestnut

San Diego, CA

Photo by @finatic iNaturalist





**Table 1.** Number of IUCN Specialist Groups for animals.

Cowie et al. 2017

Vertebrates	No. of Groups	Invertebrates	No. of Groups
Mammals	35	Insects	4
Birds	16	Other arthropods	3
Reptiles/amphibians	12	Coral	1
Fish	10	Mollusks	1
		Geography/habitat	3
<b>Total</b>	<b>73</b>	<b>Total</b>	<b>12</b>



***Glyptostoma newberryanum***

**San Diego Chestnut**

**San Diego, CA**

**Photo by @finatic iNaturalist**



*Hesperonemastoma*

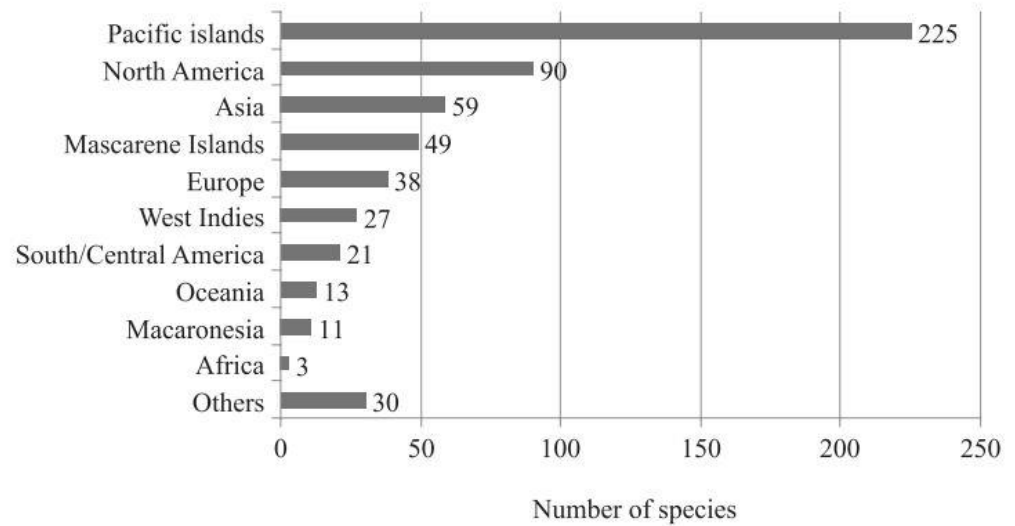
Photo: Axel Schönhofer

Tree of Life tolweb.org

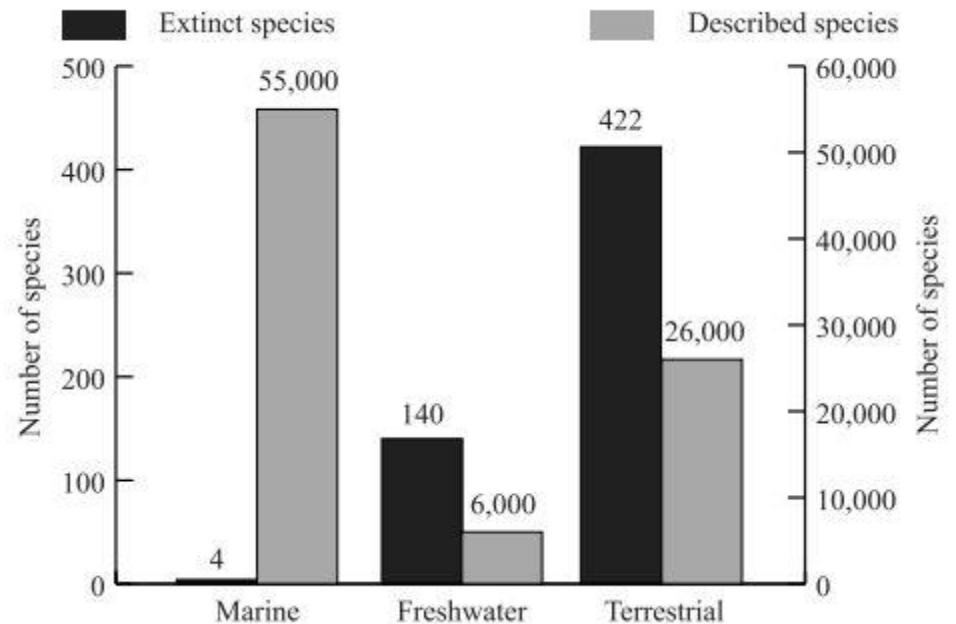




***Xerarionto stearnsiana***  
**Speckled Cactusnail**  
**Otay Mountain, CA**



Since 1500, 37.5% (260 of 693) of known extinctions have been non-marine mollusks



Régnier et al. 2009



*Sabacon* and Springtail  
Photo by @mhedin Flickr







***Gosodesmus claremontus***  
**Monterey, CA**  
**Photo by @mhedin Flickr**



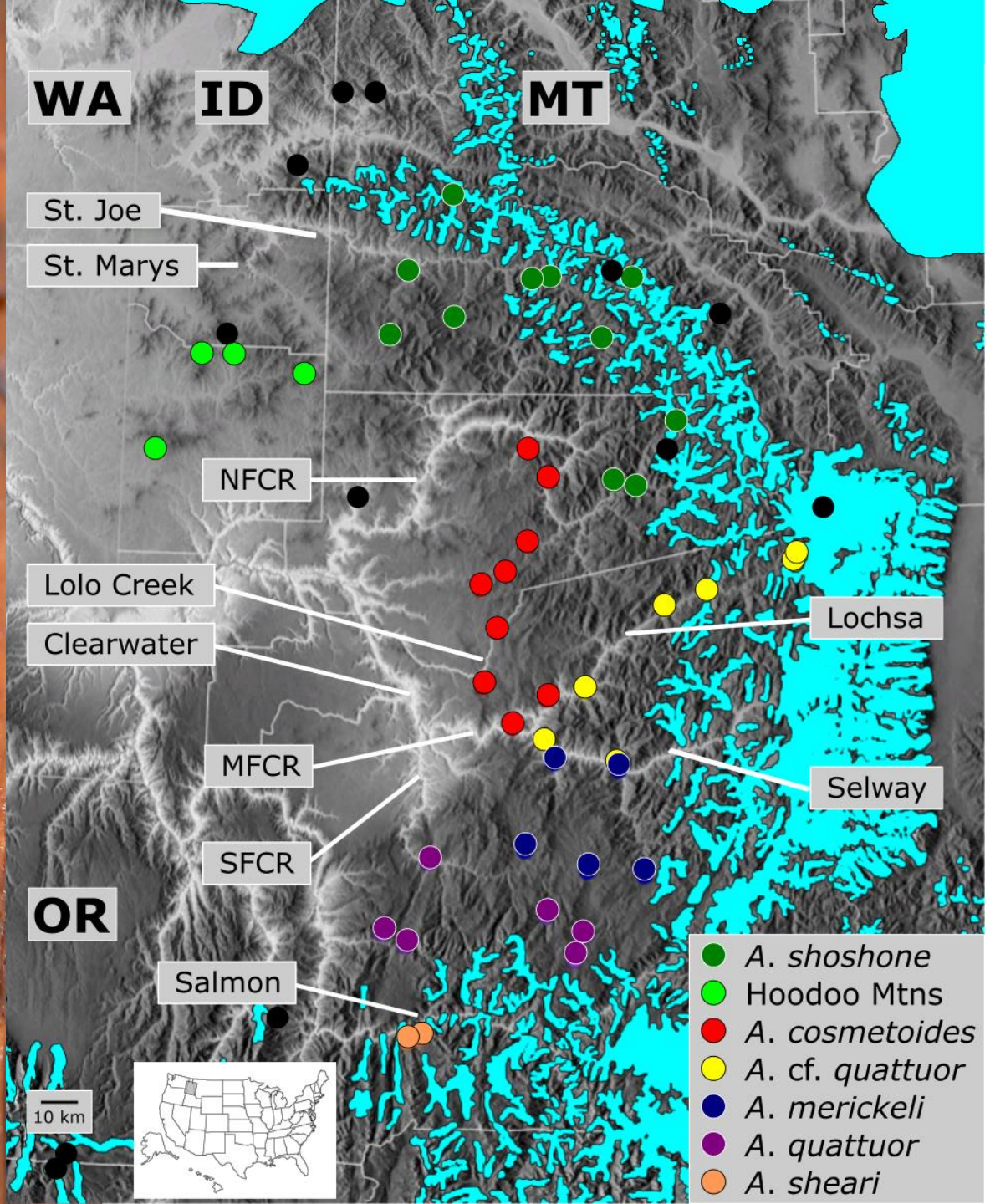
***Acuclavella leonardi***

**Lewis County, WA**

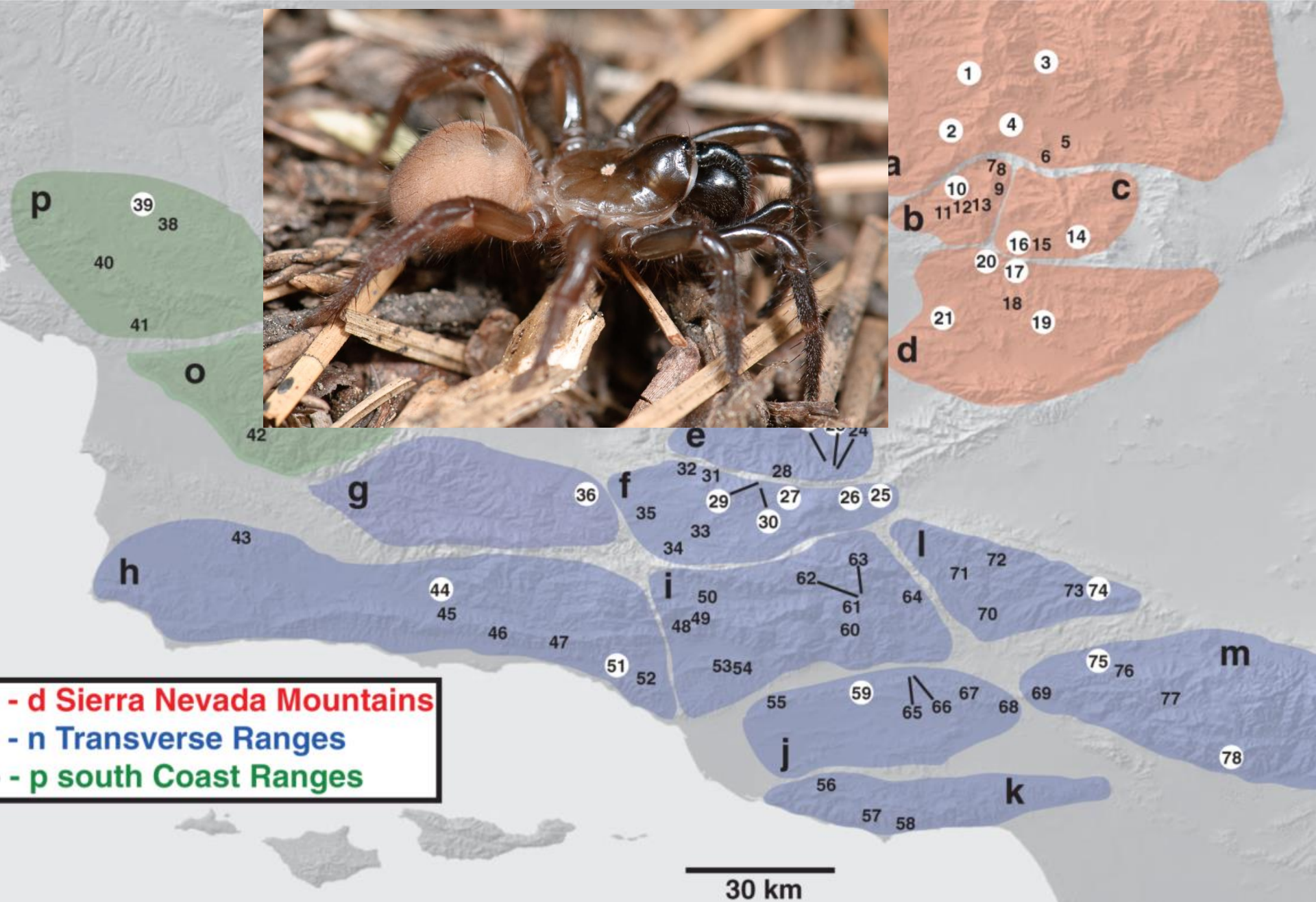
**Photo by Joe Warfel**











- d Sierra Nevada Mountains  
 - n Transverse Ranges  
 - p south Coast Ranges

Satler et al. 2013; *Aliatypus janus*, Tulare, CA, photo: mhedin Flickr





**Mohave Shoulderband © Lance Gilbertson**









***Helminthoglypta californiensis***

**Monterey County, CA**

**Photo: John Slapcinsky, Flickr**





Cypress Point Lookout



Cypress Point Club

Sunset Point

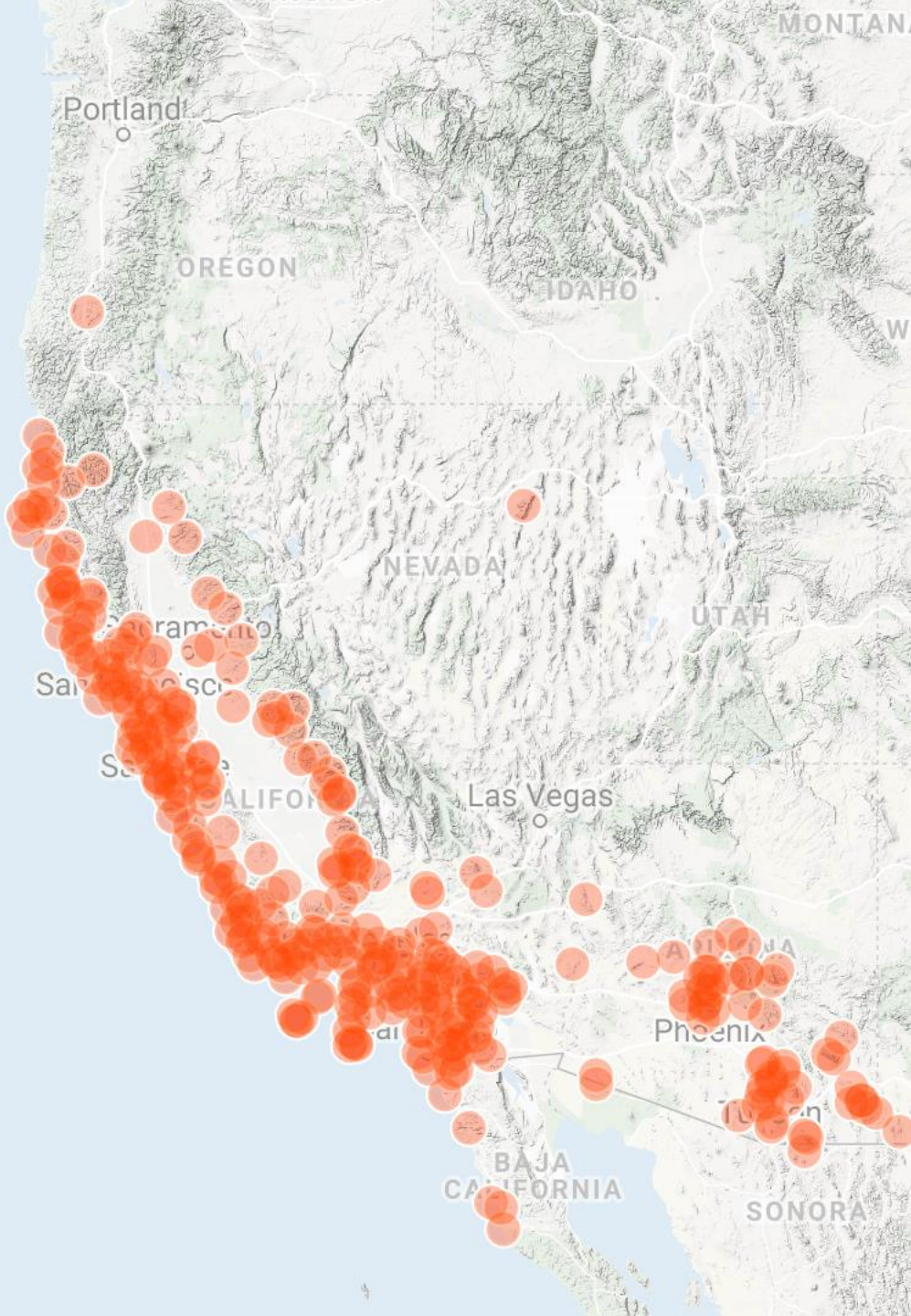


# IUCN: International Union for Conservation of Nature

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			
C. Small population size and decline			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 250	< 2,500	< 10,000
AND at least one of C1 or C2			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals			



*Helminthoglypta tudiculata*  
**Southern California Shoulderband**  
**Mission Trails, San Diego**





**Torrey Pines State Park, CA**  
**Photo by mhedin Flickr**





# "A Biologist's Manifesto for Preserving Life on Earth"

By E.O. Wilson



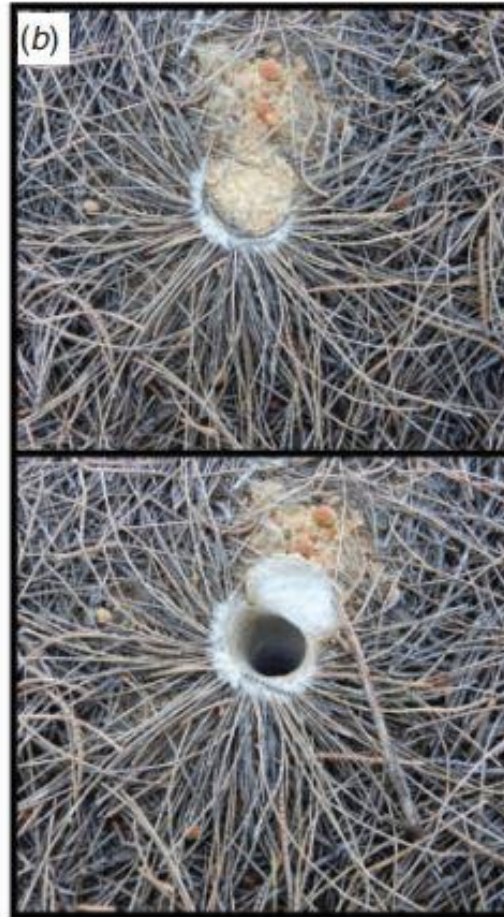




***Garypus pseudoscorpion***  
**Imperial Beach, CA**  
**Photo by @mhedin Flickr**



# The World's Oldest Spider – 43 years



*Gauis villosus*, SW Australia  
Photos by Leanda Denise Mason

Mason et al. 2018