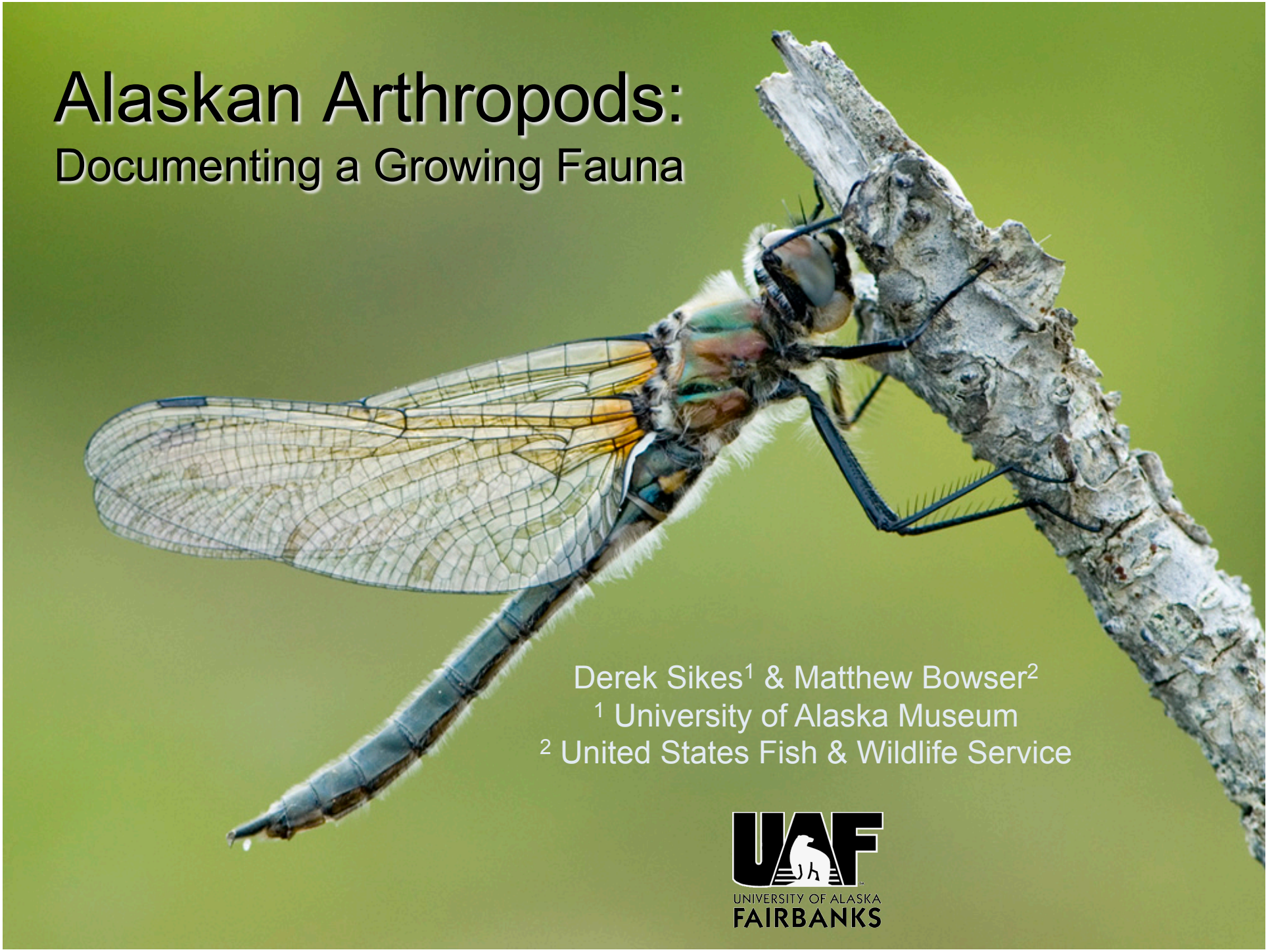
Alaskan Arthropods:
Documenting a Growing Fauna



Derek Sikes[1] & Matthew Bowser[2]
[1] University of Alaska Museum
[2] United States Fish & Wildlife Service

UNIVERSITY OF ALASKA
FAIRBANKS

Acknowledgements

University of Alaska

United States Fish and Wildlife Service

United States Dept. Agriculture
Dr. James Kruse

National Science Foundation

UAF Cooperative Extension

Alaskan Entomologists

The University of Alaska Museum

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Overview

Welcome to the University of Alaska Museum Entomology Web Page. The collection was established as part of a NSF - funded Arctic Archival Observatory grant in late 2000.

The UAM Insect collection is the northern-most facility of its kind in the United States. It has the potential to become a world-class depository for dry and preserved-tissue samples of northern arthropods, primarily from Alaska.

Although a young collection, we already have a backlog of more than 100,000 insects (mostly aquatics) from Alaska and other regions, including Canada, Eastern Russia, and the contiguous United States. The collection is currently in need of significant curatorial attention to make it an accessible and valuable resource.

Stay tuned for what will surely be some exciting developments in the world of Alaskan insects at the museum!

Volunteers

If you have a few hours a week and would like to volunteer in the Entomology Department please contact the Curator, Derek Sikes.

Donations

If you are thinking of starting a project that will produce insect specimens which you would like to donate, please contact the Curator to discuss details such as which pins to use if you are pinning specimens (stainless #3 are highly recommended) and how to record latitude / longitude for your labels. See the section devoted to donations

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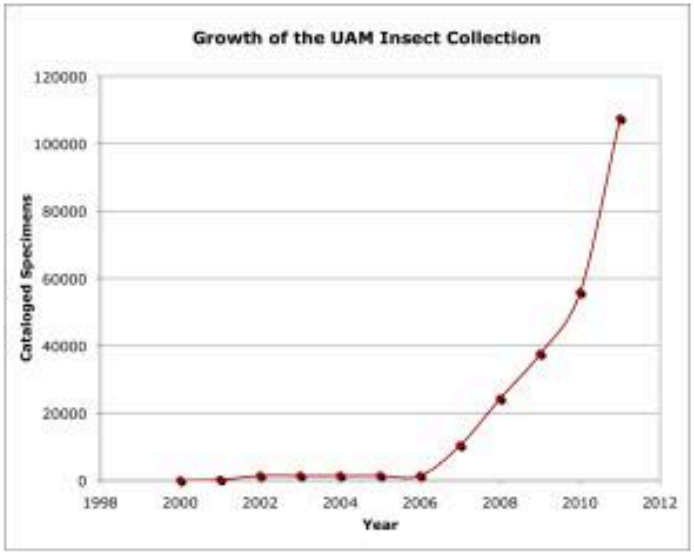
labels. See the section devoted to donations.



Specimen Data

Search the Insect Collection Database, ARCTOS, or DNA Barcoded specimens

go straight to specimens records with images

or records of potential Alaska endemics

or records of nonnative species.

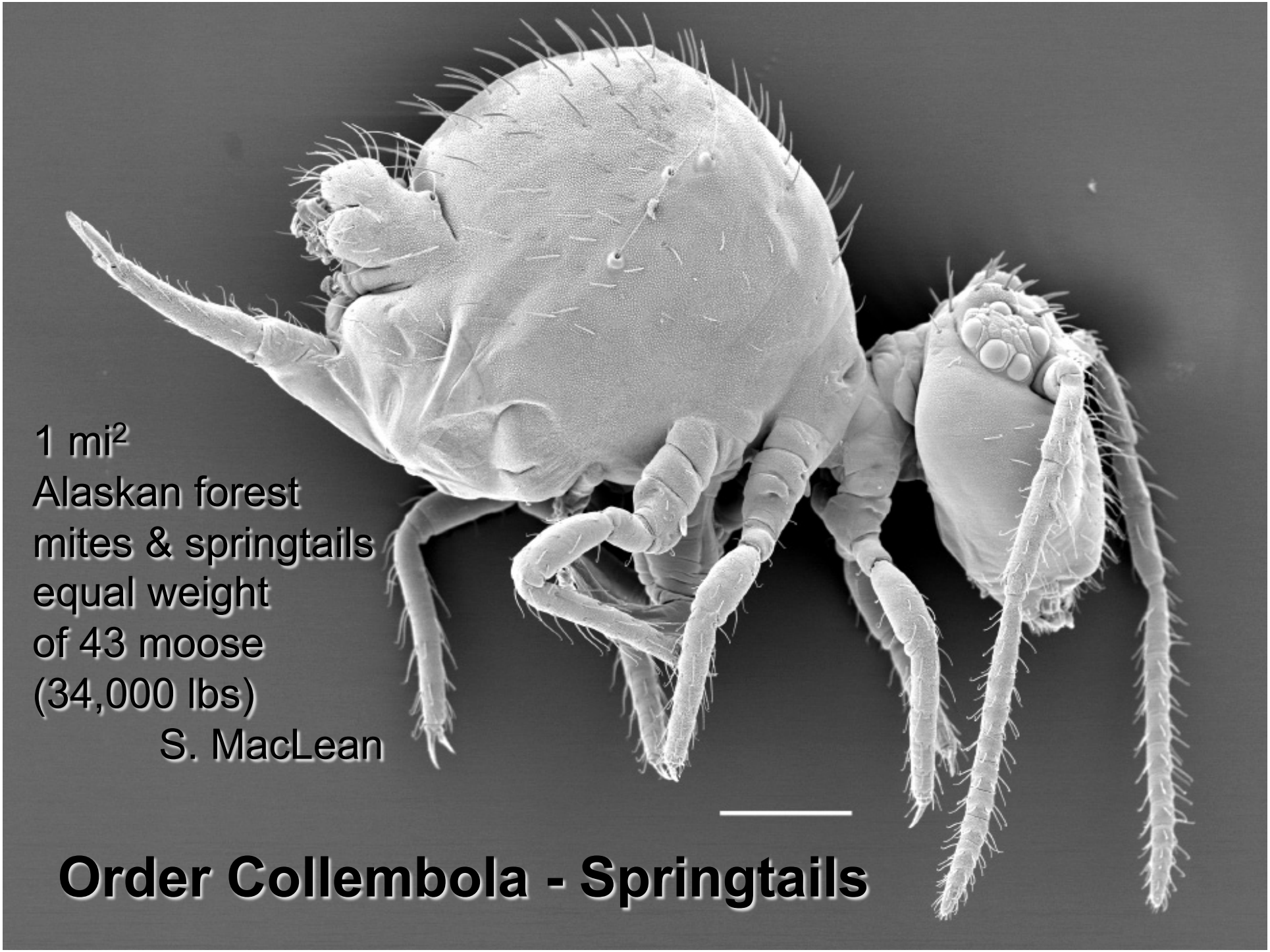
Derek S. Sikes
Curator of Insects
University of Alaska Museum
907 474 6278
dssikes 'at' alaska.edu

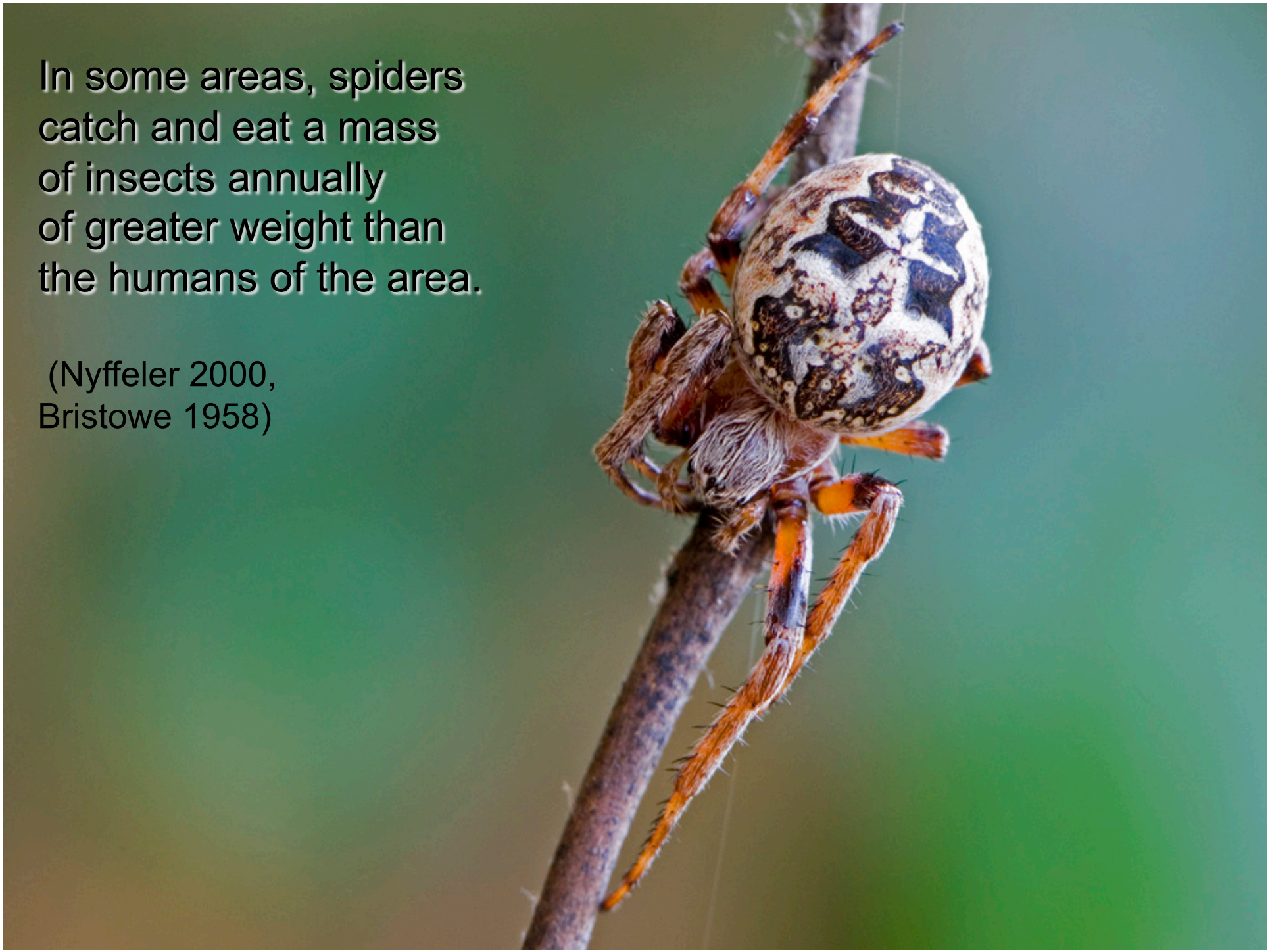
Largest state
Greatest evidence of climate change
Significant biogeographic complexity (Beringia)

"…woefully incomplete knowledge of current distributional limits for many species, prevents scientists from making reliable predictions concerning future changes in biodiversity and ecosystem services in response to these expected changes."

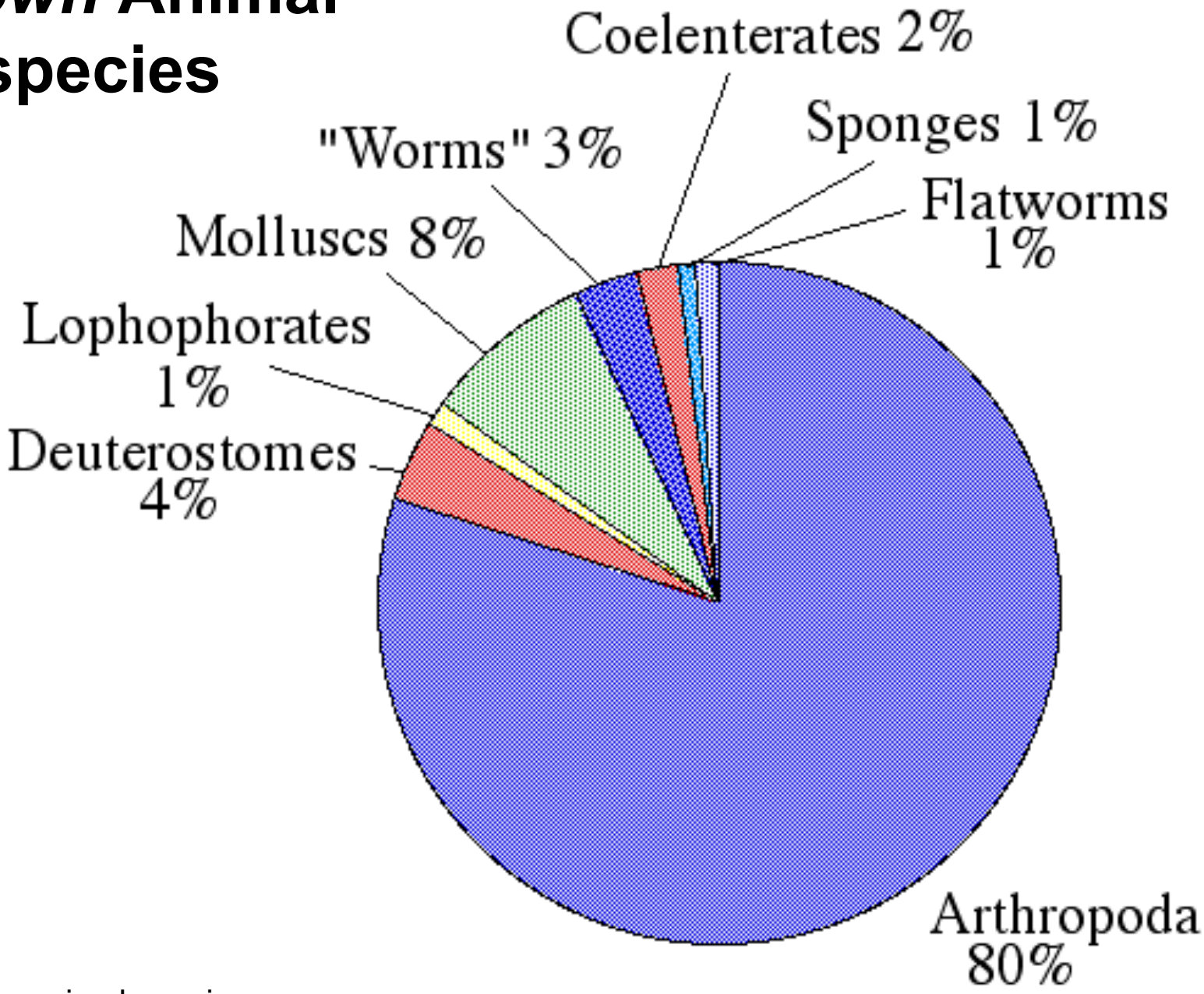
http://www.alaska.edu/epscor/focus/biology/

change 'many species' to '*most species*'


1 mi²
Alaskan forest
mites & springtails
equal weight
of 43 moose
(34,000 lbs)
S. MacLean
Order Collembola - Springtails


In some areas, spiders
catch and eat a mass
of insects annually
of greater weight than
the humans of the area.
(Nyffeler 2000,
Bristowe 1958)

Known Animal species



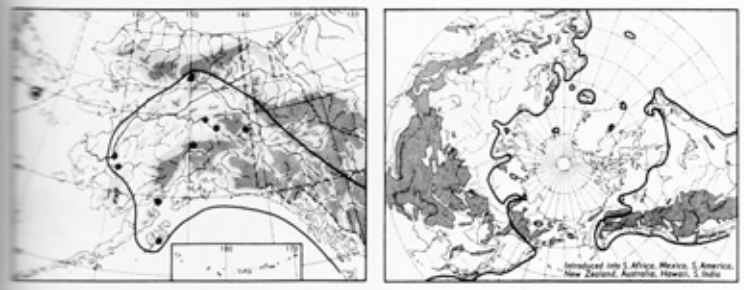
~1.03 million animal species

Flora of Alaska
and Neighboring Territories

A MANUAL OF THE VASCULAR PLANTS

Eric Hultén

1968



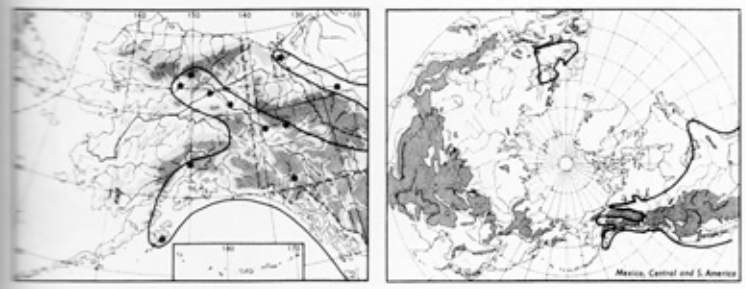
5. Chenopòdium álbum L. Pigweed

Including *Chenopodium paganum* Rchb.

Plant more or less mealy, with short, strict branches; leaves longer than broad, rhomboid to lanceolate, toothed, highly variable in form; inflorescence lacking leaves at top; flowers in densely crowded glomerules; perianth segments keeled; seeds 1.2–1.7 mm in diameter, lustrous, not pitted.

An introduced weed. Described from Europe.

The leaves can be eaten raw or boiled.



6. Chenopòdium Berlandièri Moq.
subsp. **Zschácke**i (Murr.) Zobel

Chenopodium Zschackei Murr.

Similar to *C. album*, but highly variable in leaf form; seeds smaller, up to 1 mm in diameter, pitted on upper surface.

An introduced weed. *C. Berlandieri* described from Mexico, subsp. *Zschackei* from Anhalt.

Circumpolar map gives range of entire species complex.

A few insect groups so well covered:

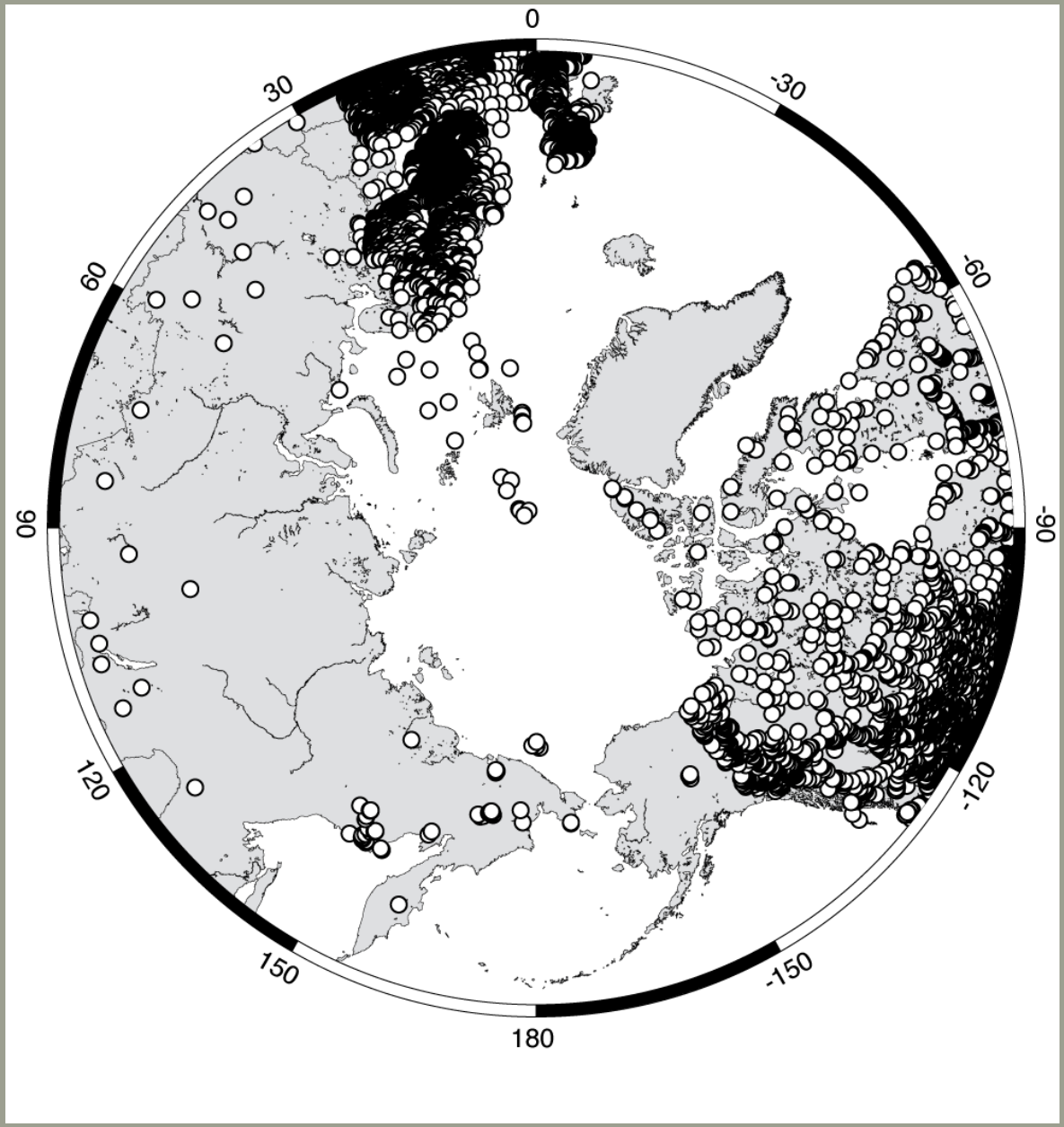
Plecoptera (Stoneflies)
hard copy only

Odonata (dragonflies)
in prep

Butterflies - in prep

<5 % of species

All GBIF records for northern butterflies



Do we really need to know…

All the arthropod species that occur in Alaska?

Where all the species occur?

What all these species do?

Do we really need to know…

Yes:

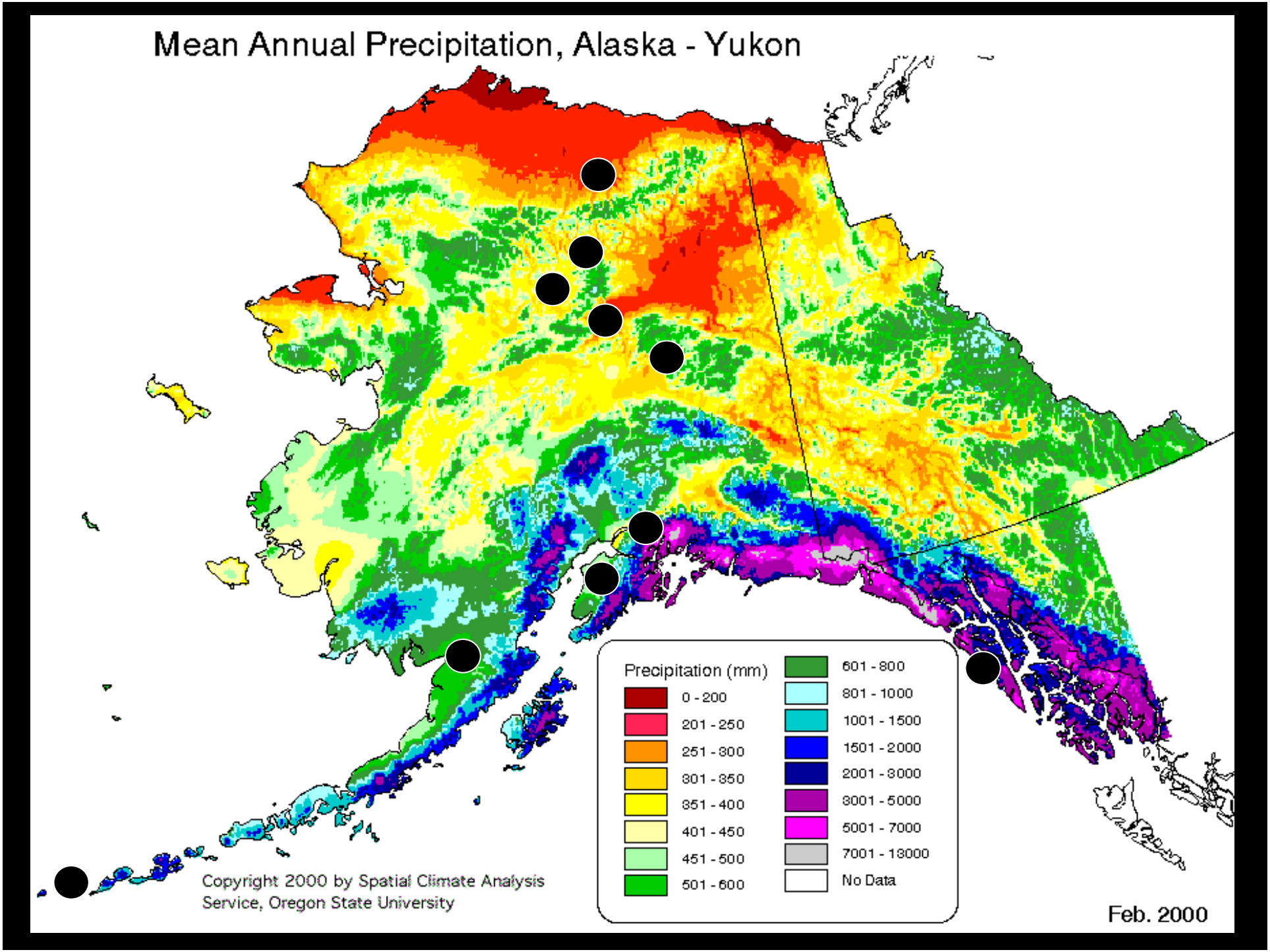
- the public constantly has issues with arthropods (in their homes, food, eating them, biting / stinging, transmission of disease)

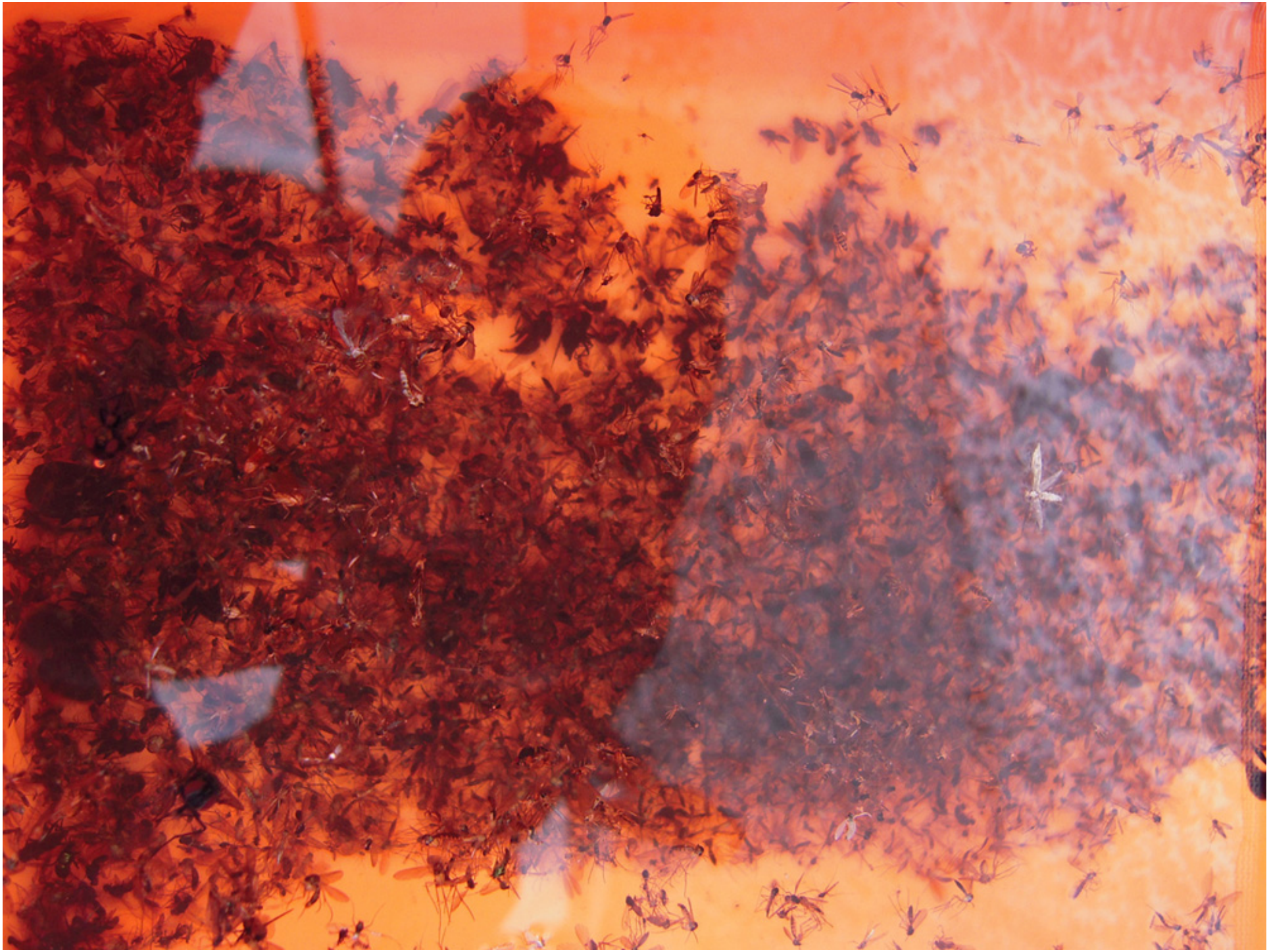
- arthropods are the largest consumers of vegetation in Alaska (30 million Alaskan spruce trees killed by these animals during the 1990s)

- ecosystem services (decomposition, pollination, food base for large but unknown % of vertebrates)

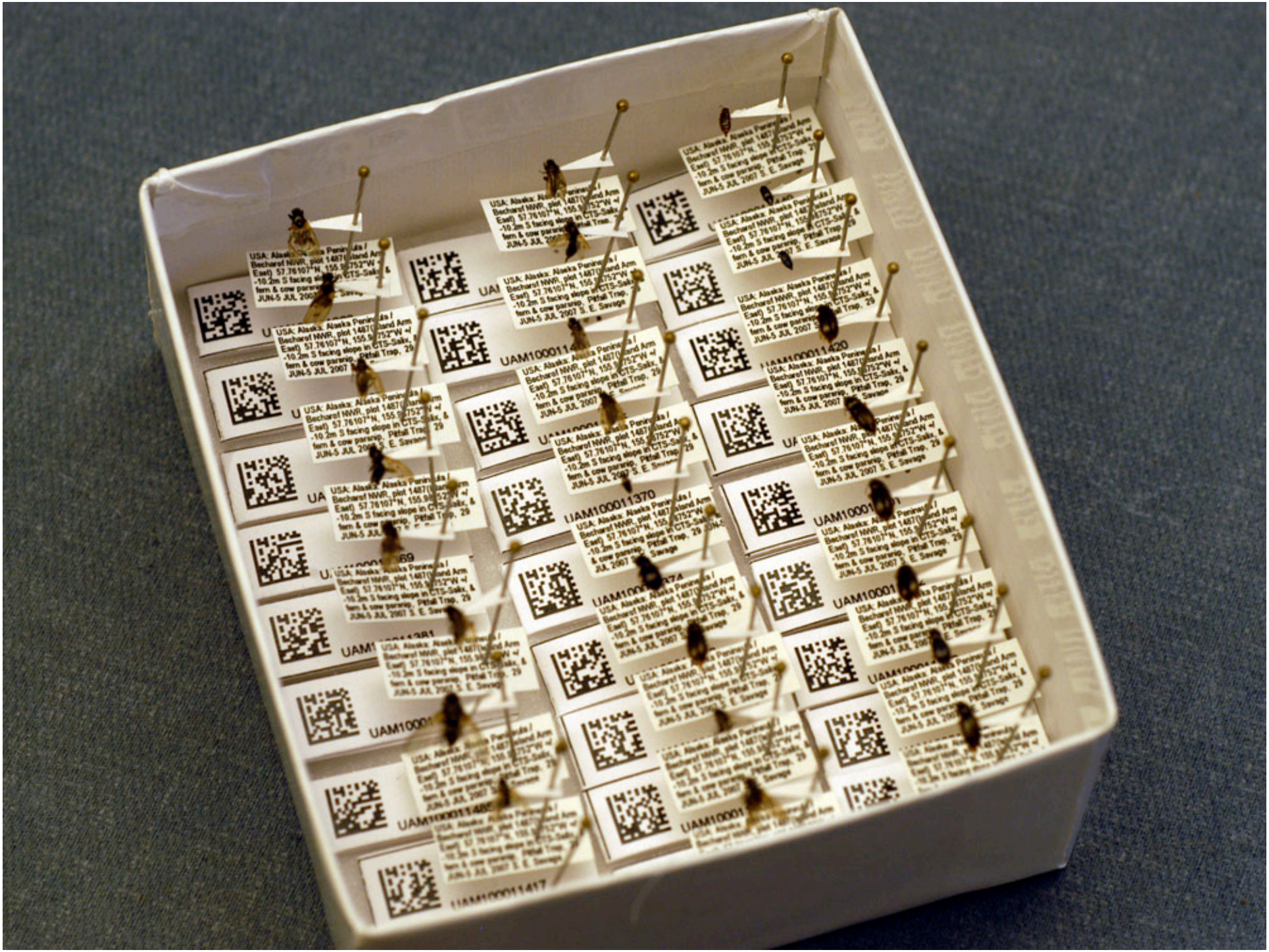
- climate change - local species ranges may shrink or expand, non-native species may invade

- forensic entomology - insect species and their natural history data can be used to solve crimes

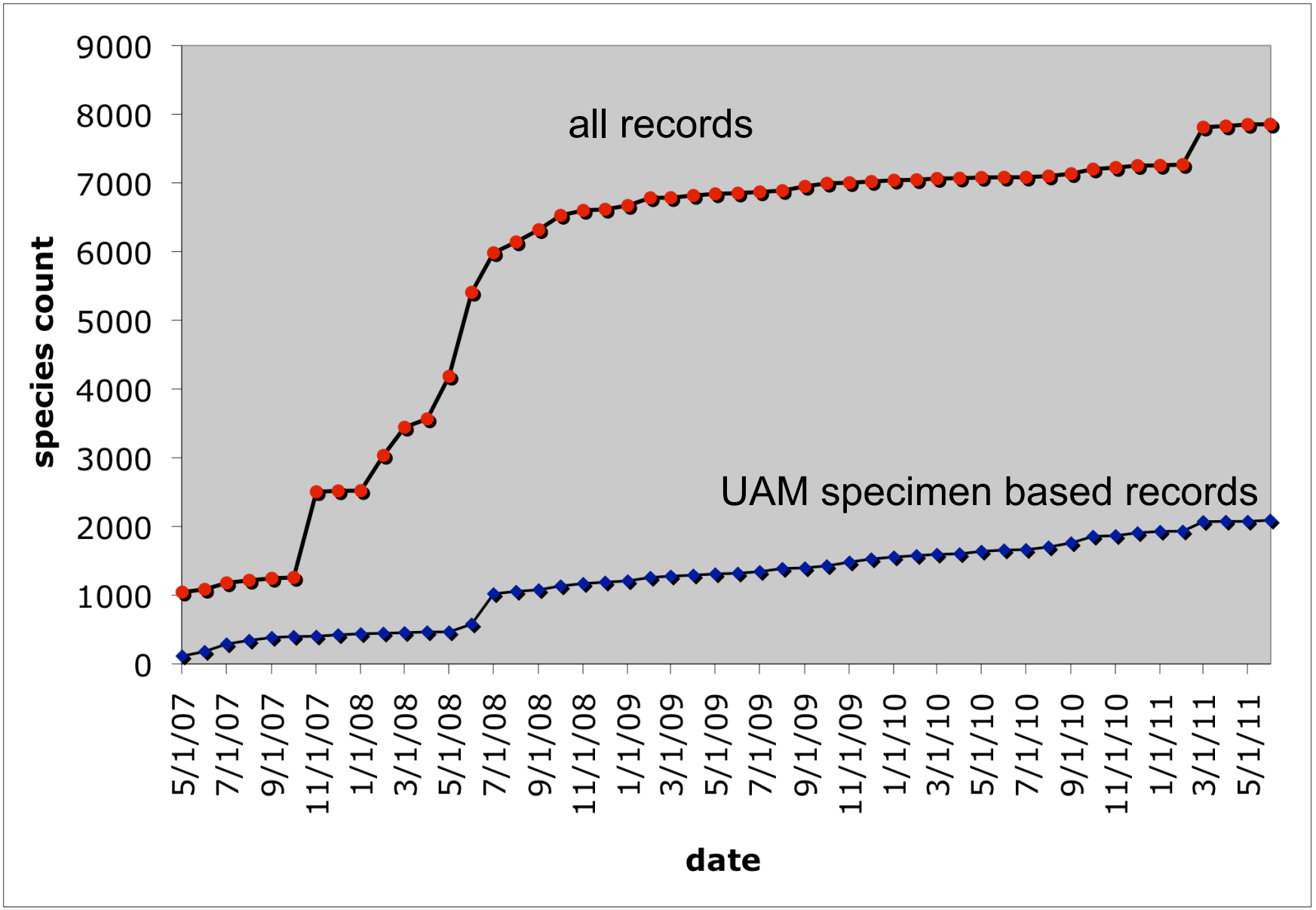

Mean Annual Precipitation, Alaska - Yukon
Precipitation (mm)
0 - 200
201 - 250
251 - 300
301 - 350
351 - 400
401 - 450
451 - 500
501 - 600
601 - 800
801 - 1000
1001 - 1500
1501 - 2000
2001 - 3000
3001 - 5000
5001 - 7000
7001 - 13000
No Data
Copyright 2000 by Spatial Climate Analysis Service, Oregon State University
Feb. 2000

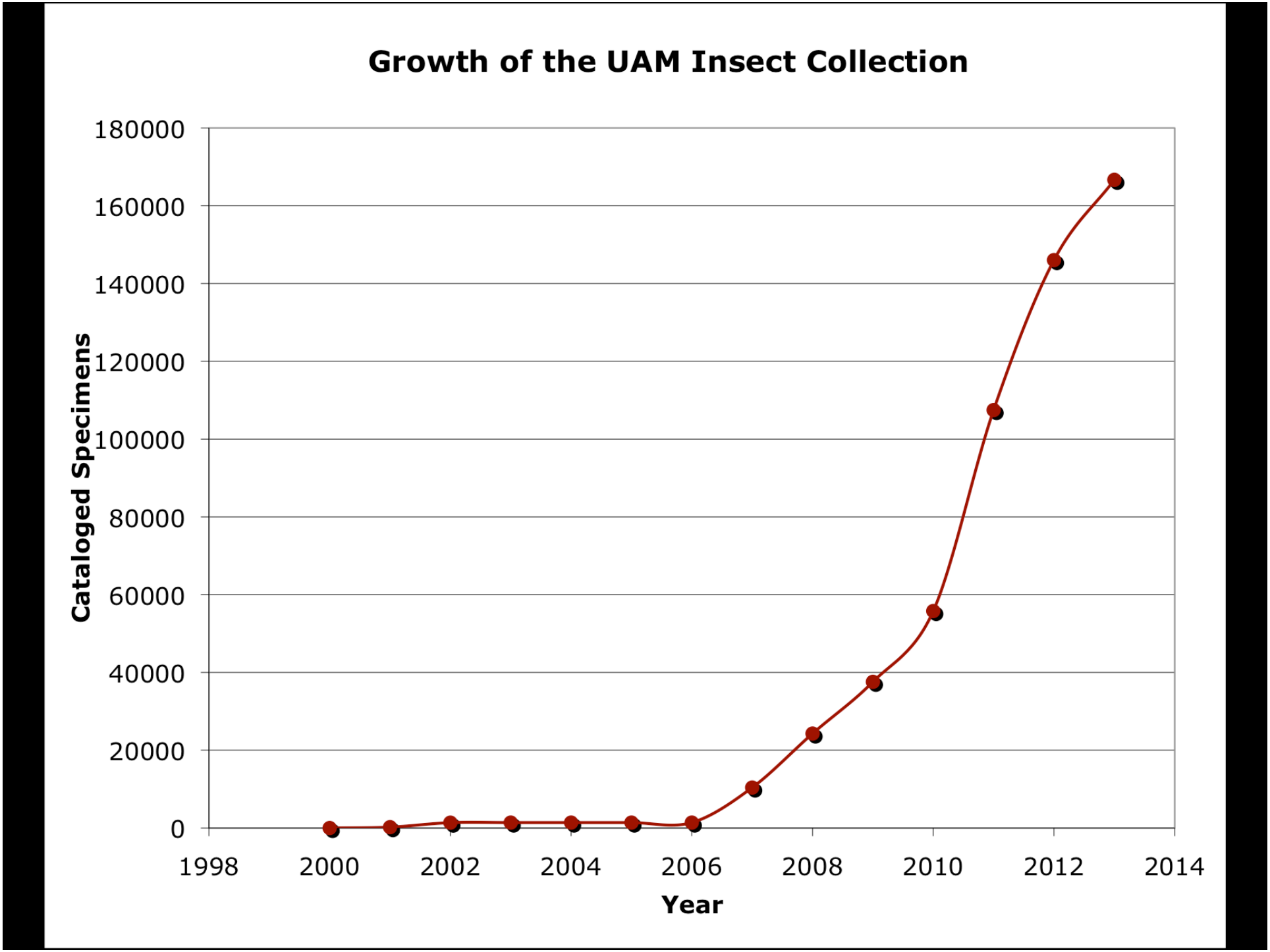


ALASKA
LEPIDOPTERA
SURVEY



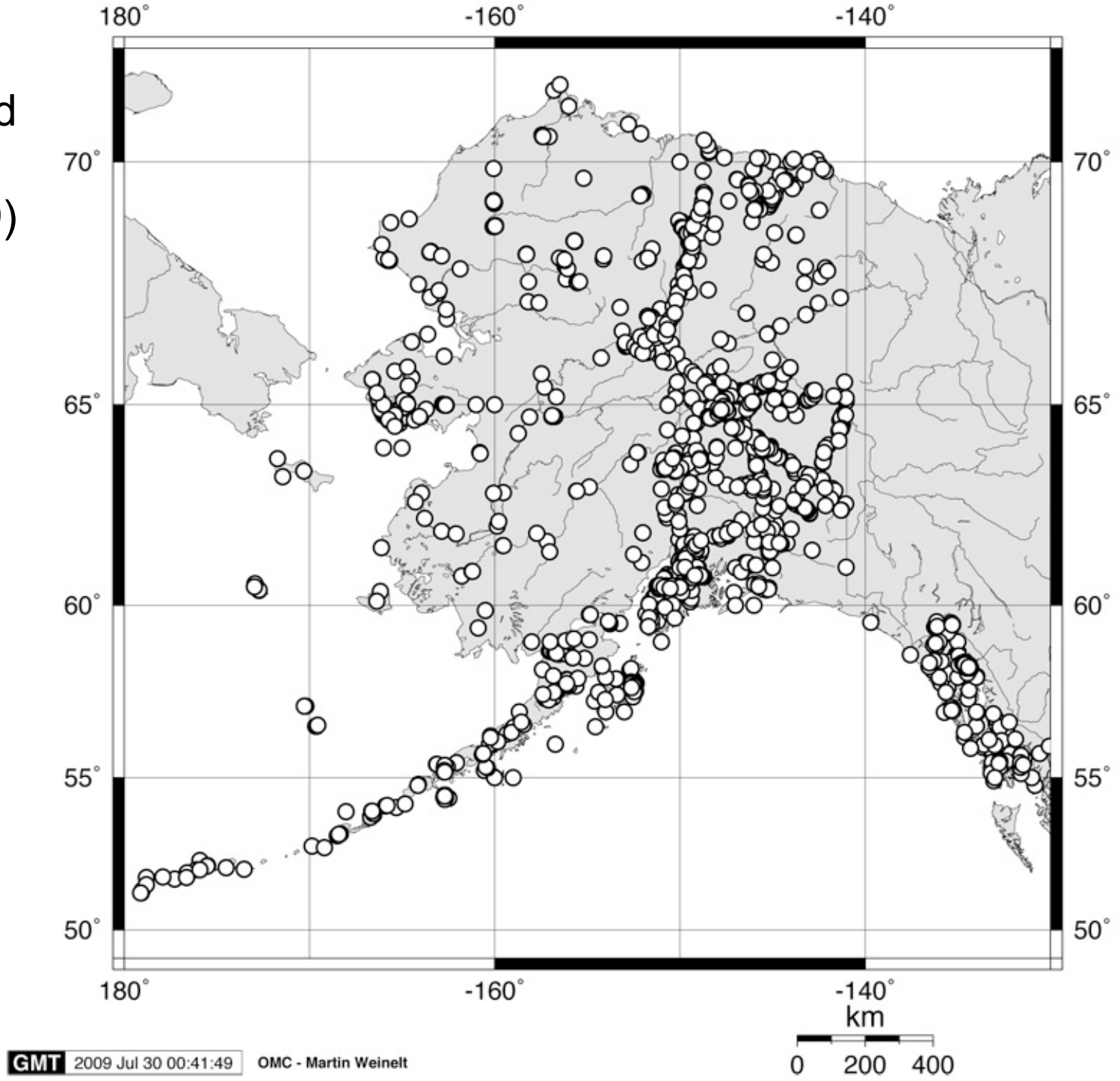
Cumulative AK Species Added to Database




Growth of the UAM Insect Collection
Cataloged Specimens
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year

All geo-referenced Alaskan records (3,029)

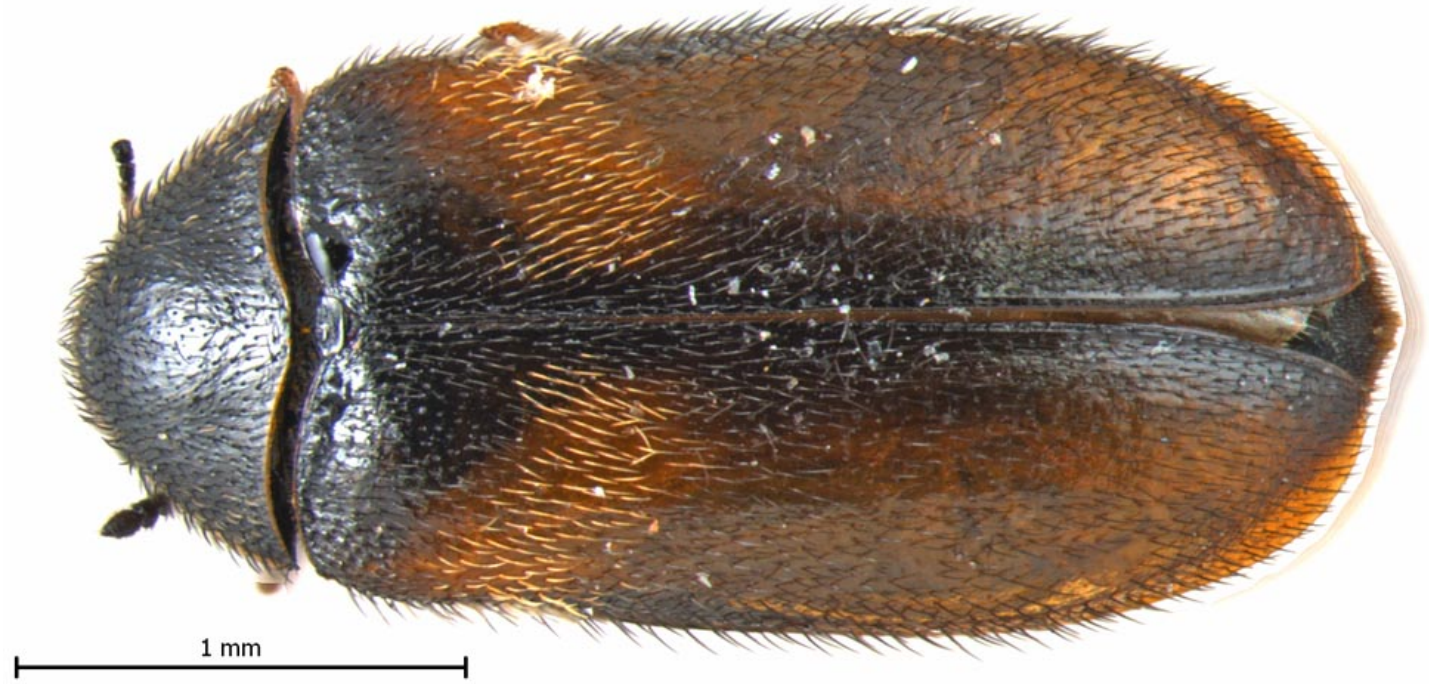
specimen + literature



812 species new *records* for Alaska (at least 3 from UAF Cooperative Extension)
(89 new genus, 11 new family)

12 % of total list so far is “new” (hard to tell non-natives...)

17 species new to science



Reesa vespulae - no males known, virgin birth

Non-native Mites, Ticks, Harvestmen & Spiders

Some established, some not

Acari	Demodicidae	*Demodex folliculorum* Simon [likely]
Acari	Demodicidae	*Demodex brevis* Akbulatova [likely]
Acari	Ixodidae	*Amblyomma dissimile* Koch
Acari	Ixodidae	*Dermacentor variabilis* (Say)
Acari	Varoidae	*Varroa* sp.
Araneae	Pholcidae	*Pholcus manueli* Gertsch*
Araneae	Theridiidae	*Latrodectus hesperus* Chamberlin & Ivie
Araneae	Theridiidae	*Steatoda grossa* (C. L. Koch)**
Opiliones	Phalangiidae	*Phalangium opilio* Linnaeus

*Prior id: *Pholcus phalangioides*, corrected by DNA Barcoding.
** First report: 2013-11-06, Anchorage, det. R. Crawford.

Phalangium opilo L.
no venom

© M. Bowser
Phalangium opilio eating native *Nelima paessleri*

Pholcus phalangioides

Non-native Springtails, Earwigs, Flies, Bugs

Some established, some not

Collembola Hypogastruridae	*Hypogastrura distincta* (Axelson)
Collembola Hypogastruridae	*Hypogastrura serrata* (Årgen)
Dermaptera Forficulidae	*Forficula auricularia* Linnaeus
Diptera Anthomyiidae	*Delia radicum* (Linnaeus)
Diptera Muscidae	*Musca domestica* Linnaeus
Diptera Sciaridae	*Sciara militaris* Nowicki
Hemiptera Adelgidae	*Adelges tsugae* Annand
Hemiptera Adelgidae	*Adelges piceae* (Ratz.) – E. spruce gall aphid
Hemiptera Aleyrodidae	Aleyrodidae gen. sp.
Hemiptera Aphididae	*Elatobium abietinum* (Walker) - Spruce aphid
Hemiptera Aphididae	*Myzus persicae* (Sulzer)
Hemiptera Cimicidae	*Cimex lectularius* Linnaeus
Hemiptera Coccidae	*Neopulvinaria innumerabilis* (Rathvon)
Hemiptera Pseudococcidae	*Pseudococcus longispinus* (Targioni-Tozzetti)

Oeciacus

Family Cimicidae

Swallow & bed bugs

UAF Extension

& first record of Bed

Bug

Cimex lectularius

A growing problem in Alaska

Collection is lacking

Ectoparasites

lice, fleas, ticks

Please save specimens

Pseudococcus longispinus aka “long tailed mealy bug”

Non-native Cockraoches & Beetles

Some established, some not

Blattodea Blatellidae	*Blattella germanica* (Linnaeus)
Blattidae	*Periplaneta americana* (Linnaeus)
Coleoptera:	
Anobiidae Anobiinae	*Stegobium paniceum* (Linnaeus)
Anobiidae Xyletininae	*Lasioderma serricorne* (Fabricius)
Cerambycidae Cerambycinae	*Semanotus amethystinus* (LeConte)
Coccinellidae Coccinellinae	*Coccinella septempunctata* Linnaeus
Cryptophagidae Atomariinae	*Atomaria pusilla* (Paykull)
Brentidae	*Eutrichapion viciae* (Paykull) – eats bird vetch
Curculionidae Curculioninae	*Gymnetron antirrhini* (Paykull) - eats toadflax
Curculionidae Dryophthorinae	*Sitophilus oryzae* (Linnaeus)
Curculionidae Entiminae	*Otiorhynchus ovatus* (L.) - Strawberry root weevil
Curculionidae Entiminae	*Otiorhynchus sulcatus* (Fabricius)
Curculionidae Entiminae	*Otiorhynchus singularis* (Linnaeus)
Curculionidae Entiminae	*Sitona hispidulus* (Fabricius)
Curculionidae Entiminae	*Sitona lineellus* (Bonsdorff)
Curculionidae Pissodinae	*Pissodes strobi* Peck - Sitka spruce weevil
Dermestidae Anthreninae	*Anthrenus verbasci* Linnaeus
Dermestidae Anthreninae	*Reesa vespulae* (Milliron)
Dermestidae Dermestinae	*Dermestes lardarius* (Linnaeus)
Dermestidae Dermestinae	*Dermestes maculatus* DeGeer

Periplaneta americana

aka American cockroach

UAM:Ento:237702

Blattella germanica

aka German cockroach

UAM:Ento:240835

Non-native Beetles, cont.

Some established, some not

Staphylinidae Aleocharinae	*Aleochara villosa* Mannerheim
Staphylinidae Omaliinae	*Omalium rivulare* (Paykull)
Staphylinidae Omaliinae	*Xylodromus concinnus* (Marsham)
Staphylinidae Omaliinae	*Xylodromus depressus* (Gravenhorst)
Staphylinidae Staphylininae	*Philonthus politus* (Linnaeus)
Staphylinidae Staphylininae	*Philonthus rectangulus* Sharp
Staphylinidae Staphylininae	*Philonthus varius* (Gyllenhal)
Staphylinidae Staphylininae	*Quedius mesomelinus* (Marsham)
Staphylinidae Tachyporinae	*Mycetoporus splendidus* (Gravenhorst)

Non-native Sawflies, Ants, Wasps, Bees

Some established, some not

Apidae	*Apis mellifera* Linnaeus
Formicidae Myrmicinae	*Monomorium pharaonis* (Linnaeus)
Formicidae Myrmicinae	*Tetramorium caespitum* (Linnaeus)
Formicidae Myrmicinae	*Manica invidia* Bolton
Ichneumonidae	*Lathrolestes luteolator* (Gravenhorst)
Tenthredinidae	*Eriocampa ovata* (Linnaeus) - Alder woolly sawfly
Tenthredinidae	*Fenusa pusilla* (Lepeletier) - Birch leafminer
Tenthredinidae	*Heterarthrus nemoratus* (Fallén) -Birch-edge leafminer
Tenthredinidae	*Monosoma pulveratum* (Retzius) – Green Alder sawfly
Tenthredinidae	*Profenusa thomsoni* (Konow) - Amber-marked birch leafminer
Tenthredinidae	*Hemichroa crocea* (Geoffroy)
Tenthredinidae	*Pristiphora erichsonii* (Hartig) - Larch sawfly
Tenthredinidae	*Nematus ribesii* (Scopoli)

Non-native Moths & Misc.

Lepidoptera Lasiocampidae	*Malacosoma californica* (Packard) - Western tent caterpillar
Lepidoptera Noctuidae	*Noctua pronuba* L. European Yellow Underwing Moth
Lepidoptera Pyralidae	*Plodia interpunctella* (Hübner)
Lepidoptera Tortricidae	*Archips rosana* (Linnaeus)
Lepidoptera Tortricidae	*Archips cerasivorana* (Fitch) - Uglynest caterpillar
Lepidoptera Tortricidae	*Epinotia solandriana* (L.) - Birch leafroller
Lepidoptera Tortricidae	*Rhyacionia buoliana* Schiffermüller European pine shoot moth
Lepidoptera Nymphalidae	*Roddia vaualbum* (Denis and Schiffermüller)
Phthiraptera Pediculidae	*Pediculus humanus* Linnaeus
Phthiraptera Phthiridae	*Pthirus pubis* (Linnaeus)
Phthiraptera Trichodectidae	*Trichodectes canis* (DeGeer)
Psocoptera Sphaeropsocidae	*Badonnelia titei* Pearman
Thysanura Lepismatidae	*Thermobia domestica* (Packard)
Thysanura Lepismatidae	*Lepisma saccharina* (Linnaeus) – no specimens
Chilopoda Lithobiomorpha	*Lamyctes emarginatus* (Newport)
Diplopoda Paradoxosomatidae	*Oxidus gracilis* (C.L. Koch, 1847)

Psocoptera Sphaeropsocidae *Badonnelia titei* Pearman

Thysanura *Thermobia domestica* aka Firebrat

No Alaskan specimens of Silverfish - yet

Diplopoda Paradoxosomatidae *Oxidus gracilis* (C.L. Koch)
UAM:Ento:235320

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Brown Recluse

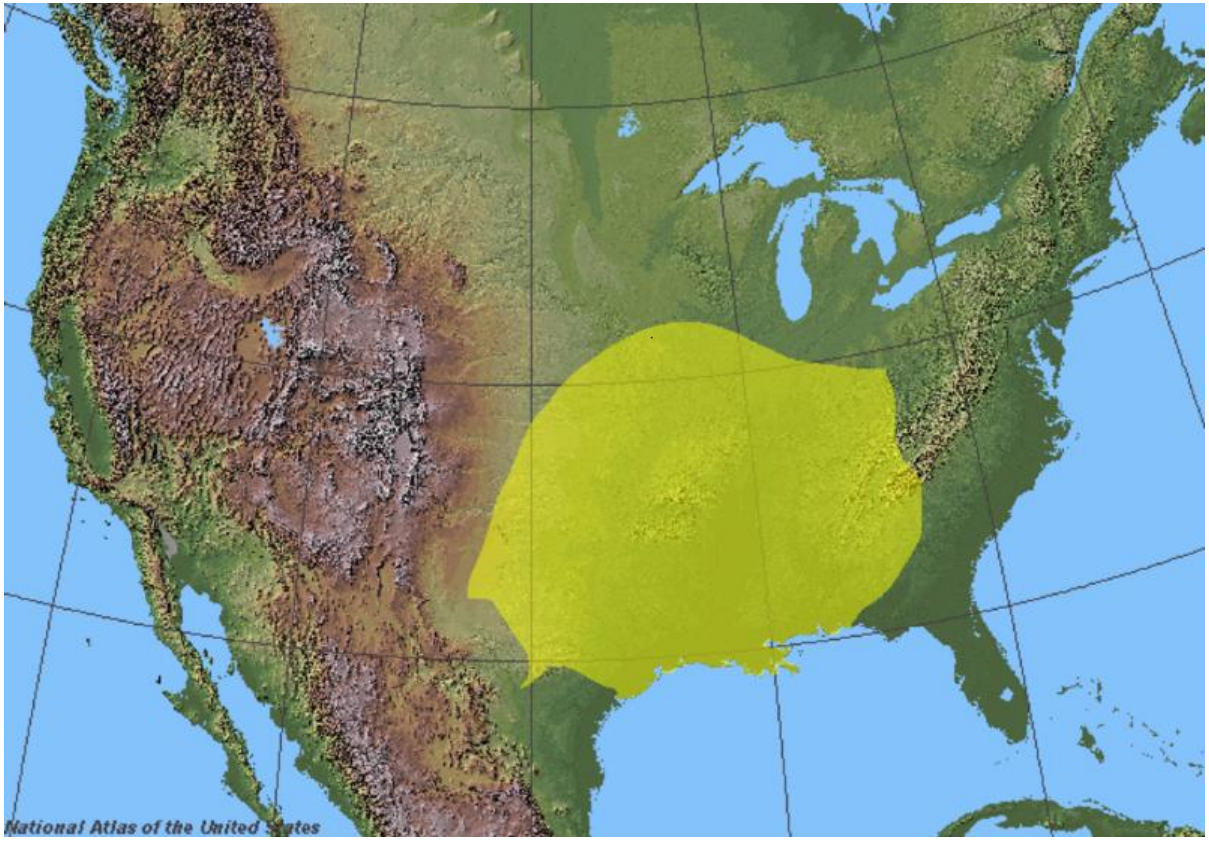
Six eyes,
not eight

Importance of specimens

NONE so far in Alaska

Separate fact from myth

Where Brown recluse Live they are common & easily collected (often in large numbers)



Several recluse bites diagnosed in Alaska each year

21,000+ Alaskan spiders in the UAM museum
Frequent public contacts on spiders found

No recluses yet...

Thousands of bite diagnoses in California - over 20,000 California spider specimens turned in - *none were recluses*

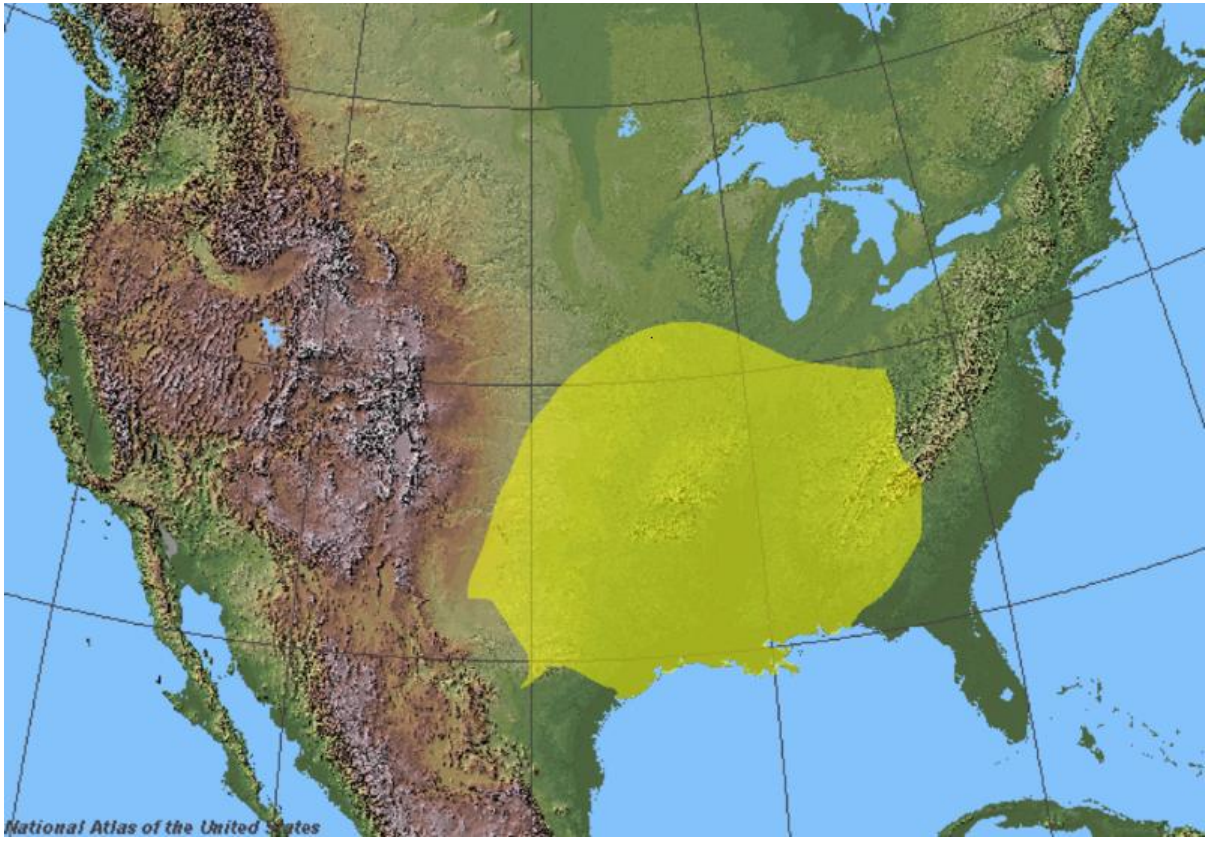
R. Vetter UCR http://spiders.ucr.edu/myth.html

Tennessee - BR are Endemic

Of 500 house spiders submitted, 75% were Brown recluses

Why can't Californians find Brown recluses?

Do recluses become invisible when they reach California?



R. Vetter UCR http://spiders.ucr.edu/myth.html

Necrotic wounds diagnosed as Recluse bites

Could be:

- Group A *Streptococcus*
- Methicillin-resistant *Staphylococcus aureus* (MSRA) [contagious]
- -mites, fleas, bed bugs, ticks
- lymphomatoid papulosis (non-Hodgkin's disease lymphoma)
- diabetic ulcer
- infected herpes simplex or shingles
- Lyme disease