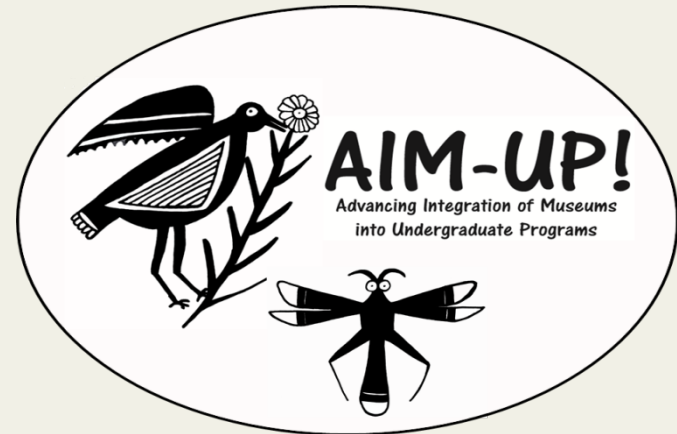


# Engaging Students Through Digital Data

Kayce Bell

Museum of Southwestern Biology  
University of New Mexico



# Students and Natural History

Not all students can experience natural history collections and research physically.

Digital and on-line resources offer a virtual way to experience and explore the natural world.



# Big Data and Digitization Initiatives

## OBAMA ADMINISTRATION UNVEILS "BIG DATA" INITIATIVE: ANNOUNCES \$200 MILLION IN NEW R&D INVESTMENTS

Aiming to make the most of the fast-growing volume of digital data, the Obama Administration today announced a "Big Data Research and Development Initiative" improving our ability to extract knowledge and insights from large and complex collections of digital data, the initiative promises to help solve some of the Nation's pressing challenges.

**Big Data Research Initiative**

At a White House event on March 29, NSF Director, Dr. Subra Suresh, joined other federal science agency leaders to discuss cross-agency plans and announce new research efforts to extract knowledge and insights from large and complex collections of digital data. NSF will direct its current efforts to develop new methods to derive knowledge from data; construct new infrastructure to manage, curate and serve data to communities; and forge new approaches for associated education and training. Specific announcements relevant to the CISE community include:

**iDigBio**  
Integrated Digitized Biocollections

About iDigBio | Portal | Technical Information | Education

Google Custom Search Search

Log In | Sign Up

15,324,063  
Specimen Records

2,342,880  
Media Records

255  
Recordsets

Search the Portal

**Digitization**  
Learn, share and develop best practices

**Sharing Collections**  
Documentation on data ingestion

**Working Groups**  
Join in, contribute, be part of the community

**Proposals**  
New tool and workshop ideas

**iDigBio**  
Integrated Digitized Biocollections

About iDigBio | Collaborators | Upcoming Events | News | Contact | Site Map

Google Custom Search Search

Log In | Sign Up

Welcome to Integrated Digitized Biocollections (iDigBio), the National Resource for Advancing Digitization of Biodiversity Collections (ADBC) funded by the National Science Foundation. Through ADBC, data and images for millions of biological specimens are being made available in electronic format for the research community, government agencies, students, educators, and the general public.

**Researchers**  
Learn about research directions

**Collections Staff**  
Learn how your collection can

**Teachers**  
Download

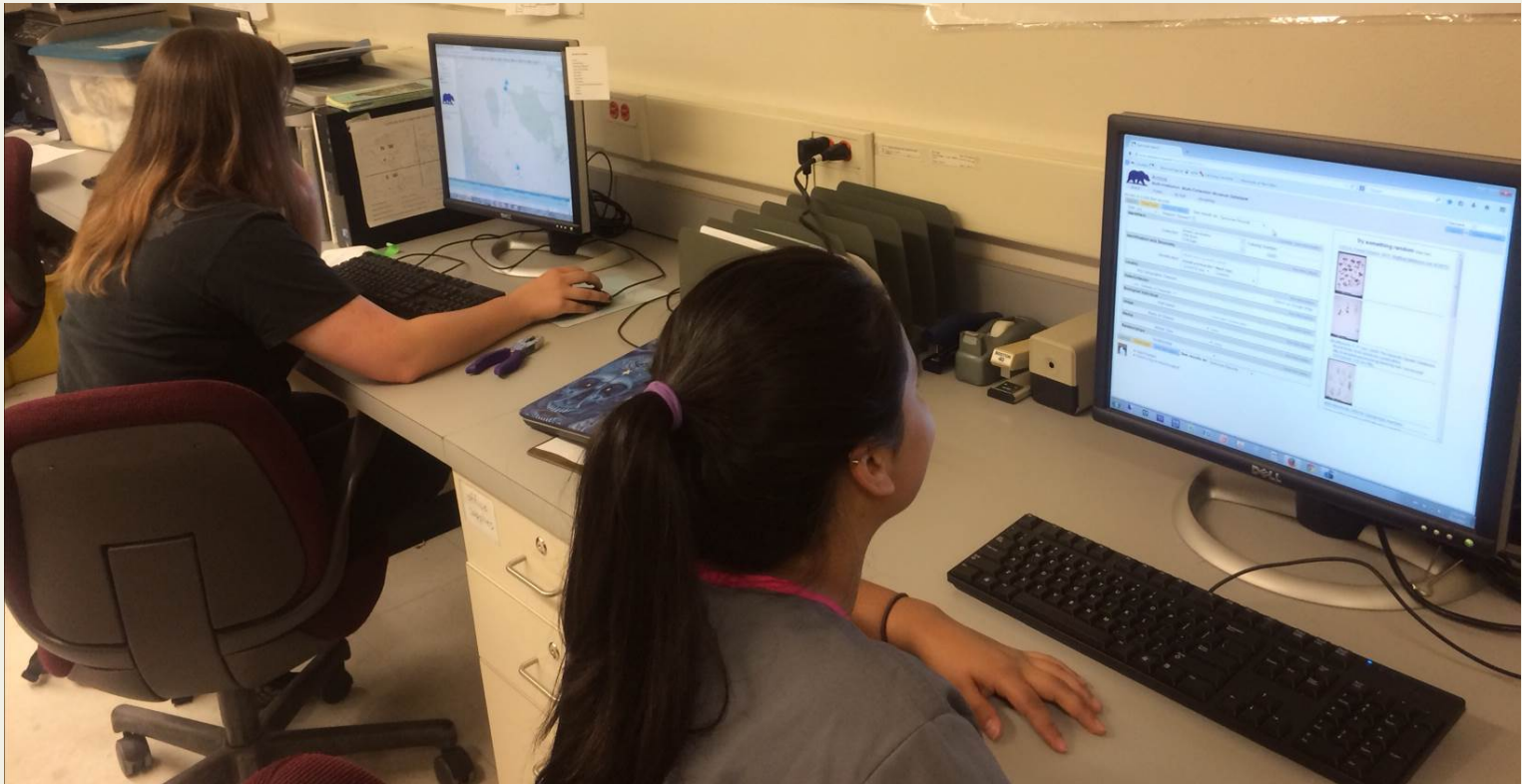
**TCN Resources**  
Collaborator information at a glance

**Project News**  
Announcements and updates about our activities

# On-line Data

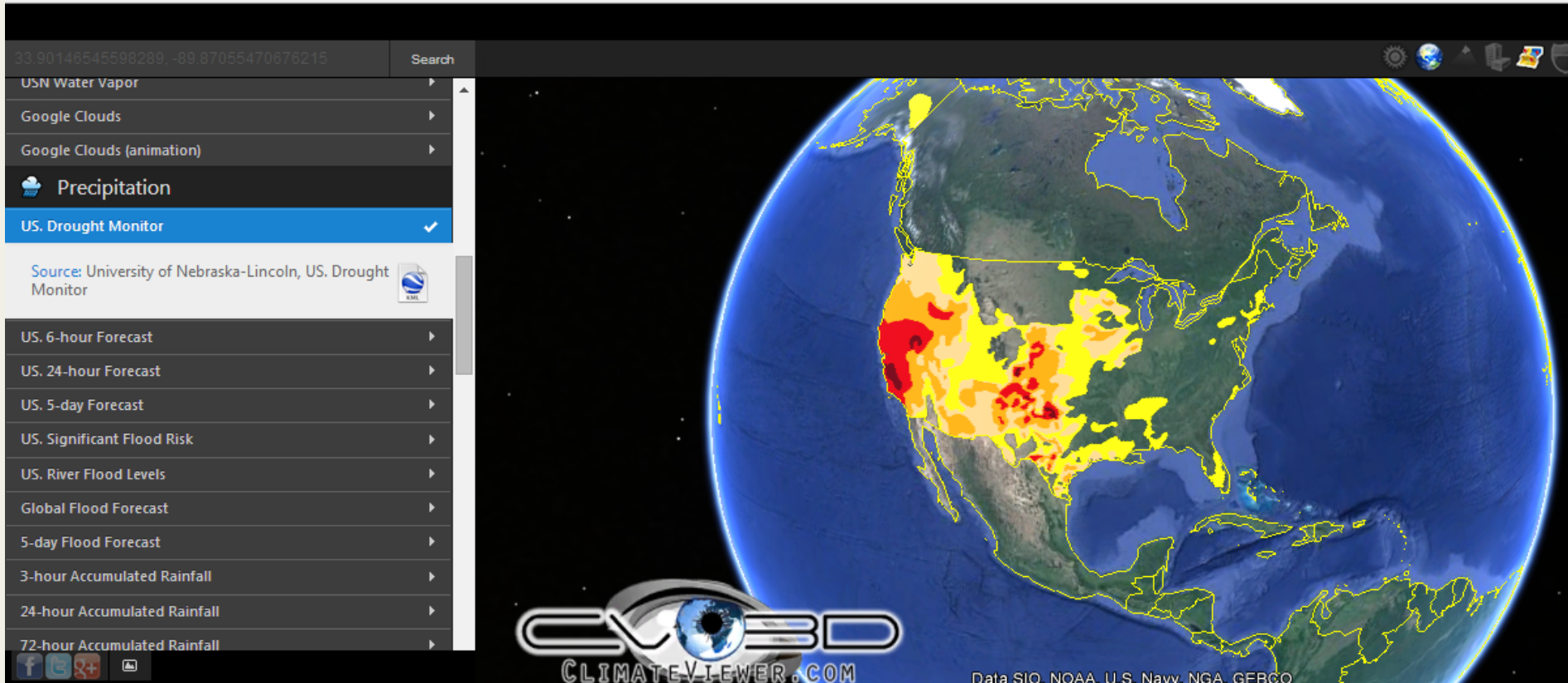
Data available on-line are unreliable and often unverifiable.

Natural history collections provide one of the few verifiable sources of biological data on the internet.



# Types of digital data available:

## 1. Abiotic – Google Earth-based, climate layers



# Types of digital data available:

1. Abiotic – Google Earth-based, climate layers
2. Specimen databases & portals – VertNet, GBIF, Arctos



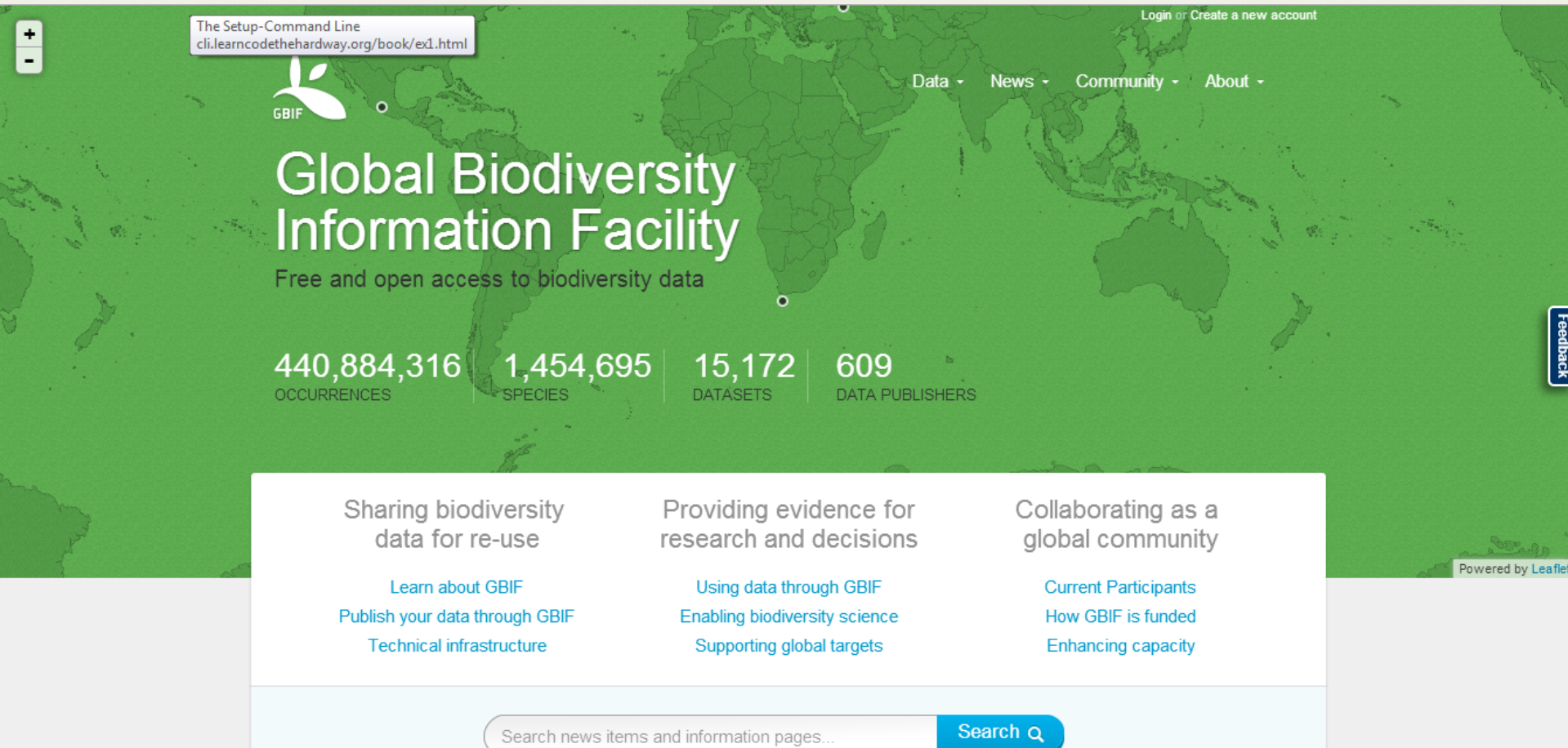
[SEARCH](#) [PUBLISHERS](#) [JOIN](#) [RESOURCES](#) [ABOUT](#) [FEEDBACK](#) [?](#)

59 PUBLISHERS



# Types of digital data available:

1. Abiotic – Google Earth-based, climate layers
2. Specimen databases & portals – VertNet, GBIF, Arctos



The screenshot shows the GBIF (Global Biodiversity Information Facility) website homepage. The background is a green world map. At the top left, there is a small window titled "The Setup-Command Line" with the URL "cli.learncodethehardway.org/book/ex1.html". The GBIF logo is on the left. The main heading is "Global Biodiversity Information Facility" with the tagline "Free and open access to biodiversity data". Below this, four statistics are displayed: 440,884,316 OCCURRENCES, 1,454,695 SPECIES, 15,172 DATASETS, and 609 DATA PUBLISHERS. A navigation menu at the top right includes "Data", "News", "Community", and "About". A "Login or Create a new account" link is also present. At the bottom, there are three columns of text describing the facility's goals: "Sharing biodiversity data for re-use", "Providing evidence for research and decisions", and "Collaborating as a global community". Each column has a list of links. A search bar is located at the bottom center.

The Setup-Command Line  
cli.learncodethehardway.org/book/ex1.html

GBIF

Global Biodiversity Information Facility

Free and open access to biodiversity data

440,884,316 OCCURRENCES | 1,454,695 SPECIES | 15,172 DATASETS | 609 DATA PUBLISHERS

Data - News - Community - About -

Login or Create a new account

Feedback

Powered by Leaflet

Sharing biodiversity data for re-use

- Learn about GBIF
- Publish your data through GBIF
- Technical infrastructure

Providing evidence for research and decisions

- Using data through GBIF
- Enabling biodiversity science
- Supporting global targets

Collaborating as a global community

- Current Participants
- How GBIF is funded
- Enhancing capacity

Search news items and information pages... Search

# Types of digital data available:

1. Abiotic – Google Earth-based, climate layers
2. Specimen databases – VertNet, GBIF, Arctos
3. Specimens + more – Map of Life, Animal Diversity Web

Animal Diversity Web



University of Michigan  
MUSEUM OF ZOOLOGY



Home

About Us

About Animal Names

Educational Resources

Special Collections

Glossary

Browse Animalia

## Browse Animalia



[Take our survey!](#)  
Help us improve the site!

Search ADW



Taxon Information

Explore Data @ Quardvark

Search Guide

### ADW Mission

The Animal Diversity Web is an online database and encyclopedia of animal natural history, built through contributions from students, photographers, and many others.

It is a rich and flexible resource designed both as an encyclopedia



# Types of digital data available:

1. Abiotic – Google Earth-based, climate layers
2. Specimen databases – VertNet, GBIF, Arctos
3. Specimens + more – Map of Life, Animal Diversity Web
4. Other biological data – GenBank, Encyclopedia of Life, IUCN Red List

The image shows the homepage of the Encyclopedia of Life (EOL). At the top, a green banner reads "Become part of the EOL community—sign up for the EOL Newsletter today". Below this is a navigation bar with "ENGLISH" on the left and "DISCOVER", "HELP", "WHAT IS EOL?", "EOL NEWS", and "DONATE" on the right. The main header features the EOL logo and the text "Encyclopedia of Life". A central banner reads "Global access to knowledge about life on Earth" with a search bar below it. Below the search bar are five image thumbnails: a colorful virus, a beetle, a frog, a pink flower, and a plant. A text box next to the flower thumbnail contains specimen data: "Central African Rep: P.N. Dzanga-Ndoki, Mabea Bai, 21.4 km 53°NE Bayangh, 3°02'N 16°25'E 510m 1-7.v.2001 B.L.Fisher#4000 sifted litter (leaf mold, rotten wood) rainforest CASENT 040500". At the bottom right, the text "Tetramorium guineense" is visible, and the URL "eol.org" is displayed in the bottom right corner.

# Types of digital data available:

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THE IUCN RED LIST OF THREATENED SPECIES

Scientific or Common name  >GO

HOME SPECIES RANGE OBSERVATION PROTECTED AREAS

RED LIST Guiding Conservation for 50 Years

CHANGE BASEMAP

Mammalia > Rodentia > Sciuridae  
**Tamias minimus**  
Least Chipmunk  
[Download Spatial data](#)  
Bachman, 1839

>Back to Red List Page

LC > LEAST CONCERN

Extant (resident)

BROWSE IMAGES  
[ARKive \(18 found\)](#)

IUCN (International Union for Conservation of Nature) 2008. *Tamias minimus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2

POWERED BY esri

# Types of digital data available:

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# Databases & Portals

- Simple searches by taxonomy



## Search VertNet

Ctenomys boliviensis

[More search options](#)



Table

[Map](#)

1-100 of 597



**Pro tip!** Click on a table row to see the full occurrence details.

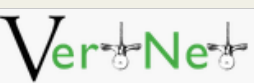


Identification	Taxonomy	Location	Year	Map	Media
MSB Mammals 55358	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 3.5 KM W ESTACION EL PAILON, 300 M; 17D39'S, 62D4...	1984		
MSB Mammals 55360	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 9 km N, 10 km W Roboré, 300 M; 18D15'S, 59D51'W	1984		
MSB Mammals 55362	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 4 KM S, 24 KM E SAN JOSE DE CHIQUITOS, 400 M; 17D...	1984		



# Databases & Portals

- Simple searches by taxonomy



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Ctenomys boliviensis

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# Databases & Portals

- Simple searches by taxonomy



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Ctenomys boliviensis

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Table [Map](#)

1-100 of 597



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# Databases & Portals

- Simple searches by taxonomy



Search

Publishers

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Resources ▾

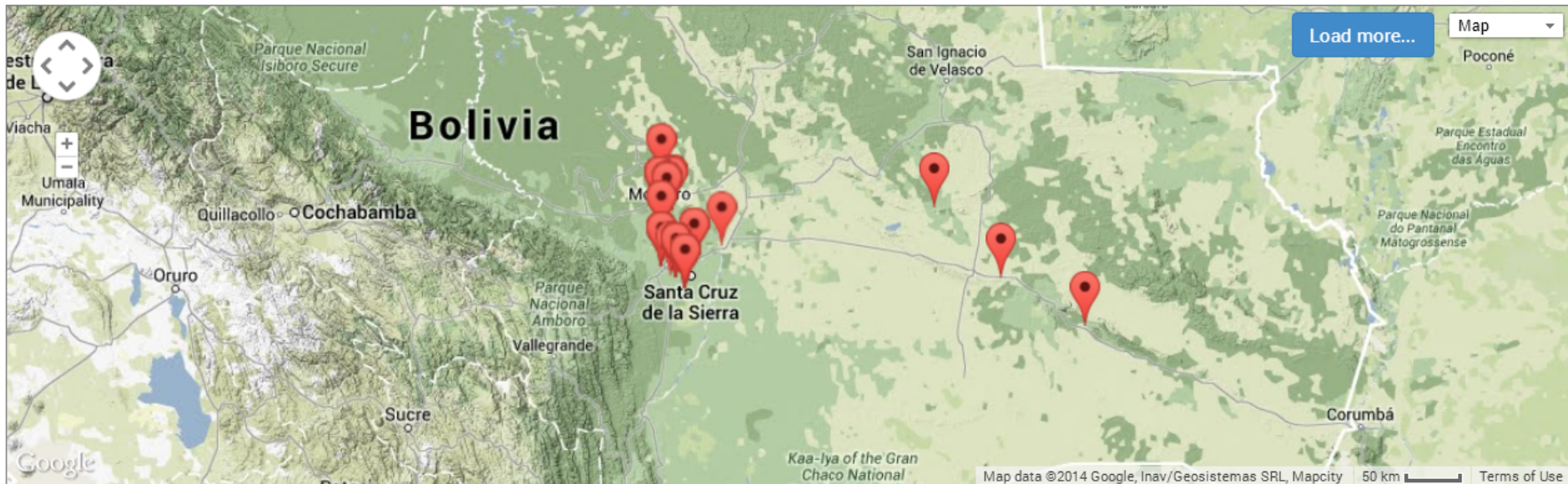
About ▾

Feedback ▾



Login

1-100 of 597



# Databases & Portals

- Simple searches by taxonomy



## Search VertNet

Ctenomys boliviensis

More search options



Table

Map

1-100 of 597



**Pro tip!** Click on a table row to see the full occurrence details.



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# Databases & Portals

- Simple searches by taxonomy
- More complex searches by geography, collector, or date

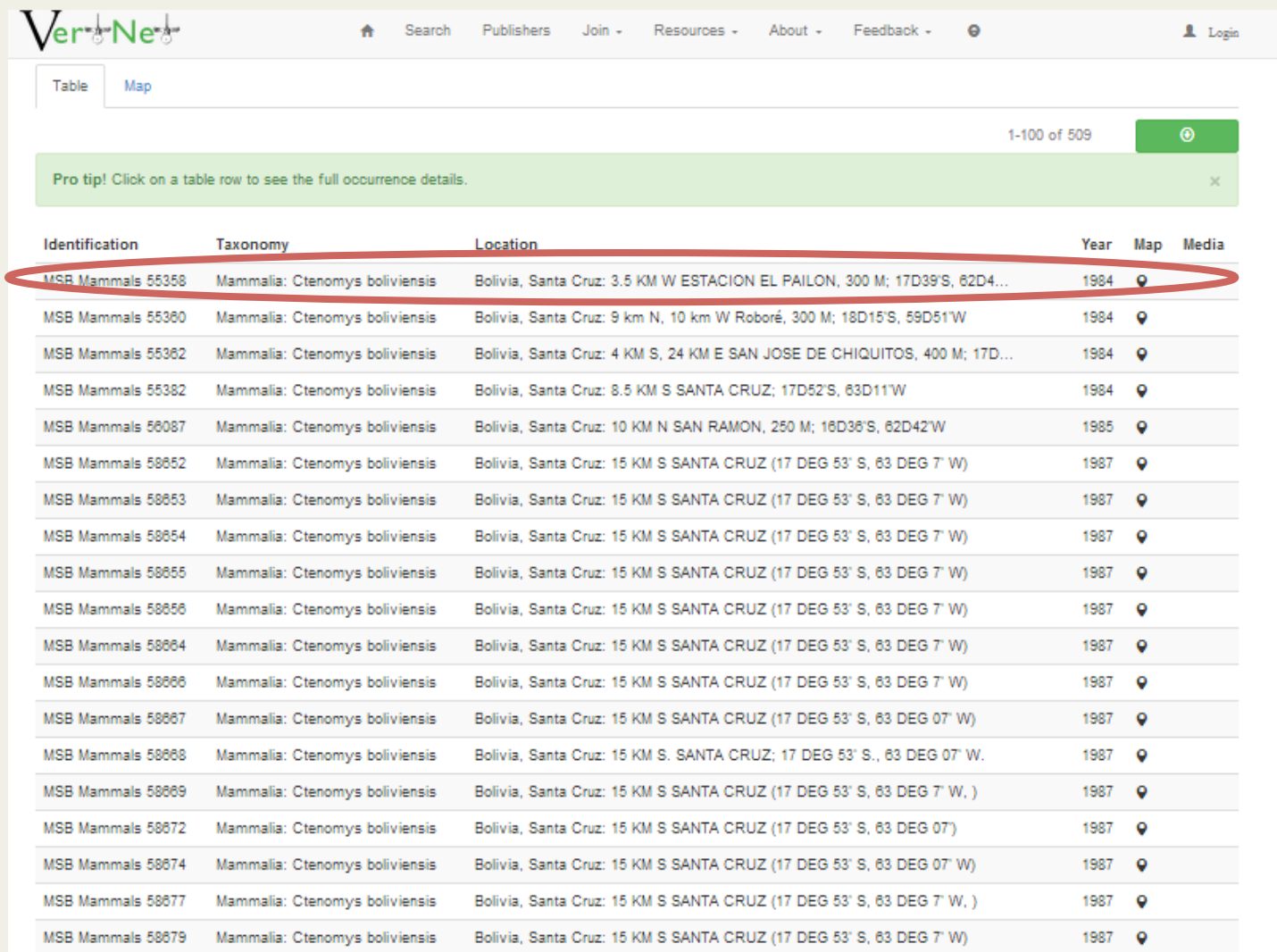
The screenshot displays the VertNet search interface. At the top, the VertNet logo is on the left, and navigation links for Home, Search, Publishers, Join, Resources, About, Feedback, and Login are on the right. Below the navigation is the 'Search VertNet' header. The main search area is a large white box with a blue search button on the right. Inside this box, there are several sections for search options:

- Search options**: A title for the search filter panel.
- Find occurrences with...**: A section for selecting filters. The filters are:  Has tissues,  Has media,  Has type status,  Is mappable, and  In circle on map.
- All these words**: A text input field containing 'Cook'.
- Exact phrase**: A text input field containing '"butorides virescens"'. The quotes are visible in the input.
- Any of these words**: A text input field containing 'tissue OR preserved'.
- None of these words**: A text input field containing 'NOT bufo NOT california'.
- Record type**: A dropdown menu currently set to 'Specimen'.
- Darwin Core terms**: A grid of input fields for Darwin Core terms: InstitutionCode, CatalogNumber, RecordedBy, Class, Ctenomys, boliviensis, Bolivia, StateProvince, and County.
- Years ranging from**: Two input fields for years, '1888' and '1922', with 'to' between them.
- Sorted by**: A dropdown menu currently set to 'No sort'.

There are two blue search buttons: one on the right side of the search options panel and one at the bottom left of the panel.

# Databases & Portals

- Simple searches by taxonomy
- More complex searches by geography, collector, or date



VertNet

Search Publishers Join Resources About Feedback

Table Map

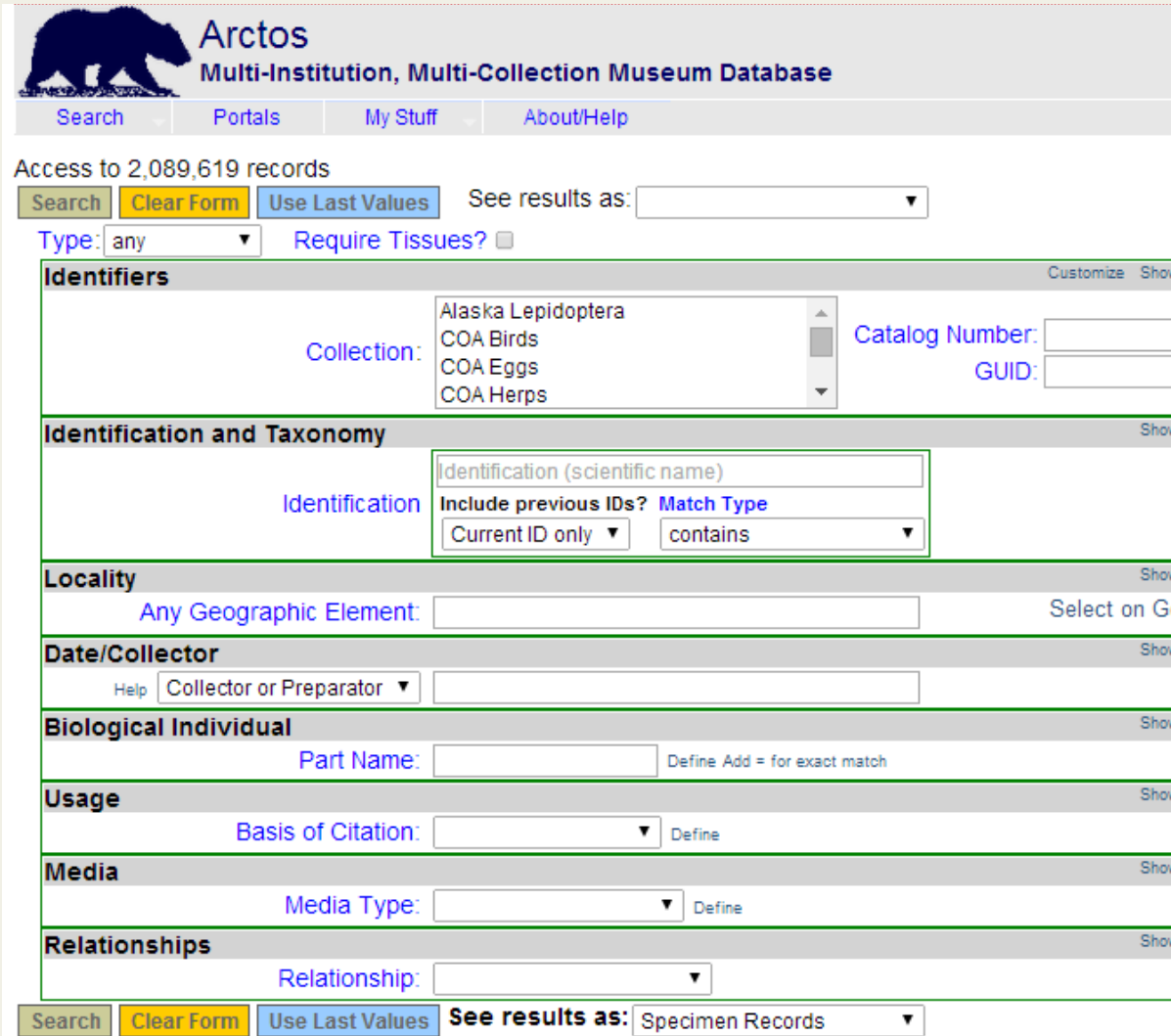
1-100 of 509


Pro tip! Click on a table row to see the full occurrence details.

Identification	Taxonomy	Location	Year	Map	Media
MSB Mammals 55358	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 3.5 KM W ESTACION EL PAILON, 300 M; 17D39'S, 62D4...	1984	📍	
MSB Mammals 55360	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 9 km N, 10 km W Roboré, 300 M; 18D15'S, 59D51'W	1984	📍	
MSB Mammals 55362	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 4 KM S, 24 KM E SAN JOSE DE CHIQUITOS, 400 M; 17D...	1984	📍	
MSB Mammals 55382	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 8.5 KM S SANTA CRUZ; 17D52'S, 63D11'W	1984	📍	
MSB Mammals 56087	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 10 KM N SAN RAMON, 250 M; 16D36'S, 62D42'W	1985	📍	
MSB Mammals 58652	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	
MSB Mammals 58653	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	
MSB Mammals 58654	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	
MSB Mammals 58655	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	
MSB Mammals 58656	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	
MSB Mammals 58664	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	
MSB Mammals 58666	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	
MSB Mammals 58667	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 07' W)	1987	📍	
MSB Mammals 58668	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S. SANTA CRUZ; 17 DEG 53' S., 63 DEG 07' W.	1987	📍	
MSB Mammals 58669	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W, )	1987	📍	
MSB Mammals 58672	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 07')	1987	📍	
MSB Mammals 58674	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 07' W)	1987	📍	
MSB Mammals 58677	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W, )	1987	📍	
MSB Mammals 58679	Mammalia: Ctenomys boliviensis	Bolivia, Santa Cruz: 15 KM S SANTA CRUZ (17 DEG 53' S, 63 DEG 7' W)	1987	📍	

# Databases & Portals

- Simple searches by taxonomy
- More complex searches by geography, collector, or date
- Additional links and media



 **Arctos**  
Multi-Institution, Multi-Collection Museum Database

Search Portals My Stuff About/Help

Access to 2,089,619 records

Search Clear Form Use Last Values See results as:

Type: any Require Tissues?

**Identifiers** Customize Show

Collection:   
COA Birds  
COA Eggs  
COA Herps

Catalog Number:   
GUID:

**Identification and Taxonomy** Show

Identification   
Include previous IDs? [Match Type](#)  
Current ID only  contains

**Locality** Show

Any Geographic Element:  Select on Go

**Date/Collector** Show

Help Collector or Preparator

**Biological Individual** Show

Part Name:  Define Add = for exact match

**Usage** Show

Basis of Citation:  Define

**Media** Show

Media Type:  Define

**Relationships** Show

Relationship:

Search Clear Form Use Last Values See results as: Specimen Records

# Databases & Portals

- Simple searches by taxonomy
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**DENVER MUSEUM OF NATURE & SCIENCE DMNS Mammals**


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**DMNS Mammals 10995** **Spanish Peaks, Cordova Pass, FS415, campground at pass** liver (frozen); baculum; skeleton; heart, kidney (frozen)  
*Tamias minimus operarius* North America, United States, Colorado, Huerfano County  
 30 August 2006

[<< Return to results](#)

[\[ Report Bad Data \]](#)  
[Mammal Database](#)

first prevnext last  
 Record 1 of 10



[Tamias minimus operarius](#)  
 Animalia Chordata Mammalia Rodentia Sciuridae Sciurinae Tamias minimus operarius  
 Identified by John R. Demboski on 2006-08-30  
 Nature of ID: expert

[Tamias minimus](#)  
 sensu [Reid et al. 2012](#)  
 Identified by John R. Demboski, Jack M. Sullivan, Noah Reid  
 Nature of ID: molecular data  
 Remarks: ID from citation in Reid et al. 2011.

**Identifiers**

DZTM: Denver Zoology Tissue Mammal: 006  
 GenBank: [JN042608](#)  
 GenBank: [JN042841](#)  
 GenBank: [JN042491](#)  
 GenBank: [JN042842](#)  
 GenBank: [JN042607](#)  
 GenBank: [JN043073](#)  
 GenBank: [JN043074](#)  
 GenBank: [JN042210](#)  
 GenBank: [JN042211](#)

**Citations**

voucher of [Tamias minimus Reid et al. 2012](#)

**Determination Type:** accepted place of collection  
assigned by John R. Demboski on 2006-08-30

Higher Geography: North America, United States, Colorado, Huerfano County  
 Specific Locality: Spanish Peaks, Cordova Pass, FS415, campground at pass  
 Habitat: coniferous forest at treeline  
 Collecting Method: Sherman Trap  
 Collecting Source: wild caught  
 Event Date: 2006-08-30  
Verbatim Date: 30 August 2006

[Details](#)

Part Name	Condition	Qty	Remarks
baculum	unchecked	1	
heart, kidney (frozen)	unchecked	1	M1-11
liver (frozen)	unchecked	1	M1-12
skeleton	unchecked	1	

**sex:** male  
John R. Demboski, 2006-09-23

**Std. Meas.**

total length	tail length	hind foot	ear	weight

# Databases & Portals

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 GenBank: [JN042607](#)  
 GenBank: [JN043073](#)  
 GenBank: [JN043074](#)  
 GenBank: [JN042210](#)  
 GenBank: [JN042211](#)

Citations

voucher of [Tamias minimus Reid et al. 2012](#)

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Username   or

DENVER MUSEUM OF NATURE & SCIENCE DMNS Mammals

Search Portals My Stuff

**DMNS Mammals 10995**  
*Tamias minimus operarius*  
[<< Return to results](#)



[\[ Report Bad Data \]](#)  
[Mammal Database](#)

first prevnext last  
Record 1 of 10

Canada  
United States  
Mexico

[Details](#)

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Citations  
voucher of [Tamias minimus Reid et al. 2012](#)

Determination Type: accepted place name  
assigned by John R. Demboski

Higher Geography: North America  
Specific Locality: Spanish Peaks  
Habitat: coniferous forest  
Collecting Method: Sherman Trap  
Collecting Source: wild caught  
Event Date: 2006-08-30  
Verbatim Date: 30 Aug 2006

weight

# Databases & Portals

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 Record 1 of 10



[Tamias minimus operarius](#)  
 Animalia Chordata Mammalia Rodentia Sciuridae Sciurinae Tamias minimus operarius  
 Identified by John R. Demboski on 2006-08-30  
 Nature of ID: expert

[Tamias minimus](#)  
 sensu Reid et al. 2012  
 Identified by John R. Demboski, Jack M. Sullivan, Noah Reid  
 Nature of ID: molecular data  
 Remarks: ID from citation in Reid et al. 2011

**Citations**  
 voucher of [Tamias minimus Reid et al. 2012](#)

**Determination Type:** accepted place of collection  
assigned by John R. Demboski on 2006-08-30  
 Higher Geography: North America, United States, Colorado, Huerfano County  
 Specific Locality: Spanish Peaks, Cordova Pass, FS415, campground at pass  
 Habitat: coniferous forest at treeline  
 Collecting Method: Sherman Trap  
 Collecting Source: wild caught  
 Event Date: 2006-08-30  
Verbatim Date: 30 August 2006

**Identifiers**  
 DZTM: Denver Zoology Tissue Mammal: 006  
 GenBank: [JN042608](#)  
 GenBank: [JN042841](#)  
 GenBank: [JN042491](#)  
 GenBank: [JN042842](#)  
 GenBank: [JN042607](#)  
 GenBank: [JN043073](#)  
 GenBank: [JN043074](#)  
 GenBank: [JN042210](#)  
 GenBank: [JN042211](#)

**Details**

Part Name	Condition	Qty	Remarks
baculum	unchecked	1	
heart, kidney (frozen)	unchecked	1	M1-11
liver (frozen)	unchecked	1	M1-12
skeleton	unchecked	1	

**sex:** male  
John R. Demboski, 2006-09-23  
**Std. Meas.**  

total length	tail length	hind foot	ear	weight

# Other Specimen Resources

Some tools incorporate specimen and other types of data.

The screenshot shows the MOL (Map of Life) website. At the top left is the logo, which consists of a blue circle with a white stylized tree and the text "MOL" in large blue letters above "MAP OF LIFE" in smaller blue letters. To the right of the logo are navigation links: "home", "contact us", and "log in", followed by a search bar with a magnifying glass icon. Below the navigation is a green horizontal bar. Underneath is a white box containing the following statistics: "55 Datasets", "971,132 Species", and "366,953,945 Records". A large green curly bracket groups these statistics and points to the text "One Searchable Map". The background of this section is a faint map of North America with green dots indicating species locations. Below this are two orange-bordered boxes. The left box is titled "Map species" and contains a close-up photograph of a brown frog. The right box is titled "Find species by location" and contains a photograph of a herd of elephants in a savanna with a large mountain in the background.

home contact us log in

**MOL**  
MAP OF LIFE

*Putting biodiversity on the map*

55 Datasets  
971,132 Species  
366,953,945 Records } One Searchable Map

Map species

Find species by location



# Other Specimen Resources

Some tools incorporate specimen and other types of data.

The screenshot displays the MOL (Map of Life) web application interface. At the top, the MOL logo is on the left, and navigation tabs for 'Species Info', 'Map a Species', 'Species Lists by Location', 'About MOL', 'News', and 'Help' are on the right. The 'Map a Species' tab is active. A search bar contains 'Scotinomys teguina' with a 'Go' button. Below the search bar, there are filters for Name, Source, and Type. The 'Name' filter is set to 'All'. The 'Source' filter is set to 'All', with 'GBIF' and 'Scientist/ literature' visible. The 'Type' filter is set to 'All', with 'Point observation' and 'Local inventory' visible. A 'Layers' panel is open, showing search results for 'Scotinomys teguina'. The results table is as follows:

Name	Records	Locations	Actions
Scotinomys teguina Alston's Brown Mouse, Short...	326 records	55 locations	<input checked="" type="checkbox"/>
Scotinomys teguina Alston's Brown Mouse, Short-Tailed Sing...	2 features		<input type="checkbox"/>
Scotinomys teguina Alston's Brown Mouse, Short-Tailed Sing...	1 features		<input type="checkbox"/>
Scotinomys teguina Alston's Brown Mouse, Short-Tailed Sing...	5 features		<input checked="" type="checkbox"/>
Scotinomys teguina Alston's Brown Mouse, Short-Tailed Sing...	263 features		<input type="checkbox"/>

Buttons for 'Map Selected Layers' and 'Clear Results' are at the bottom of the results panel. The map shows a distribution of red dots across Venezuela, Colombia, and Ecuador. The base map is set to 'Basic'. At the bottom, it says 'Map data ©2014 Google, INEGI, Inav/Geosistemas SRL, Mapcity Terms of Use'.

# Other Specimen Resources

Some tools incorporate specimen and other types of data.

The image shows the MOL (Map of Life) web interface. At the top left is the MOL logo with the text "MAP OF LIFE". To its right are navigation buttons: "Species Info" (with a "FI 24" icon), "Map a Species" (with a "FO 41" icon), and "Species Lists by Location" (with a "FO CB" icon). Further right are links for "About MOL", "News", and "Help". Below the navigation bar is a search bar with a "Search" button and a play icon. A "Layers" dropdown menu is also visible. The main area is a map of Central and South America, with a green shaded region covering parts of Mexico, Central America, and northern South America. Numerous red dots are scattered across this green region, representing specimen locations. The map includes labels for countries like Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, and Ecuador. At the bottom left, there is a "Base Map" selector with options: "Basic", "Political", "Roadmap", "Terrain", and "Satellite". The Google logo is in the bottom left corner, and "Map data ©2014 Google, INEGI, Inav/Geosistemas SRL, Mapcity Terms of Use" is in the bottom right corner.

# Types of Investigations

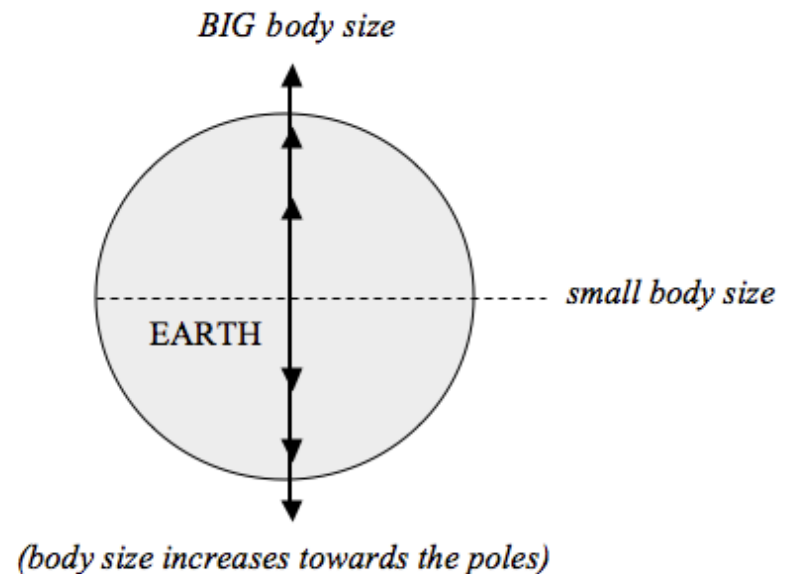
Species distributions through time

Biogeographic/ecologic rules

Invasive species

Phenology, phenological shifts

## BERGMANN'S RULE



# Citizen Science Initiatives

iNaturalist

Zooniverse – Notes from Nature

Project BudBurst



**Explore!**  
Your World!



**Learn!**  
About Life!



**Record!**  
Add Observations!

Welcome!

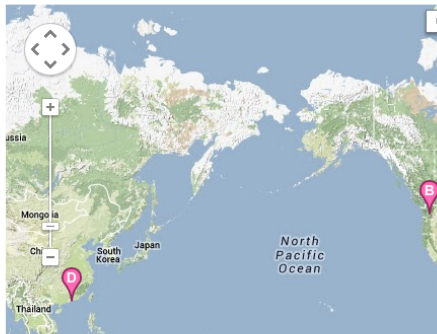
to **iNaturalist.org**, where you can **record** what you see in nature, **meet** other nature lovers, and **learn** about the natural world.

[Learn More »](#)

[Sign Up!](#)

## Recent additions

- A Bobcat**  
Observer: lmenaturalist  
Date: June 5, 2014  
Date added: June 09, 2014  
[View »](#)
- B Clintonia uniflora**  
Observer: podiceps  
Date: June 5, 2014  
Date added: June 09, 2014  
[View »](#)
- C Something...**  
Observer: delphinium  
Date: June 17, 2014



Project BudBurst  
Timing is Everything!

Get Started Observing Plants Partners Education Science Data My BudBurst

BudBurst Home

Join Project BudBurst's Summer Solstice Snapshot

Share Your Summer...

Summer Solstice Snapshot Representative Polaris Register for Summer PD Certified Instructors

People watching plants

Notes from Nature

COLLECTIONS ABOUT DISCUSS BLOG

Transcribe museum records to

# TAKE NOTES FROM NATURE

WELCOME GUEST! LOGIN

START TRANSCRIBING

People watching plants  
Contributing to research  
Join Project BudBurst

Get Started!

Newsletter Signup

Recent Reports

- First Flower on May 7  
vine maple in Seattle, WA  
Submitted on Jun 9
- All Leaves Unfolded on May 7  
vine maple in Seattle, WA  
Submitted on Jun 9
- First Leaf on Apr 16

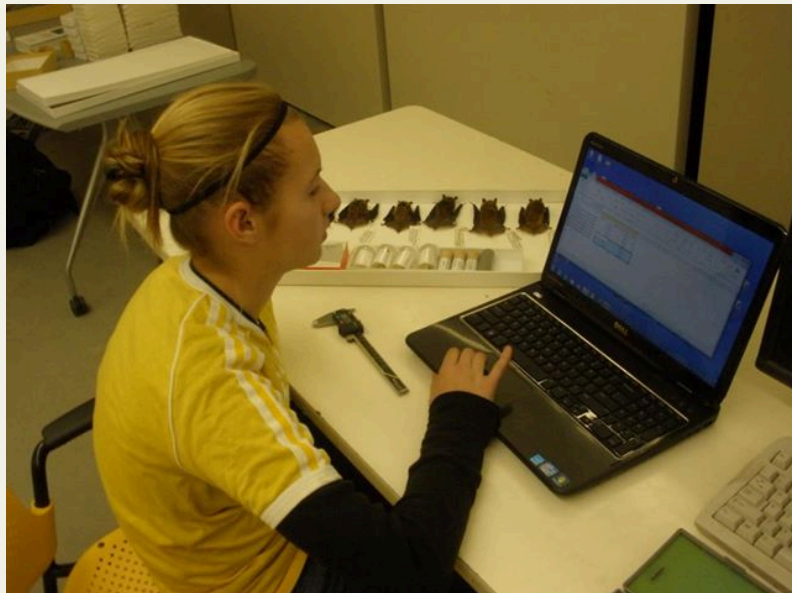
# Challenges

Databases and collections not originally developed for education

- databases developed for collection management
- collections developed and used for research

Specimen & data availability

- data not available to address many types of questions



# Challenges

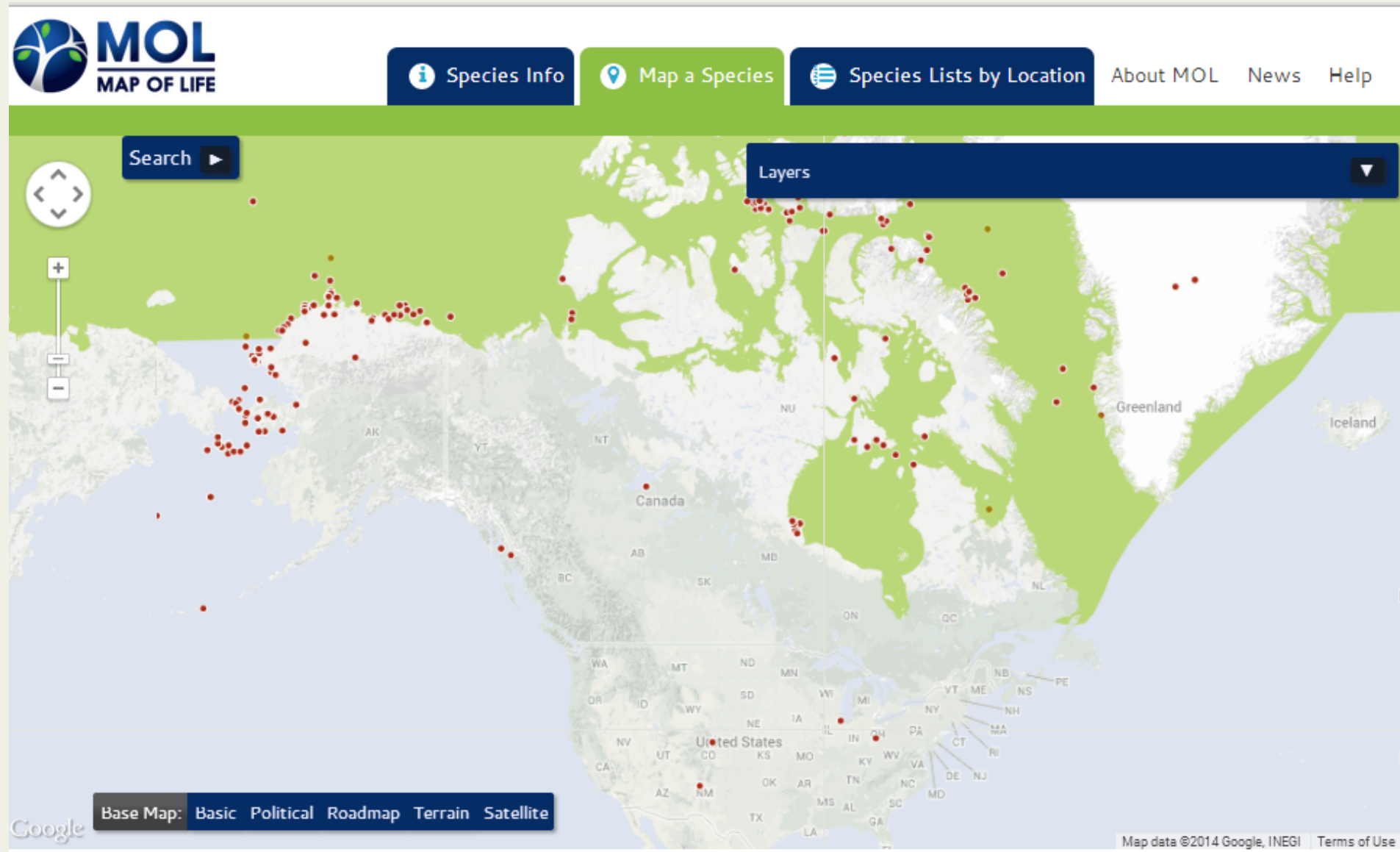
Educators & students are not aware of existence and value of collections.

Accessing and using databases can be tricky.

- sometimes need certain browsers
- databases go down
- learning curve for how to do searches
- using downloaded data usually requires clean-up and verification

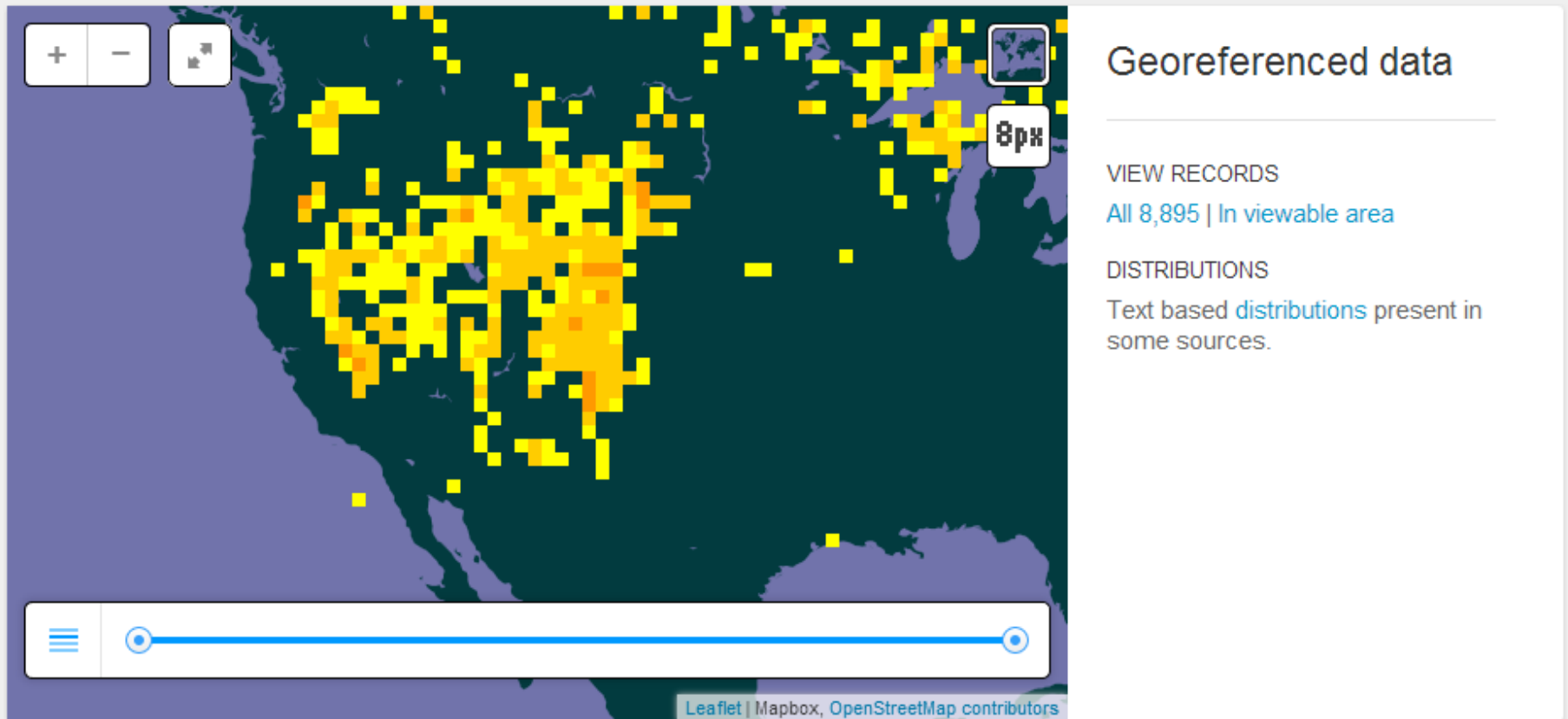
# Challenges

## Map of Life – *Ursus maritimus*



# Challenges

## GBIF – *Tamias minimus*





# Benefits

Most classrooms have internet access.

Using on-line (specimen) data allows

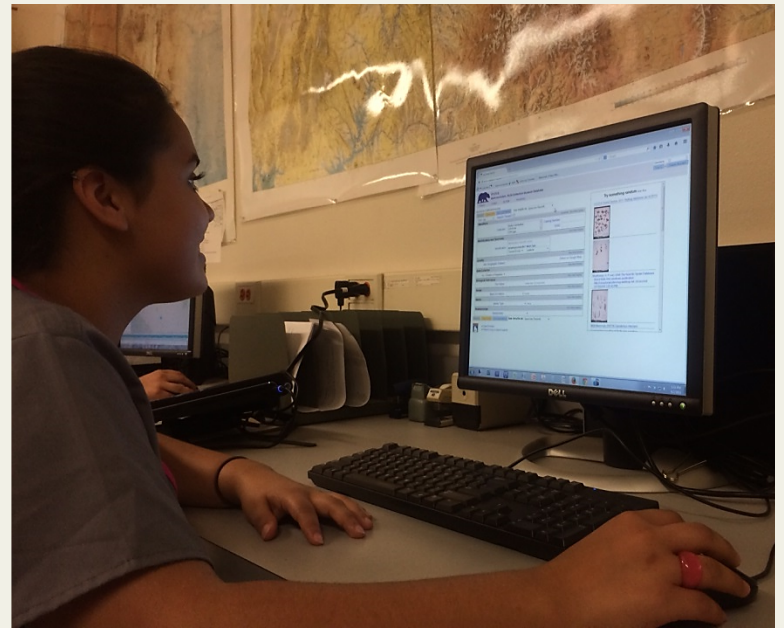
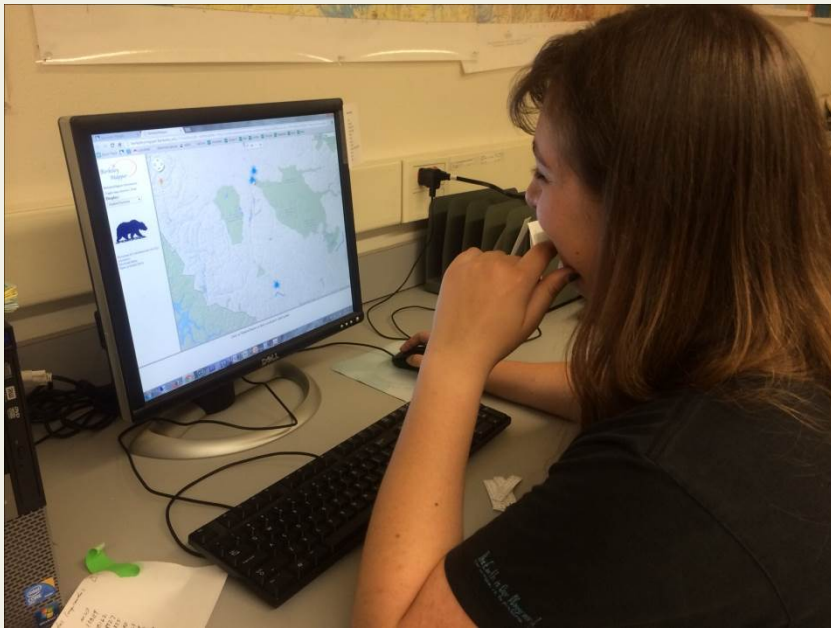
- student access to real data
- inquiry-driven education
- addressing questions of local significance



# Benefits

Natural history collection data is real, can be verified, and interesting.

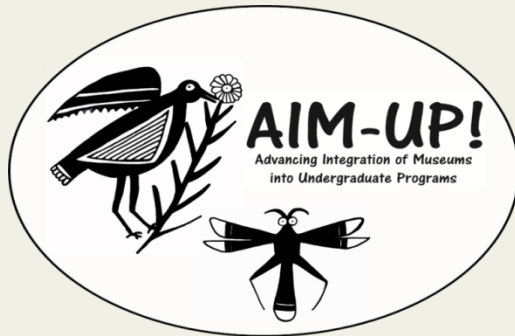
Students learn the limits of data, the importance of data quality, and critical thinking about what the data mean.



# Funding and Participation



National Science Foundation  
Grant 0956129



University of New Mexico; University of Alaska, Fairbanks; Harvard University; University of California, Berkeley; Texas A&M University; City University of New York; Occidental University; University of Nevada, Reno; Arizona State University; University of Ohio; Florida Natural History Museum; University of Illinois, Champaign-Urbana; College of Southern Nevada; Northern Michigan University; University of Michigan; Massachusetts College of Liberal Arts; University of Colorado, Boulder; Denver Museum of Nature & Science; United States Geological Survey; United States Department of Agriculture