NATURAL HISTORY RESEARCH COLLECTIONS: USE AND VALUE

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Outline

- Museum of Southwestern Biology
- Introduction to research natural history collections
- Role of natural history collections today

Museum of Southwestern Biology Division of Mammals

- >250,000 specimens
- 5th largest mammal collection world-wide.
- Largest collection of frozen mammalian tissues world-wide.
- Fully web accessible database (Arctos)
  - http://arctos.database.museum/SpecimenSearch.cfm

http://www.facebook.com/MSBDivisionofMammals

Breadth of Collection

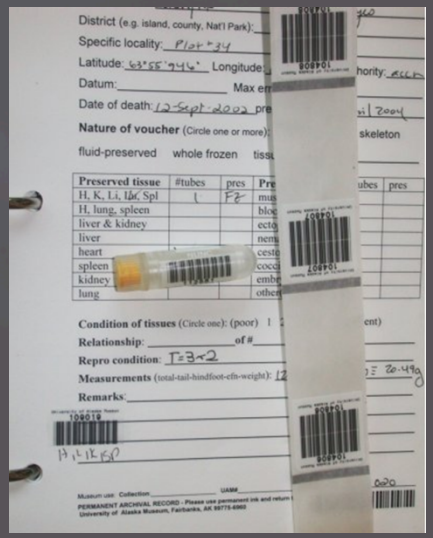
- **GEOGRAPHIC** - World-wide in scope (71 countries)
  - North America , Asia, Europe, and Latin America.
- **TAXONOMIC** - 26 orders, 104 families, >500 genera, >1,400 species
  - Rodentia (180,000), Chiroptera (25,000), Carnivora (11,500), and Soricomorpha (7,500).
- **TEMPORAL** - 1890-present; majority from 1950's on.
- **MATERIALS AVAILABLE**
  - Skin, skull, post-cranial skeletal, fluid preserved whole organisms
  - Frozen tissue (heart, kidney, liver, lung, spleen, muscle), cell suspensions, karyotype test slides
  - Parasites (endo and ecto).

Collection Statistics - Past 5 years

- **LOANS**
  - Ca. 400 loans of 20,000 specimens provided to researchers worldwide.
- **PUBLICATIONS CITING MSB SPECIMENS -**
  - Ca. 200 peer reviewed publications and dissertation/theses
- **VISITORS**
  - Over 200 researchers and managers
  - 700 other visitors
- **EDUCATIONAL USE**
  - Over 50 UNM courses
  - Over 30 K-12 schools have visited the collections and received lectures or presentations
  - Grad student projects
  - Undergrad AIM-UP, UnO
  - Public outreach

What is a Voucher Specimen?

- Skin/skeleton/whole organism
  - Evolved to include tissue/parasites/karyotypes
- Precise locality information (GPS coord)
- Collection date
- Reproductive info, measurement data
- Ecological data



What is a Research Natural History collection?

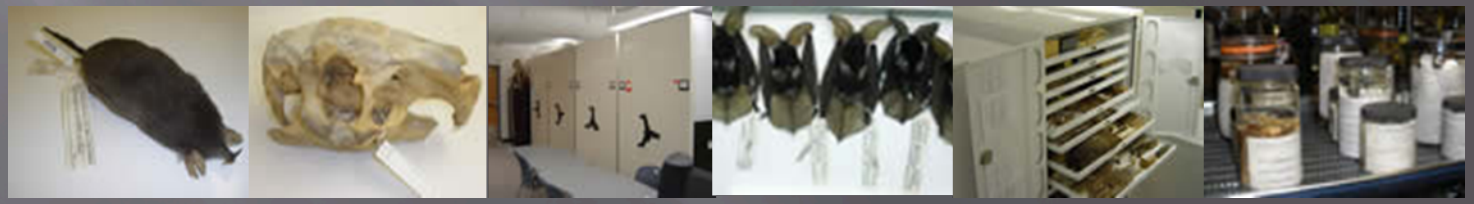
Collection of voucher specimens and their associated data which are invaluable and irreplaceable

- Organized taxonomically and geographically
- Temporal and spatial record of biodiversity on earth
- Provide a continuous record of biotic changes over the last few hundred years

- "Vouchers" past research and archives material for future use
- Foundation of biological nomenclature
- Basis of taxonomic science for centuries
- Basis for identification
- Tools for teaching

Museum Specimens - Historic Conditions

- **Disease screening**
  - Emergent pathogens
  - Historical/baseline infection rates
- **Stable-isotope ecology**
  - predator/prey
  - seasonal diet shifts
  - primary productivity
- **Toxins**
  - mercury, lead, radioactivity
- **Molecular genetics**
  - Identify individuals, populations, species



Significant questions are centered on our ability to assess change.

- Climate change
- Habitat conversion
- Pollutants
- Emerging pathogens
- Introduction of exotics
- Loss of biotic diversity

- Baseline or historic information is crucial to documenting changing environments.
- New questions
- New technology

Role of museums today

- Protect and preserve historic material
- Grow the collections
- Integrate diverse data sets
- Make data available
- Do research
- Track specimen use
- Train future generations of environmental scientists

Role of museums today

- Protect and preserve the material we have
- Specimens preserved in perpetuity if we do our job

Darwin's Mockingbirds and finches from Galapagos

Geological specimen catalogues

Beetles from Australia

Beagle voyage 1831-1836

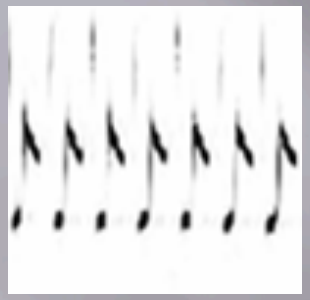
Role of museums today

- Continue to Grow
  - Large sample sizes
  - Taxonomically broad
  - Well distributed over time and space

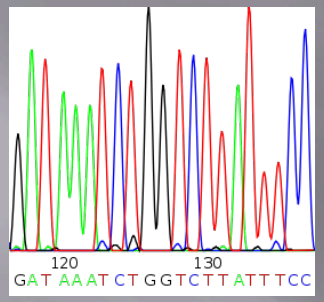
Role of museums today

- Facilitate Use and Availability
  - Connect managers, scientists, general public
  - Cyberinfrastructure for Informatics (GIS, GenBank)
  - ARCTOS
    - Data are archived in ARCTOS; a web accessible relational database

Breadth of Data Types in ARCTOS

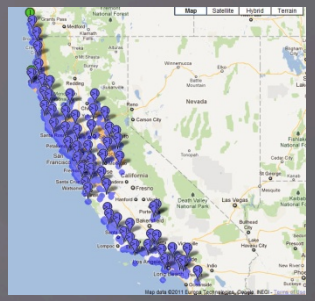


Audio



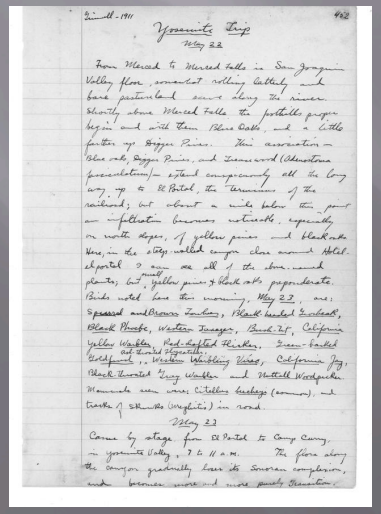
DNA

Relations



GIS

Projects/Pubs

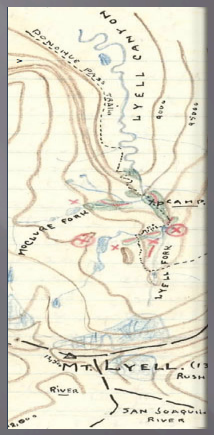


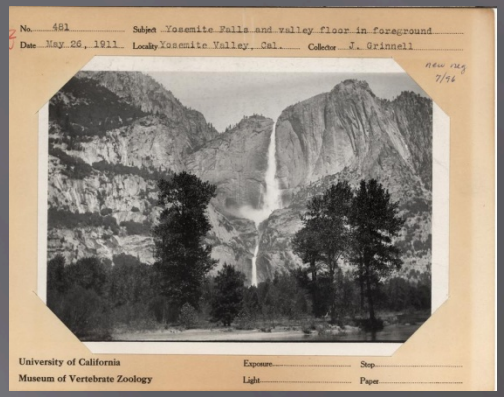
Yosemite Trip
May 22

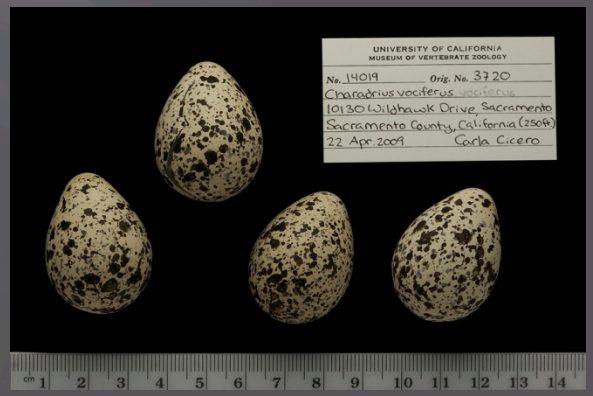
From Merced to Merced Falls in San Joaquin Valley floor, somewhat rolling latterly and bare pasturelands save along the rivers. Shortly above Merced Falls the foothills proper begin and with them Blue Oaks, and a little further up Digger Pines. This association of blue oak, digger pine, and foxtail (Alopecurus pratensis) extends conspicuously all the long way up to El Portal, the terminus of the railroad; but about a mile below this point an inflection becomes noticeable, especially on north slopes, of yellow pine and blackoak. Here, in the stage-haul canyon above Hotel El Portal ? were all of the above-named plants, but yellow pine & blackoak preponderate. Birds noted here this morning, May 23, are: Spotted and Brown Towhee, Black-headed Grosbeak, Black Phoebe, Western Tanager, Bank Sw., California Yellow Warbler, Red-shafted Flicker, Green-backed Goldfinch, Western Whistling Wren, California Jay, Black-throated Gray Warbler and Nuttall Woodpecker. Mammals seen were: Citellus beecheyi (common), and tracks of Skunks (Mephitis) in road.

May 23

Came by stage from El Portal to Camp Curry, in Yosemite Valley, 7 to 11 a.m. The flora along the canyon gradually loses its Sonoran complexion, and becomes more and more purely Transition.







Fieldnotes, Maps, and Images

Who Uses ARCTOS

- Academics (students, postdocs, profs.)
- Museum curators and researchers
- Federal and state agencies
- Non-government organizations
- Environmental consultants
- K-12 educators
- Artists

MSB Mammals 142639: Canis lupus baileyi - Mozilla Firefox

File Edit View History Bookmarks Tools Help

MSB Mammals 142639: Canis lupus baileyi | Capture a Screen Shot of your Desktop o...

arctos.database.museum/guid/MSB:Mamm:142639

screenshot windows

Edit | Post to Blog

Mammal Collection
Museum of Southwestern Biology

Log out jldunnum (Last login: 2012-07-10)

Search | Enter Data | Manage Data | Manage Arctos | Reports | Portals | My Stuff | About/Help

MSB Mammals 142639

NK: 116297

Canis lupus baileyi

<< Return to results

West of Chloride, Seventy Four Draw
North America, United States, New Mexico, Sierra County
27-May-2003

skin; skull; postcranial skeleton; muscle (frozen); muscle (frozen)

[Report Bad Data]
MSB Mammals
first prev next last
Record 240 of 791

Taxa | Accn | Locality | Agents | Relations | Parts | Part Locn. | Attributes | Other IDs | Media | Encumbrances

Edit

Canis lupus baileyi Nelson and Goldman, 1929
Animalia Chordata Mammalia Carnivora Caniformia Canidae Canis lupus baileyi
Identified by Jon L. Dunnum on 2008-08-01
Nature of ID: legacy

Canis lupus baileyi Nelson and Goldman, 1929
Animalia Chordata Mammalia Carnivora Caniformia Canidae Canis lupus baileyi
Identified by unknown on 2005-03-10
Nature of ID: legacy

Canis lupus Linnaeus, 1758
Animalia Chordata Mammalia Carnivora Caniformia Canidae Canis lupus
Lobo gris; domestic dog; gray wolf; grey wolf; loup; wolf; 狼
Identified by Paul J. Polechla on 2004-01-16
Nature of ID: expert

Edit

Determination Type: accepted place of collection
assigned by Andrew G. Hope on 2005-11-08
Higher Geography: North America, United States, New Mexico, Sierra County
Verbatim Locality: Chloride, West of, Seventy Four Draw
Specific Locality: West of Chloride, Seventy Four Draw
Event Remarks: 33*21'24"N, 107*53'23"W
Locality Remarks: Verbatim Coordinates: 33*21'24"N, 107*53'23"W
Collecting Source: wild caught
Event Date: 27-May-2003
Verification Status: unverified

Event Coordinates: 33d 21m 24s N/107d 53m 23s W
Datum: unknown
Original Coordinate Format: deg. min. sec.
Elevation: 7680 to 7680 ft
Error: 200 ft
Georeference Source: unknown
Georeference Protocol: not recorded

33.357,-107.890

Collectors
Edit
U. S. Fish and Wildlife Service Mexican Wolf Project, Colleen Buchanan

Identifiers
Edit
Mexican wolf studbook number: 592
NK: 116297
original identifier: SB592
preparator number: 2997

Edit

Part Name	Condition	Disposition	#	Label	Remarks
muscle (frozen)	unchecked	in collection	1		
muscle (frozen)	unchecked	in collection	1		
postcranial skeleton	good	in collection	1		
skin	unchecked; partial	in collection	1		mask only
skull	unchecked	in collection	1		

Edit
sex: female
unknown, 2004-01-16
Std. Meas.

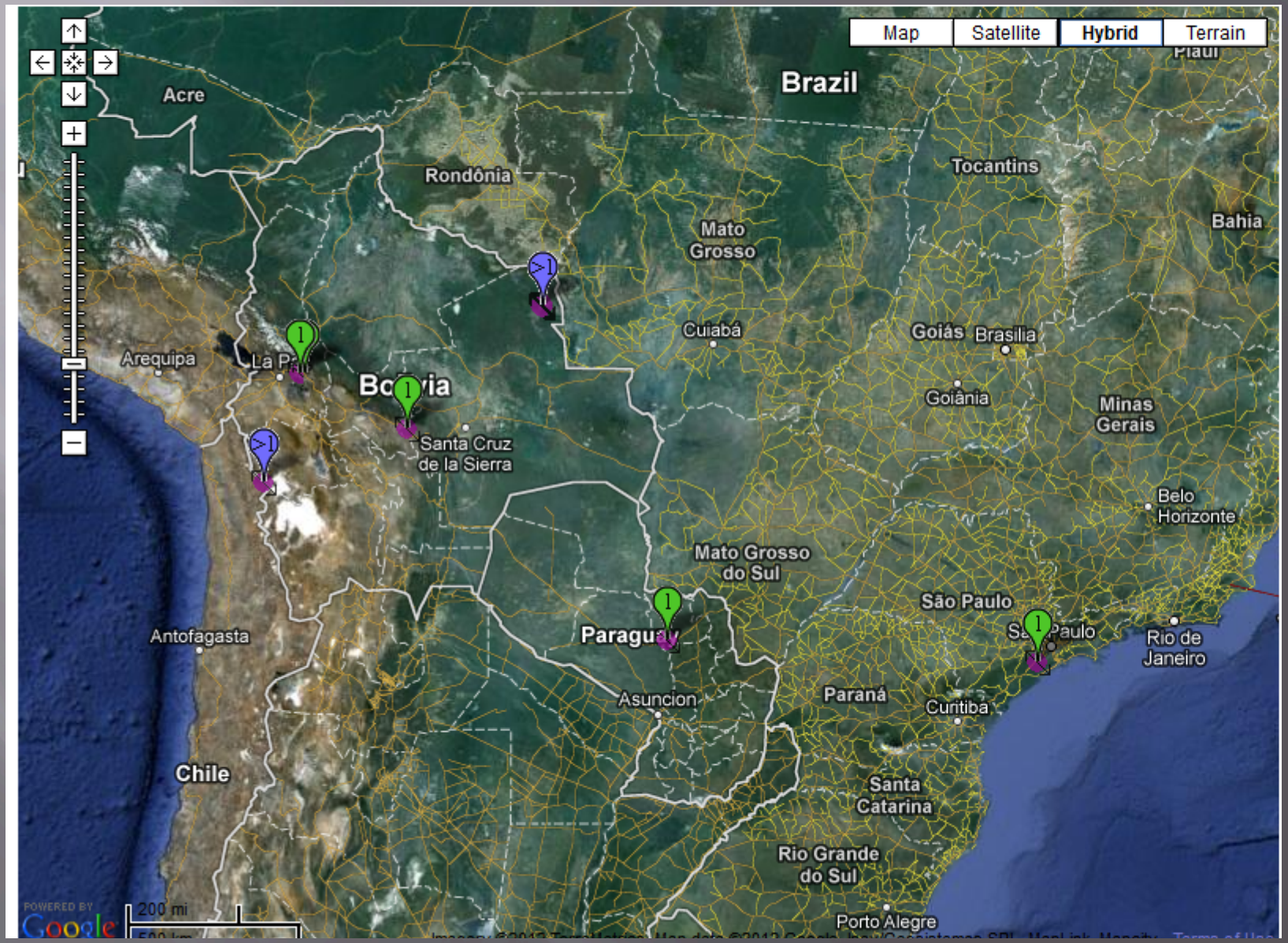
total length	tail length	hind foot	efn	weight
1462 mm	440 mm	233 mm	121 mm	23.2 kg

Edit
Remarks: National Wildlife Health Center #18677; Born 1 May 1999 in captivity, reintroduced into wild, euthanized for cattle killing; Mexican Wolf Studbook #F592
Entered By: Dusty L. McDonald on 2005-03-15
Last Edited By: GORDON on 2012-06-29

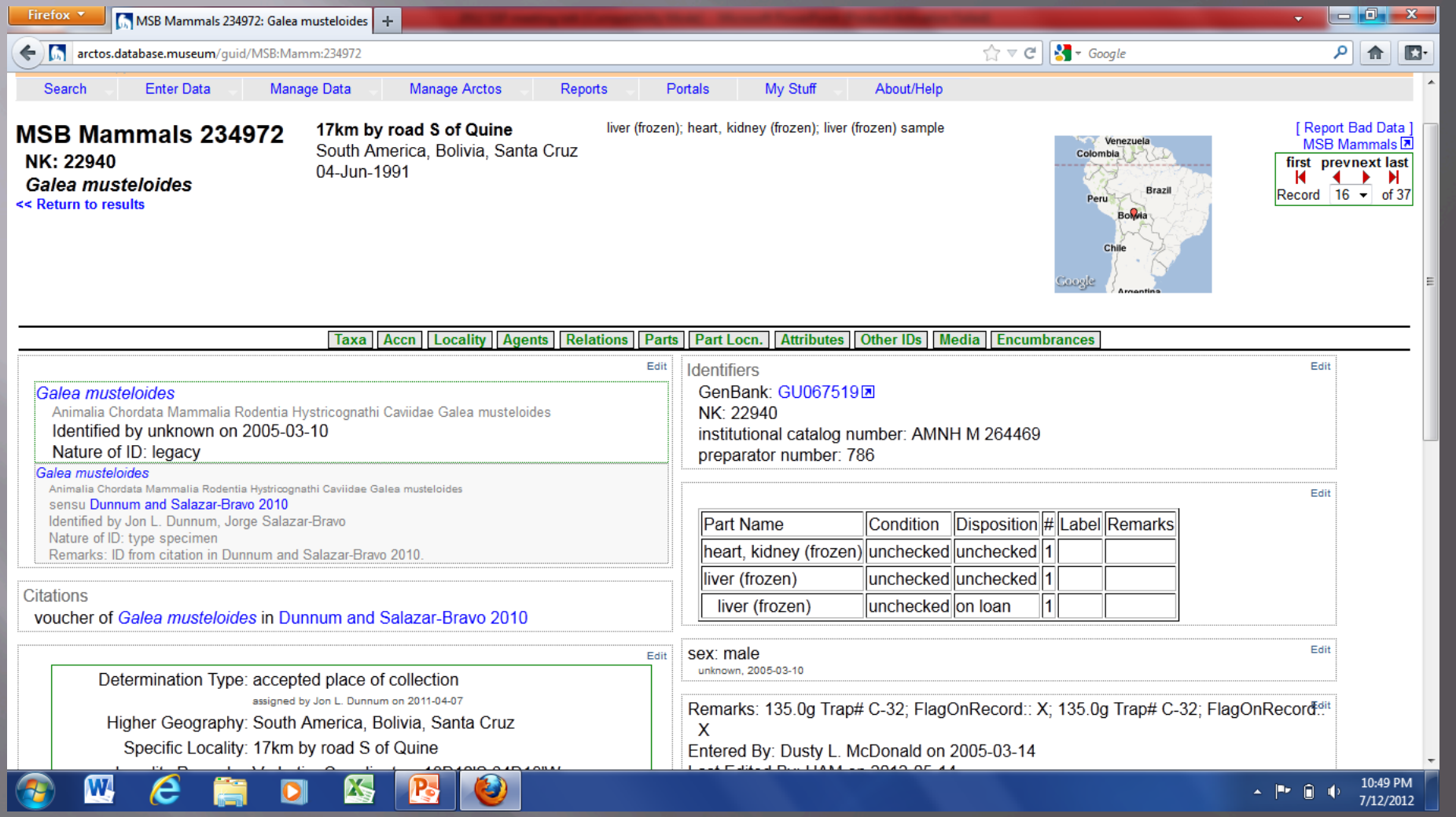
Accession
Edit
2004.950.Mamm

Usage
Contributed By Project: U.S. Fish & Wildlife Service Mexican Wolf Recovery Program

Mapping


Map
Satellite
Hybrid
Terrain
Brazil
Acre
Rondônia
Tocantins
Bahia
Mato Grosso
Cuiabá
Goiás
Brasilia
Goiânia
Minas Gerais
Arequipa
Santa Cruz de la Sierra
Belo Horizonte
Mato Grosso do Sul
São Paulo
Rio de Janeiro
Antofagasta
Asuncion
Paraná
Curitiba
Chile
Santa Catarina
Rio Grande do Sul
Porto Alegre
200 mi
Google

Citation and Genbank linkage



Link to Genbank page

NCBI Resources How To My NCBI Sign In

Nucleotide Nucleotide Search

Limits Advanced Help

Display Settings: GenBank Send:

Galea musteloides voucher AMNH264469 cytochrome b gene, complete cds; mitochondrial

GenBank: GU067519.1

FASTA Graphics PopSet

Go to:

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  AUTHORS   Dunnum,J.L. and Salazar-Bravo,J.
  TITLE     Phylogeny, evolution, and systematics of the Galea musteloides
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  JOURNAL   J. Mammal. 91 (1), 243-259 (2010)
REFERENCE   2  (bases 1 to 1140)
  AUTHORS   Dunnum,J.L. and Salazar-Bravo,J.
  TITLE     Direct Submission
  JOURNAL   Submitted (07-OCT-2009) Museum of Southwestern Biology, Division of
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```

Change region shown

Customize view

Analyze this sequence
- Run BLAST
- Pick Primers
- Highlight Sequence Features
- Find in this Sequence

LinkOut to external resources
- MSB Mammals 234972 [Arctos Specimen Database]

Related information
- Related Sequences
- PopSet
- Protein
- Taxonomy

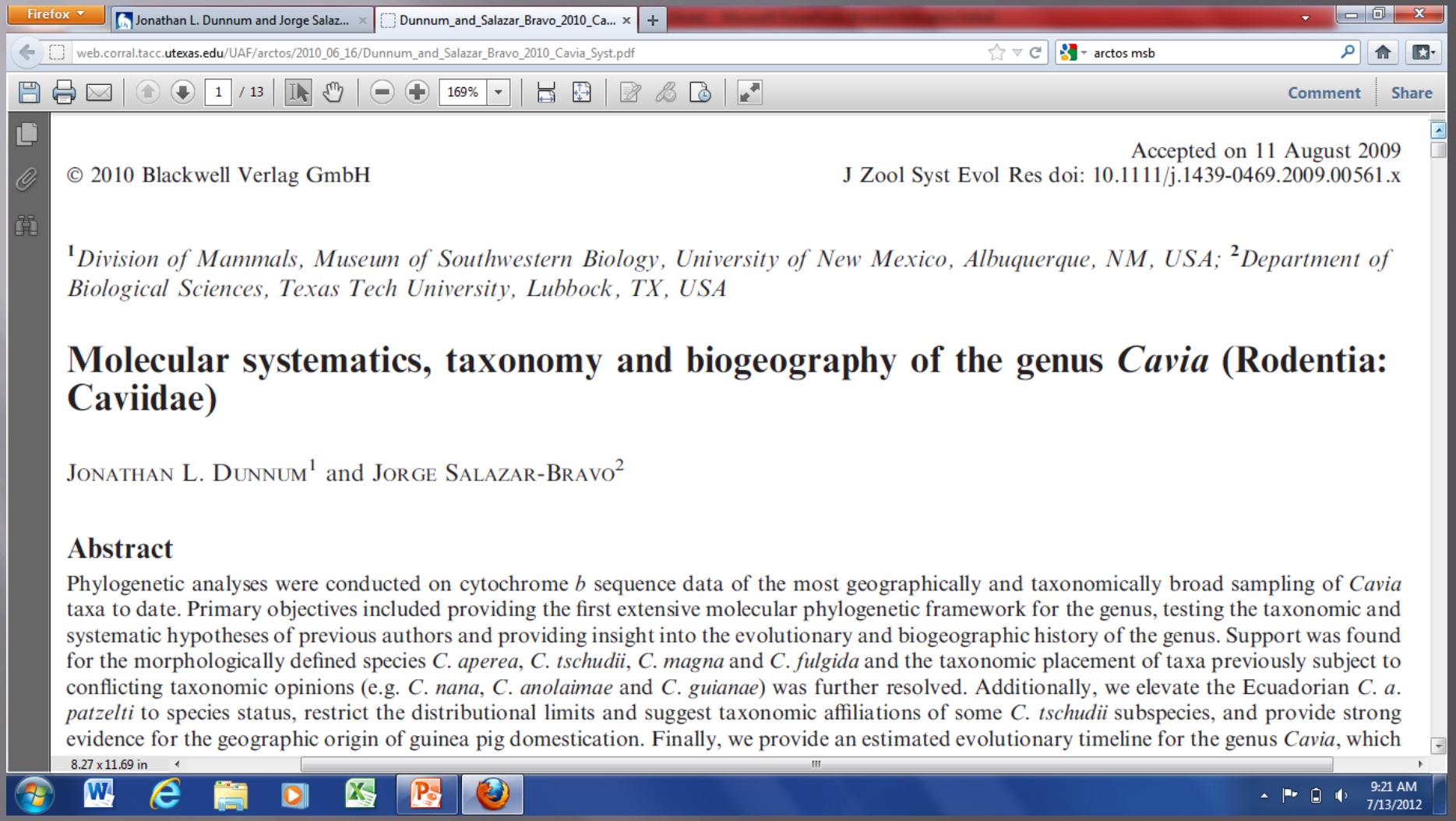
Recent activity

Turn Off Clear

Galea musteloides voucher AMNH264469 cytochrome b gene, complete cds; Nucleotide

See more...

Link to Publications



Role of museums today

- Cutting Edge Research and tracking specimen use

Good science is testable and repeatable !

NH collections provide a way to track past research and retest hypotheses

Role of museums today

- Train Future Investigators
- NH collections value depends on our ability to train the next generation of scientists to creatively explore, utilize and integrate these vast resources across disciplines and into critical science initiatives.
- Kayce's presentation

NH collections conclusions

- Still utilized for systematic and taxonomic questions
- Now relied upon to answer questions related to environmental change
- Primary resource that unequivocally documents historic conditions and provides critical baseline data.

"At this point, I wish to emphasize what I believe will ultimately prove to be the greatest value to our museum-and that is that the student of the future will have access to the original record of faunal conditions …. Right now are probably beginning changes to be wrought in the next few years vastly more conspicuous than those that have occurred in ten times that length of time preceding.“

-Joseph Grinnell (1912)