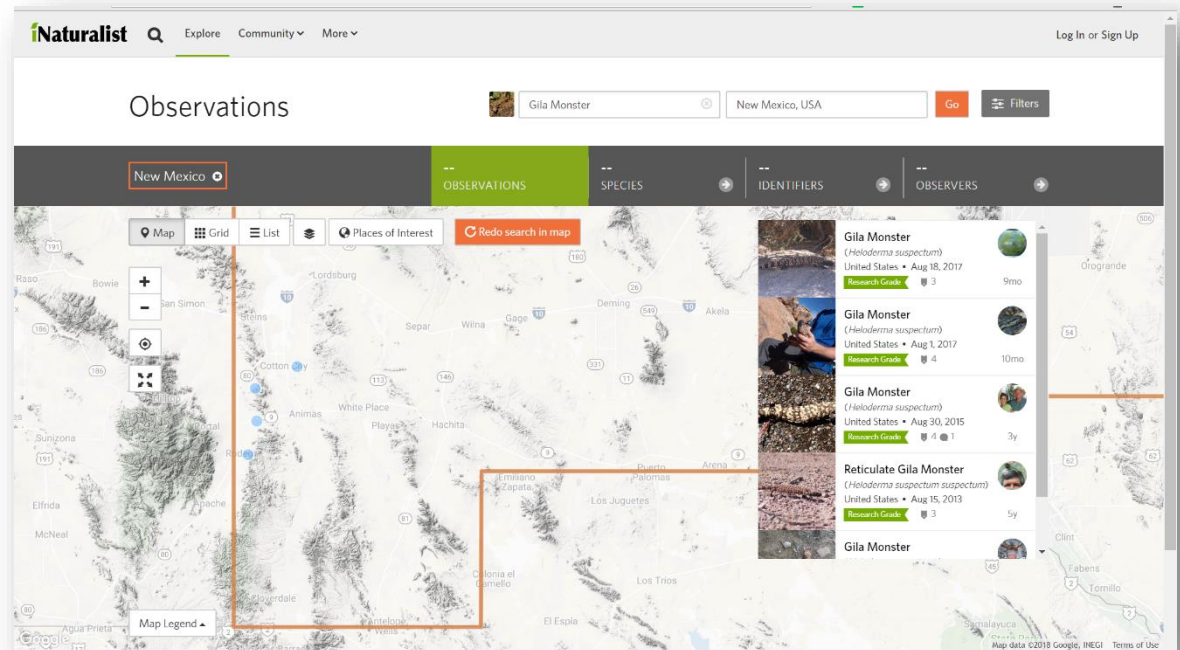


Lessons from both sides: challenges in providing and using data from specimens

J. Tomasz Giermakowski Museum of Southwestern Biology, University of New Mexico
Mason J. Ryan * Terrestrial Wildlife Branch, Arizona Game and Fish Department
Ian M. Latella Museum of Southwestern Biology, University of New Mexico

Outline

- Value of natural history specimens enhanced by data
 - Shift focus from documenting species to conserving species:
 - Availability: enhance and provide data to wide audiences
 - Quality: QA/QC and standardize data likely to be used repeatedly



Enhance and provide data

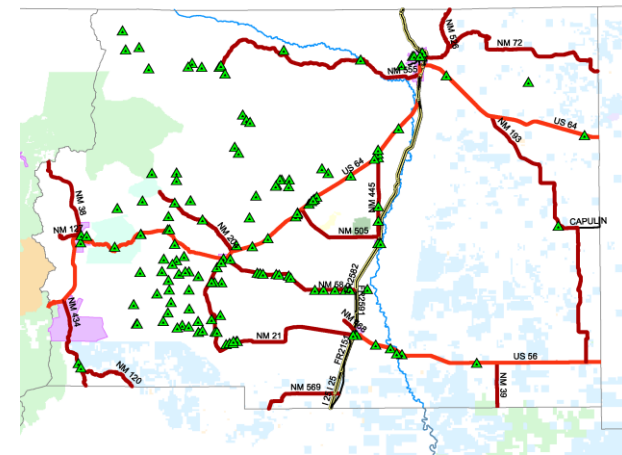
- Enhance specimen data

- Georeferencing
- Collection digitization
 - Specimen imaging
 - Scanning of original documentation
 - Transcription of field notes



provides context and allows for new approaches in applied research and conservation

Acc. No.	Species	Collector	Date	Locality	ESP No.
49320	<i>Rana caudescens</i>	C.W. Painter, C.G. Schmitt	17 Sep. 1986	Union Co.: Long Canyon, ~1/2 mi. upstream of Dry Cimarron River (T100-R11E-S14)	ESP 6494
49321	<i>Rana blairi</i>	"	18 Sep. 1986	" : Small pond beside Dry Cimarron River, NM 225, ~1/2 mi. w. jct. with US Hwy 251, Berg Ranch	ESP 6493
49322	<i>Rana celastriana</i>	"	1 Apr. 1986	" : Carrasco creek at NM/OK border, 4th Hwy. 325 bridge	ESP 6491
49323	"	"	"	OKlahoma: Cimarron Co.: Dry Cimarron River, ~ 7 km. downstream of 6th/3rd border, 4th Road	ESP 6492
49324	"	"	"	OKlahoma: Cimarron Co.: Dry Cimarron River, ~ 0.5 km. upstream of 6th/3rd border, at Pecos Creek	ESP 6492
49325	<i>Hypsiglena torquata</i>	J.P. Haklard, J. Knight	21 Feb. 1987	" : Colfax Co.: San Francisco River Valley, ~1/2 mi. downstream of US Hwy. 80 bridge	ESP 542
49326	"	C.W. Painter, B.R. Tomberlin	3 Aug. 1986	" : Hidalgo Co.: 4th Hwy. 338, 1 mi. S Animas	ESP 542
49327	<i>Dadophis punctatus</i>	B. R. Tomberlin	1 Jul. 1986	" : NM Hwy. 9, 4th W 4th Hwy. 338 at Animas	ESP 518
49328	<i>Sceloporus jarrovi</i>	C.W. Painter, B.R. Tomberlin	4 Aug. 1986	" : Sabinos Canyon, ~1/2 mi. upstream of jct. with Pecos Canyon (T8S-R14E-S14, 10197)	ESP 527
49329	<i>Aneides harrisi</i>	C.W. Painter, S.F. Stebbins	22 Jun. 1987	" : Lincoln Co.: Captain Mts., Lincoln Nat. Forest, Radio facility at summit, 10200' elev. 5/2 mi. W of radio towers	ESP 1006
49330	"	"	"	" : Captain Mts., Lincoln Nat. Forest, Along Summit Trail, ~ 1/2 mi. E of P.	ESP 1007



Enhance and provide data

- Provide data
 - Examples of efforts:
 - GBIF
 - Vertnet
 - Arctos



QA/QC and standardize data


The screenshot displays the iNaturalist Observations page for "Gila Monster" in "New Mexico, USA". The page features a search bar with "Gila Monster" and "New Mexico, USA" entered, and a "Go" button. Below the search bar, there are tabs for "New Mexico", "OBSERVATIONS", "SPECIES", "IDENTIFIERS", and "OBSERVERS". The "OBSERVATIONS" tab is selected. The main content area shows a map of New Mexico with several observation points marked by blue dots. A red box highlights a specific area on the map. On the right side, there is a list of observations for "Gila Monster" (Heloderma suspectum) and "Reticulate Gila Monster" (Heloderma suspectum suspectum). Each observation includes a photo, the species name, the location (United States), the date, the research grade, and the number of observers.

Species	Location	Date	Research Grade	Observers	Time
Gila Monster (<i>Heloderma suspectum</i>)	United States	Aug 18, 2017	Research Grade	3	9mo
Gila Monster (<i>Heloderma suspectum</i>)	United States	Aug 1, 2017	Research Grade	4	10mo
Gila Monster (<i>Heloderma suspectum</i>)	United States	Aug 30, 2015	Research Grade	4	3y
Reticulate Gila Monster (<i>Heloderma suspectum suspectum</i>)	United States	Aug 15, 2013	Research Grade	3	5y
Gila Monster					

QA/QC and standardize data

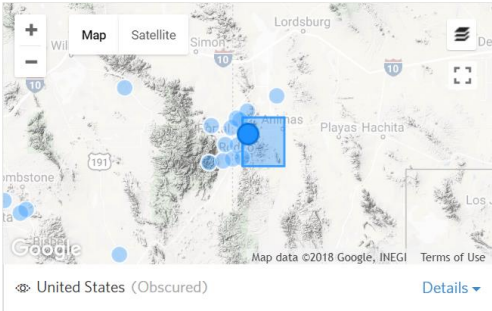
iNaturalist Explore Community More

Gila Monster (*Heloderma suspectum*) NT Research Grade



mjryan
649 observations

Observed: Aug 18, 2017 · 4:59 PM MDT
Submitted: Aug 21, 2017 · 7:47 AM MDT



United States (Obscured) [Details](#)

Activity

mjryan suggested an ID Improving 9mo


Gila Monster
Heloderma suspectum Compare

Community ID

[What's this?](#)

Gila Monster (*Heloderma suspectum*) NT

Cumulative IDs: 4 of 4



0 2/3rds 4

QA/QC and standardize data

- Darwin Core

Biodiversity
Information
Standards
TDWG

Introduction

References

Quick Reference Guide

Term Index

Record-level Terms

Occurrence

Organism

MaterialSample

LivingSpecimen

PreservedSpecimen

FossilSpecimen

Event

HumanObservation

MachineObservation

Location

GeologicalContext

Identification

Taxon

MeasurementOrFact

ResourceRelationship

Term Definitions

Simple Darwin Core

Darwin Core Terms: A quick reference guide

Title: Darwin Core Terms: A quick reference guide

Date Issued: 2009-02-12

Date Modified: 2015-06-02

Abstract: This document is a quick reference for all recommended Darwin Core terms. For complete historical term information, including version changes and pre-standard terms, see [HISTORY]. For a comparative table of elements from pre-standard versions of Darwin Core to the current terms in the standard, see [VERSIONS].

Contributors: John Wieczorek (MVZ), Markus Döring (GBIF), Renato De Giovanni (CRIA), Tim Robertson (GBIF), Dave Vieglais (KUNHM)

Legal: This document is governed by the standard legal, copyright, licensing provisions and disclaimers issued by the Taxonomic Databases Working Group.

Part of TDWG Standard: <http://www.tdwg.org/standards/450/>

Creator: Darwin Core Task Group

Identifier: <http://rs.tdwg.org/dwc/2015-03-19/terms/>

Latest Version: <http://rs.tdwg.org/dwc/terms/>

Replaces: <http://rs.tdwg.org/dwc/2014-11-08/terms/>

Document Status: Current Standard

Value of natural history specimens

- Availability: enhance and provide data to wide audiences



- Quality: QA/QC and standardize data likely to be used repeatedly



Distribution of the Gila Monster (*Heloderma suspectum*) in southwestern New Mexico

J. Tomasz Giermakowski Museum of Southwestern Biology, University of New Mexico
Mason J. Ryan Terrestrial Wildlife Branch, Arizona Game and Fish Department
Ian M. Latella Museum of Southwestern Biology, University of New Mexico

Outline

- Status of Gila Monsters in New Mexico
 - Widespread and locally common in other areas
 - Few scattered records in disjunct areas in NM
- Threats
 - Illegal collection for trade
 - Habitat fragmentation
 - Changes in land use
 - Change in habitat due to changing climate



Objectives

- Evaluate distribution in NM based on previous records and surveys
 - Still there?
- Quantify detectability
 - How effective are VES?
- Calculate current and future areas of occurrence
 - Is the current range larger than previously expected?
 - Is it likely to change in the future?



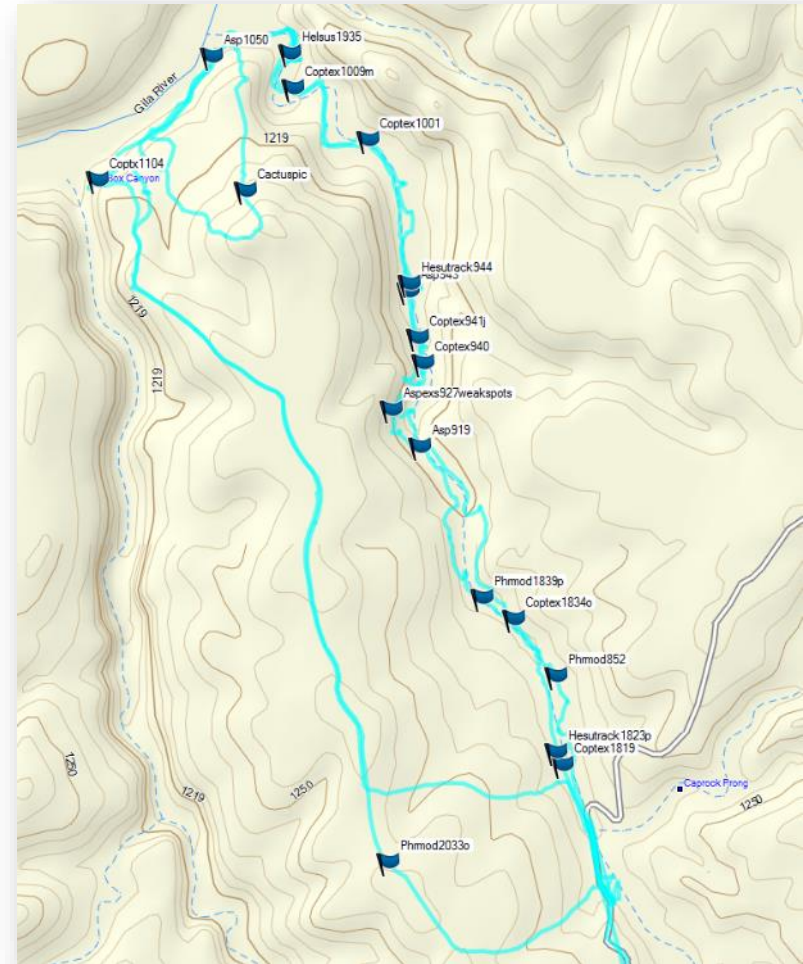
Objectives

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Outline of methods

- Review known occurrences
 - Map records and observations
 - Select areas of interest
- Visual Encounter Surveys
 - Areas of previous records
 - Various observers/speeds
 - Record track to quantify effort
- Calculate detectability
 - Compare several models to inform future survey and monitoring
- Model distribution
 - Incorporate results from this study

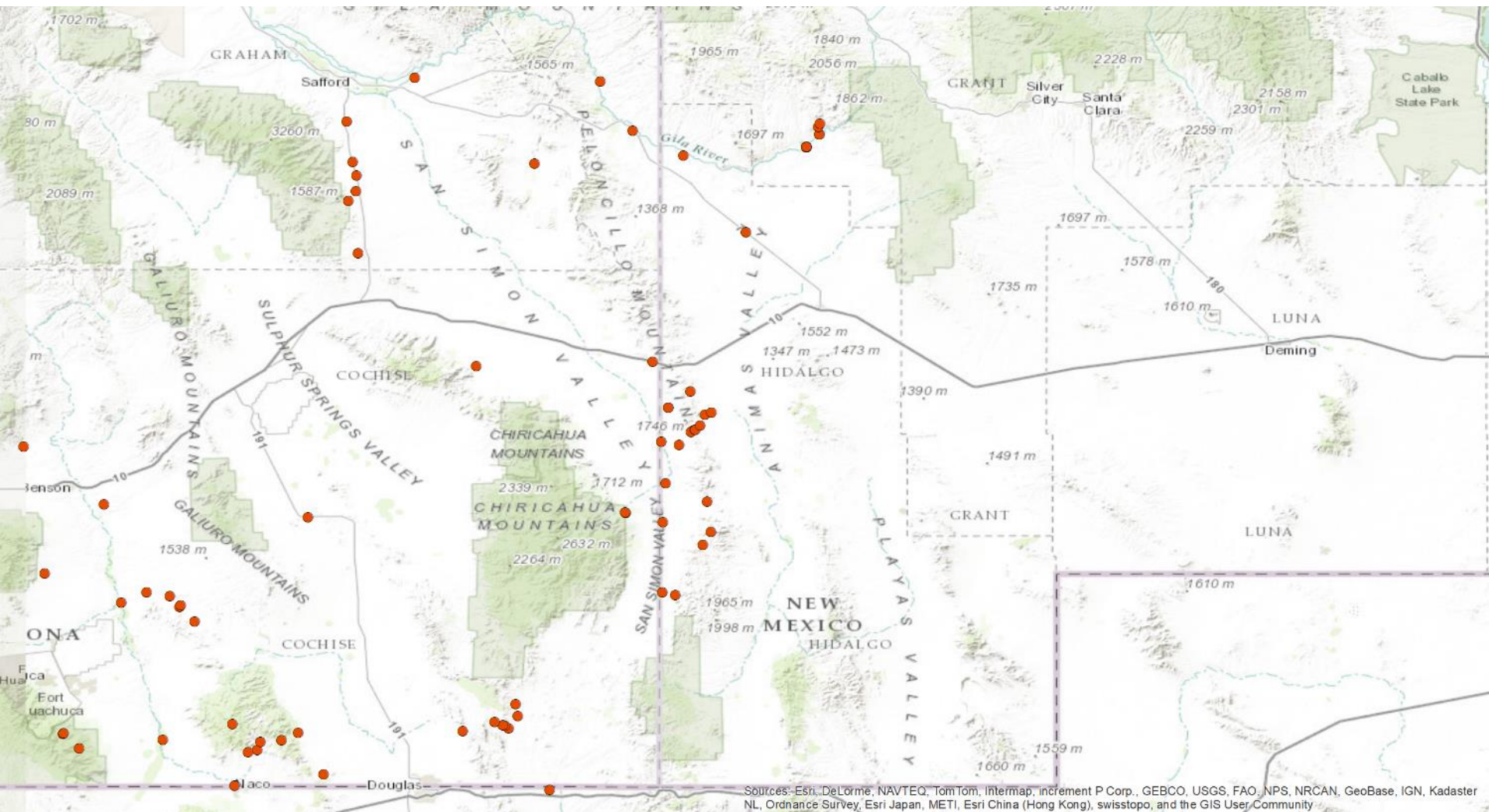


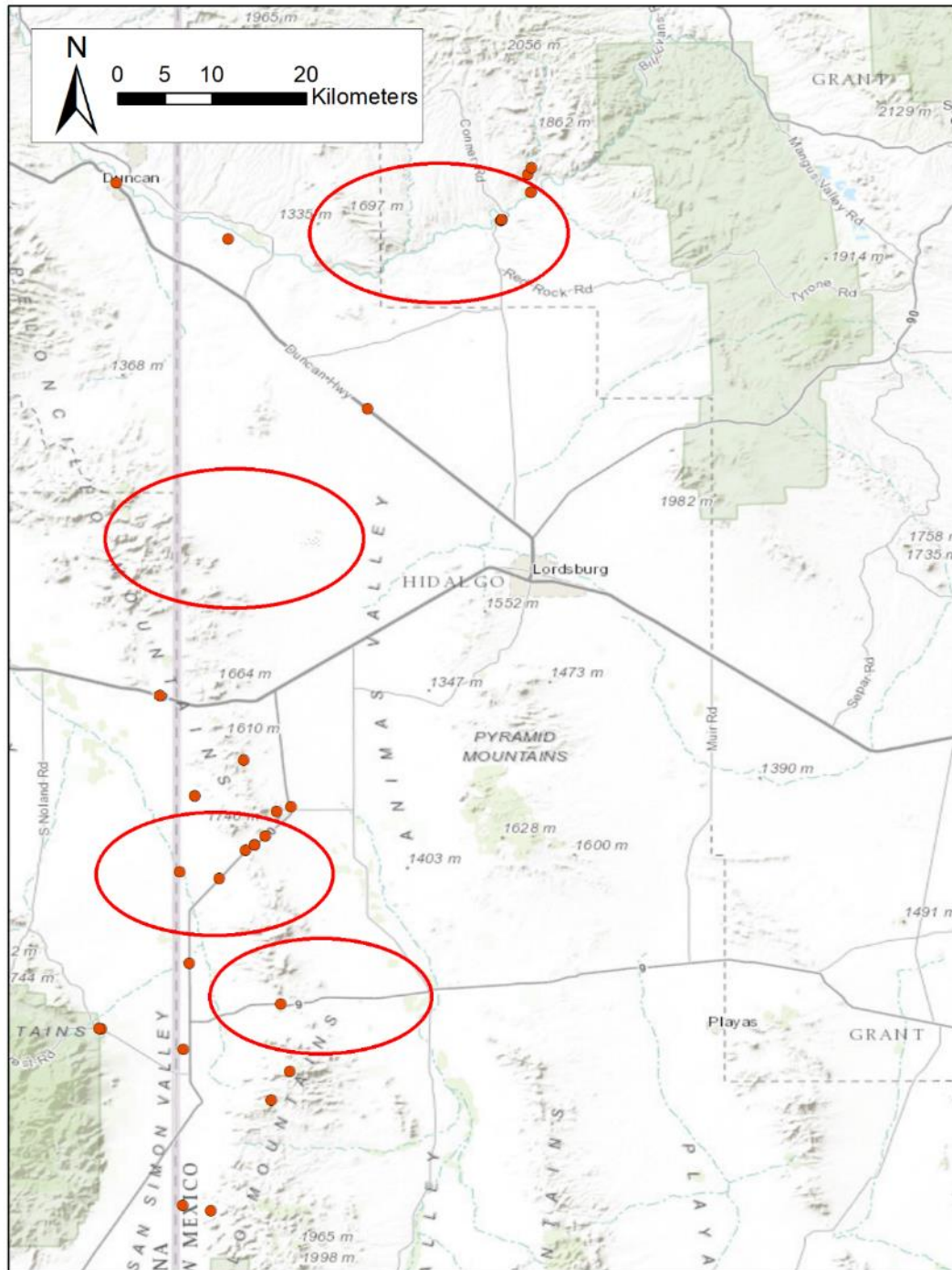
Outline of methods

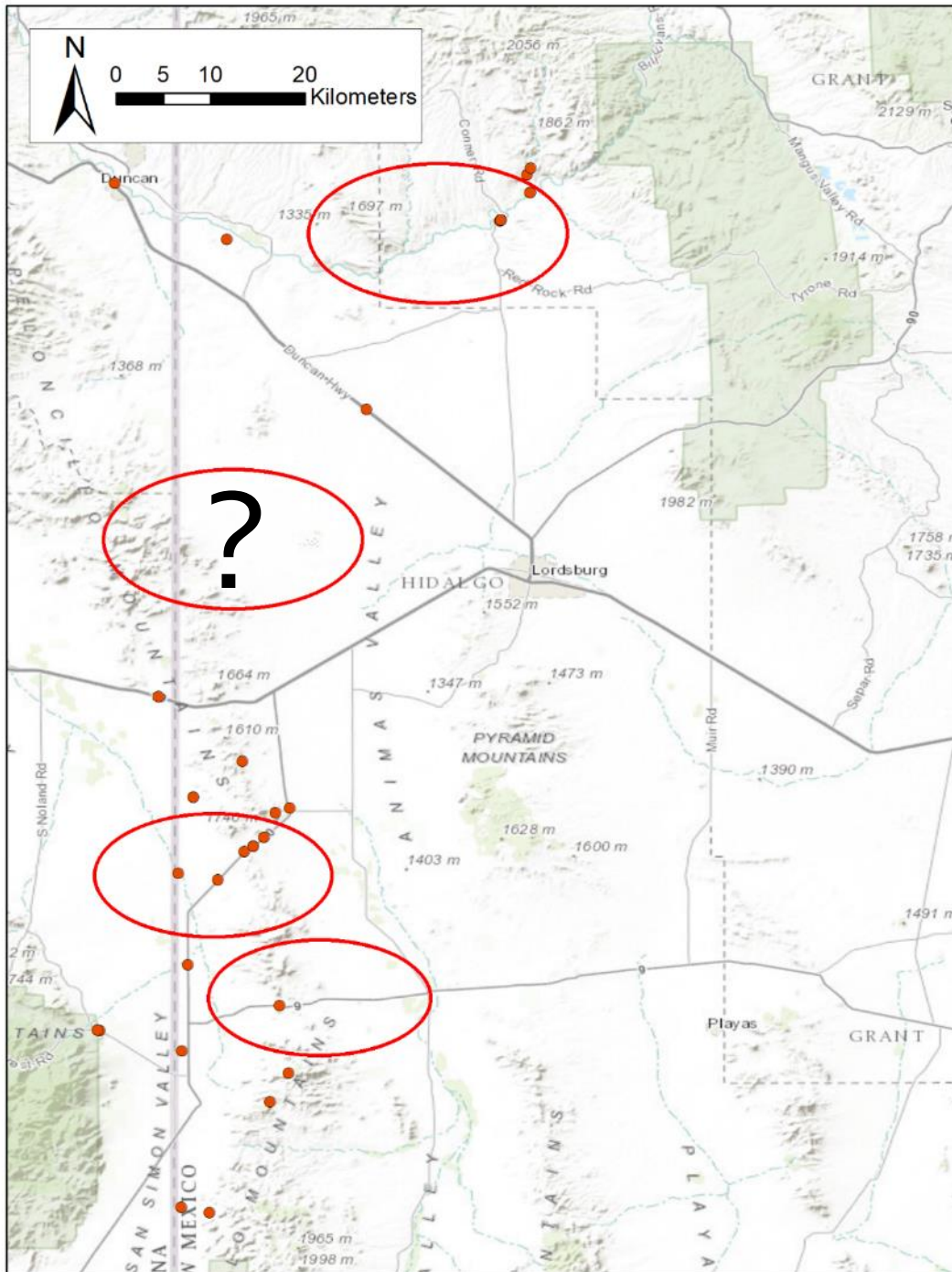
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- Model distribution
 - Incorporate results from this study



Known records







Value of specimens

1. Gather records from databases
 - Use all three and then some...
2. Combine all data into one spreadsheet
3. Identify and fix data deficiencies
 - Coordinates, locality description, date of collection
4. Map specimen data to identify areas for surveys

Value of specimens

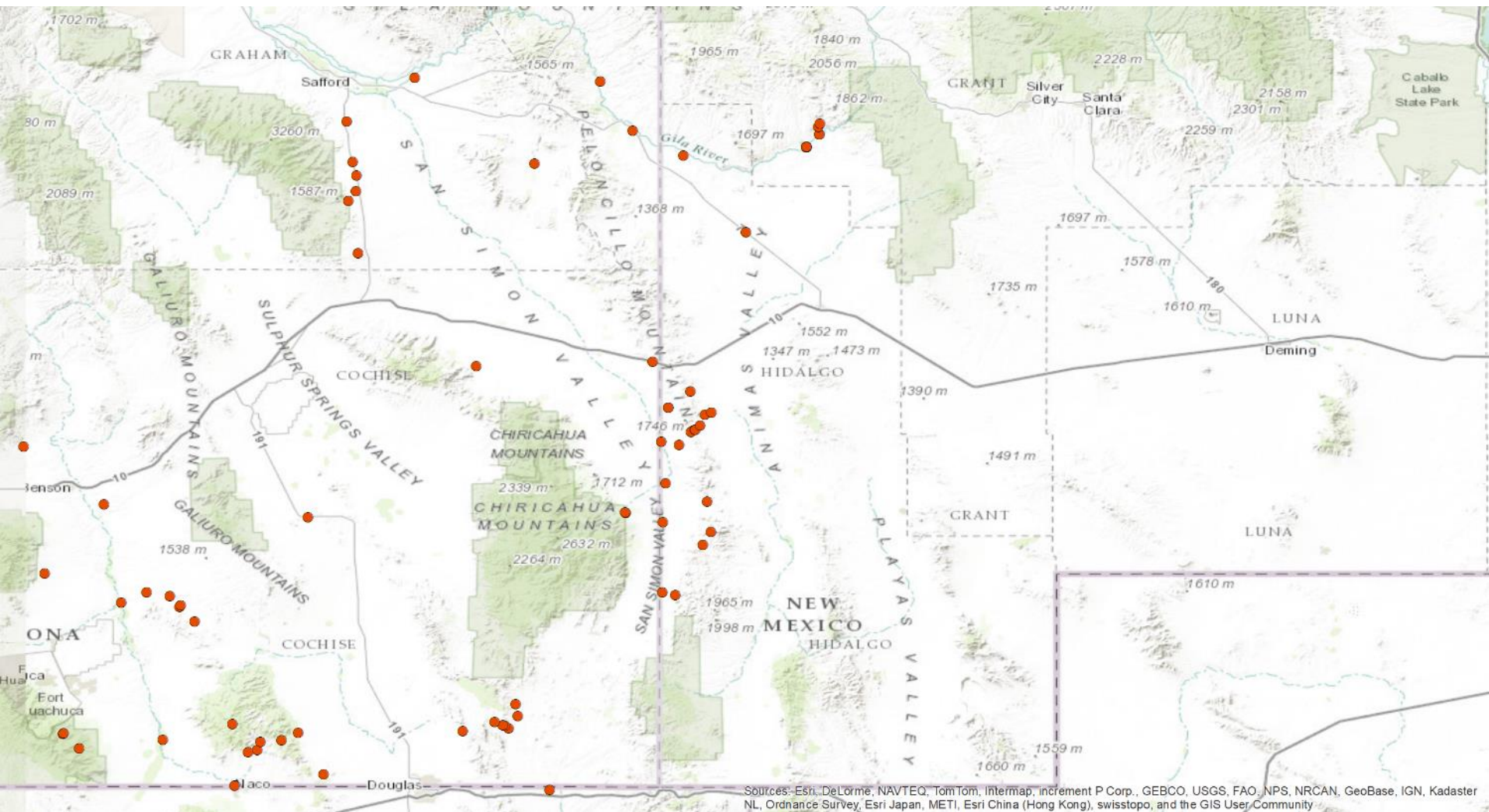
1. Gather records from databases
 - 173 data columns → 81 for analyses
2. Combine all data into one spreadsheet
 - Add data from several institutions → missing
3. Identify and fix data deficiencies
 - Contact collections and modify records
4. Map specimen data to identify areas for surveys
 - Use GIS software to import specimen data

Value of specimens

1. Gather records from databases ■ 8 hours
2. Combine all data into one spreadsheet ■ 88 hours
3. Identify and fix data deficiencies ■ 38 hours
4. Map specimen data to identify areas for survey ■ 6 hours

140 hours to produce a high quality map

Known records



Conclusions

- Research grade means a need to review specimens and associated data for errors and omissions
 - Accuracy of data associated with specimens potentially overlooked by both curators and users of specimens
 - Quality of data increases value & credibility of collections
 - There's a cost/burden to increase availability and quality of data associated with specimens – next challenge is to create effective mechanisms for data flows both ways

Acknowledgements

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