

Webinar Series

Data Use Skills

Featuring Data from Natural History Collections

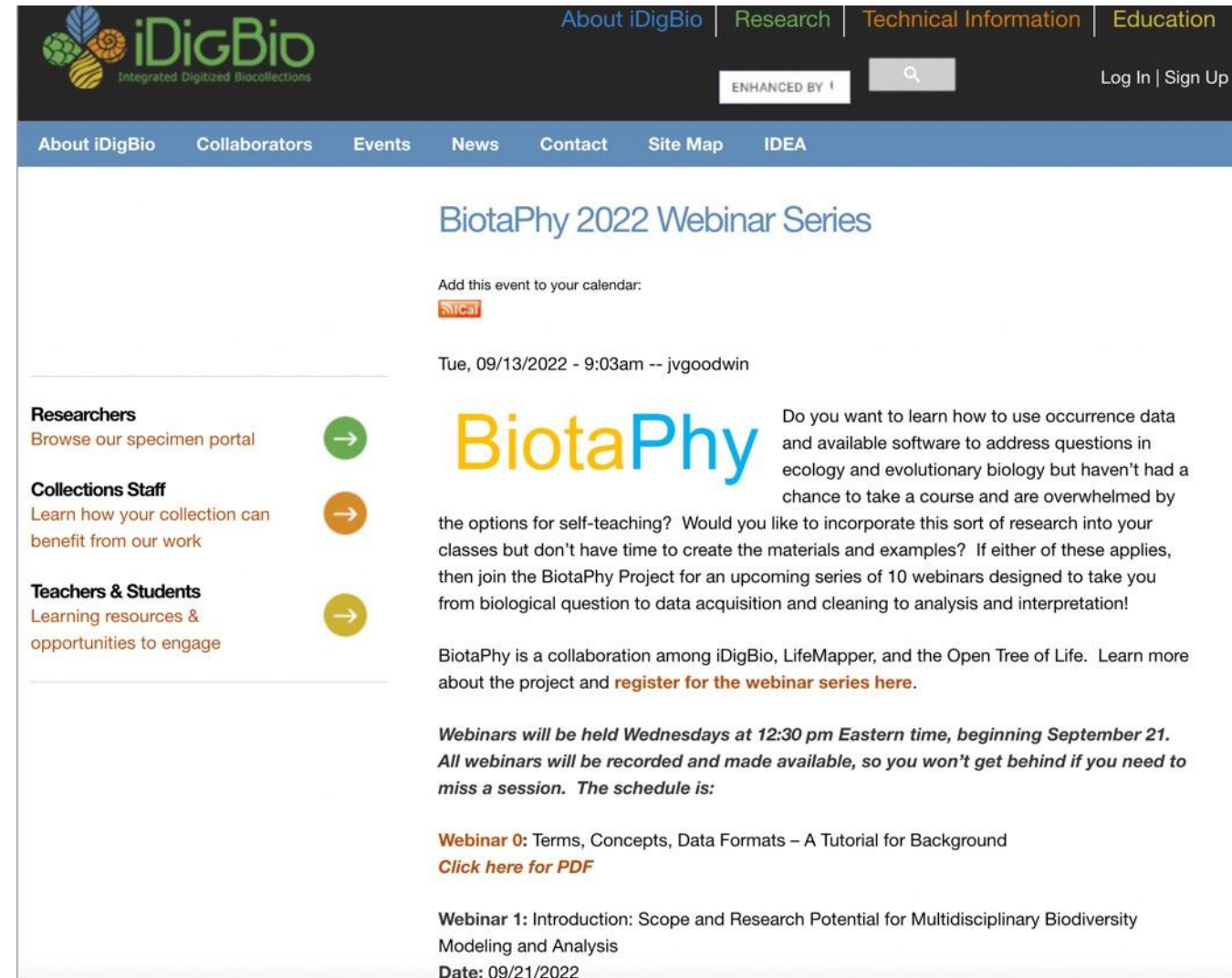
September 21-November 30, 2022

<https://www.idigbio.org/content/biotaphy-2022-webinar-series>

iDigBio:


<https://www.idigbio.org/content/biotaphy-2022-webinar-series>

[iDigBio.org](https://www.idigbio.org)



The screenshot shows the iDigBio website with a navigation bar at the top containing links for About iDigBio, Research, Technical Information, and Education. Below this is a secondary navigation bar with links for About iDigBio, Collaborators, Events, News, Contact, Site Map, and IDEA. The main content area features a section for the BiotaPhy 2022 Webinar Series, including a calendar add button, the date and time (Tue, 09/13/2022 - 9:03am -- jvgoodwin), and a detailed description of the webinar series. On the left side of the page, there are three links with right-pointing arrows: Researchers (Browse our specimen portal), Collections Staff (Learn how your collection can benefit from our work), and Teachers & Students (Learning resources & opportunities to engage).

BiotaPhy 2022 Webinar Series

Add this event to your calendar:


Tue, 09/13/2022 - 9:03am -- jvgoodwin

BiotaPhy Do you want to learn how to use occurrence data and available software to address questions in ecology and evolutionary biology but haven't had a chance to take a course and are overwhelmed by the options for self-teaching? Would you like to incorporate this sort of research into your classes but don't have time to create the materials and examples? If either of these applies, then join the BiotaPhy Project for an upcoming series of 10 webinars designed to take you from biological question to data acquisition and cleaning to analysis and interpretation!

BiotaPhy is a collaboration among iDigBio, LifeMapper, and the Open Tree of Life. Learn more about the project and [register for the webinar series here](#).

Webinars will be held Wednesdays at 12:30 pm Eastern time, beginning September 21. All webinars will be recorded and made available, so you won't get behind if you need to miss a session. The schedule is:

Webinar 0: Terms, Concepts, Data Formats – A Tutorial for Background
[Click here for PDF](#)

Webinar 1: Introduction: Scope and Research Potential for Multidisciplinary Biodiversity Modeling and Analysis
Date: 09/21/2022

Researchers
[Browse our specimen portal](#) →

Collections Staff
[Learn how your collection can benefit from our work](#) →

Teachers & Students
[Learning resources & opportunities to engage](#) →



Thank You

**Maria Cortez
Aimee Stewart**

**Jill Goodwin
Gil Nelson**

Webinar 4

Georeferencing with GEOLocate

**How to use locality information in
specimen records to obtain georeferences
(i.e., latitude and longitude)**

Biological Objectives:

- ✓ **Introduction to basic geospatial concepts and their relevance in biodiversity analyses**
- ✓ **Introduction to georeferencing and its importance for biodiversity analyses**

Technical Objectives:

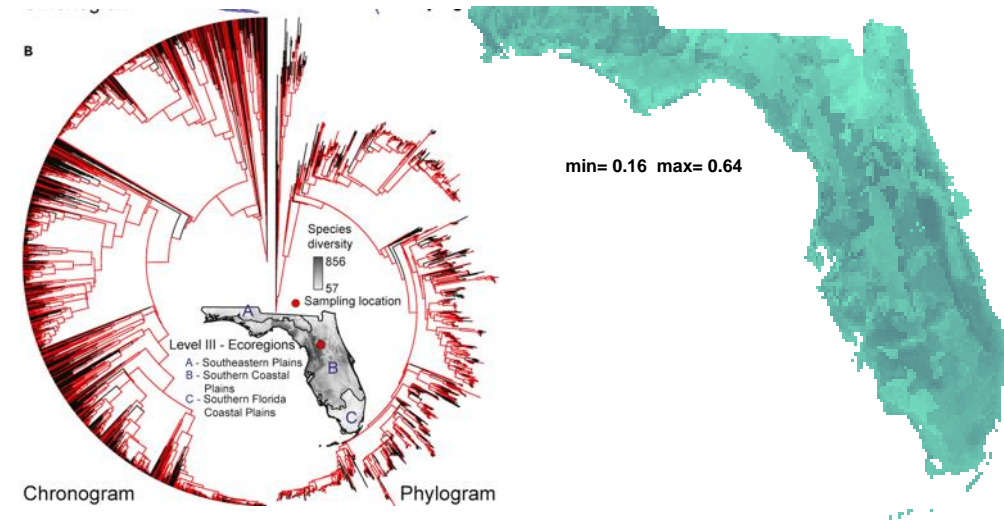
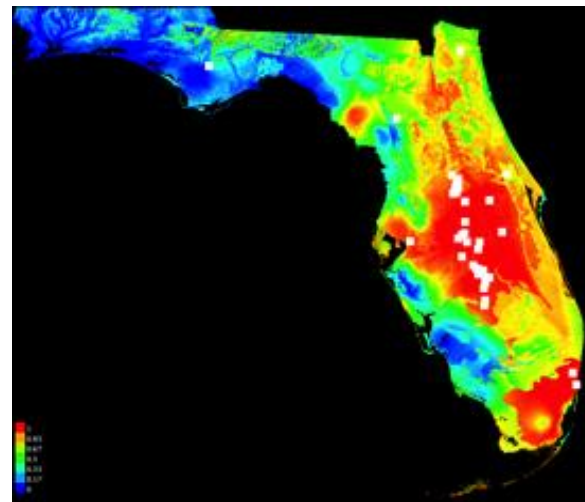
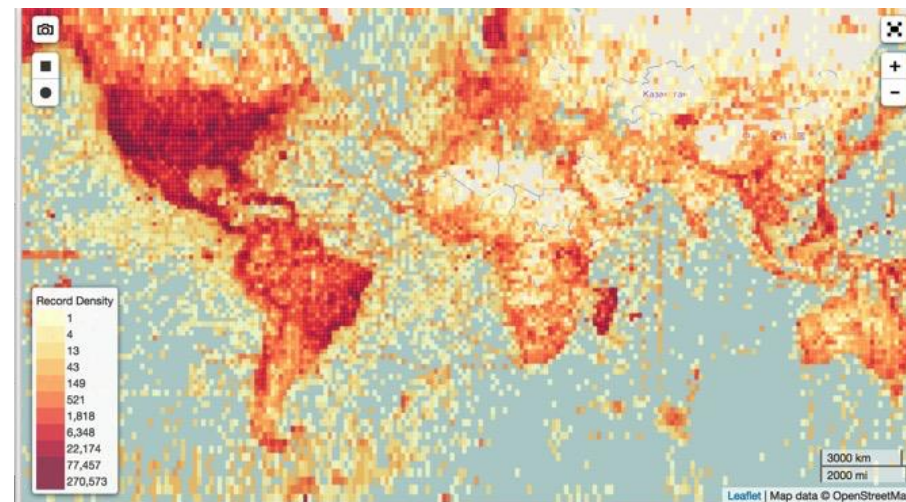
- ✓ **Introduce GEOLocate as a tool to recover geographic coordinates based on locality information.**
- ✓ **Demonstrate and practice how to use GEOLocate**
- ✓ **Practice how to manually add modified georeferences to the spreadsheet containing geographic coordinates.**

1. **Exploring Concepts: understanding spatial concepts and GEOLocate**
2. **Demonstration: how to use GEOLocate**
3. **Exercises: using GEOLocate to recover geographic coordinates and merging the information recovered to your dataset!**
4. **Session Summary, Q&A and Discussion**

Learning Objectives

Biological Objectives:

- ✓ Introduction to basic geospatial concepts and their relevance in biodiversity analyses



Biological Objectives:

- ✓ Introduction to basic geospatial concepts and their relevance in biodiversity analyses
- ✓ Introduction to georeferencing and its importance for biodiversity analyses

What is a georeference?

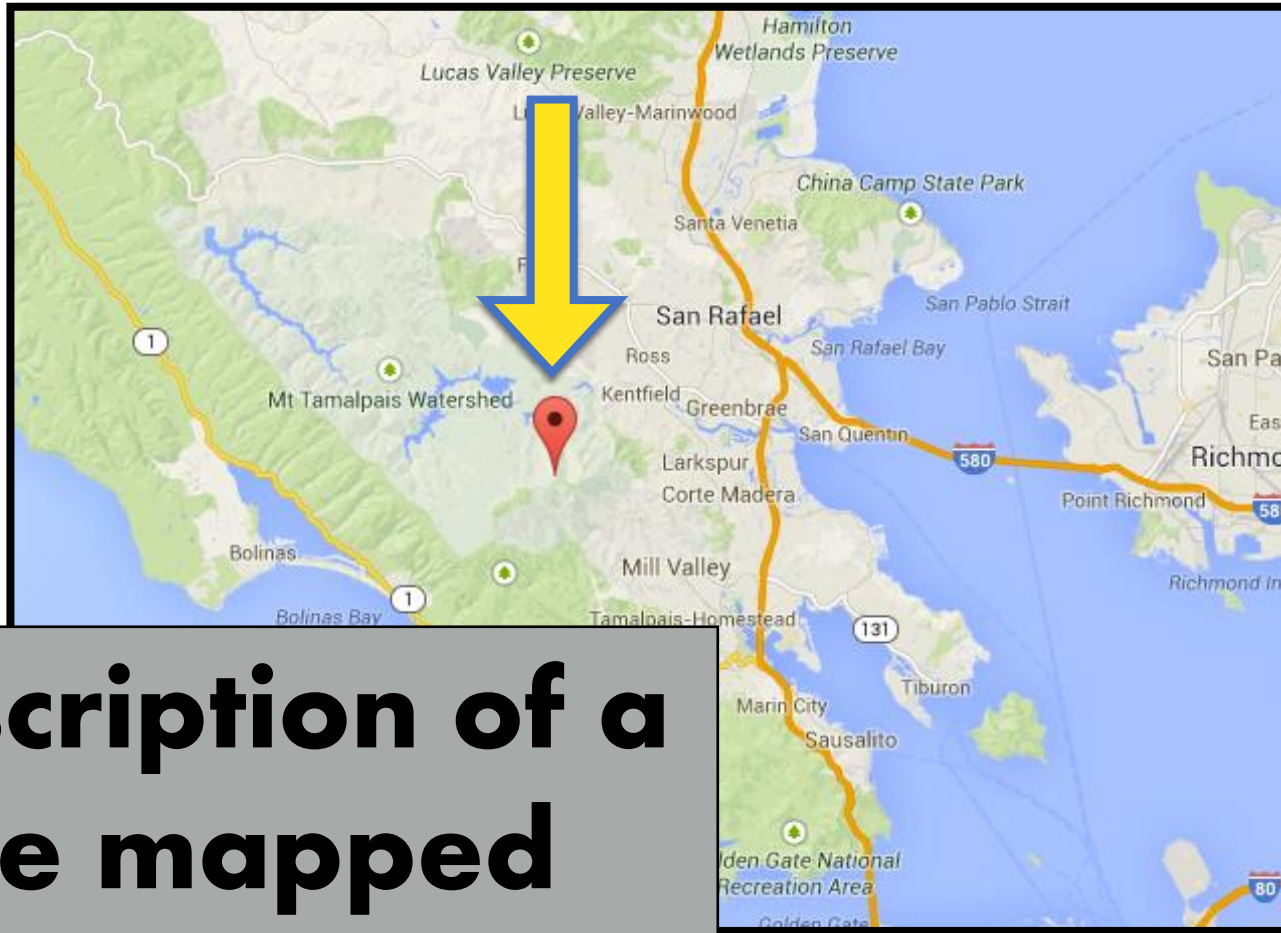


What is a georeference?



Species: *Polypodium californicum*
State: CA
County: Marin
Locality: Marin Municipal Water District Lands:
Mount Tamalpais. Middle Peak Rd. culvert RT-3

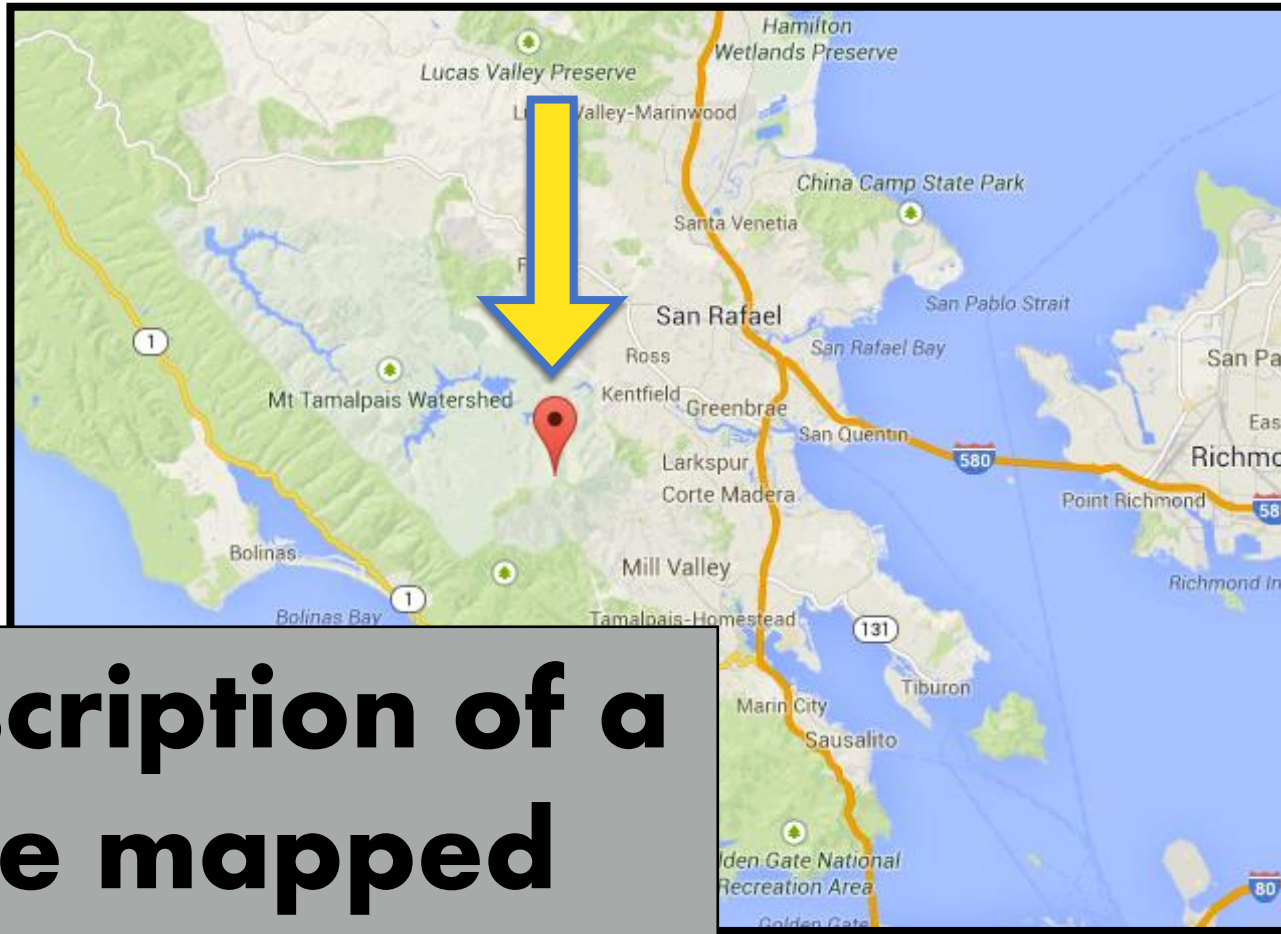
What is a georeference?



A numerical description of a place that can be mapped

What is a georeference?

37.93, -122.59



A numerical description of a place that can be mapped

What is a georeference?

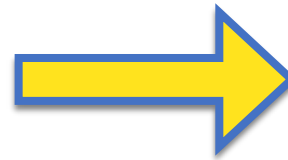
process of turning a textual description into a numerical description

Species: *Polypodium californicum*

State: CA

County: Marin

Locality: Marin Municipal Water District Lands:
Mount Tamalpais. Middle Peak Rd. culvert RT-3



37.93, -122.59

Why georeference?

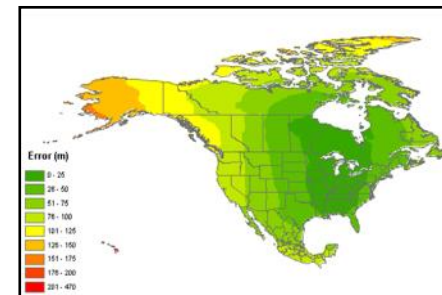
- **Add more occurrences to a data set**
- **Correct geographic and specimen identification data = dependable occurrence record**
- **Provide uncertainty data, which allow points to be evaluated with regard to fitness for research applications and the resulting quality of output**

Sources of uncertainty

- **Coordinate uncertainty**
- **Map scale**
- **GPS accuracy**
- **Unknown datum**
- **Imprecision in direction measurements**
- **Imprecision in distance measurements**
- **Extent of locality**

20° 30' N 112° 36' W

| Scale | Uncertainty (ft) | Uncertainty (m) |
|-----------|------------------|-----------------|
| 1:1,200 | 3.3 ft | 1.0 m |
| 1:2,400 | 6.7 ft | 2.0 m |
| 1:4,800 | 13.3 ft | 4.1 m |
| 1:10,000 | 27.8 ft | 8.5 m |
| 1:12,000 | 33.3 ft | 10.2 m |
| 1:24,000 | 40.0 ft | 12.2 m |
| 1:25,000 | 41.8 ft | 12.8 m |
| 1:63,360 | 106 ft | 32.2 m |
| 1:100,000 | 167 ft | 50.9 m |
| 1:250,000 | 417 ft | 127 m |



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| Precision | 0 degrees Latitude | 30 degrees Latitude | 60 degrees Latitude | 85 degrees Latitude |
|-----------------|--------------------|---------------------|---------------------|---------------------|
| 1.0 degrees | 156904 m | 146962 m | 124605 m | 112109 m |
| 0.1 degrees | 15691 m | 14697 m | 12461 m | 11211 m |
| 0.01 degrees | 1570 m | 1470 m | 1247 m | 1122m |
| 0.001 degrees | 157 m | 147 m | 125 m | 113 m |
| 0.0001 degrees | 16 m | 15 m | 13 m | 12 m |
| 0.00001 degrees | 2 m | 2 m | 2 m | 2 m |
| 1.0 minutes | 2615 m | 2450 m | 2077 m | 1869 m |
| 0.1 minutes | 262 m | 245 m | 208 m | 187 m |
| 0.01 minutes | 27 m | 25 m | 21 m | 19 m |
| 0.001 minutes | 3 m | 3 m | 3 m | 2 m |
| 1.0 seconds | 44 m | 41 m | 35 m | 32 m |
| 0.1 seconds | 5 m | 5 m | 4 m | 4 m |
| 0.01 seconds | 1 m | 1 m | 1 m | 1 m |

Sources of uncertainty

- Coordinate uncertainty
- **Map scale**
- GPS accuracy
- Unknown/incorrect datum
- Imprecision in direction measurements
- Imprecision in distance measurements
- Extent of locality

| Scale | Uncertainty (ft) | Uncertainty (m) |
|-----------|------------------|-----------------|
| 1:1200 | 3.3 ft | 1.0 m |
| 1:2400 | 6.7 ft | 2.0 m |
| 1:4800 | 13.3 ft | 4.1 m |
| 1:10,000 | 27.8 ft | 8.5 m |
| 1:12,000 | 33.3 ft | 10.2 m |
| 1:24,000 | 40.0 ft | 12.2 m |
| 1:25,000 | 41.8 ft | 12.8 m |
| 1:63,360 | 106 ft | 32.2 m |
| 1:100,000 | 167 ft | 50.9 m |
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USGS Standard Map Accuracy

Sources of uncertainty

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Sources of uncertainty

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Datum

What is a datum?

A geodetic datum is an abstract coordinate system with a reference surface (such as sea level) that serves to provide known locations to begin surveys and create maps. In this way, datums act similar to starting points when you give someone directions.

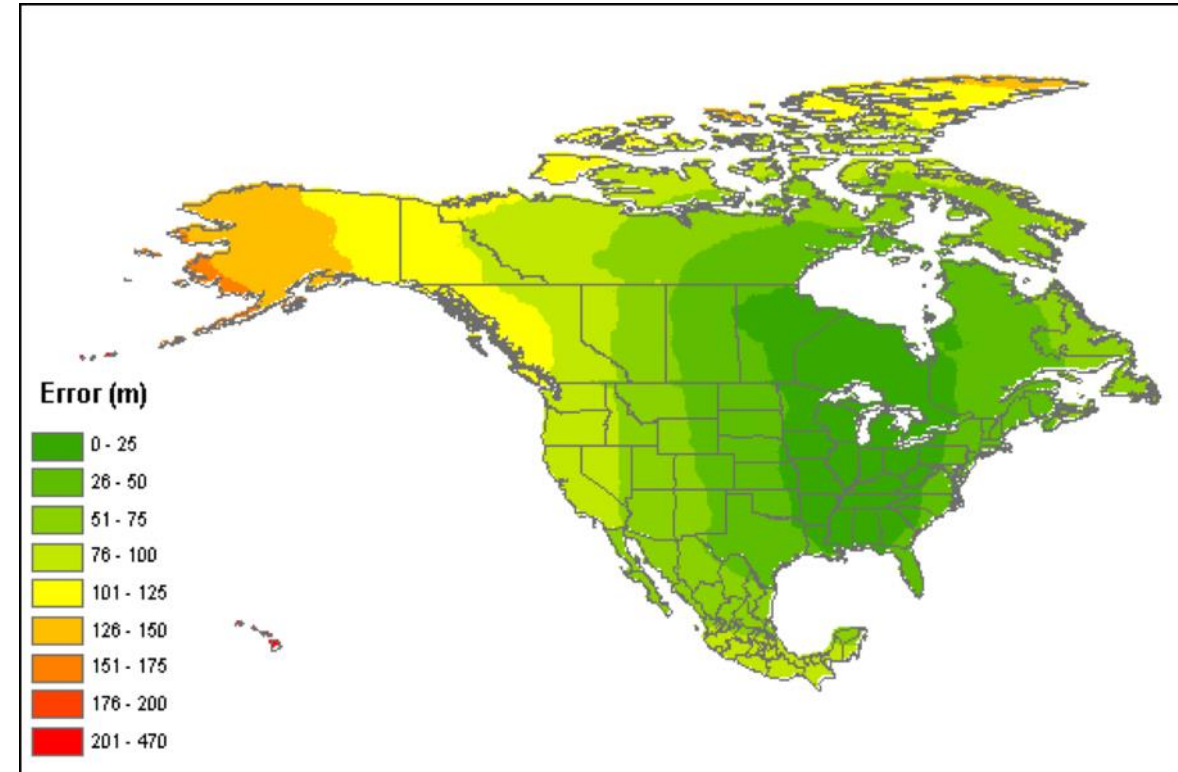
Geodetic datum

A model of the Earth used for geodetic calculations (related to Earth's figure, orientation, and gravity). A geodetic datum describes the size, shape, origin, and orientation of a coordinate system for mapping the surface of the Earth.

<https://oceanservice.noaa.gov/facts/datum.html#:~:text=A%20geodetic%20datum%20is%20an,when%20you%20give%20someone%20directions.>

Sources of uncertainty

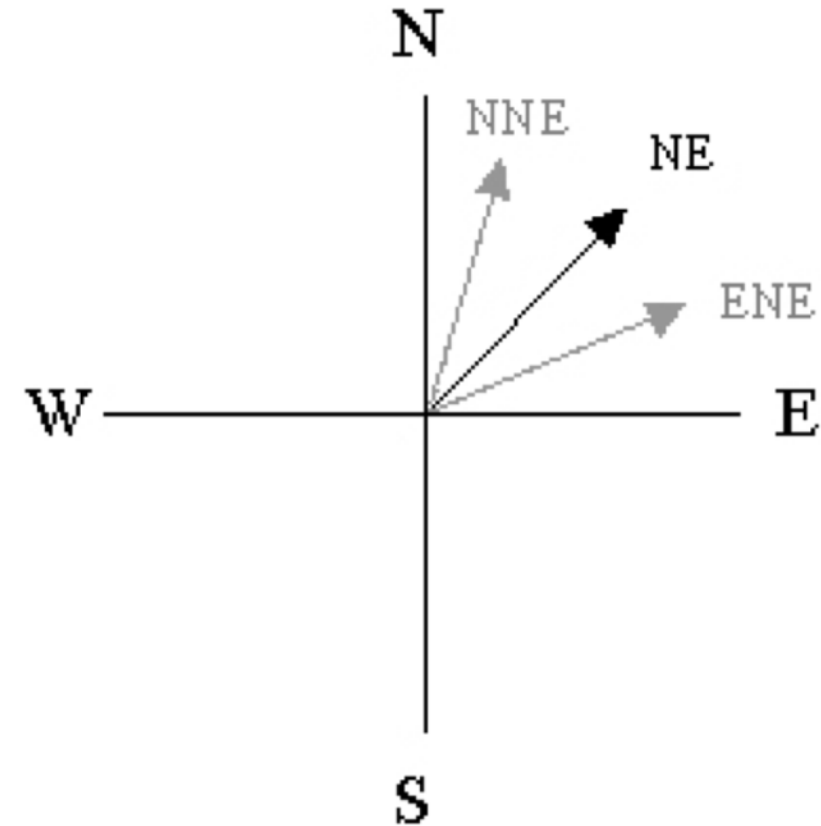
- Coordinate uncertainty
- Map scale
- GPS accuracy
- **Unknown/incorrect datum**
- Imprecision in direction measurements
- Imprecision in distance measurements
- Extent of locality



Error assuming NAD₂₇ vs NAD₈₃ or WGS₈₄

Sources of uncertainty

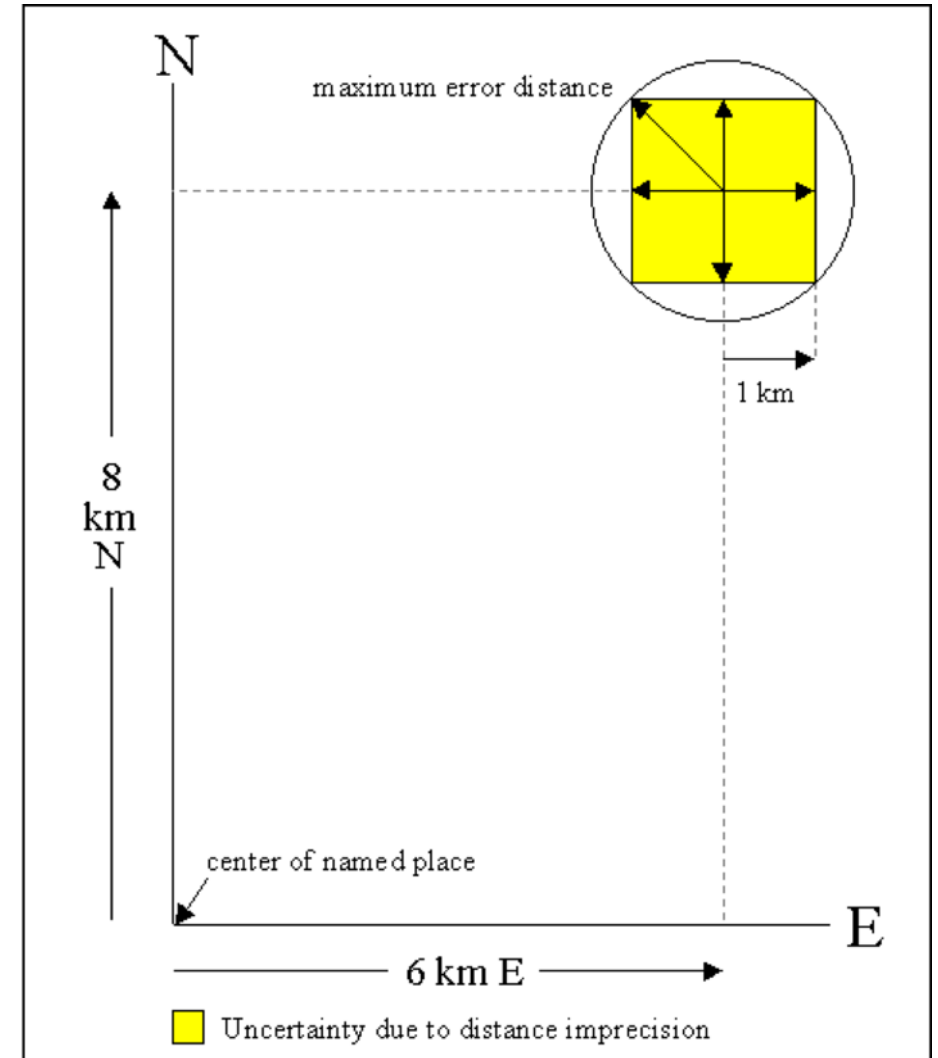
- Coordinate uncertainty
- Map scale
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- Imprecision in distance measurements
- Extent of locality



N > NE > ENE

Sources of uncertainty

- Coordinate uncertainty
- Map scale
- GPS accuracy
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- **Imprecision in distance measurements**
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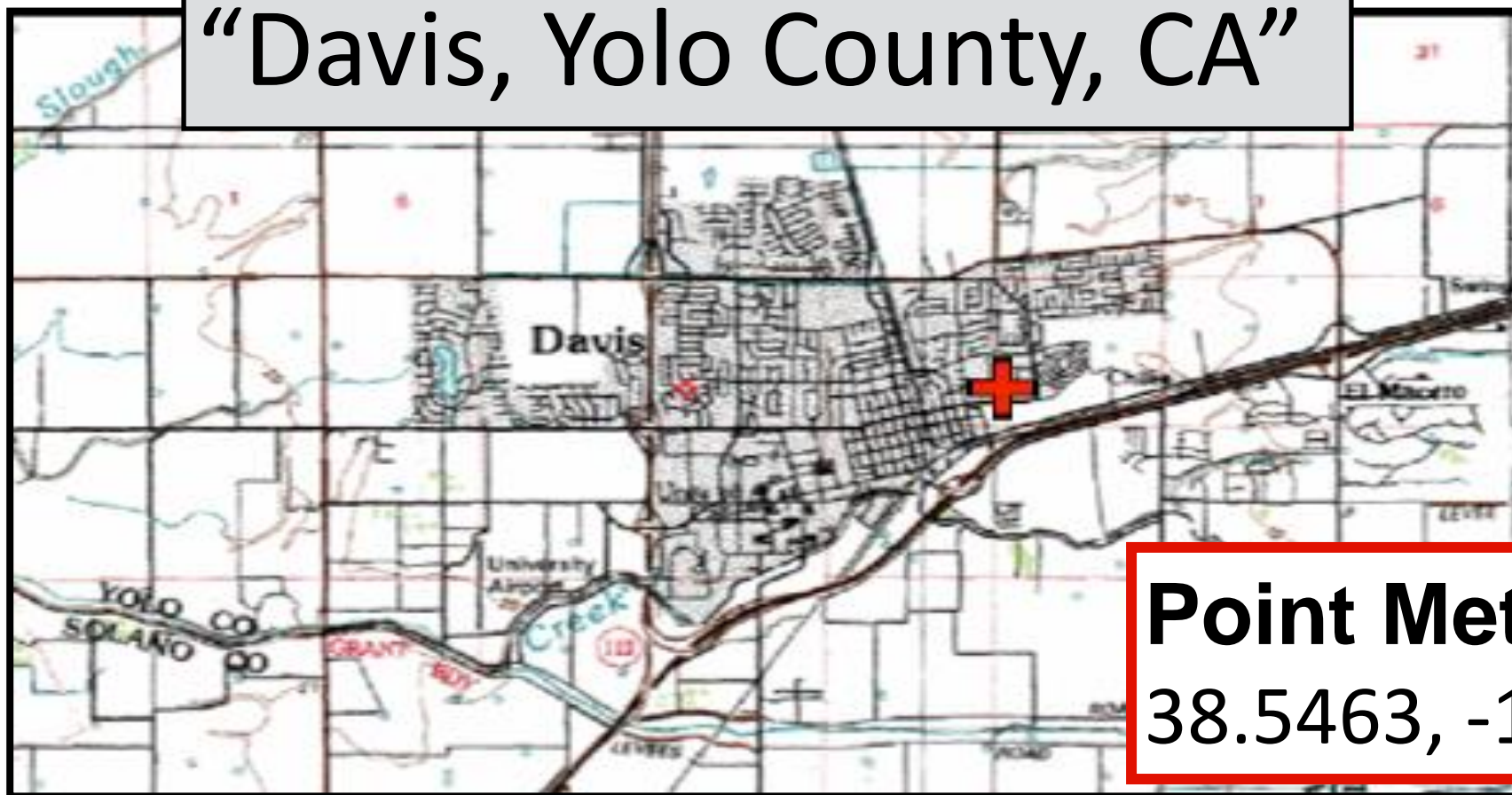


Sources of uncertainty

- **Coordinate uncertainty**
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Sources of uncertainty: **Extent of locality**

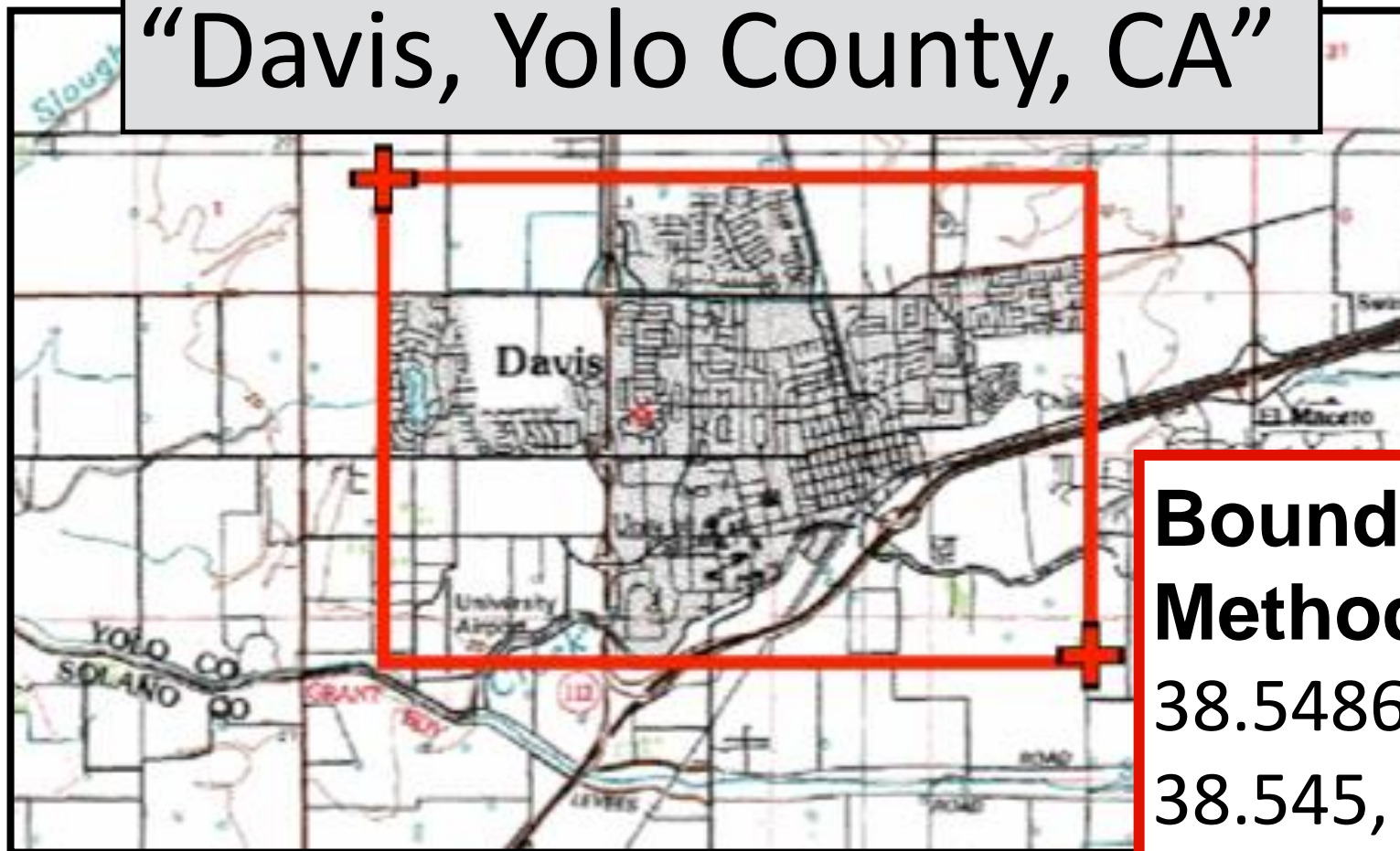
“Davis, Yolo County, CA”



Point Method
38.5463, -121.7425

Sources of uncertainty: **Extent of locality**

“Davis, Yolo County, CA”



**Bounding-Box
Method**

38.5486, -121.7542

38.545, -121.7394

Sources of uncertainty: **Extent of locality**

“Davis, Yolo County, CA”



Point-Radius Method

38.5468, -121.7469

Uncertainty radius: 8325 m

What is the ideal georeference?

What is the ideal georeference?

A numerical description of a place that can be mapped

What is the ideal georeference?

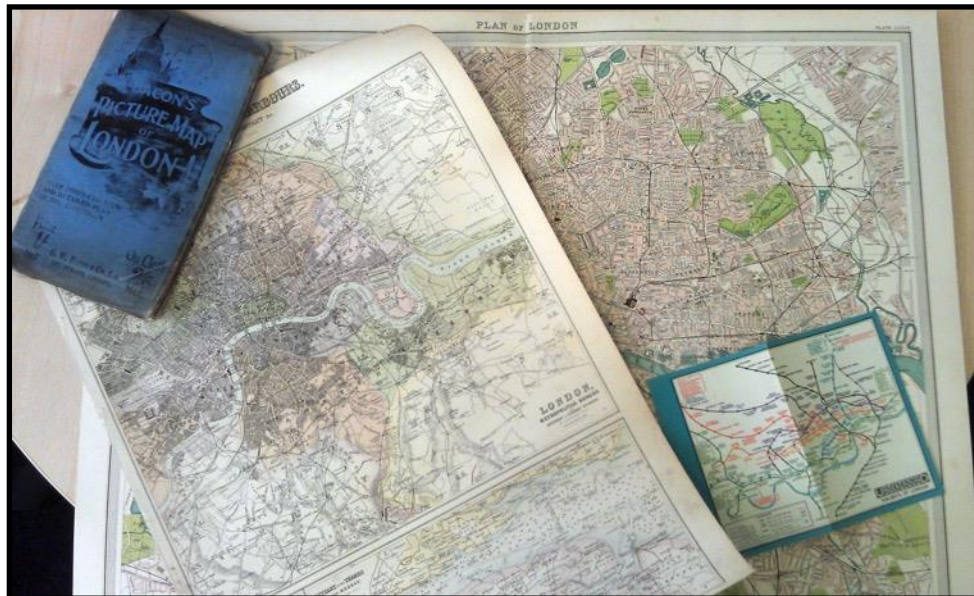
A numerical description of a place that can be mapped

and that describes the spatial extent of a locality and its associated uncertainties

How to do it?

Paper Maps

- Time-consuming
- Good quality paper maps may be hard to find



Internet Resources

How to do it?

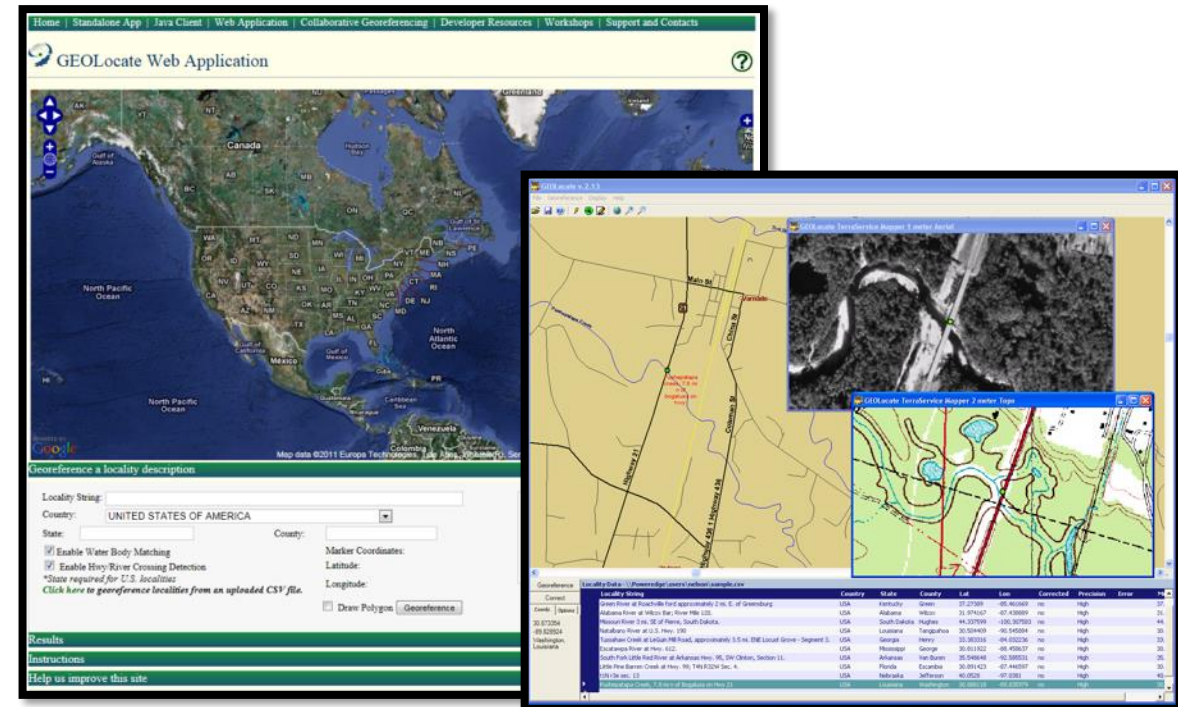
Google Maps

- **Search and directions**
 - Free text search
 - Directions for traveling by car, bike, public transportation, or foot
 - Data compiled from different sources
- **Maps**
 - Views: map, satellite, terrain, Google Street View
 - Sources of maps indicated at bottom



How to do it? **GEOLocate**

- Software services for georeferencing of natural history collection data
- Automated georeferencing
- Verification and correction
- Multi-lingual
- Interoperability
- Training
- Uncertainty determination
- Batch processing
- Collaborative georeferencing
- Geographic visualization
- Kml export



Exploring Concepts

How to do it?

Falling Rain

- Worldwide gazetteer for cities and towns
- Great for hard-to-find localities, especially outside US
 - No search
 - Provides hierarchy, alternative names, topo maps, altitude, weather information, and location of nearby towns
 - Example: Qaryeh-ye Gol'alam, Velayat-e Lowgar, AF

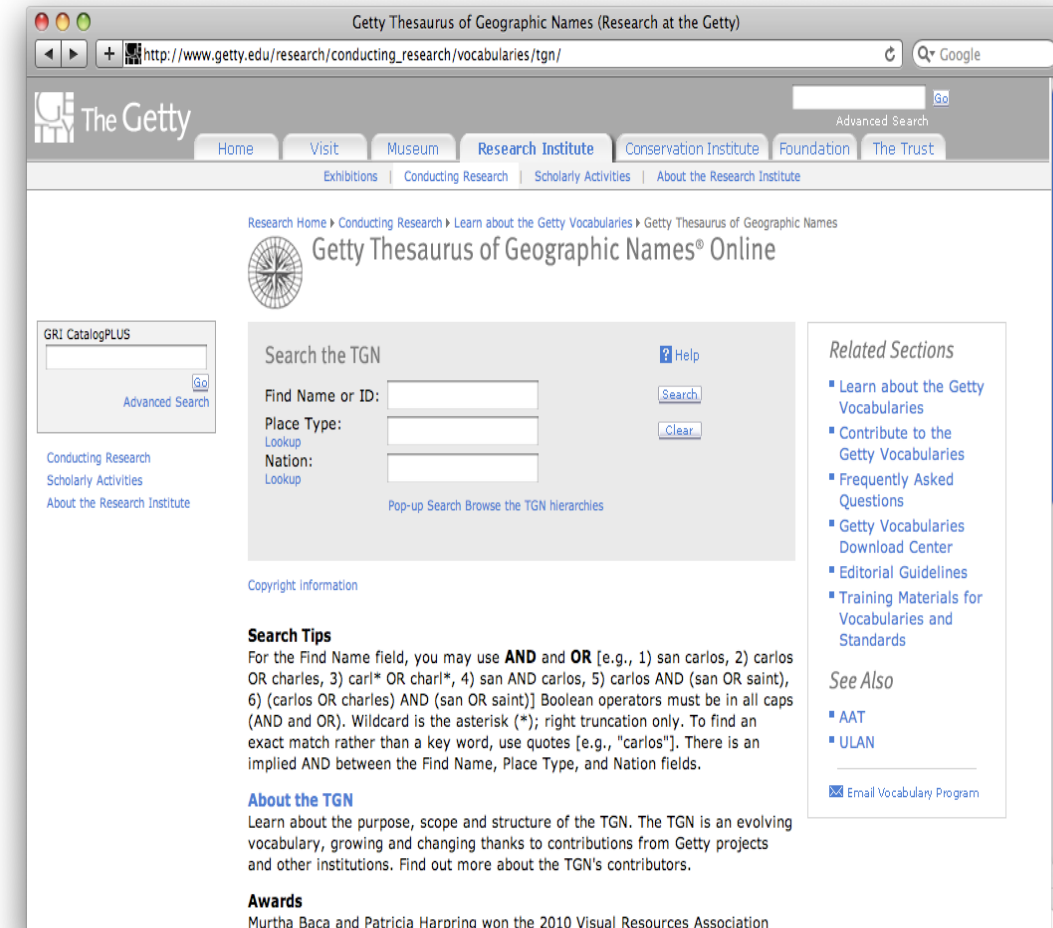


www.fallingrain.com

How to do it?

Getty Thesaurus of Geographic Names

- Worldwide gazetteer by The Getty
- Useful for alternative and old names
 - Feature types
 - Geographical hierarchy
 - Degrees-minutes, not coordinates
 - Use recent name and search in Google Maps
- Example: New Amsterdam, US



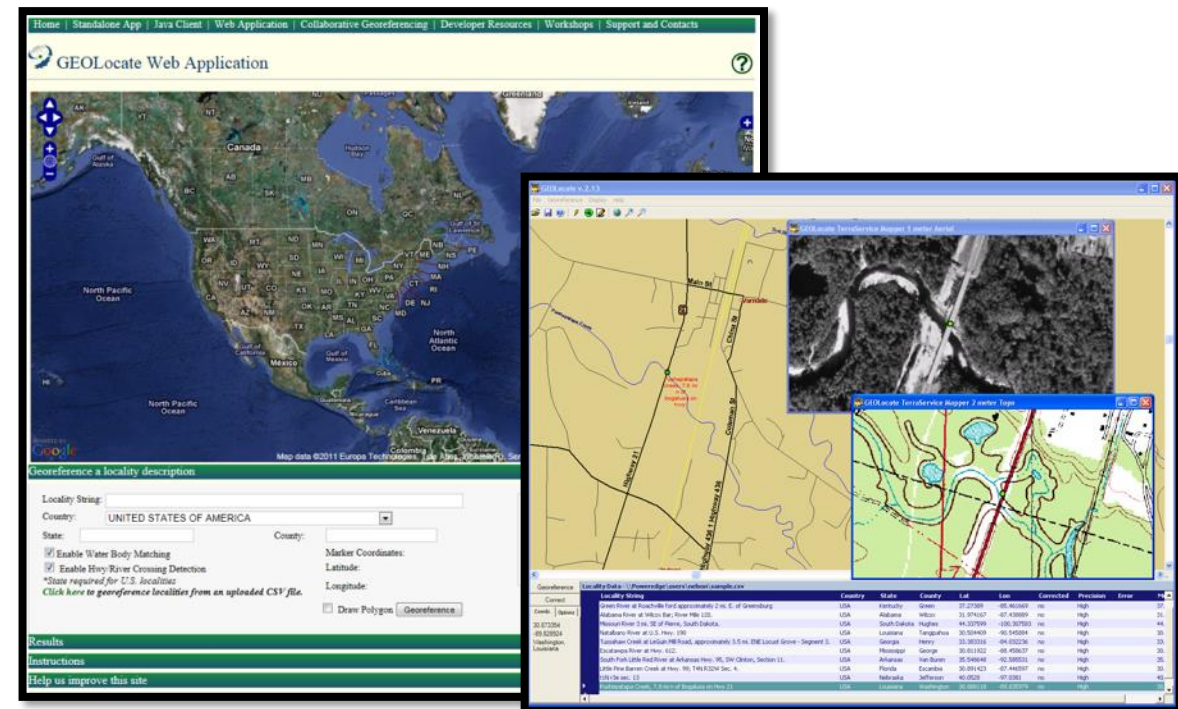
The screenshot shows the Getty Thesaurus of Geographic Names (TGN) website. The browser address bar displays the URL: http://www.getty.edu/research/conducting_research/vocabularies/tgn/. The page features a search interface with the following elements:

- Search the TGN** section with a "Find Name or ID:" field, a "Place Type:" field, and a "Nation:" field. There are "Search" and "Clear" buttons.
- Related Sections** on the right side, including links for "Learn about the Getty Vocabularies", "Contribute to the Getty Vocabularies", "Frequently Asked Questions", "Getty Vocabularies Download Center", "Editorial Guidelines", and "Training Materials for Vocabularies and Standards".
- Search Tips** section providing instructions on using AND and OR operators, wildcards, and quotes.
- About the TGN** section explaining the purpose and structure of the TGN.
- Awards** section mentioning Murtha Baca and Patricia Harpring.

<http://bit.ly/Getty-TGN>

How to do it? **GEOLocate**

- Software services for georeferencing of natural history collection data
- Automated georeferencing
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- Multi-lingual
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- Training
- Uncertainty determination
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- Geographic visualization
- Kml export



- ✓ **Access GEOLocate web interface and learn how to navigate it**

GEOLocate Workflow

1 Data Entry & Preparation

pushepatapa creek, trib. to pearl river, 7.8 miles north of bogalusa at hwy 21; Washington; LA; USA

2 Automated Processing

Georeferencing Algorithm

3 Manual Verification

Visualize, verify & adjust output coordinates & uncertainties



*latitude: 30.88797
longitude: -89.83601
uncertainty radius: 48m
uncertainty polygon: 30.88823,-89.83641, 30.88815,-89.83634, 30.88808,-89.83622...*

GEOLocate Workflow

Home | **Web Application** | Collaborative Georeferencing | Developer Resources | Education & Outreach | Support and Contacts

GEOLocate

A Platform for Georeferencing Natural History Collections Data

For Users:

- Overview
- GEOLocate Web Clients
- Collaborative Georeferencing
- Education & Outreach

For Developers:

- Web Services
- Embeddable Web Client

Brief overview (video) of the GEOLocate Project.

Web Applications

Web Services

Collaborative Georeferencing

Georeference collections data using your web browser. Quick and easy georeferencing.

Integrate georeferencing into your own databases and applications using GEOLocate webservices.

Build communities, share data, relate records across collections and improve verification efficiency.

GEOLocate Workflow

Home | Web Application | Collaborative Georeferencing | Developer Resources | Education & Outreach | Support and Contacts

Web Based Clients

The following based web clients are available to allow you to georeference data directly from your web browser:



Standard Client

Simply type in your locality description and get back georeferenced results. Start here if you are new to GEOLocate.



Batch (File Based) Client

Allows you to upload a .csv file and batch process it. ([file formatting instructions](#))



Collaborative Georeferencing Client

Utilizes the collaborative georeferencing framework. Ideal for largescale multi-institution projects. ([https link](#))

Note: if you use the secure SSL (HTTPS) link, please make sure you browser is configured to allow mixed mixed content, or you may see a blank map. Here are SSL configuration instructions for various browsers: in [English](#) and in [Spanish](#) (special thanks to David Draper for the Spanish translation).

Embeddable client

- A streamlined web client for the purpose of embedding in other web applications.

[Sample link](#) demonstrating use this client.

[Documentation link](#) on how to craft URLs for this client.

Other Clients:

- [Arctos](#)
- [Specify](#)
- [Symbiota](#)
- [Tropicos](#)

Know of any other web based clients using GEOLocate? [Let us know](#) and we will be happy to list them.

Demonstration: How to use GEOLocate



GEOLocate Workflow

Home | Web Application | Collaborative Georeferencing | Developer Resources | Education & Outreach | Support and Contacts

GEOLocate Web Application

2000 km
1000 mi

Google

Map data ©2022 Imagery ©2022 NASA, TerraMetrics Terms of Use

Workbench Results

Georeference Options | Draw polygon Place marker Measure

Locality String:

Country: Latitude: Longitude: Uncertainty: Error polygon:

State:

County:

Demonstration: How to use GEOLocate



GEOLocate Workflow

Home | Web Application | Collaborative Georeferencing | Developer Resources | Education & Outreach | Support and Contacts

GEOLocate Web Application

7 possible locations found

Georeference Options | Draw polygon | Place marker | Map

Locality String:

Country: latitude: 29.181676 longitude: -82.754334 uncertainty: Unavailable error polygon

State:

County:

GEOLocate Workflow

Home | Web Application | Collaborative Georeferencing | Developer Resources | Education & Outreach | Support and Contacts

GEOLocate Web Application

100 m | 500 ft

Google

Map data ©2022 Imagery ©2022, Maxar Technologies, U.S. Geological Survey | Terms of Use | Report a map error

Workbench 7 possible locations found

Georeference Options | Draw polygon Place marker Measure

Locality String: Waccasassa Bay State Preserve; Fiber Factory Road (dirt road, 4 km are state-owned), north of Cow Creek

Country: UNITED STATES OF AMERICA latitude: 29.181676 longitude: -82.754334 uncertainty: 210 m error polygon

State: FL 29.181676 -82.754334 210 Unavailable

County: Levy

GEOLocate Workflow

GEOLocate Web Application
1 possible location found.

Lon: -90.190633
Lat: 30.88792
Uncertainty: 90 meters
[Edit uncertainty](#)
Parse pattern: HAYS CREEK AT HWY 25

Workbench | 1 possible location found

Georeference | Options | Draw polygon | Place marker | Measure

Locality String: Hays Creek, 3 mi. n of Franklinton on hwy. 25

Country: UNITED STATES OF AMERICA

State: La

County: Washington

| | | | |
|--|---|---|---|
| <input checked="" type="checkbox"/> latitude: 30.88792 | <input checked="" type="checkbox"/> longitude: -90.190633 | <input checked="" type="checkbox"/> uncertainty: 90 m | <input checked="" type="checkbox"/> error polygon |
| 30.88792 | -90.190633 | 90 | Unavailable |

Red arrows point to the map location and the data entry fields.

GEOLocate Workflow

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State: La

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| | | | |
|----------|------------|----|-------------|
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|----------|------------|----|-------------|

Demonstration: How to use GEOLocate



GEOLocate Workflow

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Demonstration: How to use GEOLocate



GEOLocate Workflow

Batch Georeferencing

Workbench 2 possible locations found

Show 8 records Page Georeference Georeference Options Correct Draw polygon Place marker Measure

| Locality | Country | StateProvince | County | Latitude | Longitude | Corrected | precision |
|---|---------|---------------|-----------|-----------|------------|-----------|-----------|
| Chambers Spring Road 2.5 km S of Hwy 412, 8.0 km E of Siloam Springs, T17N, R33W, | USA | Arkansas | Benton | 36.188027 | -94.451005 | no | High(89) |
| Osage Creek, 1.0 mile N on gravel road to bridge crossing; gravel road jcts with | USA | Arkansas | Benton | 36.189077 | -94.395375 | no | High(97) |
| Yocum Creek, near Oak Grove (Pass 11a), Sec. 30 | USA | Arkansas | Carroll | 36.454986 | -93.322008 | no | Low(35) |
| Village Creek State Park, S of driving range, Sec. 6 | USA | Arkansas | Cross | 35.16111 | -90.70833 | no | Low(39) |
| Sugar Creek, Hwy 163 at Bay Village, Sec. 4 | USA | Arkansas | Cross | 35.44909 | -90.67533 | no | High(100) |
| Buck Creek, 8.0 miles SE Corydon | USA | Indiana | Harrison | 38.155118 | -86.014724 | no | High(88) |
| E Branch Mill Creek, Hessdale Road, 4.0 km S of Alle | USA | Kansas | Wabaunsee | 39.003564 | -96.277745 | no | High(88) |
| Blissdale Creek, Hillside National Wildlife Refuge, 50 Blissdale on Blis | USA | Mississippi | Holmes | 33.083754 | -90.224633 | no | High(84) |

Search: File management Phoxinus_erythrogaster_Locations_MMN... Showing 1 to 8 of 44 records

Time to Exercise!

- ✓ **Instruction sheet**
- ✓ **Data file**
- ✓ **Go to geo-locate.org**

✓ Instruction sheet

Georeferencing Exercises

Resources:

GEOLocate – Web application: <http://www.geo-locate.org/default.html>

Google Maps: <https://www.google.com/maps>

Falling Rain: <http://www.fallingrain.com>

Getty Thesaurus of Geographic Names (TGN): <http://bit.ly/Getty-TGN>

1. Use the standard GEOLocate client to identify the first three localities in the GeorefExamples_Florida.xls file.
 - a. Enter the locality string, country, state, and county information from the Excel sheet.
 - b. Click “Georeference.”
 - c. Inspect the “Possible Locations” by clicking on the “XX possible locations found” where XX is the number of locations GEOLocate identified.
 - d. Use an alternative resource to double check the locality. Try Google Maps.
 - e. Adjust the point location as you see fit. The green point is the active one.
 - f. Click the green point on the map, then click “Edit uncertainty”. Adjust the uncertainty radius by moving the grey arrow.
 - g. Return to the “Workbench” and record the latitude, longitude, and uncertainty.
 - h. If the uncertainty is >1000, it then discards the points.

Time to Exercise!

✓ Data file

GeorefExamples_Florida

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General

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N6 fx United States, Florida, Columbia, United States: Florida: Columbia County. Flora of O'leno State Park, Florida. Open ruderal area along trail leading north from entrance road, starting NW c

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
|----|----------|--------|---------------|---------------------|---------------------|---------------|---------|------------|---------------|--------|-----------|-----|------|--|---|---------------------------|---|
| | instcode | accno | familyeng | genus | species | country | state | county | collector | collno | datecoll | lat | long | locality | habitat | pltdesc | |
| 1 | FLAS | 193115 | Lamiaceae | <i>Lamium</i> | <i>amplexicaule</i> | United States | Florida | Levy | J. Richard Al | 9941 | 16-Feb-97 | | | United States, Florida, Levy, Uni | forested and | Waccasassa Bay State Pres | |
| 2 | FLAS | 129785 | Acanthaceae | <i>Justicia</i> | <i>spicigera</i> | United States | Florida | Lee | W.C. Brumb | 9194 | 29-Mar-77 | | | United States, Florida, Lee, United States: Florida: Lee County. The Sander | | | |
| 3 | FLAS | 183310 | Violaceae | <i>Viola</i> | <i>septemloba</i> | United States | Florida | Suwannee | Brenda Herri | 185 | 23-Mar-91 | | | United States, Florida, Suwannee Sandhill. Grc | Ichetucknee Springs State P | | |
| 4 | FLAS | 175841 | Zingiberaceae | <i>Hedychium</i> | <i>coronarium</i> | United States | Florida | Alachua | Caroline Easl | 786 | 20-May-88 | | | United States, Florida, Alachua, United States: | Paynes Prairie State Preserv | | |
| 5 | FLAS | 197838 | Solanaceae | <i>Physalis</i> | <i>virginiana</i> | United States | Florida | Columbia | Bian Tan | 205 | 6-Oct-89 | | | United States, Florida, Columbia, United State | Oleno State Park | | |
| 6 | FLAS | 151423 | Solanaceae | <i>Petunia</i> | <i>atkinsiana</i> | United States | Florida | Leon | J.B. Nelson | 2530 | 9-Jun-83 | | | United States, Florida, Leon, United States: Florida: Leon County. Persistar | | | |
| 7 | FLAS | 181023 | Rosaceae | <i>Prunus</i> | <i>americana</i> | United States | Florida | Alachua | William J. D | 1232 | 2-Jul-81 | | | United States, Florida, Alachua, United States: | San Felasco Hammock Pre | | |
| 8 | FLAS | 172611 | Onagraceae | <i>Ludwigia</i> | <i>palustris</i> | United States | Florida | Alachua | Caroline Easl | 637 | 25-Jun-87 | | | United States, Florida, Alachua, U In low wet pl | Paynes Prairie State Preserv | | |
| 9 | FLAS | 136500 | Myrtaceae | <i>Melaleuca</i> | <i>quinquenervi</i> | United States | Florida | Alachua | F.G. Meyer | 13355 | 29-Mar-73 | | | United States, Florida, Alachua, United States: | Gainesville: University of F | | |
| 10 | FLAS | 191141 | Liliaceae | <i>Lilium</i> | <i>longiflorum</i> | United States | Florida | Jefferson | Bruce Hanse | 12871 | 2-Aug-95 | | | United States, Florida, Jefferson, United States: Florida: Jefferson County. | | | |
| 11 | FLAS | 185629 | Gentianaceae | <i>Eustoma</i> | <i>exaltatum</i> | United States | Florida | Levy | Jame L. Am | 1052 | 21-Aug-92 | | | United States, Florida, Levy, United States: Flo | Cedar Key Scrub State Res | | |
| 12 | FLAS | 251725 | Fabaceae | <i>Chamaecrista</i> | <i>pilosa</i> | United States | Florida | Palm Beach | Paul M. Cass | 453 | 30-Nov-68 | | | United States, Florida, Palm Beac | disturbed ground; trailing on the ground, | | |
| 13 | FLAS | 194457 | Ericaceae | <i>Monotropa</i> | <i>uniflora</i> | United States | Florida | Highlands | Steven P. Ch | 549 | 24-Apr-86 | | | United States, Florida, Highlands, United States: Florida: Highlands Count | | | |
| 14 | FLAS | 201677 | Ericaceae | <i>Ceratiola</i> | <i>ericoides</i> | United States | Florida | Marion | Clementina E | 1 | 28-Oct-88 | | | United States, Florida, Marion, U | Site burned in | Ocala National Forest | |
| 15 | FLAS | 175316 | Commelinaceae | <i>Commelina</i> | <i>erecta</i> | United States | Florida | Miami-Dade | Bian Tan and | CR5 | 24-Jul-90 | | | United States, Florida, Miami-Da | Fire exclusion was evident in the eastern : | | |
| 16 | FLAS | 185425 | Bromeliaceae | <i>Tillandsia</i> | <i>recurvata</i> | United States | Florida | Levy | Jame L. Amc | 990 | 30-Apr-92 | | | United States, Florida, Levy, United States: Flo | Cedar Key Scrub State Res | | |
| 17 | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | |

Georeferencing Exercises

1. Use the standard GEOLocate client to identify the first three localities in the GeorefExamples_Florida.xls file.

- a. Enter the locality string, country, state, and county information from the Excel sheet.
- b. Click “Georeference.”
- c. Inspect the “Possible Locations” by clicking on the “XX possible locations found” where XX is the number of locations GEOLocate identified.
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- f. Click the green point on the map, then click “Edit uncertainty”. Adjust the uncertainty radius by moving the grey arrow.
- g. Return to the “Workbench” and record the latitude, longitude, and uncertainty.
- h. If the uncertainty is >1000 , it then discards the points.

Time to Exercise!

✓ **Check results...**

2. Use the batch GEOLocate client to upload the localities in the GeorefExamples.xls file.
 - a. Copy and paste the appropriate information from the GeorefExamples.xls file into your own GEOLocateBatchFormat.csv.
 - i. <http://www.geo-locate.org/standalone/tutorial.html>
 - ii. Do not label the columns (your first row = first sample)
 - iii. ****Make sure to save as a .csv****
 - iv. The majority of the columns will be empty
 - b. Go to the batch GEOLocate client and upload the formatted csv file
 - c. “Page Georeference” will georeference all eight localities available at once. “Georeference” will do one at a time.
 - d. Select a locality and go through Steps 1c to 1g. Once you are pleased with the locality and uncertainty, click “Correct” to note that you have gone through this georeference.
 - e. Work through the remaining localities.
 - f. If you do not finish a batch georeferencing, you can click on “File Management” at the bottom of the screen to receive a retrieval code. This will allow you to re-access this file whenever you wish without the need to download and upload.
 - g. If you do finish a batch georeferencing, you can click on “File Management” and then “Export” to download the finished georeferenced file.

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 - i. <http://www.geo-locate.org/standalone/tutorial.html>

How to import data from Microsoft Excel into GEOLocate

Create a blank spreadsheet within Excel. Add the following to the first row of columns in your spreadsheet:

| | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 | Column 7 | Column 8 | Column 9 | Column 10 |
|------|-----------------|----------|----------|----------|----------|-----------|-------------------|-----------|---------------|------------------|
| Row1 | locality string | country | state | county | latitude | longitude | correction status | precision | error polygon | multiple results |

After the 10th column, you may add the names of other fields in your dataset that you would like to include (field number, localityID, remarks etc.) but you must be certain that each entry in the first row is unique.

Copy and paste your data from its original source to the appropriate columns starting at row 2 (alternatively, you could modify an existing spreadsheet to conform to the above format).

Select *Save As...* from the file menu in Excel. Enter a filename for your file, select CSV (*comma delimited*) (*.csv) from the drop down box labeled *Save as type*, and click the save button. Exit Microsoft Excel.

You now have a file that can be used with GEOLocate.

From the GEOLocate file menu, select Import -> CSV, and select the file you just created to import.

***NOTE: Our web based file client now supports the generation of uncertainty radii.**

If you wish to generate and record uncertainty radii for your records using this client, your spreadsheet must also include an additional column to store that data. In this case you would need at least 11 columns for your data instead of 10. Using uncertainty radii is optional, so you can ignore this, if you choose not to utilize that option.

Time to Exercise!

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Time to Exercise!

✓ **Check results...**

- ✓ **Understand the importance of georeferencing for biodiversity analyses**
- ✓ **Understand the sources of uncertainty in a georeference**
- ✓ **Be familiar with GEOLocate**
- ✓ **Use GEOLocate to georeference localities**

Links with links...



<https://www.idigbio.org/wiki/index.php/Georeferencing>



<http://herpnet.org/Gazetteer/GeorefResources.htm>

Any questions??

Please use the chat for questions!