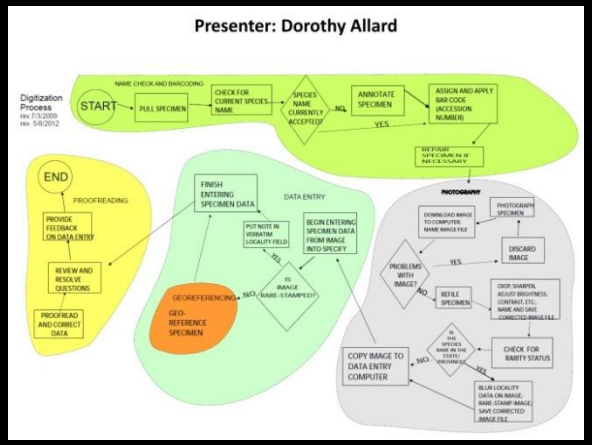
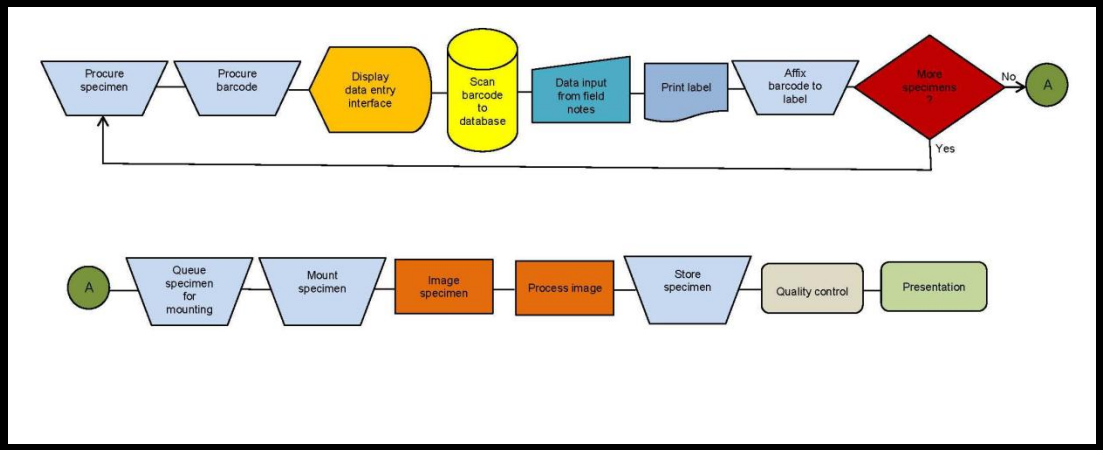
GEOREFERENCING
TOOLS AND PRACTICES
iDigBio
Integrated Digitized Biocollections
Yukon
Northwest Territories
Gulf of Alaska
Hudson Bay
Canada
Alberta
Manitoba
British Columbia
Saskatchewan
Edmonton
Calgary
Ontario
Quebec
Newfoundland and Labrador
Gulf of St Lawrence
Washington
Montana
North Dakota
Minnesota
Oregon
Idaho
Wyoming
South Dakota
Wisconsin
Michigan
Nebraska
Iowa
Chicago
Illinois
Nevada
Utah
Colorado
United States
Kansas
Missouri
Indiana
Ohio
Pennsylvania
New York
California
Kentucky
West Virginia
Virginia
Tennessee
North Carolina
Oklahoma
Arkansas
South Carolina
Mississippi
Alabama
Georgia
Texas
Louisiana
Florida
Los Angeles
Arizona
New Mexico
Phoenix
San Diego
Dallas
Houston
San Antonio
Jacksonville
Gulf of California
Gulf of Mexico
Mexico
Mexico City
Havana
Cuba
Guatemala
Honduras
Caribbean
Dominican Republic
Port-au-Prince
Puerto Rico
Montreal
Ottawa
Toronto
Maine
New Brunswick
Nova Scotia
Prince Edward Island
Vermont
New Hampshire
Massachusetts
Rhode Island
Connecticut
New Jersey
Delaware
Maryland
District of Columbia

Where does georeferencing fit into the digitization workflow?

- Traditional legacy approach: As complete records are entered, all data, including georeferencing data are determined and entered.

- New collections approach: Due to the prevalence of GPS devices, most modern collection data include georeferencing data which can be entered at the time specimen data area entered. Each collecting station becomes a collecting event that gets named, georeferenced, and entered. Collections at that station are all assigned to the same event and georeferenced as they are entered.

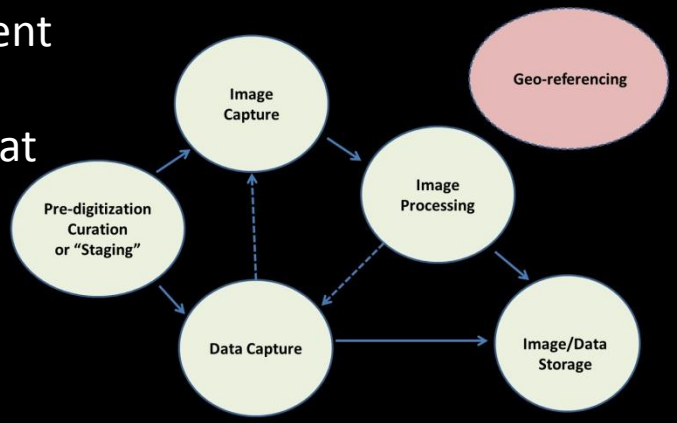




Where does georeferencing fit into the digitization workflow?

- New legacy approach 1: Georeferencing becomes an activity divorced from the initial entry of legacy data and dependent upon collaborative tools that allow records with similar localities to be parsed and pooled by software in a way that they are assigned georeferences in bulk.

- In bulk or individually based on known boundaries of counties, parks, preserves, sections, towns, counties, or other known areas with defined boundaries and known extents. In these cases, georeferencing is to reported accurate to the known extent. Such georeferencing can be built in to the data entry algorithm as a record is saved.



Georeferencing Data Elements

Required:

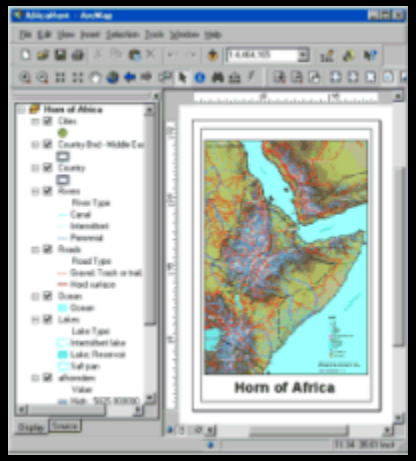
- Latitude (dd.dddd)
- Longitude (dd.dddd)
- Datum (coordinate system)

Desired:

- Precision
- Georeferencing method
- Georeferencing remarks
- Projection

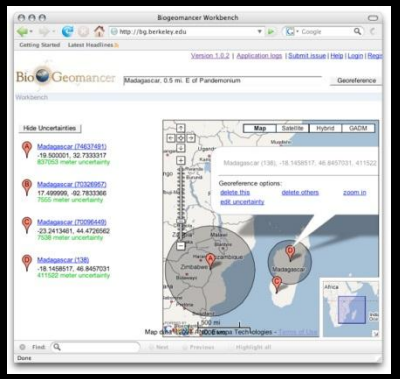
Georeferencing Methods and Tools

ArcGIS



Google Earth/Maps

Biogeomancer



Geolocate

iDigBio
Integrated Digitized Biocollections

PowerlineMap.mxd - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:20,000

Editor

Table Of Contents

Layers
- C:\Users\Gil\Documents\FlatwoodsGroup
  - PowerLinePoints_Final
  - PowerLinePoints_2
  - PowerLinePoints
- C:\Users\Gil\Documents\FlatwoodsGroup\Points_2011-05-
  - 'Points_2011-05-16-17$' Events
  - 'Points_2011-05-16-17$'
- C:\Users\Gil\Documents\MapData\Powerlines
  - powerlines
- C:\DataMaps10\streetmap_na\data
  - citiesmjr.sdc
    - Cities (60m-25m)
  - cities.sdc
    - Cities (25-5m)
    - Cities (5-1.5m)
    - Cities (1.5m-750k)
    - Cities (750-300k)
    - Cities (300-150k)
    - Cities (150-100k)
    - Cities (100-15k)
  - exits.sdc
    - Exits (Numbers) (15k-0)
  - interstates.sdc
    - Major Routes (60-25m)
    - Major Routes (25-5m)
    - Major Routes (5-3m)
    - Interstates (3-1.5m)
  - highways.sdc
    - Highways (3-1.5m)
    - Roads (1.5m-750k)
    - Roads (750-300k)
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  - mroads.sdc
    - Roads (150-50k)
  - streetscarto.sdc
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    - Roads (25-15k)
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    - Roads (5k-0)
  - railroads.sdc
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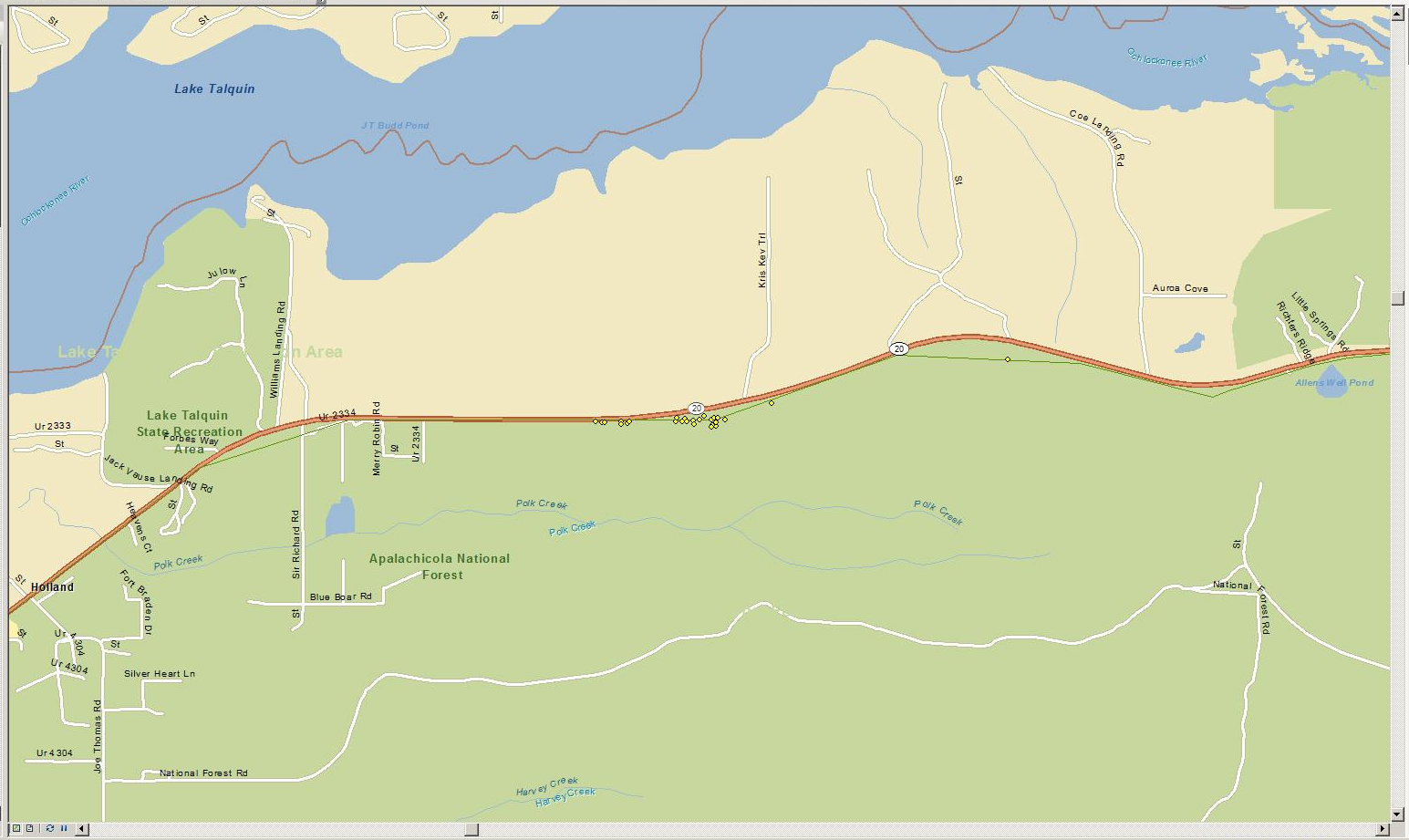
    - Railroads (100-25k)
    - Railroads (25-15k)
    - Railroads (15-2.5k)



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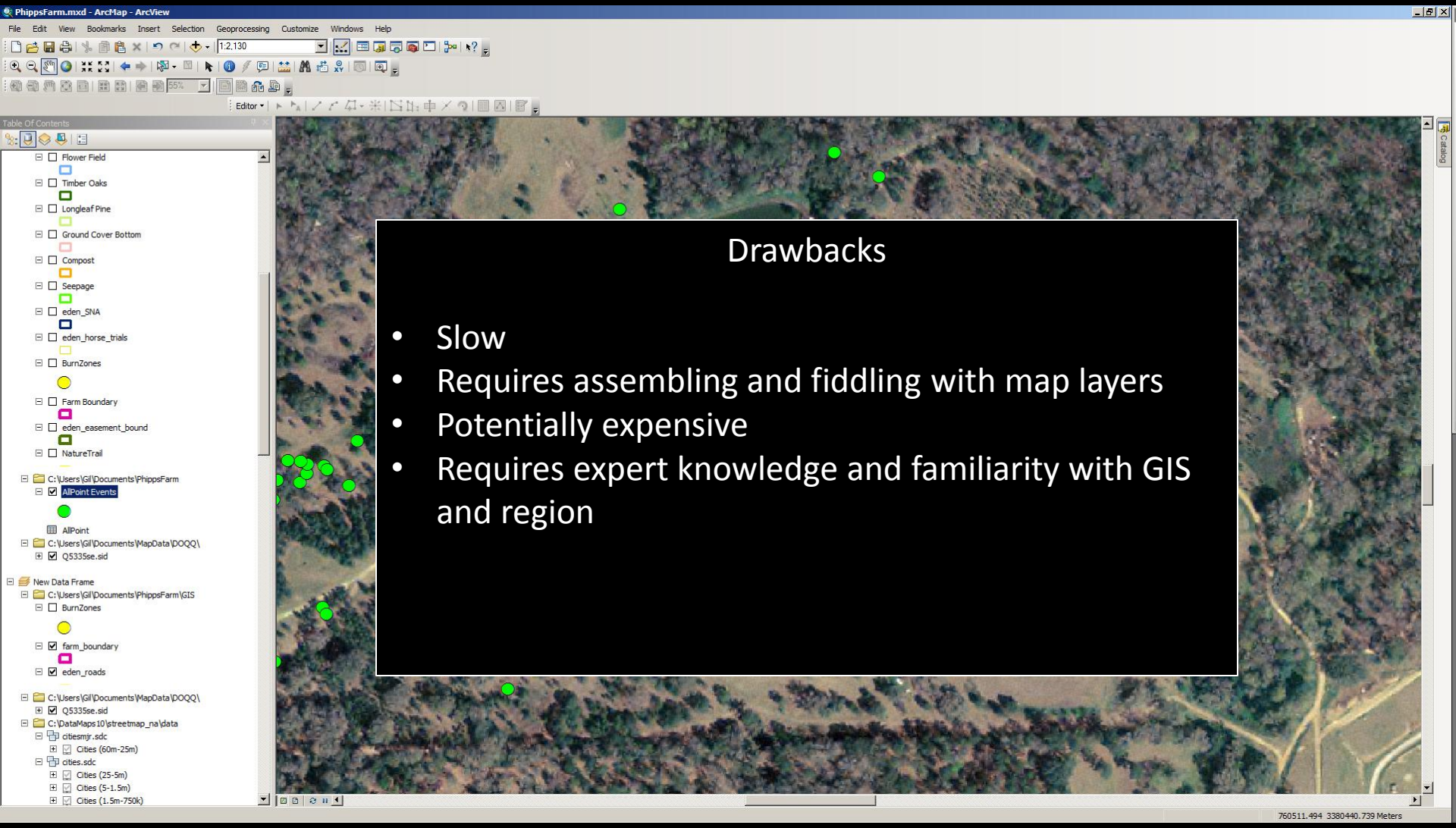
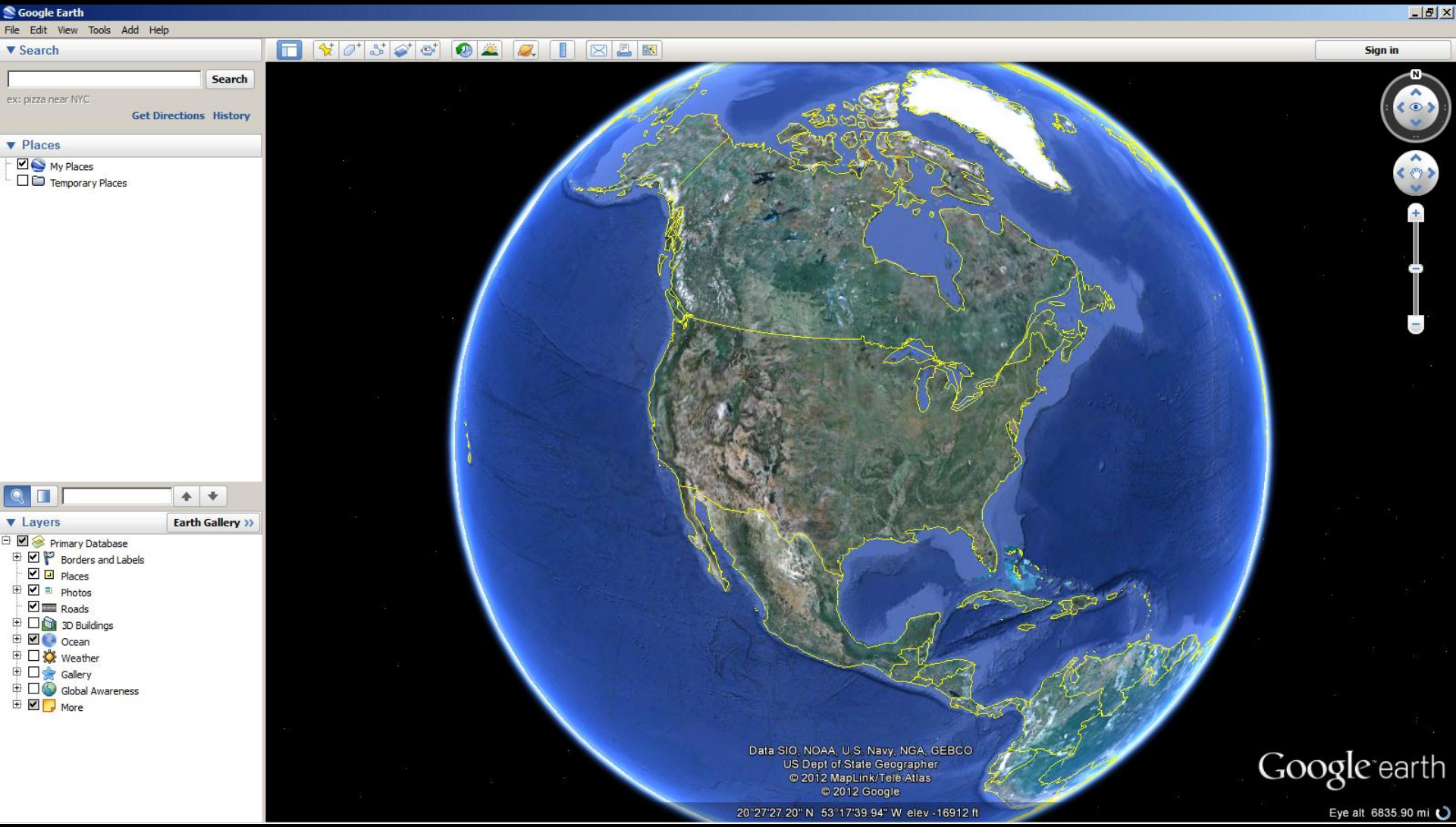


Drawbacks

- Slow
- Requires assembling and fiddling with map layers
- Potentially expensive
- Requires expert knowledge and familiarity with GIS and region


Google Earth
File Edit View Tools Add Help
Search
Search
ex: pizza near NYC
Get Directions History
Places
My Places
Temporary Places
Layers
Earth Gallery
Primary Database
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Sign in
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
US Dept of State Geographer
© 2012 MapLink/Tele Atlas
© 2012 Google
20°27'27.20" N 53°17'39.94" W elev -16912 ft
Google earth
Eye alt 6835.90 mi

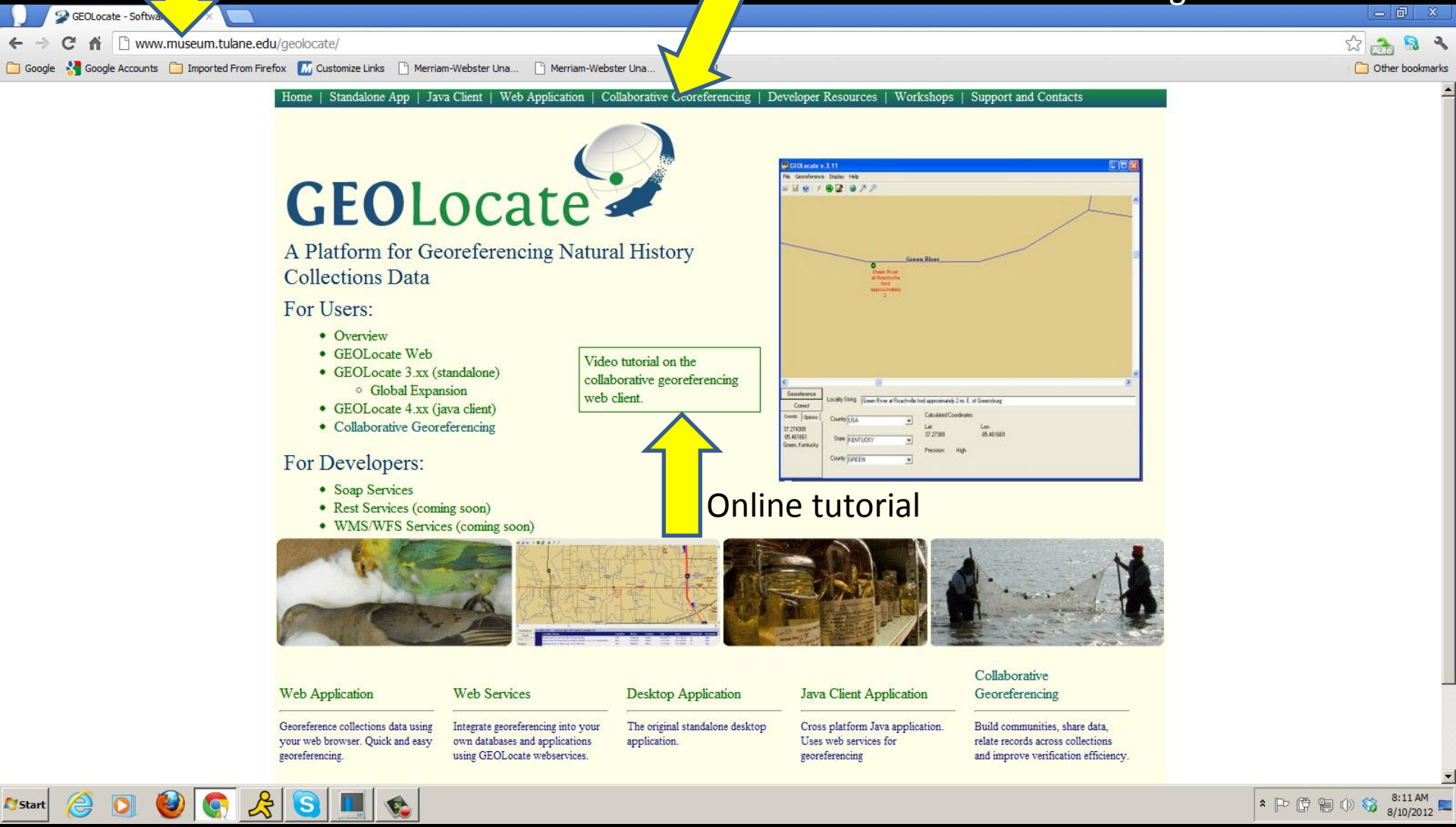
BioGeomancer:
Semi-automated Georeferencing Engine

http://bg.berkeley.edu/latest/

Developed by: John Wieczorek, Aaron Steele, Dave Neufeld, P. Bryan Heidorn, Robert Guralnick, Reed Beaman, Chris Frazier, Paul Flemons, Nelson Rios, Greg Hill, Youjun Guo

www.museum.tulane.edu/geolocate/

Collaborative Georeferencing



Currently incorporated into Specify and Symbiota

Management portal

GEOLocate - Software for Ge

www.museum.tulane.edu/geolocate/community/default.html

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Collaborative Georeferencing

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1. A client application for reviewing and editing community records. Currently there are 2 applications available for this task:
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   - The GEOLocate web-based collaborative client (click link to try it out)
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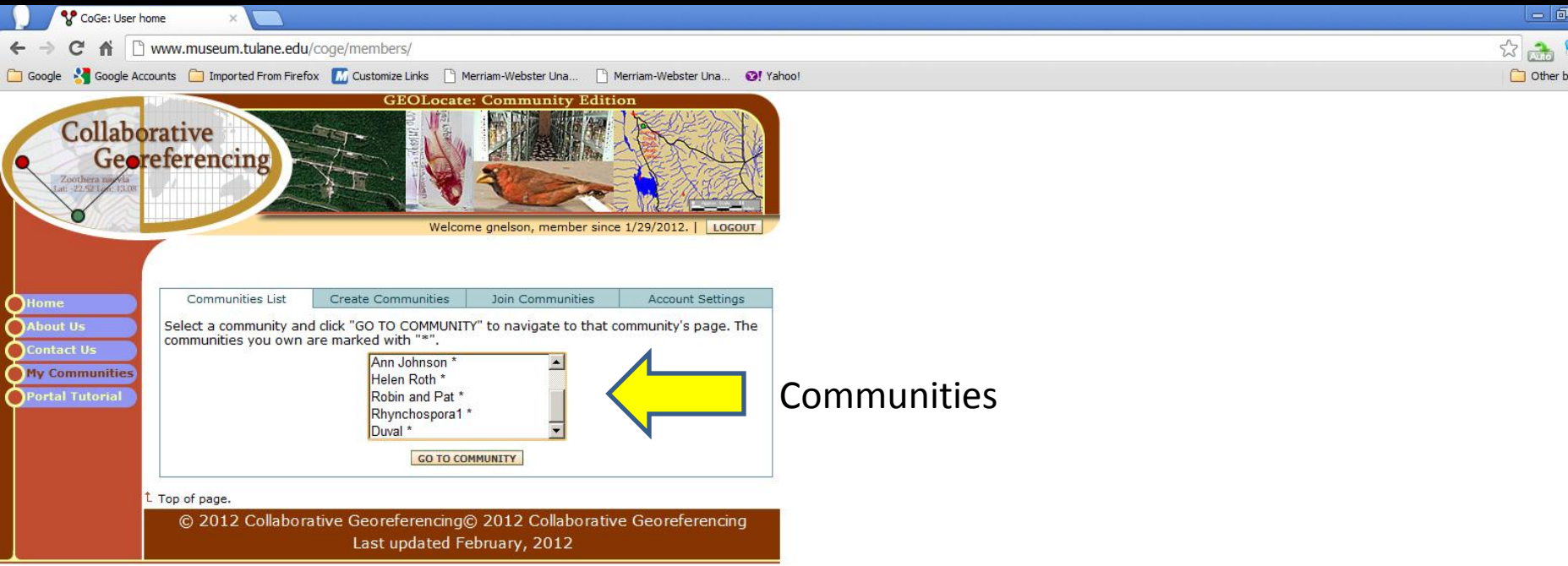
Video Tutorials

Start

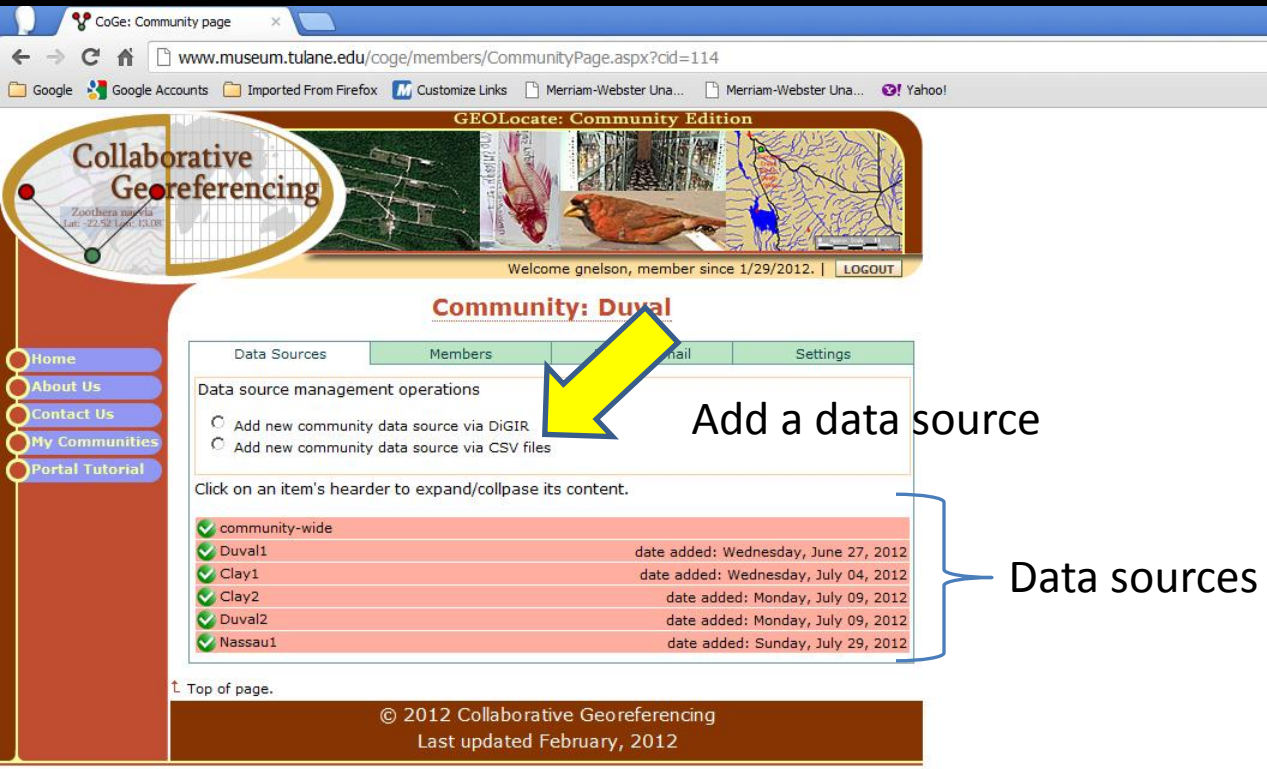
8:14 AM
8/10/2012

CoGe: Home
www.museum.tulane.edu/coge/
Google
Google Accounts
Imported From Firefox
Customize Links
Merriam-Webster Una...
Merriam-Webster Una...
Yahoo!
Other bookmarks
GEOLocate: Community Edition
Collaborative Georeferencing
username:
password:
LOGIN
GEOLocate: Community Edition
Home
About Us
Contact Us
Sign Up
Communities
Welcome to the Tulane University Museum of Natural History's Community Edition of GEOLocate. This site along with GEOLocate (version 3 and higher) and DiGIR provider software form the foundation of community-based georeferencing, whereby participants form communities and pool data to maximize efficiency of georeferencing.
Beta testing is now open, so if you are interested in using our software and services for collaborative georeferencing please follow the registration link below. After personal review of your registration information, you will be granted access to the system. Questions or comments may be directed to Nelson Rios
Registration is free and gives you access to restricted areas of this portal, where you can join or create a community. Read more about us.
Top of page.
© 2012 Collaborative Georeferencing
Last updated February, 2012
Start
8:15 AM
8/10/2012

Sign in

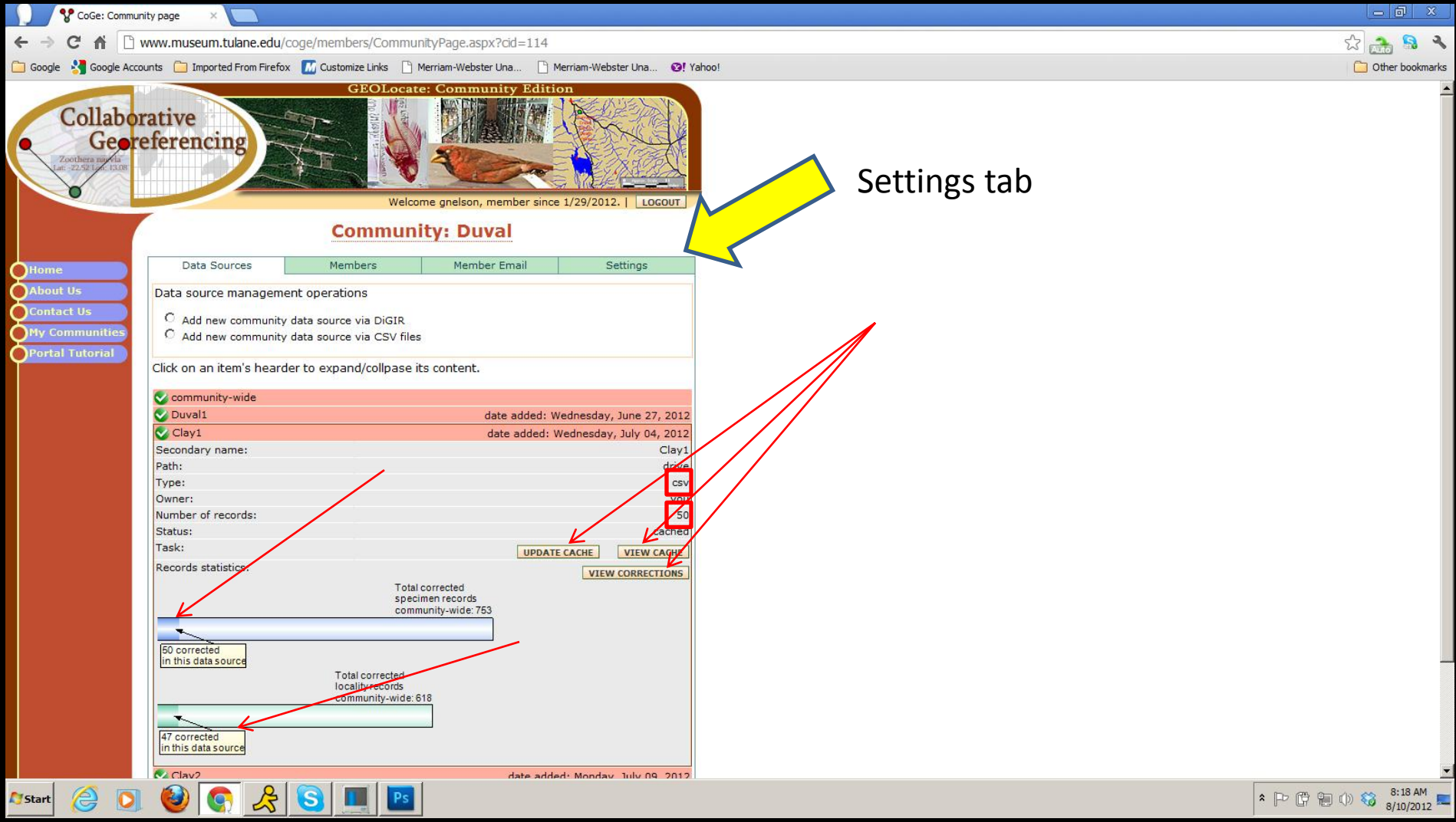


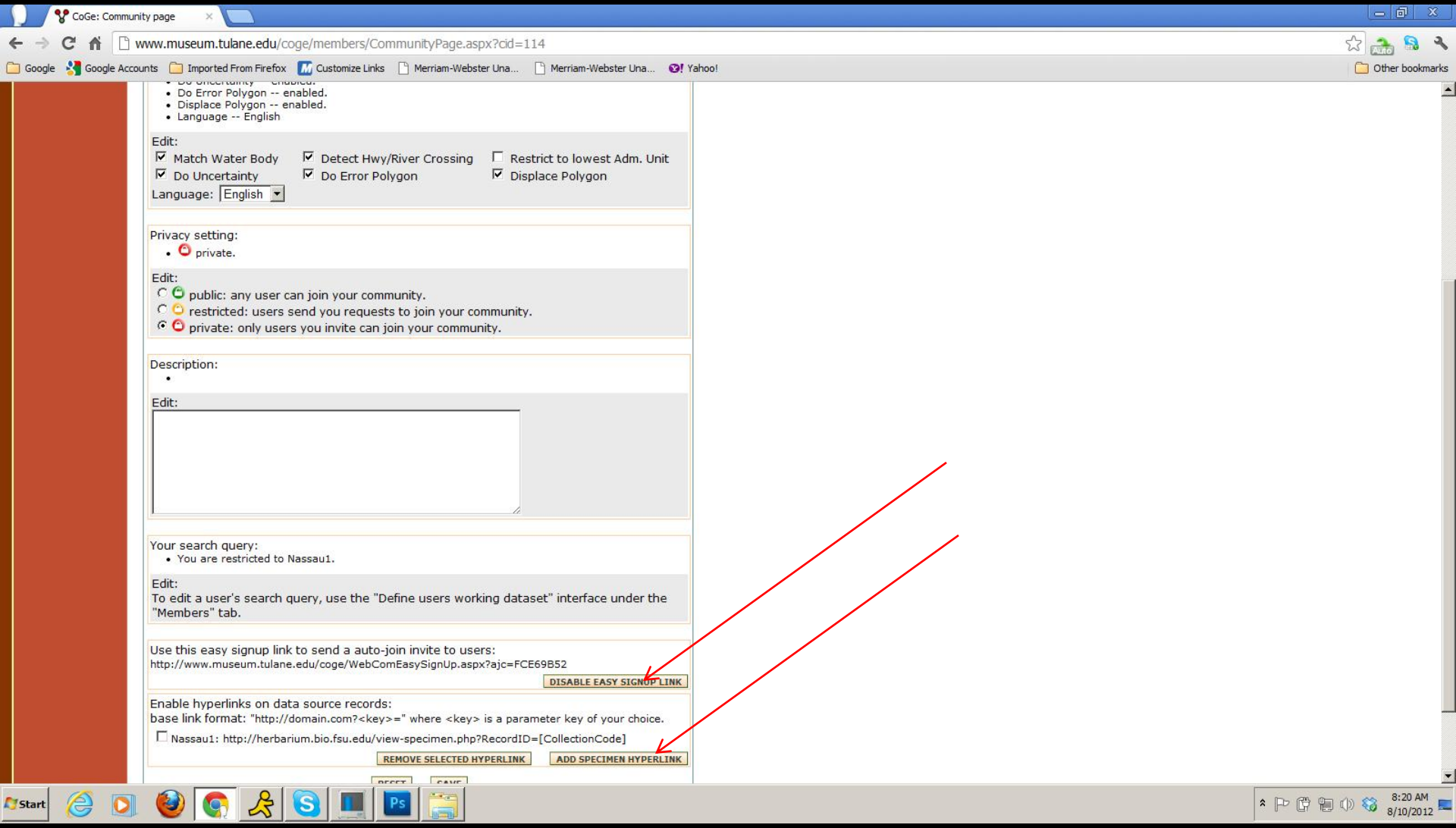
Communities



Add a data source

Data sources


CoGe: Community page
www.museum.tulane.edu/coge/members/CommunityPage.aspx?cid=114
GEOLocate: Community Edition
Collaborative Georeferencing
Welcome gnelson, member since 1/29/2012. | LOGOUT
Community: Duval
Home
About Us
Contact Us
My Communities
Portal Tutorial
Data Sources
Members
Member Email
Settings
Data source management operations
Add new community data source via DiGIR
Add new community data source via CSV files
Click on an item's hearder to expand/collpase its content.
community-wide
Duval1
date added: Wednesday, June 27, 2012
Clay1
date added: Wednesday, July 04, 2012
Secondary name:
Clay1
Path:
Type:
csv
Owner:
Number of records:
50
Status:
cached
Task:
UPDATE CACHE
VIEW CACHE
Records statistics:
VIEW CORRECTIONS
Total corrected specimen records community-wide: 753
50 corrected in this data source
Total corrected locality records community-wide: 618
47 corrected in this data source
Clay2
date added: Monday, July 09, 2012
Settings tab
Start
8:18 AM
8/10/2012


CoGe: Community page
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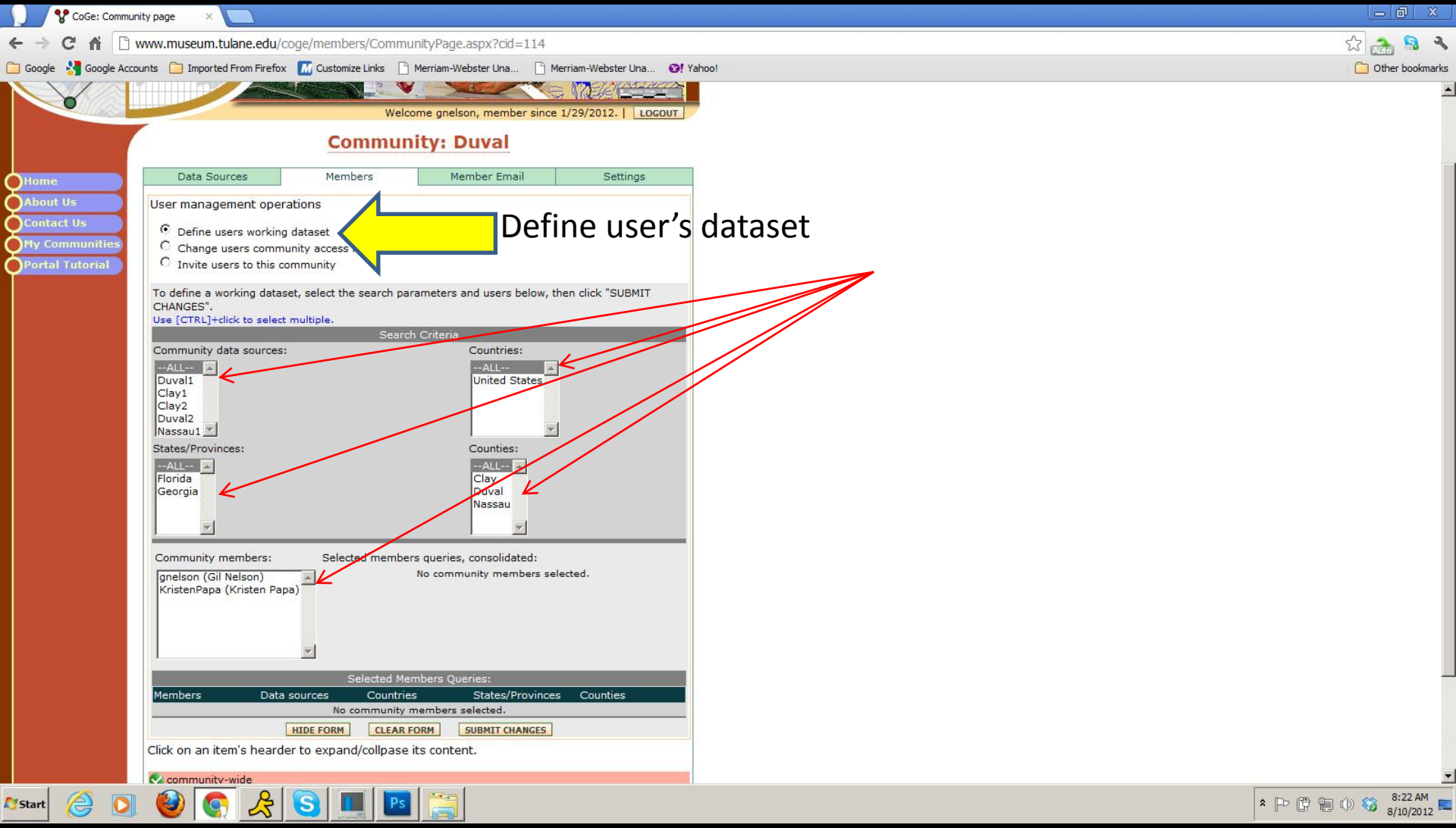
Google
Google Accounts
Imported From Firefox
Customize Links
Merriam-Webster Una...
Merriam-Webster Una...
Yahoo!
Other bookmarks
Do Error Polygon -- enabled.
Displace Polygon -- enabled.
Language -- English
Edit:
Match Water Body
Detect Hwy/River Crossing
Restrict to lowest Adm. Unit
Do Uncertainty
Do Error Polygon
Displace Polygon
Language: English
Privacy setting:
private.
Edit:
public: any user can join your community.
restricted: users send you requests to join your community.
private: only users you invite can join your community.
Description:
Edit:
Your search query:
You are restricted to Nassau1.
Edit:
To edit a user's search query, use the "Define users working dataset" interface under the "Members" tab.
Use this easy signup link to send a auto-join invite to users:
http://www.museum.tulane.edu/coge/WebComEasySignUp.aspx?ajc=FCE69B52
DISABLE EASY SIGNUP LINK
Enable hyperlinks on data source records:
base link format: "http://domain.com?<key>=" where <key> is a parameter key of your choice.
Nassau1: http://herbarium.bio.fsu.edu/view-specimen.php?RecordID=[CollectionCode]
REMOVE SELECTED HYPERLINK
ADD SPECIMEN HYPERLINK
Start
8:20 AM
8/10/2012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Welcome gnelson, member since 1/29/2012. | LOGOUT
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Home
About Us
Contact Us
My Communities
Portal Tutorial
Data Sources
Members
Member Email
Settings
User management operations
Define users working dataset
Change users community access
Invite users to this community
Define user's dataset
To define a working dataset, select the search parameters and users below, then click "SUBMIT CHANGES".
Use [CTRL]+click to select multiple.
Search Criteria
Community data sources:
--ALL--
Duval1
Clay1
Clay2
Duval2
Nassau1
Countries:
--ALL--
United States
States/Provinces:
--ALL--
Florida
Georgia
Counties:
--ALL--
Clay
Duval
Nassau
Community members:
gnelson (Gil Nelson)
KristenPapa (Kristen Papa)
Selected members queries, consolidated:
No community members selected.
Selected Members Queries:
Members
Data sources
Countries
States/Provinces
Counties
No community members selected.
HIDE FORM
CLEAR FORM
SUBMIT CHANGES
Click on an item's hearder to expand/collpase its content.
community-wide

Web client

GEOLocate - Software for Ge

www.museum.tulane.edu/geolocate/community/default.html

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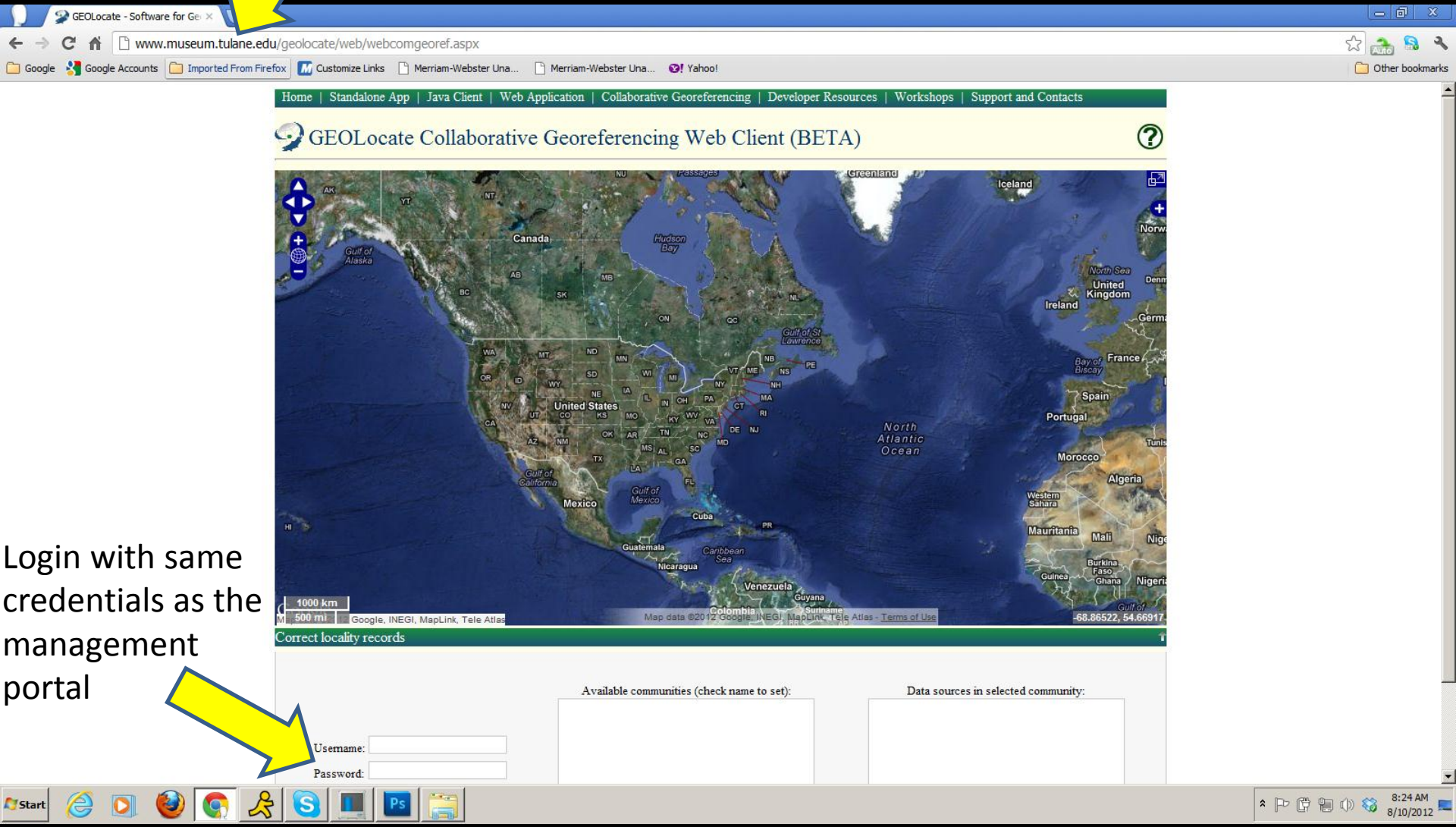
Video Tutorials

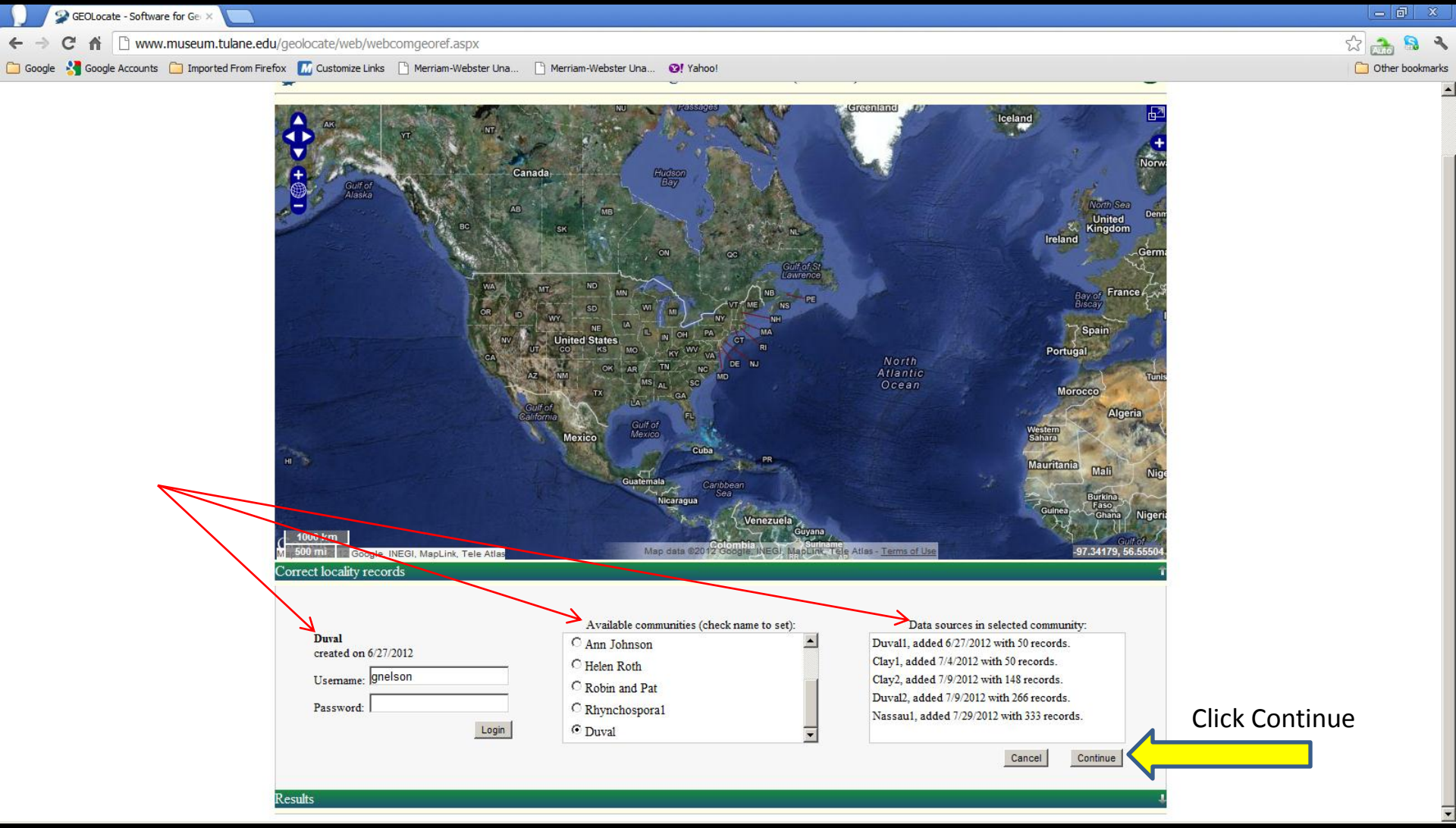
Start

8:14 AM
8/10/2012

www.museum.tulane.edu/geolocate/web/webcomgeoref.aspx



Login with same credentials as the management portal



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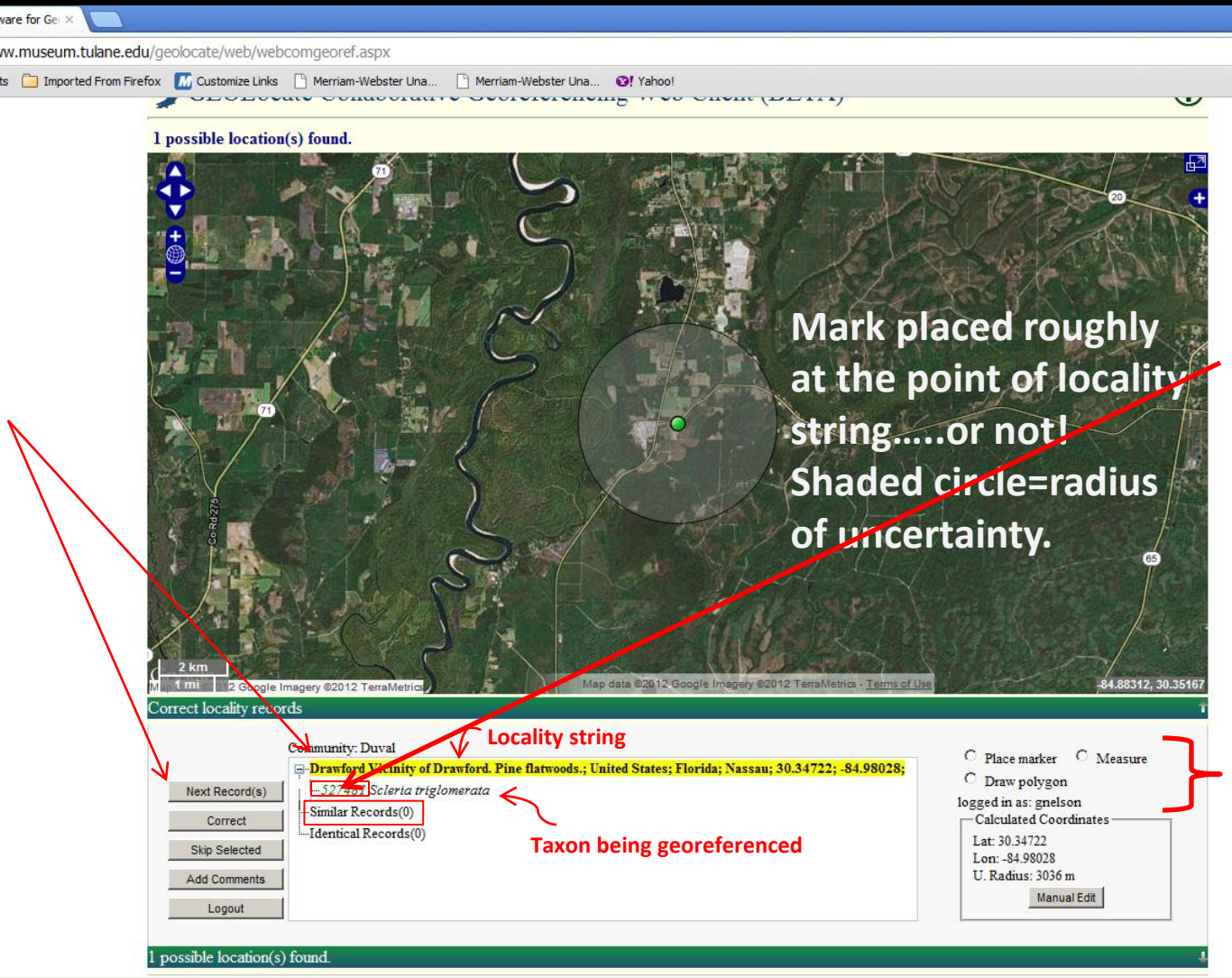
GEOLocate - Software for Ge
www.museum.tulane.edu/geolocate/web/webcomgeoref.aspx
1 possible location(s) found.
Mark placed roughly at the point of locality string.....or not!
Shaded circle=radius of uncertainty.
Click the specimen id to access the original record.
Correct locality records
Locality string
Community: Duval
Drawford Vicinity of Drawford. Pine flatwoods.; United States; Florida; Nassau; 30.34722; -84.98028;
Scleria triglomerata
Taxon being georeferenced
Similar Records(0)
Identical Records(0)
Next Record(s)
Correct
Skip Selected
Add Comments
Logout
Place marker
Measure
Draw polygon
logged in as: gnelson
Calculated Coordinates
Lat: 30.34722
Lon: -84.98028
U. Radius: 3036 m
Manual Edit
1 possible location(s) found.

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FSU Herbarium - Specimen De
herbarium.bio.fsu.edu/view-specimen.php?RecordID=34466
Google | Google Accounts | Imported From Firefox | Customize Links | Merriam-Webster Una... | Merriam-Webster Una... | Yahoo! | Other bookmarks

THE FLORIDA STATE UNIVERSITY
Biology Department
Robert K. Godfrey Herbarium

SEARCH FLORIDA STATE
FSU Biology | Search | GO

Specimen Details

Report a Problem

Species:	Scleria triglomerata
Collection Date:	June 2, 1958
Bar Code ID:	000027481
Collectors:	R.K. Godfrey, William Lindsey
Collector's Identifier:	56898
Flower Buds Present?:	True
Flowers Present?:	True
Fruit Present?:	True
Country:	United States
State or Province:	Florida
County or Parish:	Nassau
Fips Code:	12089
Nearest Named Place:	Drawford
Verbatim Directions to Locality:	Vicinity of Drawford.
Habitat:	Pine flatwoods.
Non digital information?:	N

View Image View JPEG
Download JPEG (1.35 MB)
Download TIFF (30.83 MB)

Identification Records

Identifier's Name:	R. K. G.
Formal Identification Date:	1958-06-02
Lowest Rank Identified:	Species
Identification History:	Scleria triglomerata Michx.
Determinavit:	det.

FSU Herbarium - View Image - Google Chrome

herbarium.bio.fsu.edu/view-image.php?Image=images/herbarium/jpegs/000027481.jpg&ImageType=jpeg

ENGTH SKILL CHARACTER STRENGTH SKILL CHARACTER STRENGTH SKILL CHARACTER STRENGTH SKILL CHARACTER STRENGTH SKILL CHARACTER STRENGTH SKILL CHARACTER

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FSU Biology Search GO

o the SE North American Coastal Plain.

n Details

Problem

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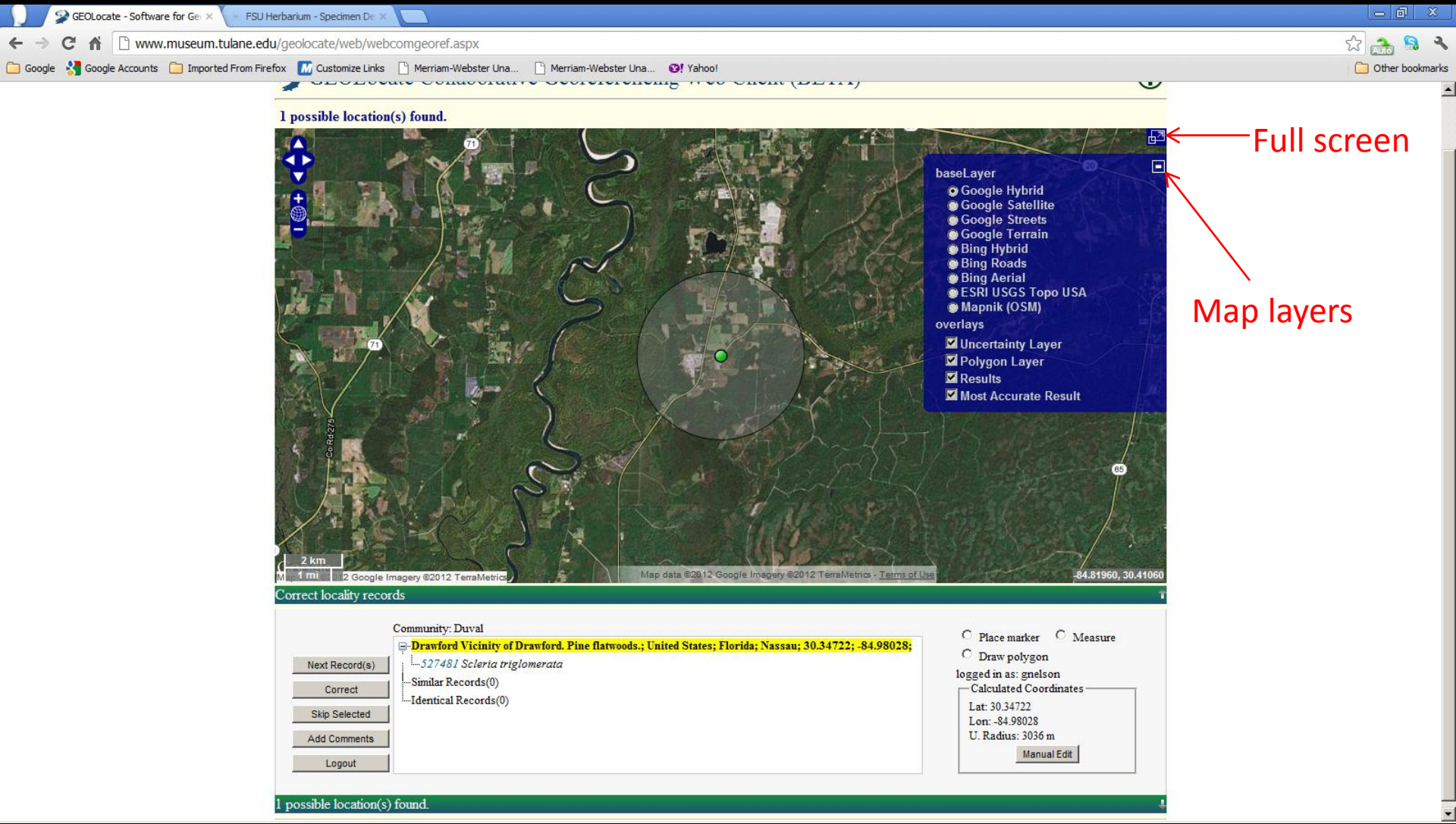
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FSU Herbarium - Specimen De
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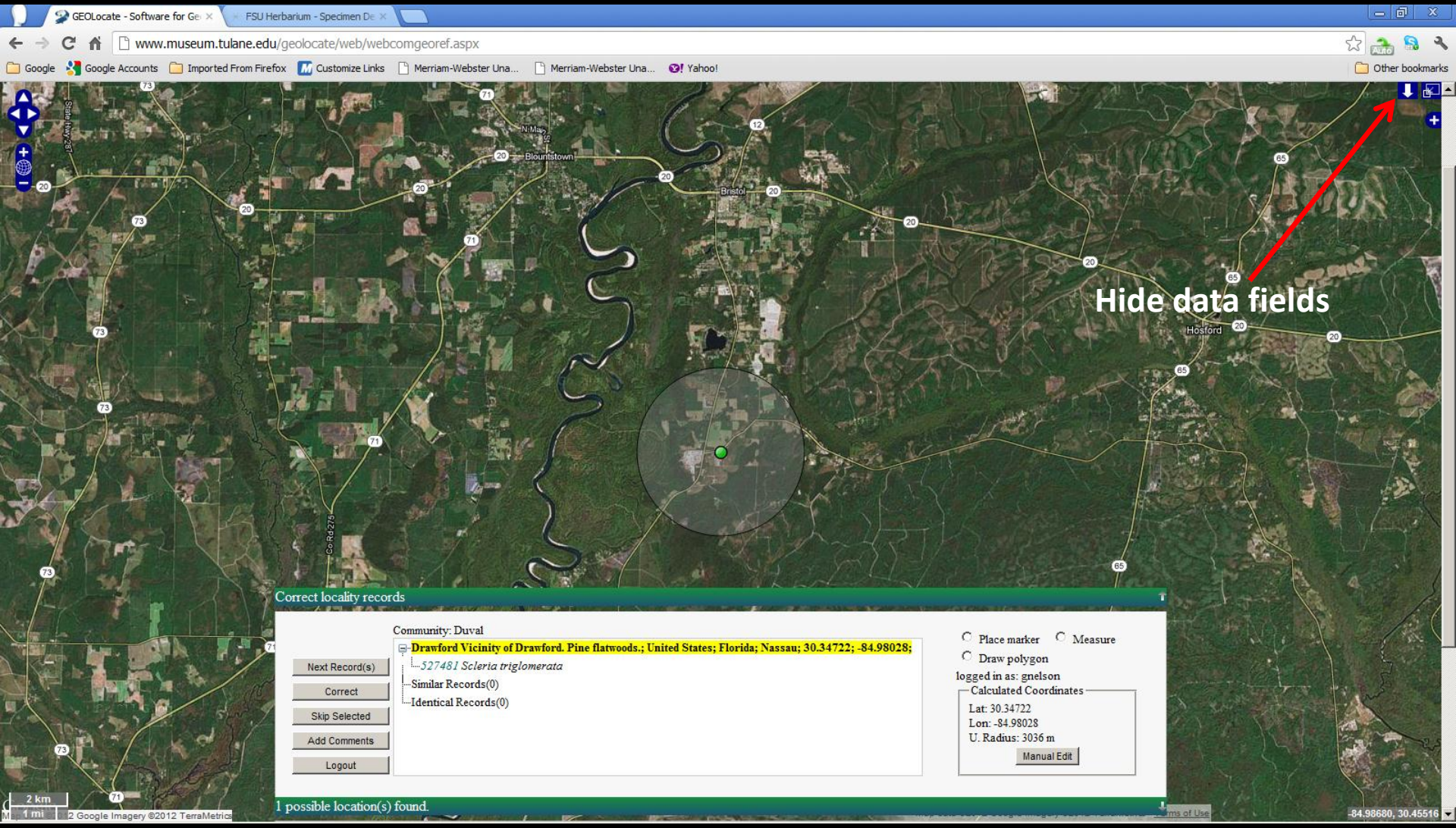
Google Accounts
Imported From Firefox
Customize Links
Merriam-Webster Una...
Merriam-Webster Una...
Yahoo!
Other bookmarks
1 possible location(s) found.
baseLayer
Google Hybrid
Google Satellite
Google Streets
Google Terrain
Bing Hybrid
Bing Roads
Bing Aerial
ESRI USGS Topo USA
Mapnik (OSM)
overlays
Uncertainty Layer
Polygon Layer
Results
Most Accurate Result
Full screen
Map layers
2 km
1 mi
Map data ©2012 Google Imagery ©2012 TerraMetrics - Terms of Use
-84.81960, 30.41060
Correct locality records
Community: Duval
Drawford Vicinity of Drawford. Pine flatwoods.; United States; Florida; Nassau; 30.34722; -84.98028;
527481 Scleria triglomerata
Similar Records(0)
Identical Records(0)
Next Record(s)
Correct
Skip Selected
Add Comments
Logout
Place marker
Measure
Draw polygon
logged in as: gnelson
Calculated Coordinates
Lat: 30.34722
Lon: -84.98028
U. Radius: 3036 m
Manual Edit
1 possible location(s) found.


GEOLocate - Software for Ge
FSU Herbarium - Specimen De
www.museum.tulane.edu/geolocate/web/webcomgeoref.aspx
Google
Google Accounts
Imported From Firefox
Customize Links
Merriam-Webster Una...
Merriam-Webster Una...
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Other bookmarks
Hide data fields
Correct locality records
Community: Duval
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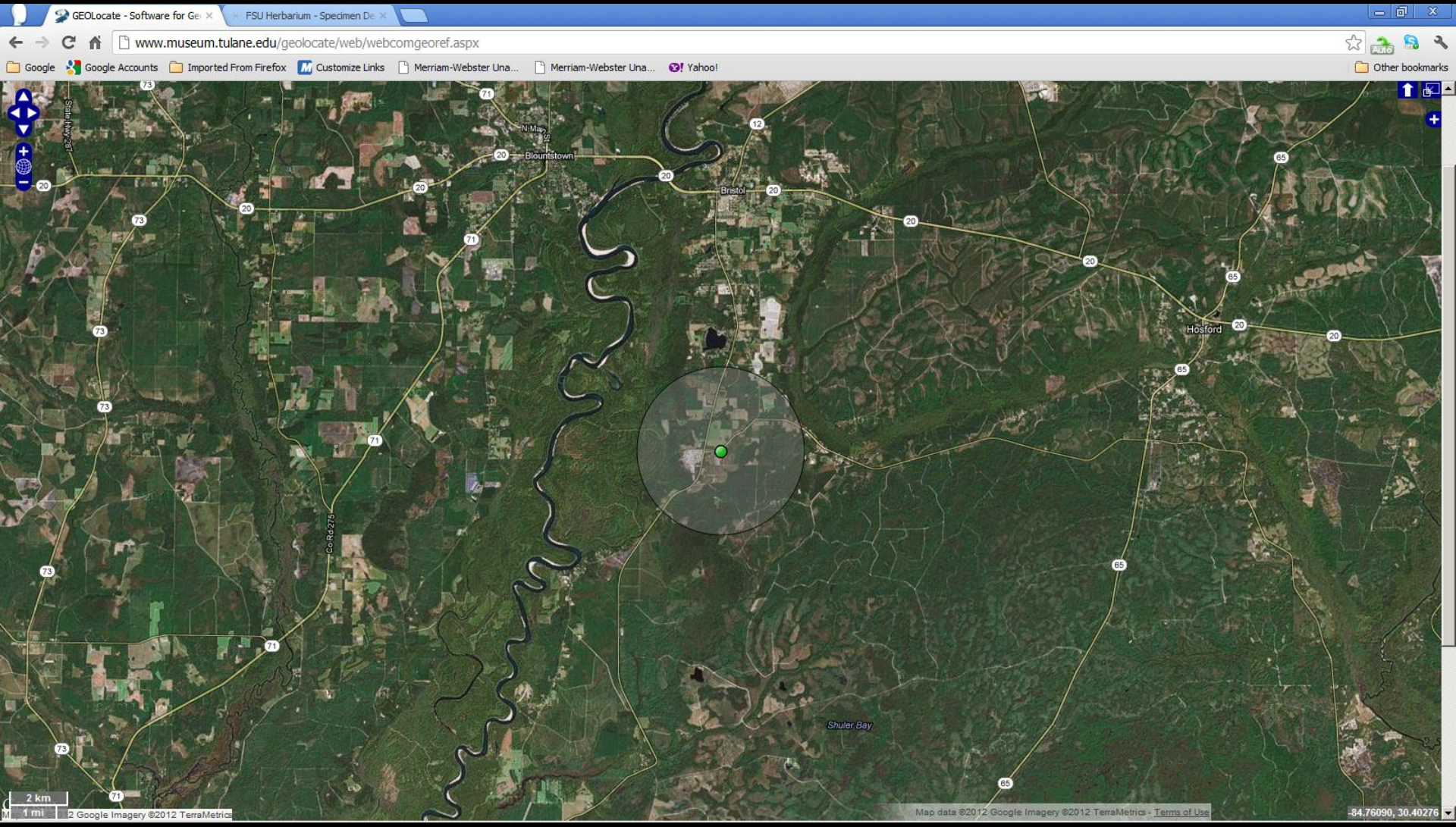
Measure
Draw polygon
logged in as: gnelson
Calculated Coordinates
Lat: 30.34722
Lon: -84.98028
U. Radius: 3036 m
Manual Edit
1 possible location(s) found.
Blountstown
Bristol
Hosford
2 km
1 mi
-84.98680, 30.45516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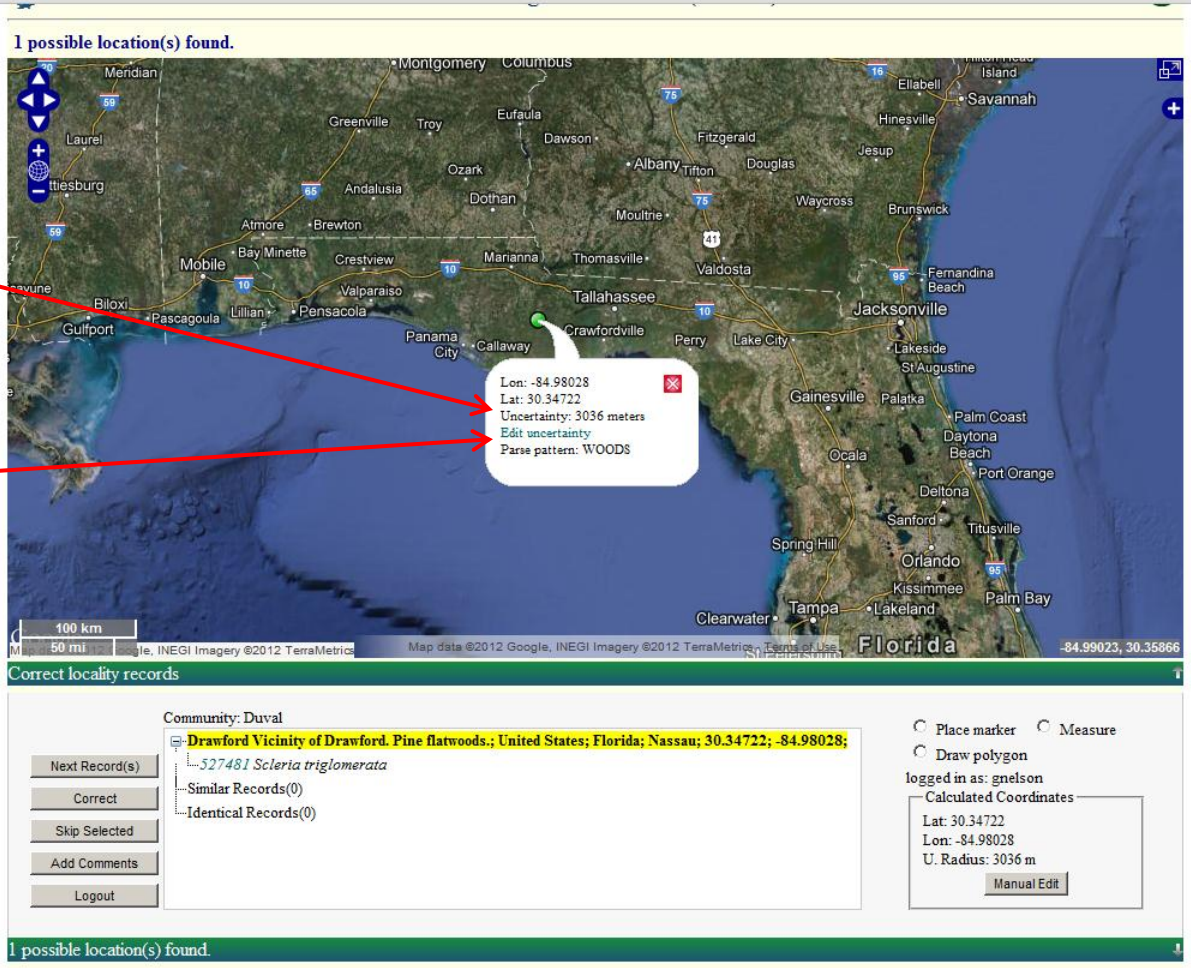
Customize Links
Merriam-Webster Una...
Merriam-Webster Una...
Yahoo!
Other bookmarks
Blountstown
Bristol
Hosford
Co Rd 275
Shuler Bay
2 km
1 mi
2 Google Imagery ©2012 TerraMetrics
Map data ©2012 Google Imagery ©2012 TerraMetrics - Terms of Use
-84.76090, 30.40276

Uncertainty

Edit uncertainty



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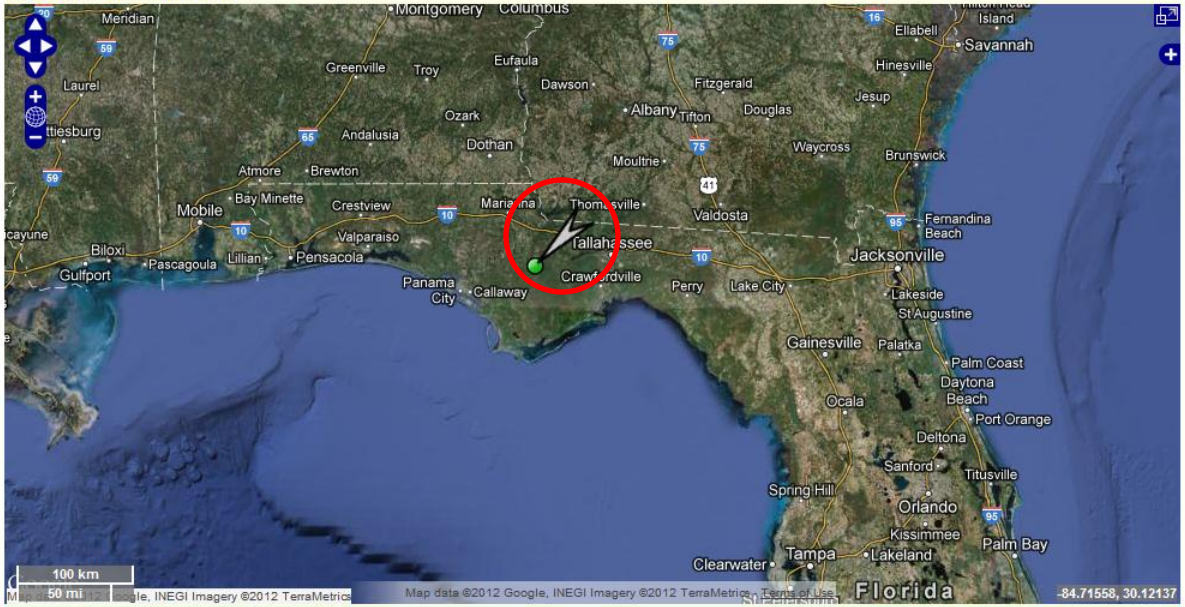
www.museum.tulane.edu/geolocate/web/webcomgeoref.aspx

Google | Google Accounts | Imported From Firefox | Customize Links | Merriam-Webster Una... | Merriam-Webster Una... | Yahoo! | Other bookmarks

1 possible location(s) found.



Correct locality records

Community: Duval

- **Drawford Vicinity of Drawford. Pine flatwoods.; United States; Florida; Nassau; 30.34722; -84.98028;**
  - *527481 Scleria triglomerata*
  - Similar Records(0)
  - Identical Records(0)

Next Record(s) | Correct | Skip Selected | Add Comments | Logout

Place marker | Measure | Draw polygon

logged in as: gnelson

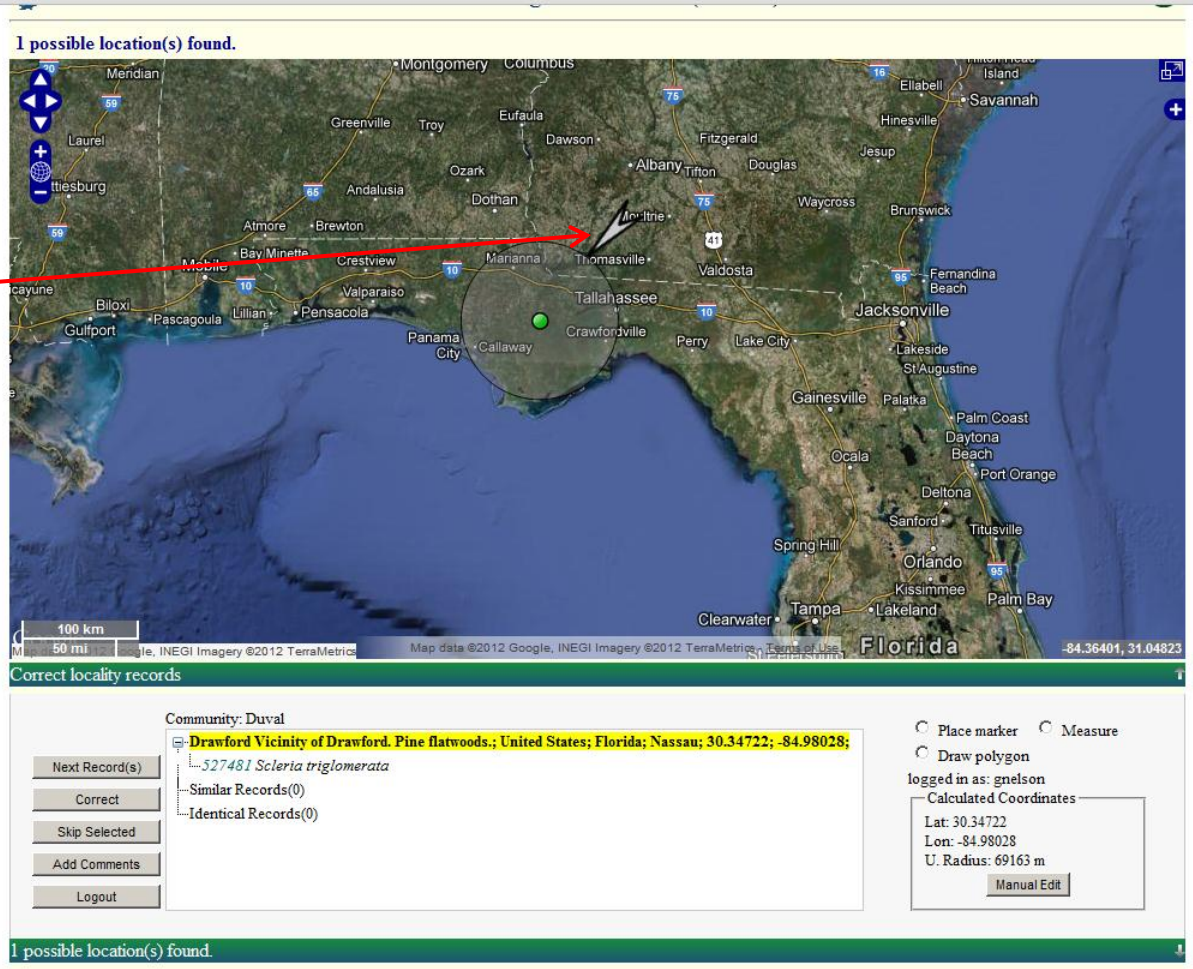
Calculated Coordinates

Lat: 30.34722
Lon: -84.98028
U. Radius: 3036 m

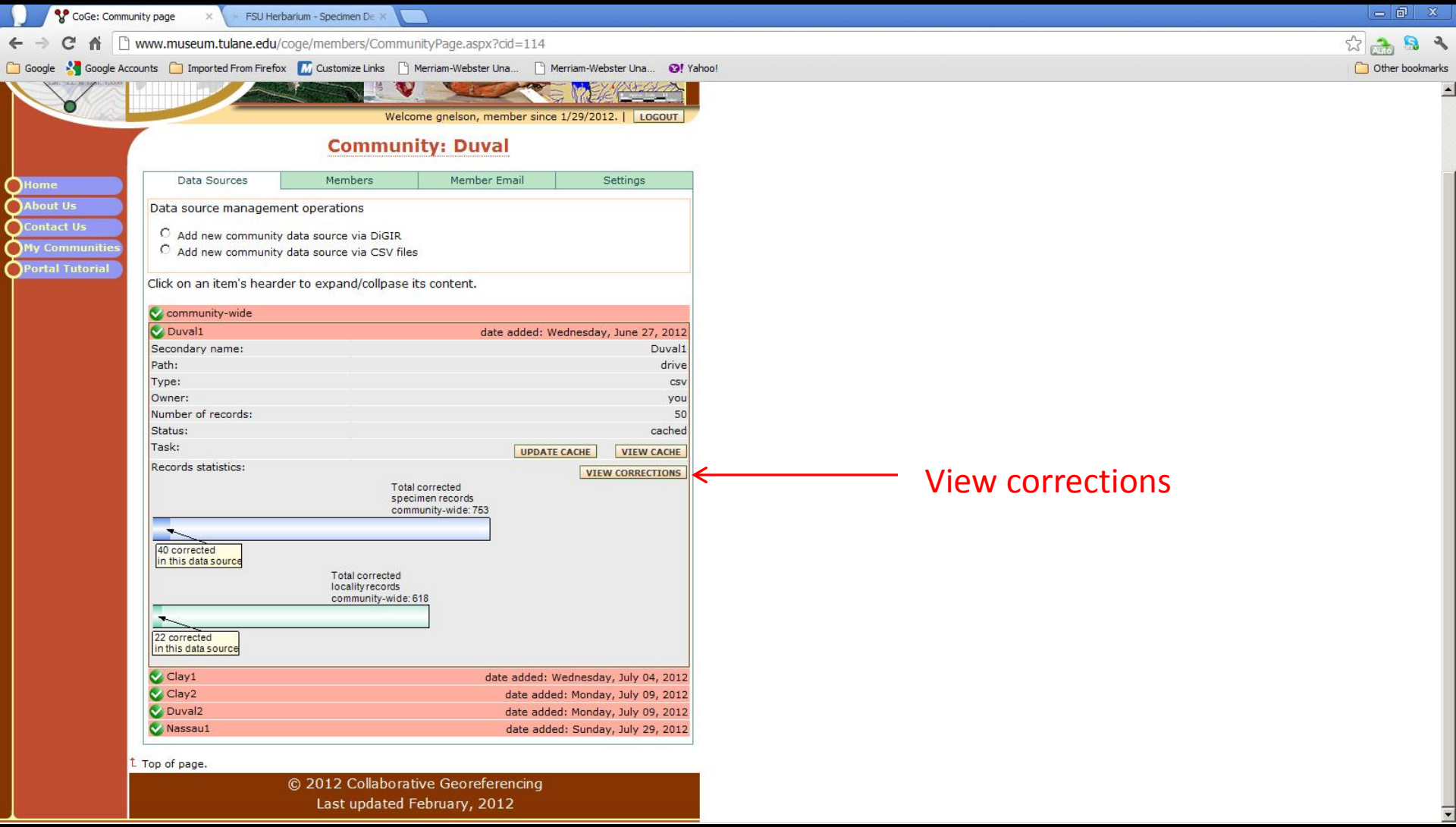
Manual Edit

1 possible location(s) found.

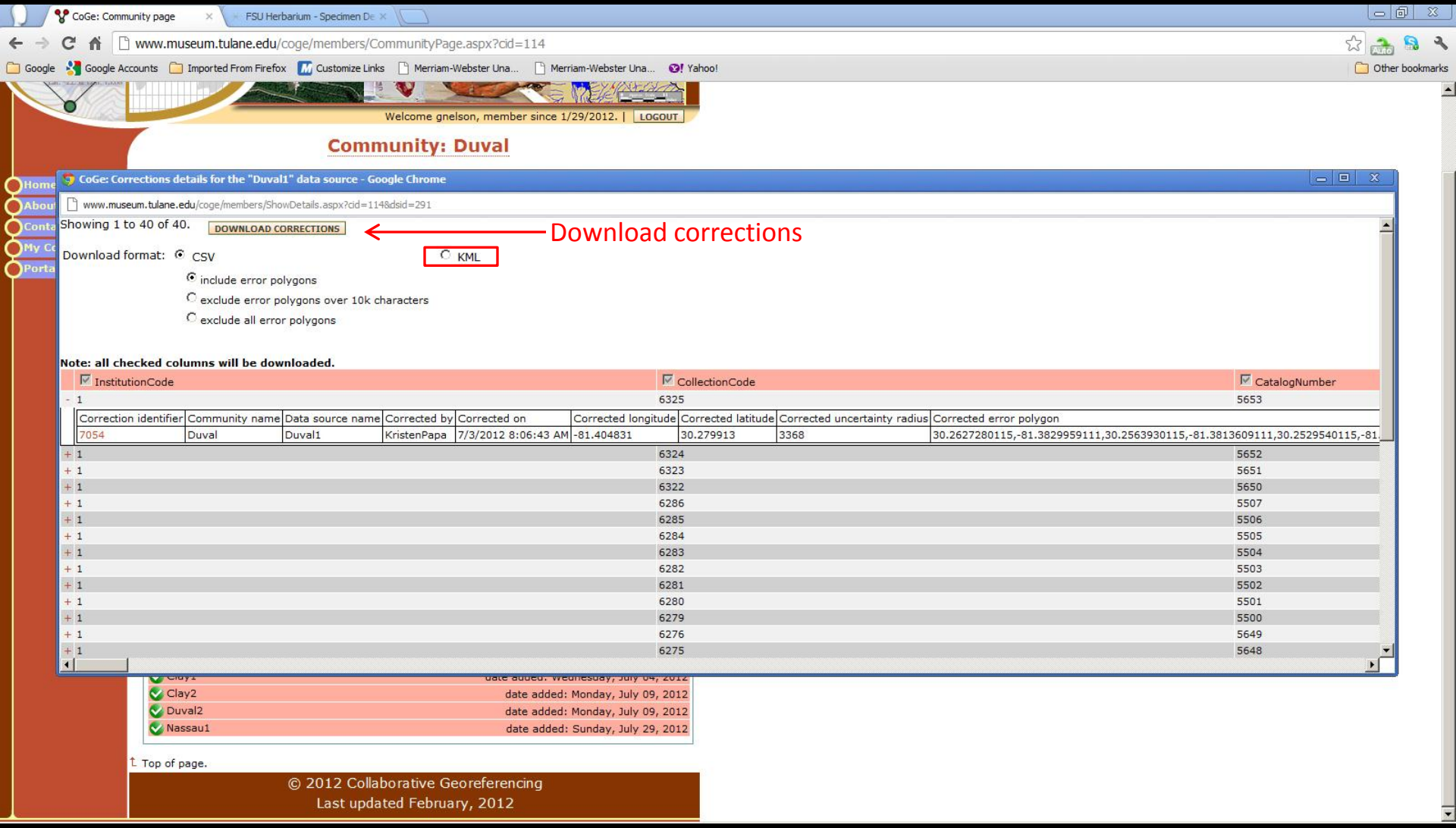
Drag the arrow to increase or decrease the circle of uncertainty.



Determining uncertainty can be subjective and is not always easy. Effectively, georeferencers should strive to use physical features to draw their circle or polygon. Such features might include roads, city or park boundaries, landscape features (lakes, bogs, habitat signatures, etc.), and other known demarcations. Attend additional trainings and establish institutionally specific policies and protocols, which may include manifest estimates of confidence.



View corrections


CoGe: Community page
FSU Herbarium - Specimen De
www.museum.tulane.edu/coge/members/CommunityPage.aspx?cid=114
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Google Accounts
Imported From Firefox
Customize Links
Merriam-Webster Una...
Merriam-Webster Una...
Yahoo!
Other bookmarks
Welcome gnelson, member since 1/29/2012. | LOGOUT
Community: Duval
CoGe: Corrections details for the "Duval1" data source - Google Chrome
www.museum.tulane.edu/coge/members/ShowDetails.aspx?cid=114&dsid=291
Showing 1 to 40 of 40.
DOWNLOAD CORRECTIONS
Download corrections
Download format: CSV
KML
include error polygons
exclude error polygons over 10k characters
exclude all error polygons
Note: all checked columns will be downloaded.
InstitutionCode
CollectionCode
CatalogNumber
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6325
5653
Correction identifier
Community name
Data source name
Corrected by
Corrected on
Corrected longitude
Corrected latitude
Corrected uncertainty radius
Corrected error polygon
7054
Duval
Duval1
KristenPapa
7/3/2012 8:06:43 AM
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1 6323 5651
1 6322 5650
1 6286 5507
1 6285 5506
1 6284 5505
1 6283 5504
1 6282 5503
1 6281 5502
1 6280 5501
1 6279 5500
1 6276 5649
1 6275 5648
Clay2 date added: Monday, July 09, 2012
Duval2 date added: Monday, July 09, 2012
Nassau1 date added: Sunday, July 29, 2012
Top of page.
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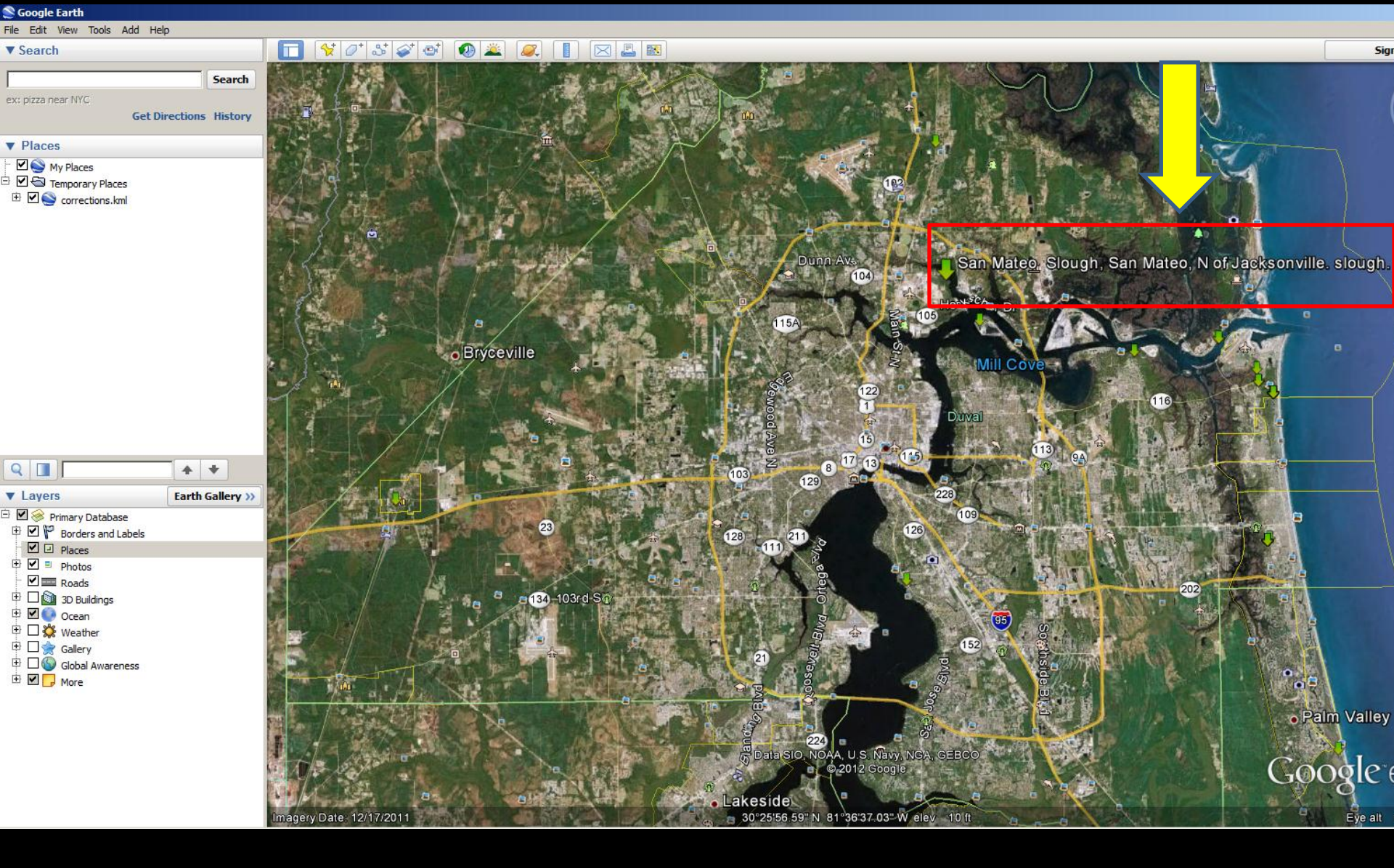
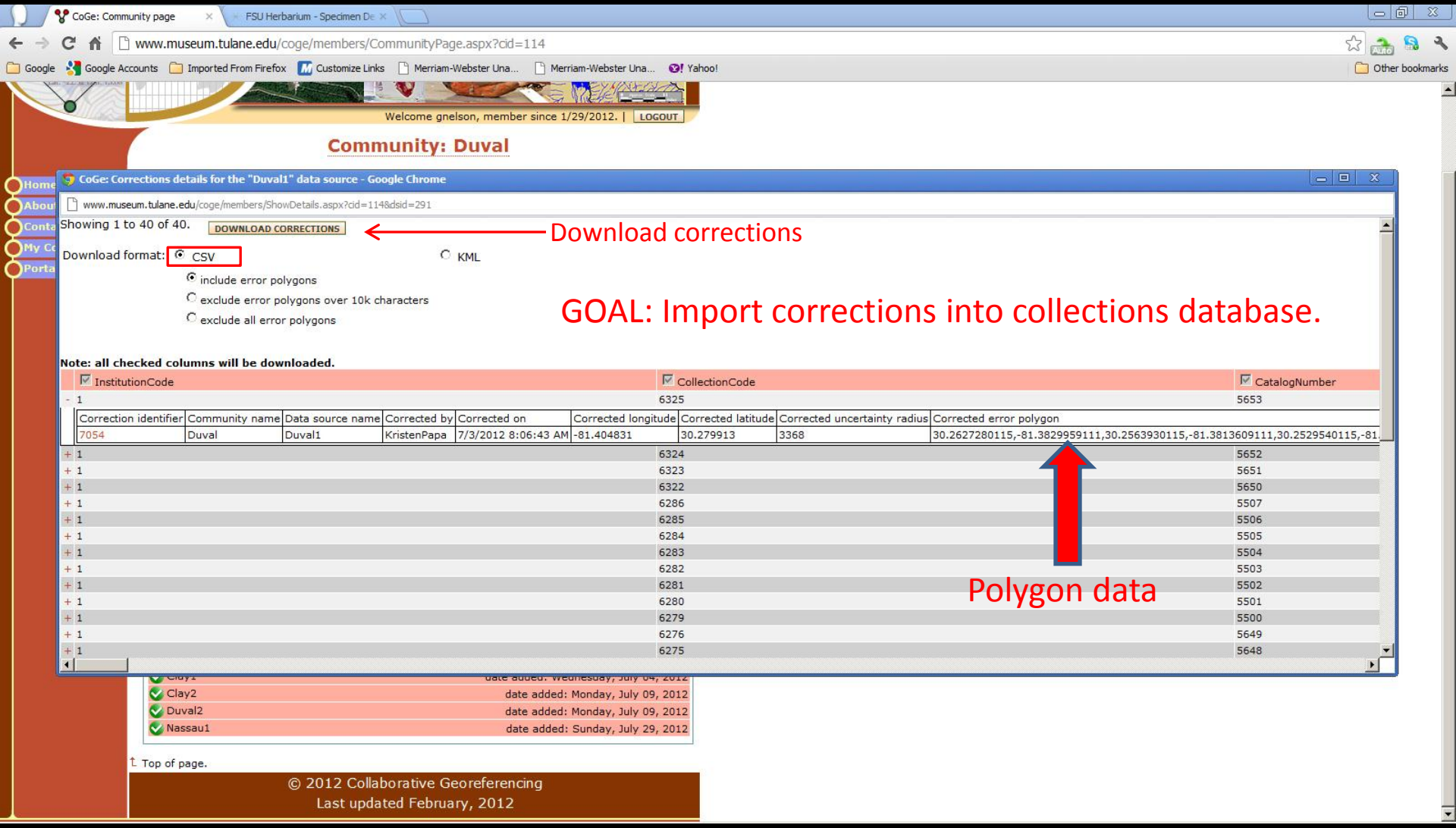
Last updated February, 2012


Google Earth
File Edit View Tools Add Help
Search
Search
ex: pizza near NYC
Get Directions History
Places
My Places
Temporary Places
corrections.kml
Layers
Earth Gallery
Primary Database
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
San Mateo, Slough, San Mateo, N of Jacksonville. slough.
Bryceville
Mill Cove
Duval
Palm Valley
Lakeside
Dunn Av.
Main St N
Edgewood Ave N
Ortega Blvd
Roosevelt Blvd
San Jose Blvd
Southside Blvd
103rd St
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2012 Google
Imagery Date: 12/17/2011
30°25'56.59" N 81°36'37.03" W elev 10 ft
Eye alt


CoGe: Community page
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www.museum.tulane.edu/coge/members/CommunityPage.aspx?cid=114
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Showing 1 to 40 of 40.
DOWNLOAD CORRECTIONS
Download corrections
Download format:
CSV
KML
include error polygons
exclude error polygons over 10k characters
exclude all error polygons
GOAL: Import corrections into collections database.
Note: all checked columns will be downloaded.
InstitutionCode
CollectionCode
CatalogNumber
1
6325
5653
Correction identifier
Community name
Data source name
Corrected by
Corrected on
Corrected longitude
Corrected latitude
Corrected uncertainty radius
Corrected error polygon
7054
Duval
Duval1
KristenPapa
7/3/2012 8:06:43 AM
-81.404831
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1 6280 5501
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1 6276 5649
1 6275 5648
Polygon data
Clay2 date added: Monday, July 09, 2012
Duval2 date added: Monday, July 09, 2012
Nassau1 date added: Sunday, July 29, 2012
Top of page.
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Last updated February, 2012

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