PART 3: STEP-BY-STEP EXAMPLES

EXAMPLES

Feature – with Obvious Spatial Extent using GEOLocate

Feature – without Obvious Spatial Extent using Google Maps & MaNIS Georeferencing Calc.

Offset – Distance at a Heading using Google Maps & the MaNIS Georeferencing Calculator

Offset – Path using Google Maps and the MaNIS Georeferencing Calculator

Feature – with Obvious Spatial Extent

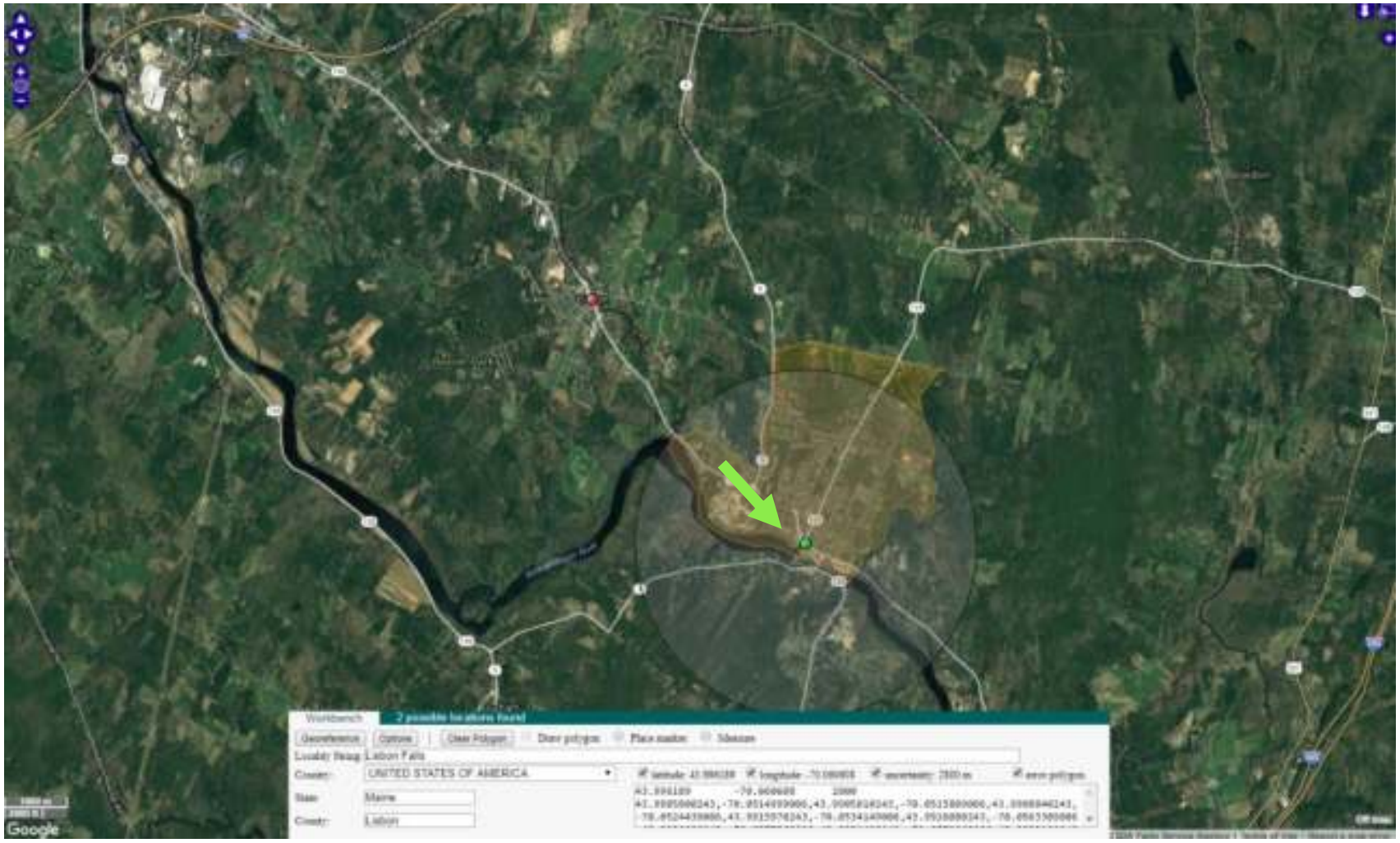
Example: Lisbon Falls, Lisbon Co., Maine (U.S.)

Procedure:

- Use GEOLocate to find coordinates and radial for the city
- Ensure coordinates are at corrected center of the city
- Edit radial to encompass area as precisely as possible (snap to feature)

GEOLocate is best for ‘simple’ localities and to find offsets at a heading

GEOLOCATE

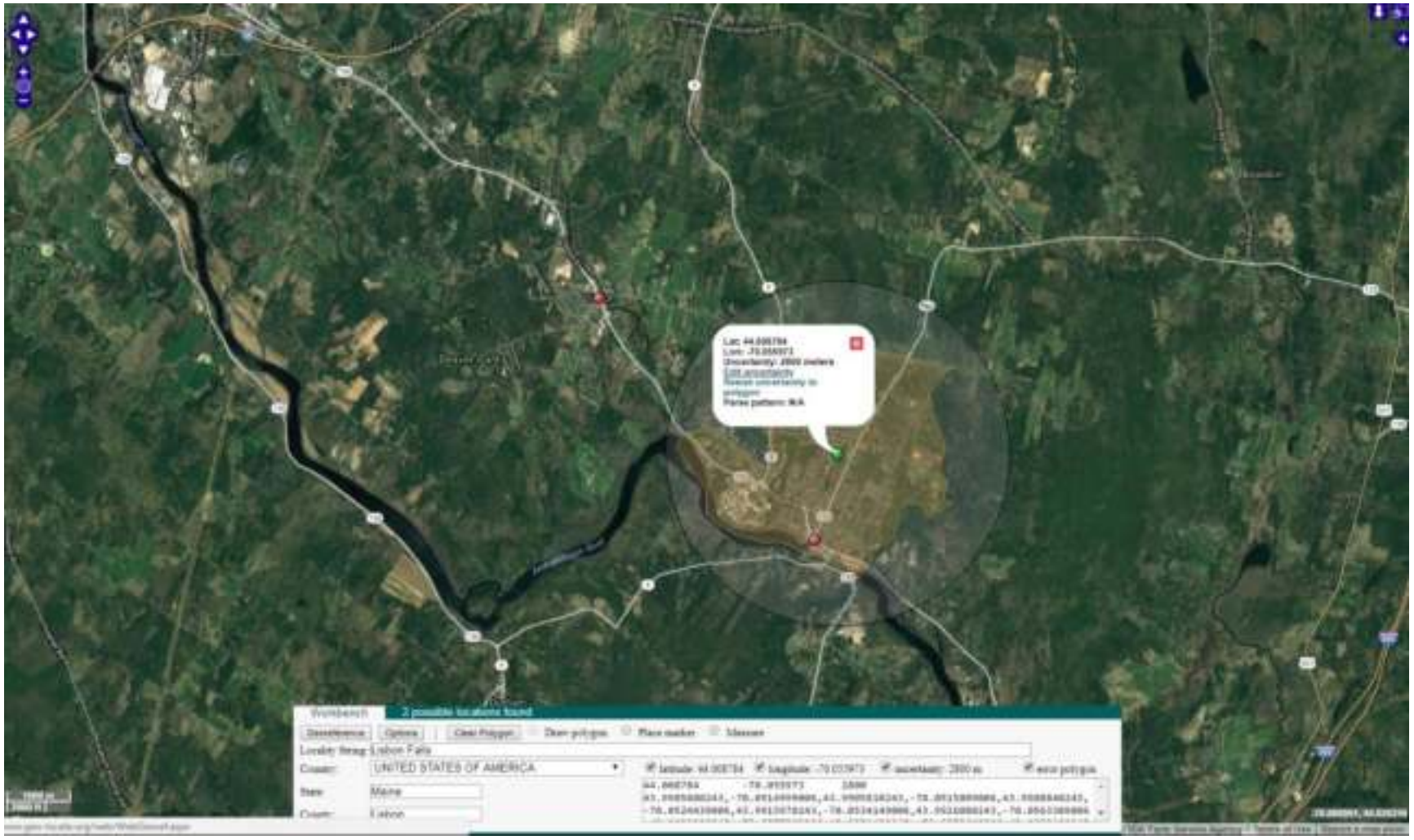


GEOLocate finds coordinates within Lisbon Falls

Coordinates need to be shifted to a more appropriate center

Uncertainty radius does not encompass entire area of city

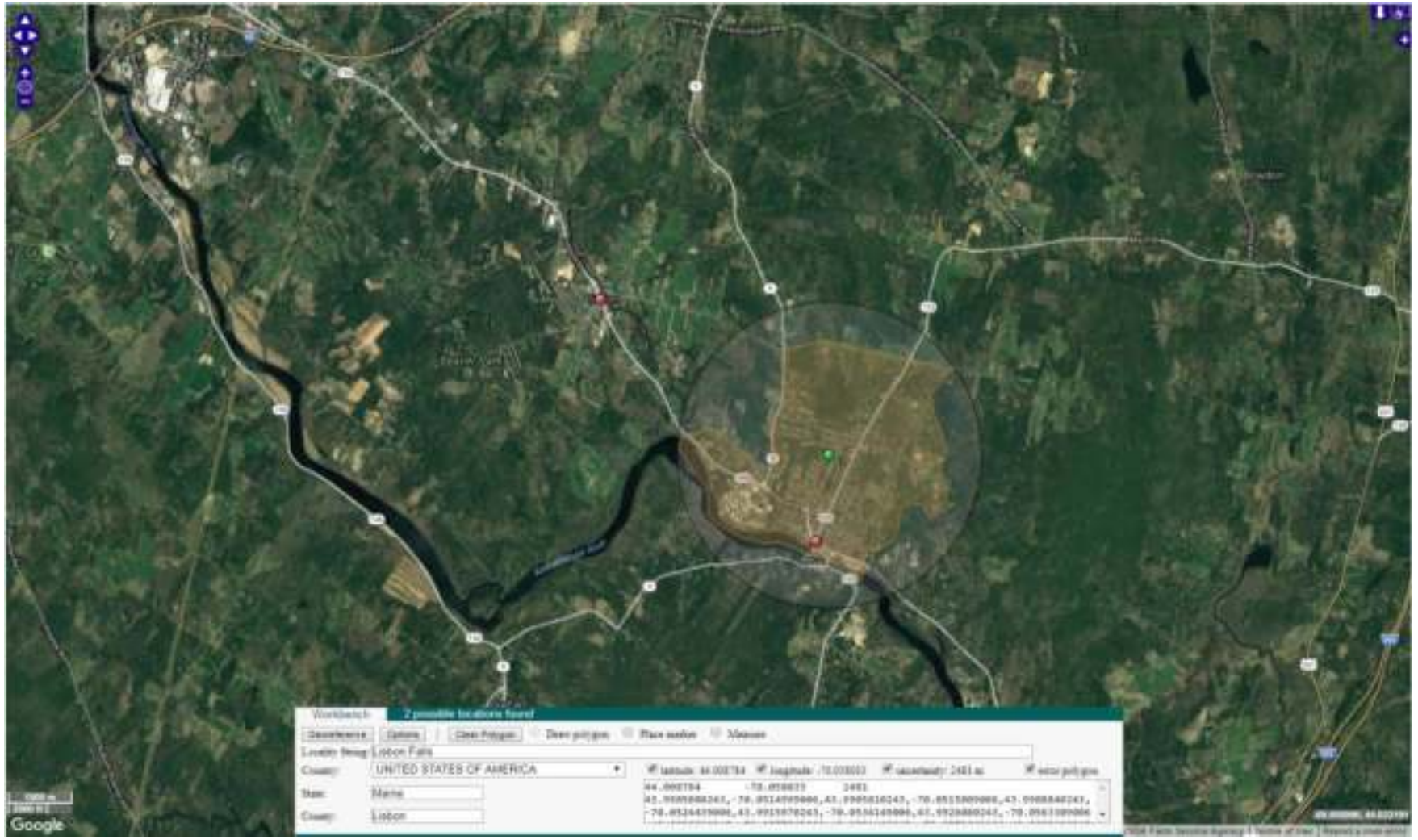
COORDINATE ADJUSTMENT



Adjust point to be in approximate center of region

Uncertainty should encompass <u>entire</u> area of city (polygon)

EDIT UNCERTAINTY



Resize uncertainty to polygon (faster than manually editing the radius)

Note: polygon of city extent is not always displayed/known

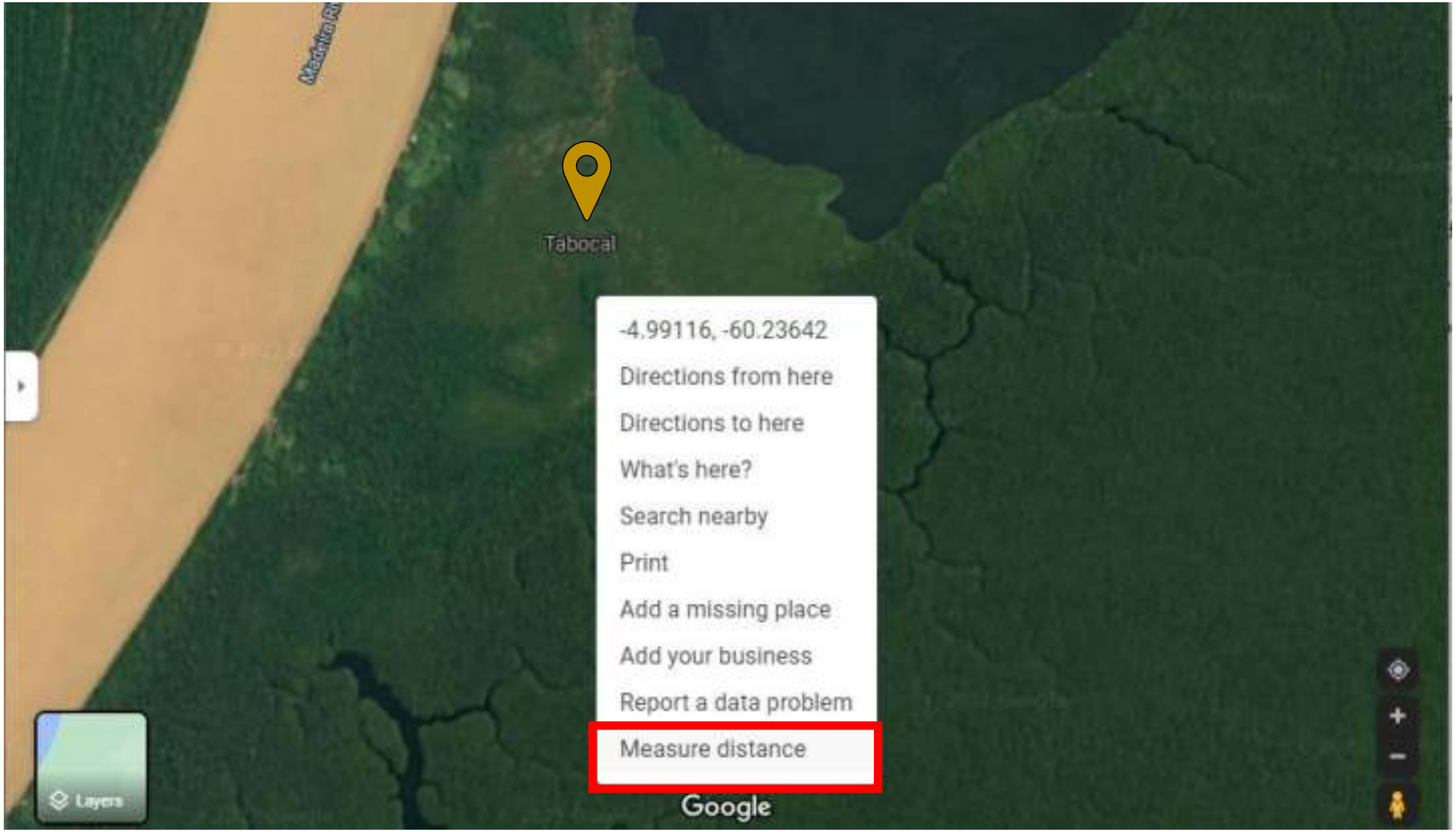
Feature – without Obvious Spatial Extent

Example: Tabocal, Amazonas (Brazil)

- Use Google Maps to locate coordinates of the area
- Measure from the coordinates to the approximate center of the nearest feature (of similar locality type)
- Divide distance in half to approximate the radial
- Input information into the MaNIS Georef. Calculator to find the uncertainty radius

Instructions are from previous version of the Quick Reference Guide (Wieczorek 2012) but in agreement with the updated guide (Zermoglio 2020)

PINNING YOUR LOCATION

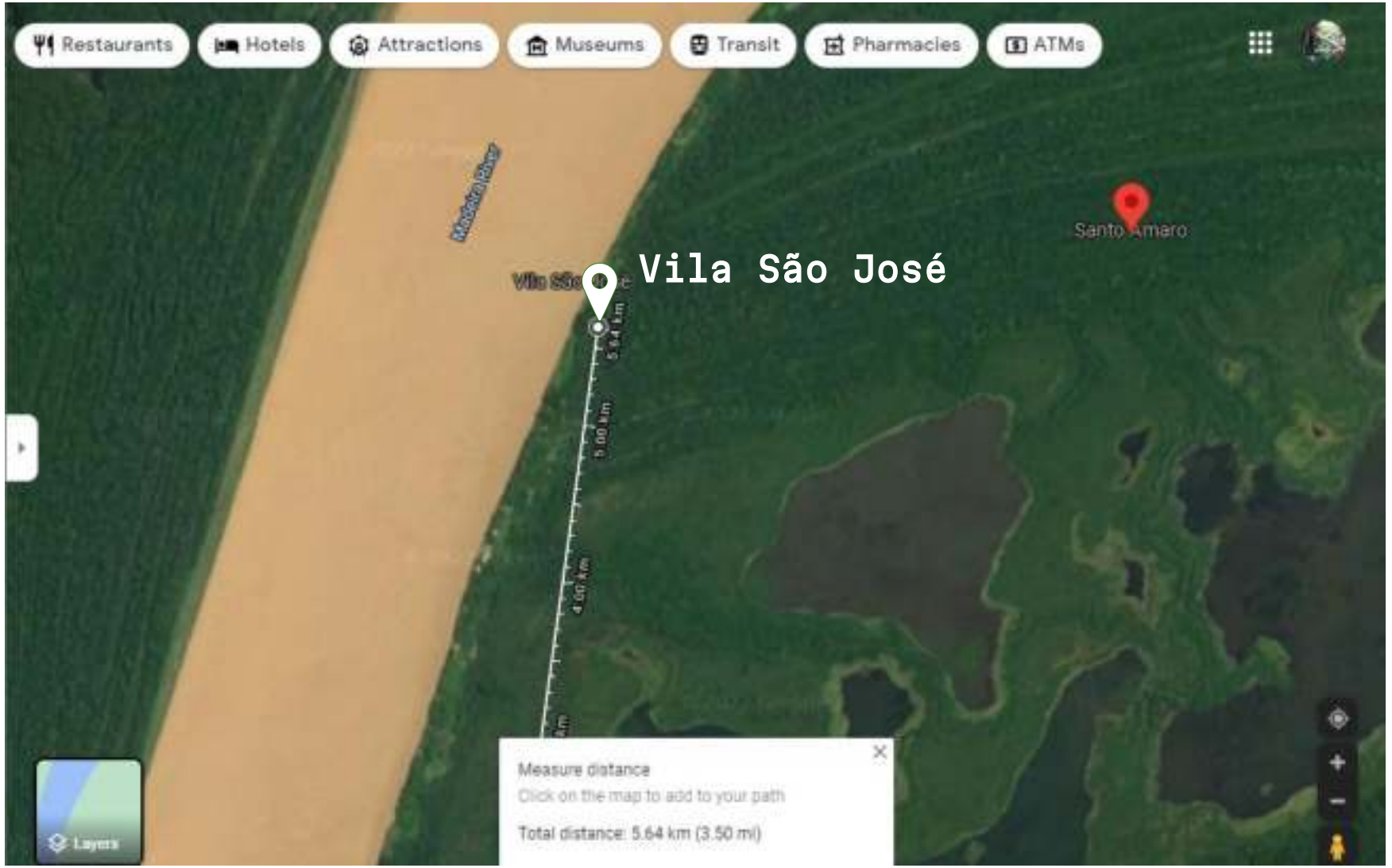


To begin, right-click on the map where Google Maps displays the name of the location and select the "Measure distance" tool

FIND NEAREST NAMED PLACE

To find the nearest named feature you must pan around the map

MEASURE



Vila São José is nearest; measure a straight line between centers of both features, then halve distance = radial

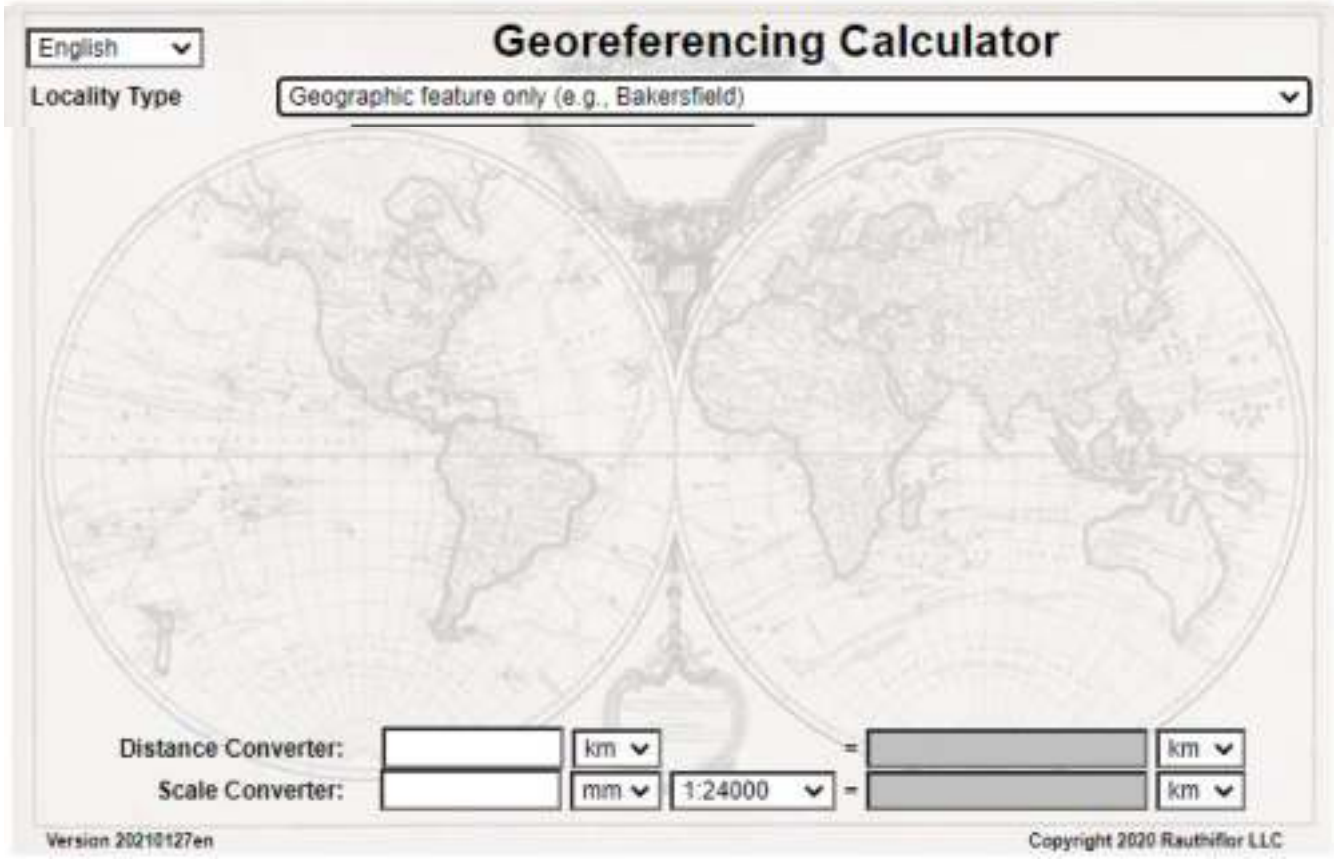
RADIAL PROTOCOL

CALCULATOR PROCEDURE

LOCALITY TYPE	CALCULATION PROCEDURE (instructions on how to use the Georeferencing Calculator)
Named place **Undefined Area**: Locality refers to a geographic feature that does not have a clear spatial boundary *Example: "Pampa Grande" (the extent is 4.7 km given that the center of the nearest named place, "Colonia Mariano Sarratea" is 9.4 km distant)*	~~**Calculation Type**: "Error only - enter Lat/Long for the actual locality"~~ **Locality Type**: "Named place only" **Coordinates**: Determine the coordinates for the named place as well as possible using visible evidence near the label for the named place on the map. **Extent**: Use half the measured distance from the selected coordinates to the center of the nearest named placed. Make note of the measure and the nearest named place in **georeferenceRemarks**.

LOCALITY TYPE

Locality Type = Geographic feature only

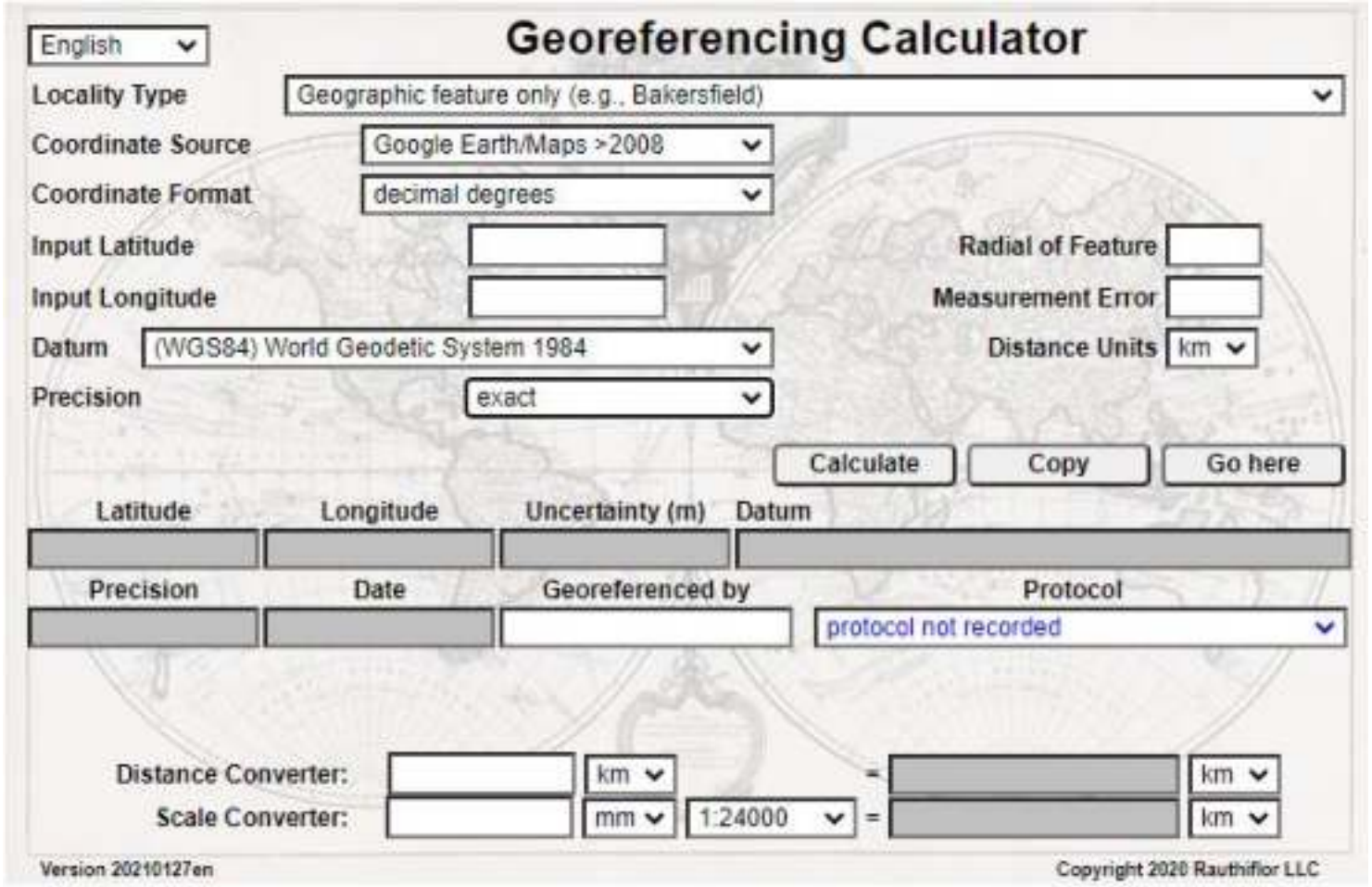


MaNIS Georeferencing Calculator

Undefined Area: Tabocal, Município Borba, Amazonas (Brazil)

COORDINATE SOURCE, FORMAT, DATUM, PRECISION

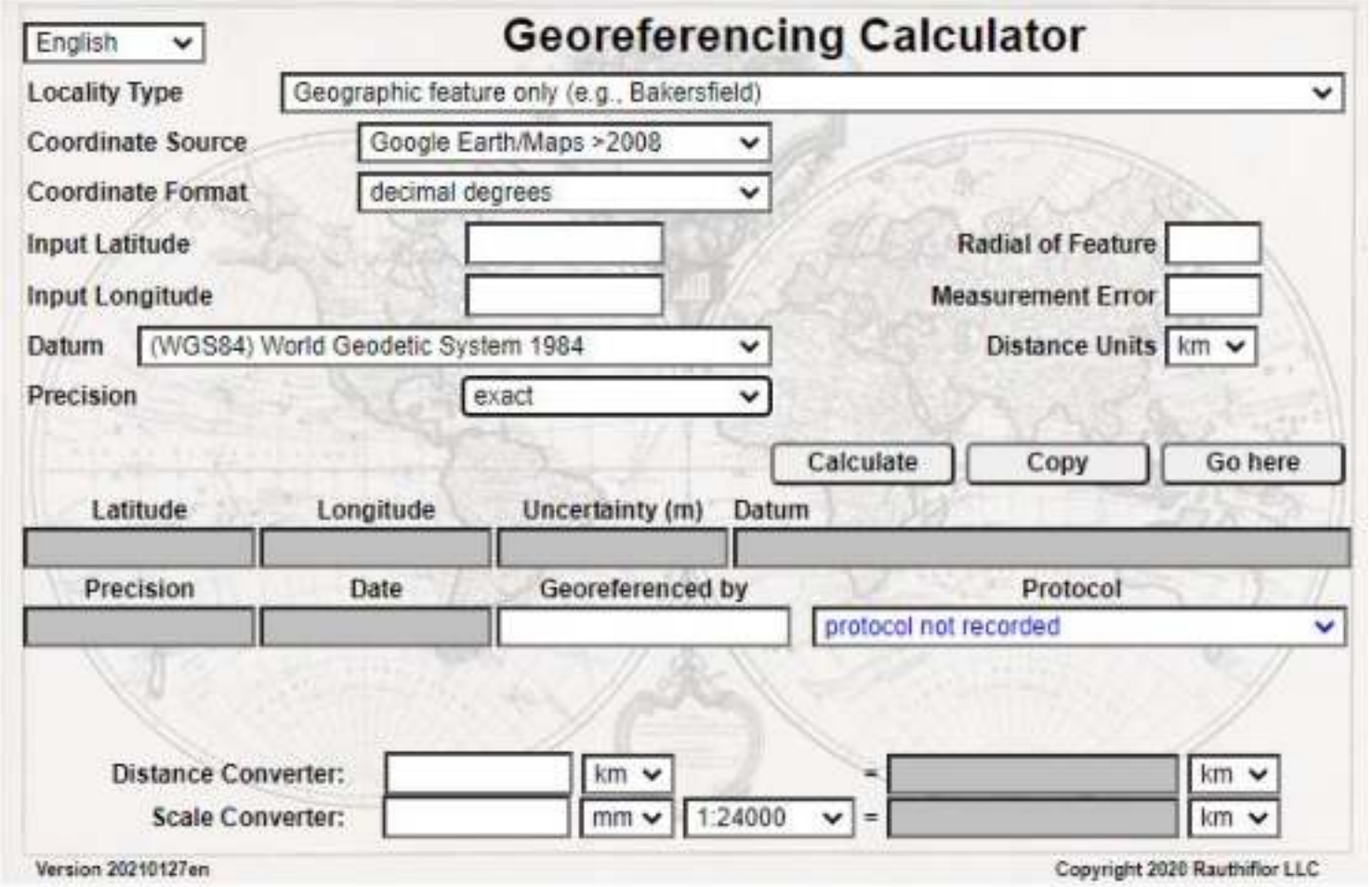
- **Coordinate Source**: Google Maps > 2008
- **Coordinate Format**: Based on coordinate source (Google Maps) = decimal degrees
- **Datum**: WGS84 (Google Maps)
- **Precision** (of the coordinates): exact (Google Maps)



Undefined Area: Tabocal, Município Borba, Amazonas (Brazil)

LATITUDE AND LONGITUDE

Latitude & Longitude do not need to be entered – important only when calculating offset coordinates



Undefined Area: Tabocal, Município Borba, Amazonas (Brazil)

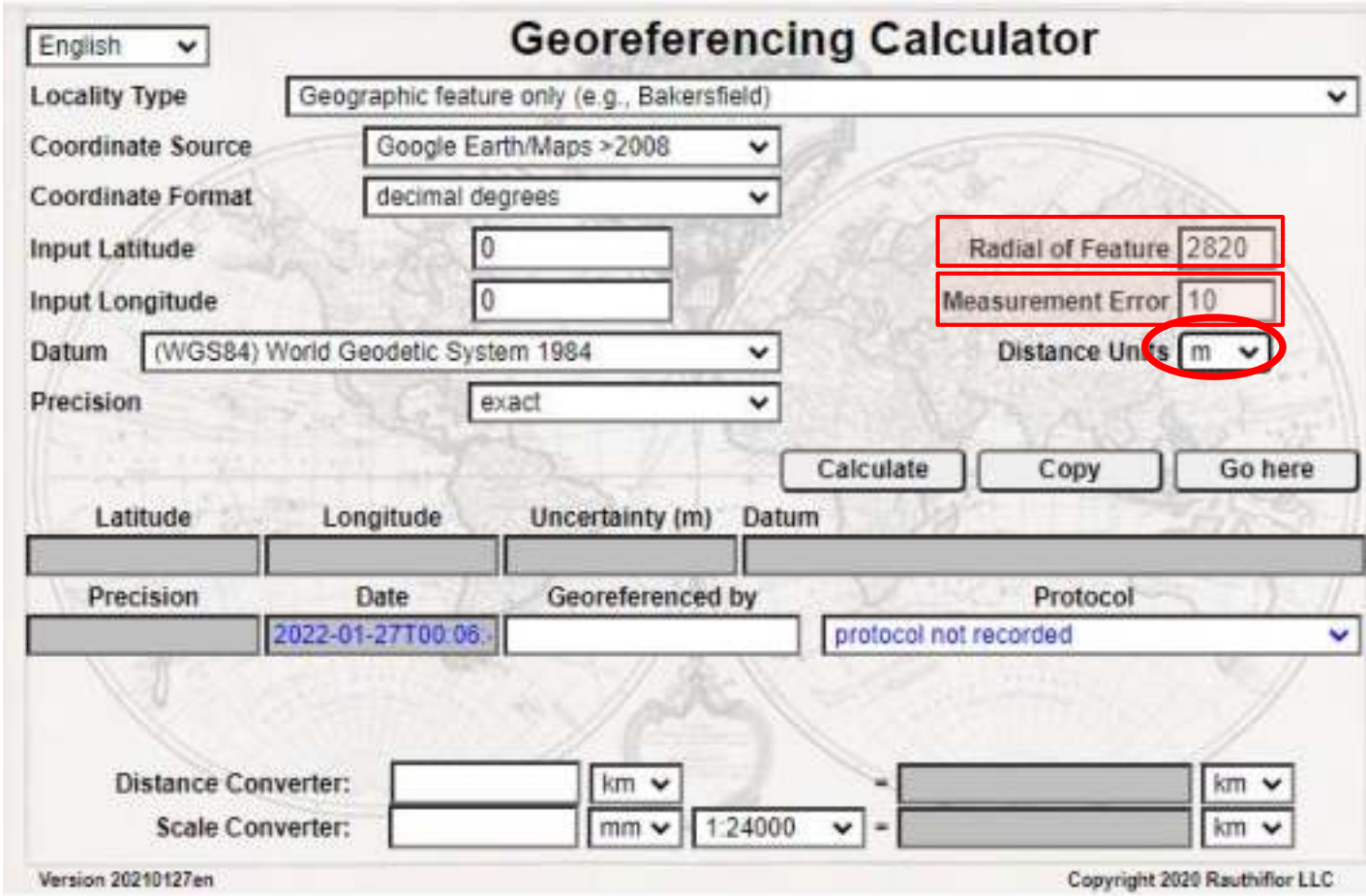
RADIAL

Radial of Feature: calculated radial of Tabocal

Measurement Error: 10m (standard)

= Error associated with the georeferencer's ability to measure on the map

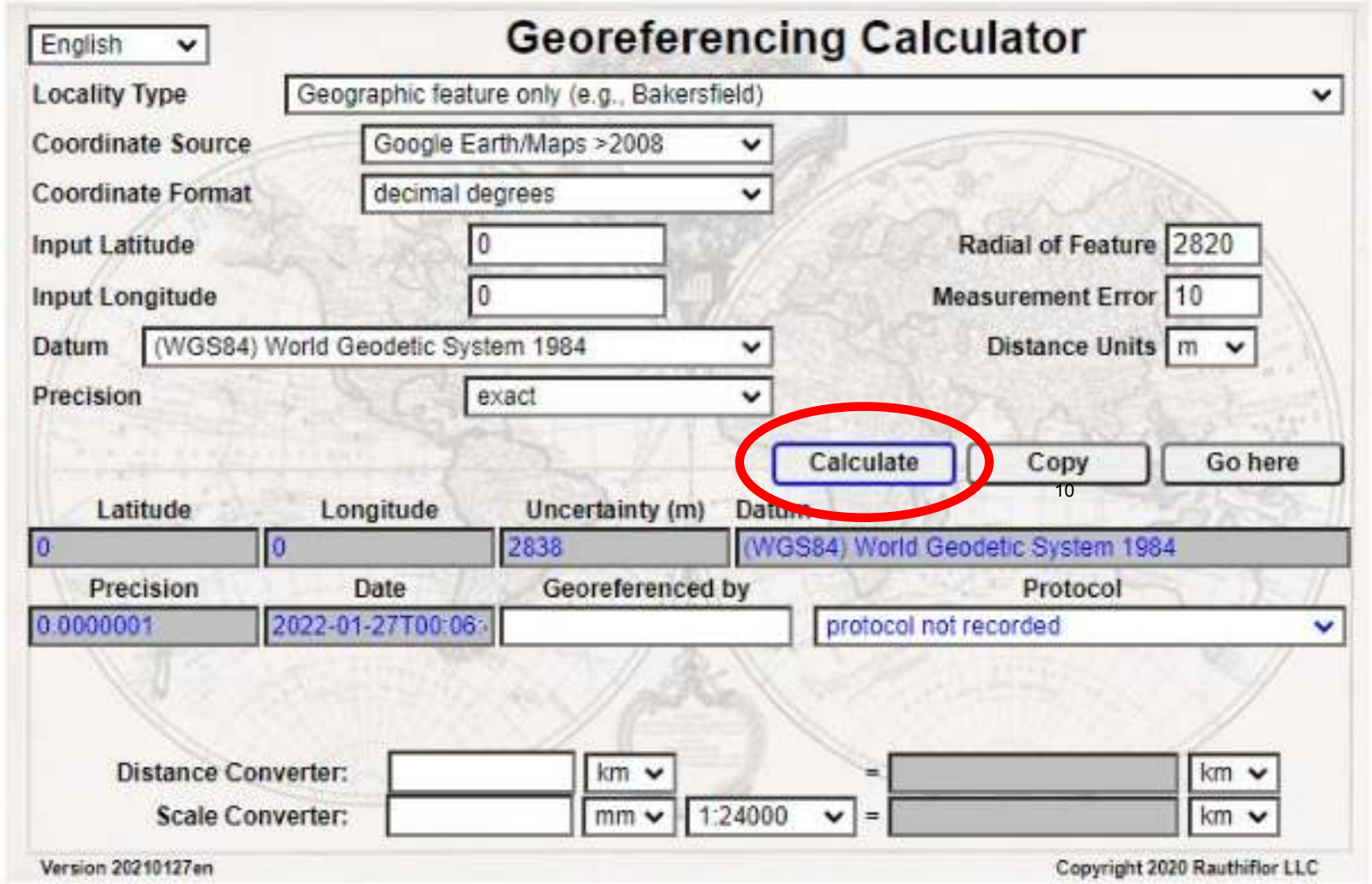
Distance Unit: m (must reflect the two fields above)



Undefined Area: Tabocal, Município Borba, Amazonas (Brazil)

CALCULATE

Uncertainty radius is provided in meters, regardless of the input unit



Undefined Area: Tabocal, Município Borba, Amazonas (Brazil)

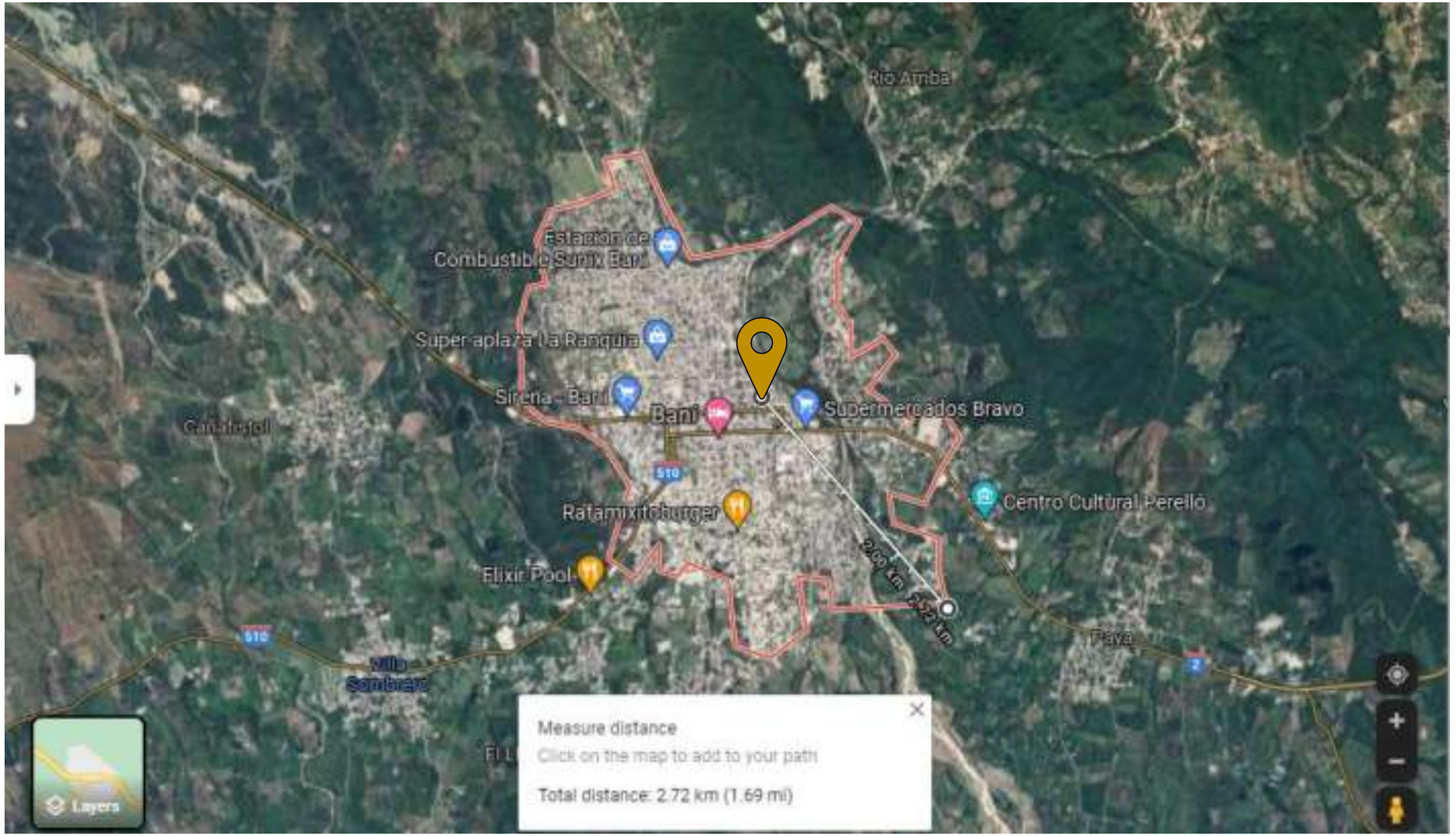
Offset – Distance at a Heading

Example: 5km north of Baní, Dominican Republic

- Use Google Maps to locate coordinates of the city
- Find radial by measuring from coordinates to the farthest extent of the city
- Input information into the MaNIS Georeferencing Calculator to find the offset coordinates and the uncertainty radius.

Note: Use GEOLocate when applicable (U.S., Canada, Europe)

COORDINATES & RADIAL



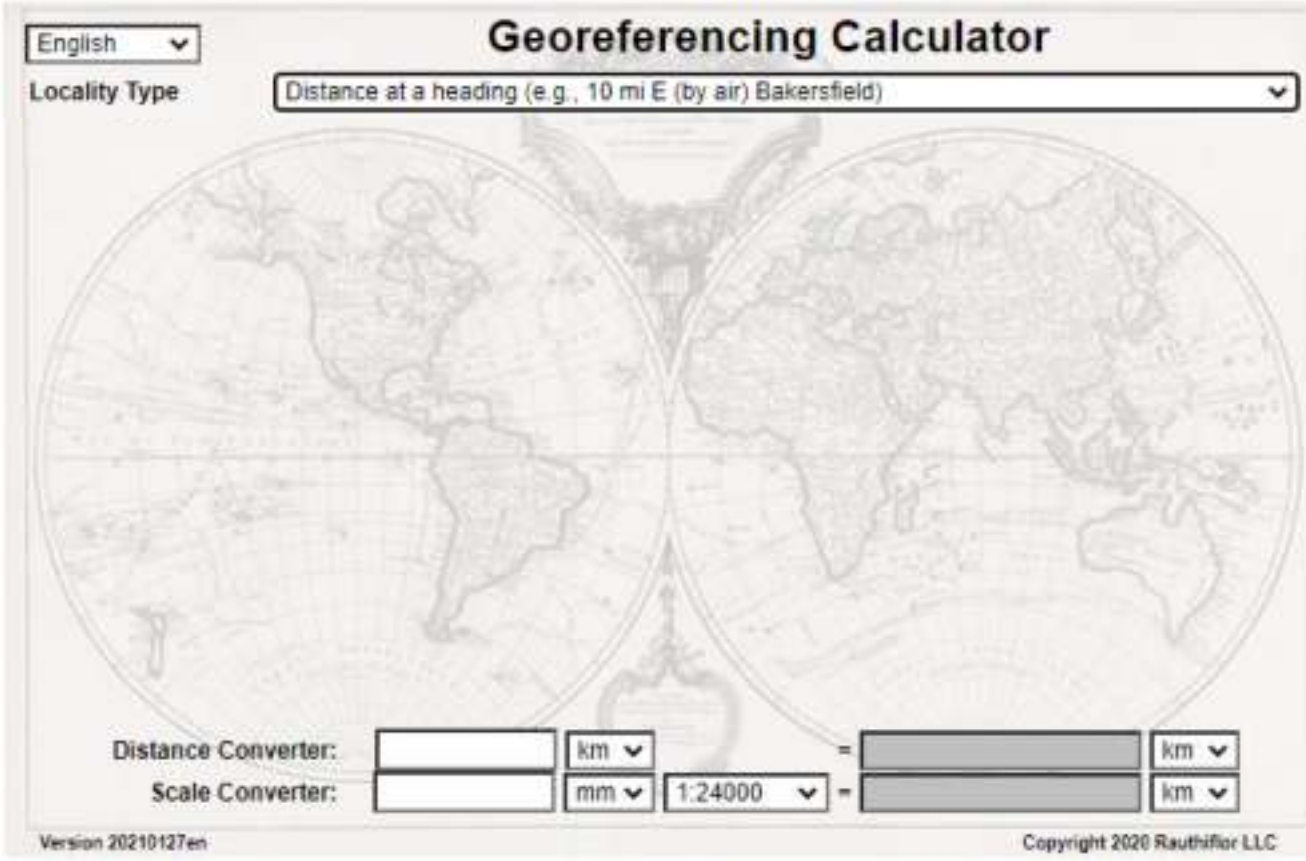
Locate coordinates of Baní center (18.2822270, -70.328719) and radial (2.72km to match offset units)

CALCULATOR PROCEDURE

LOCALITY TYPE	CALCULATION PROCEDURE (instructions on how to use the Georeferencing Calculator)
Offset **Offset at a heading** *Examples: "50 miles W of Las Vegas", "10 km E de Amamá"*	~~**Calculation Type**: "Coordinates and error - enter the Lat/Long for the named place or~~ starting point" **Locality Type**: "Distance at a heading" **Coordinates**: If "by road" or other path is specified in the locality description, use the method under **Offset Along a Path**. If the description could be interpreted reasonably either by a route or by air, use the method under **More Than One Possibility**. Otherwise, assume that the heading is "by air" and note this assumption in **georeferenceRemarks**. In this case use the coordinates of the geographic center of the named place as a starting point in the Georeferencing Calculator. These are not the coordinates of the locality, which will be given in the fields to the left of the **Calculate** button when it is clicked after all the fields above it have been entered. **Extent**: As for **Named Places – Bounded Area** or **Named Places – Undefined Area**, as appropriate.

LOCALITY TYPE

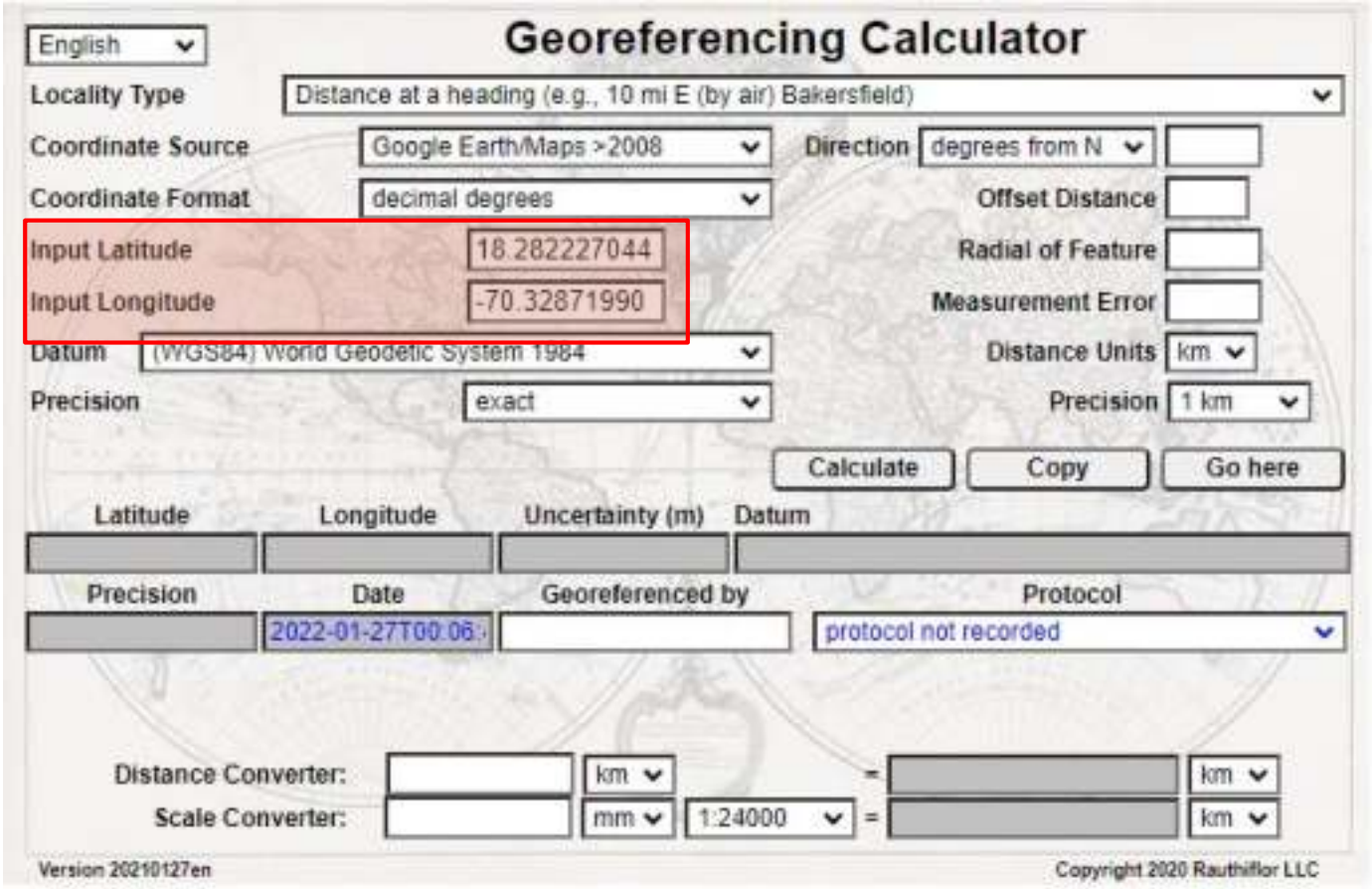
Locality Type: Distance at a heading



Offset at a Heading: 5km N of Baní

COORDINATE SOURCE, FORMAT, DATUM, PRECISION

- **Coordinate Source**: Google Maps > 2008
- **Coordinate Format**: Based on coordinate source (Google Maps) = decimal degrees
- **Input Latitude/Long.**: coordinates must be entered in order to calculate the offset coordinates according to input parameters
- **Datum**: WGS84 (Google Maps)
- **Precision** (of the coordinates): exact (Google Maps)



Offset at a Heading: 5km N of Baní

OFFSET

Offset Direction: N

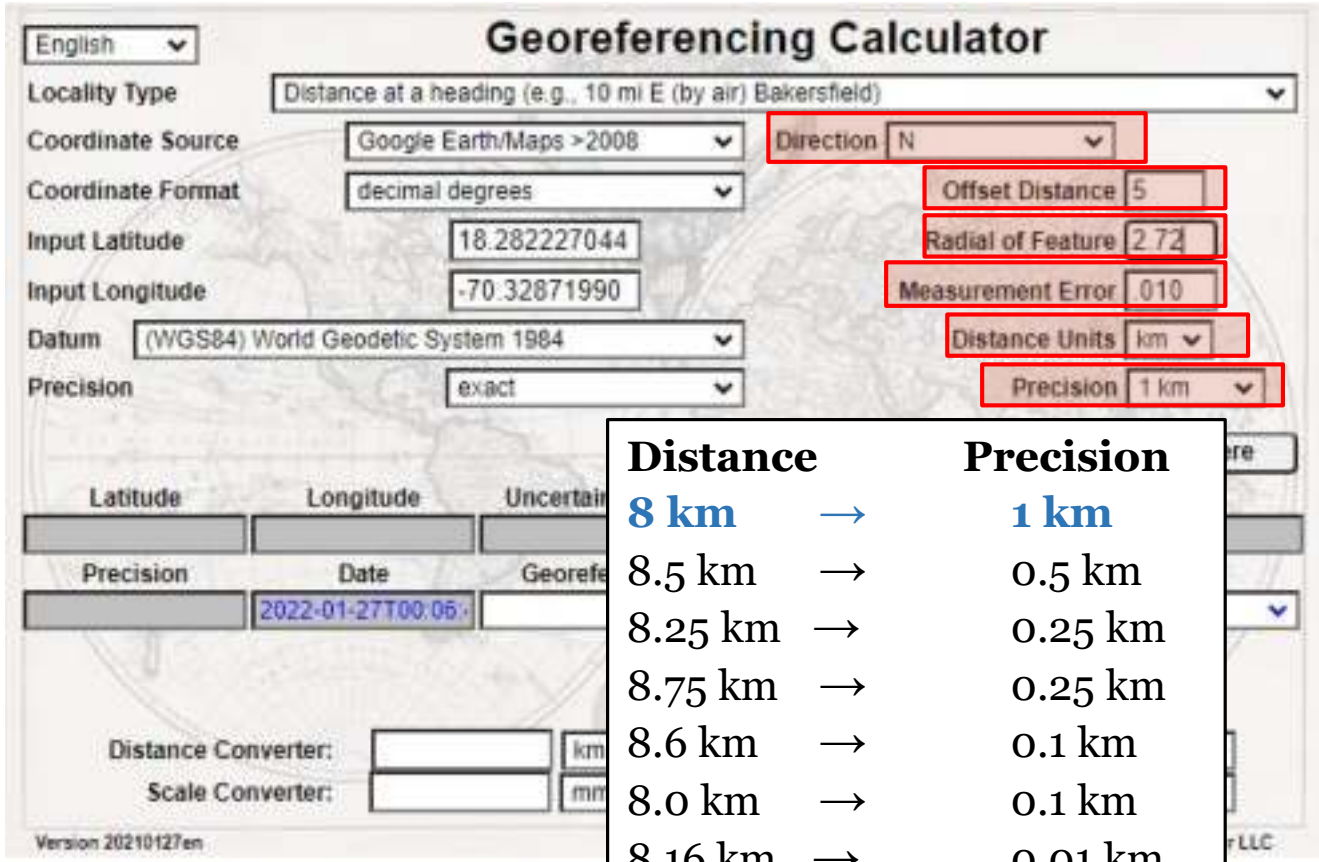
Offset Distance: 5(km) – according to locality description.

Radial of Feature: (Starting point of offset)
City of Baní = 2.72(km)

Measurement Error:
Always use 10m (or 0.01km)

Distance Precision:
precision of 5km distance is 1km

* Maintain consistency in measurement units

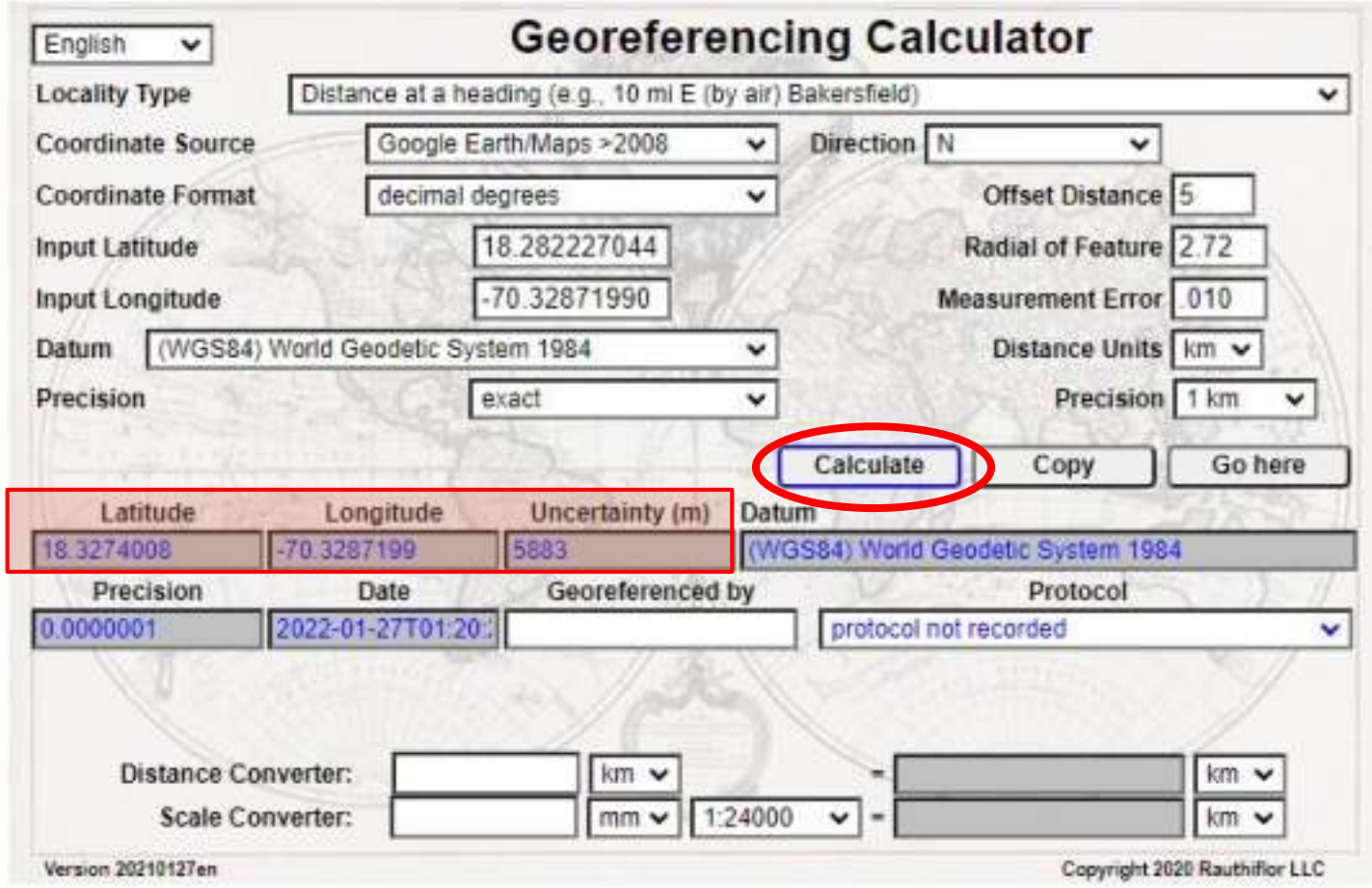


Distance		Precision
8 km	→	1 km
8.5 km	→	0.5 km
8.25 km	→	0.25 km
8.75 km	→	0.25 km
8.6 km	→	0.1 km
8.0 km	→	0.1 km
8.16 km	→	0.01 km
80 km	→	10 km
800 km	→	100 km
1000 km	→	500 km

Offset at a Heading: 5km N of Baní

CALCULATE

Offset coordinates and **uncertainty** radius (in meters) are provided.



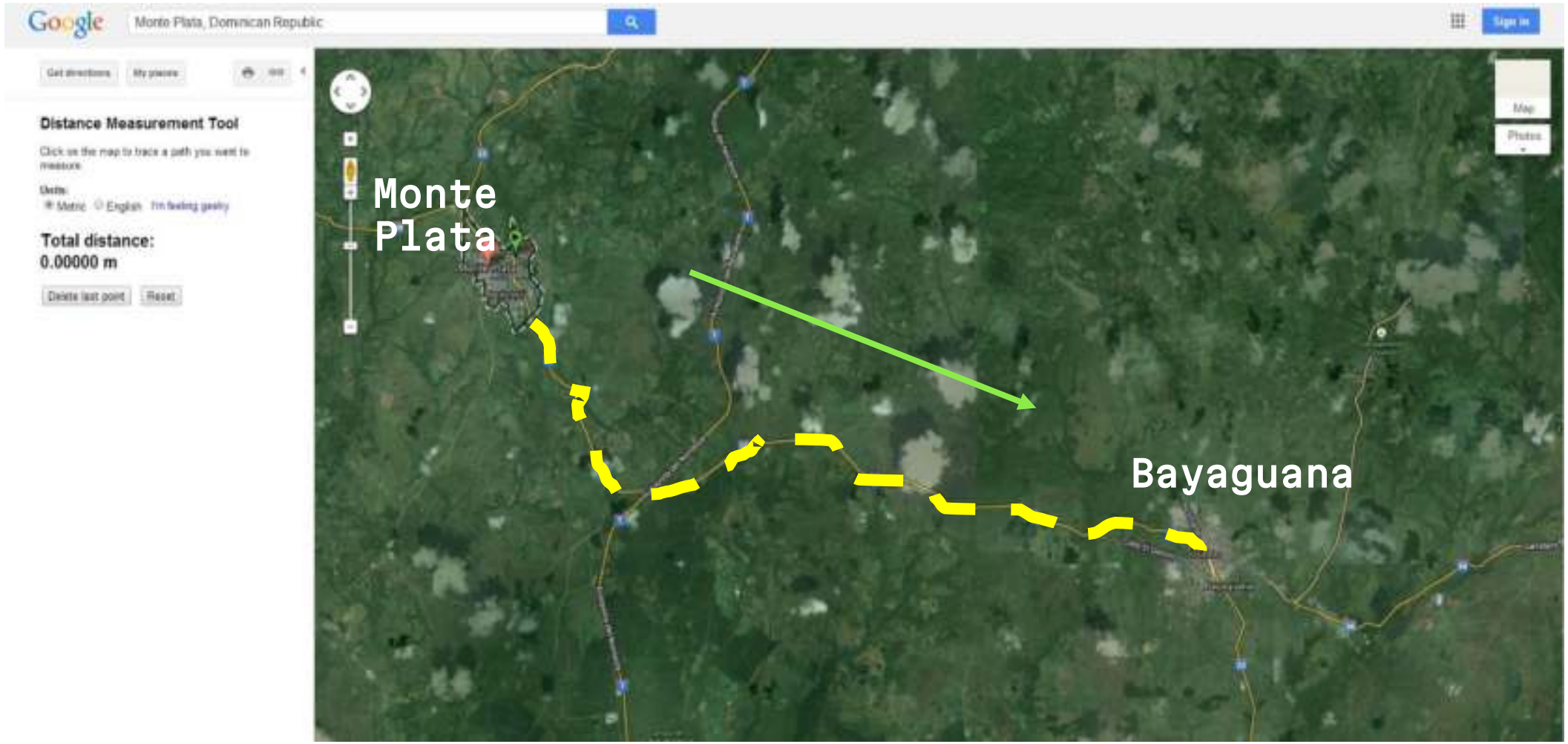
Offset at a Heading: 5km N of Baní

Offset – Offset along a Path

Example: 3km along Monte Plata–Bayaguana Road, D.R.

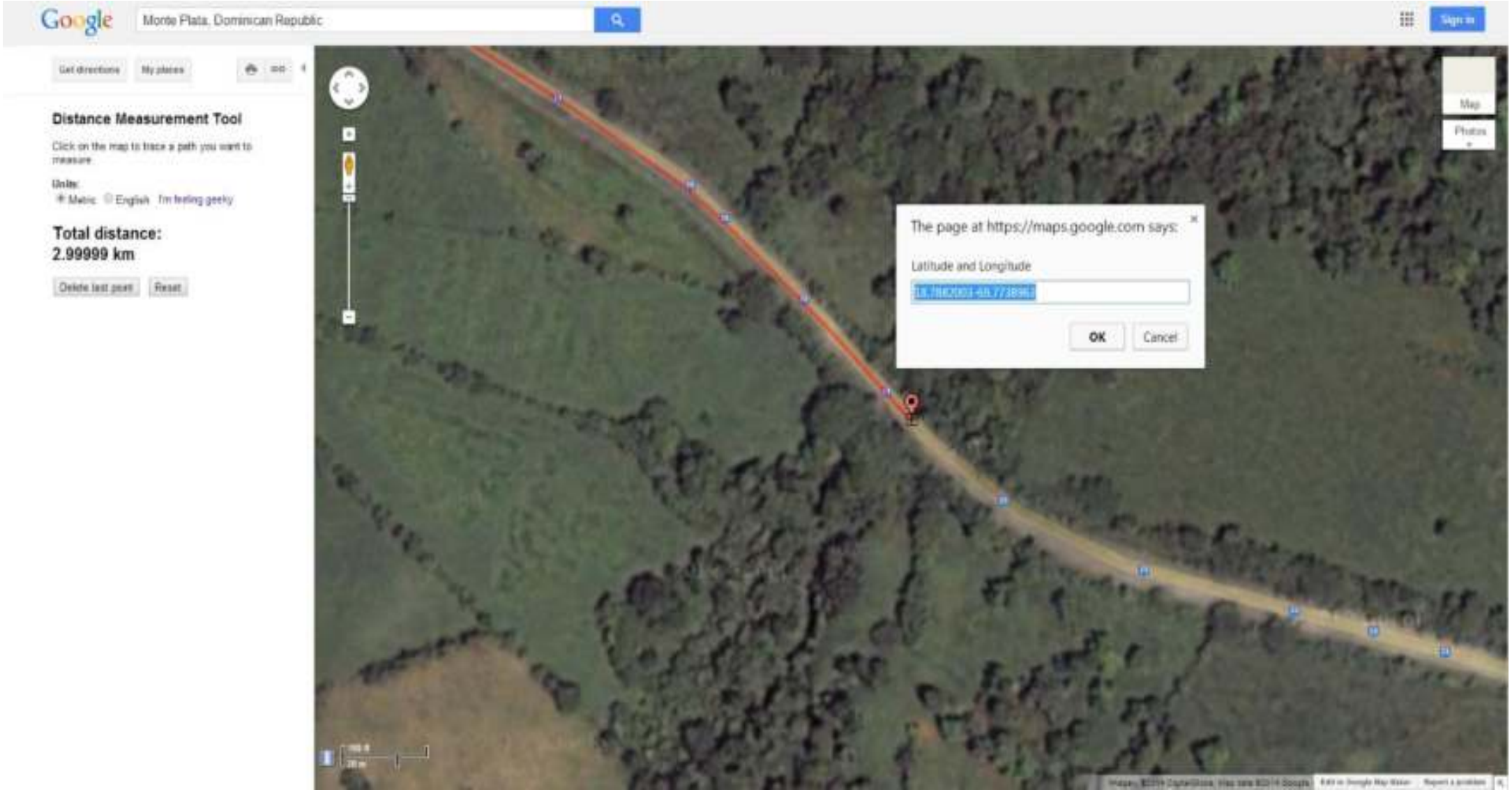
- Use Google Maps to locate road connecting the cities
- Measure 3km along road in specified direction (from Monte Plata toward Bayaguana) starting from first named place and capture coordinates
- Find radial by measuring from starting location of offset to farthest extent of linear feature within city bounds
- Input information into the MaNIS Georeferencing Calculator to find the uncertainty radius.

ASSESS



Locate road connecting the cities. Begin measuring offset from location where road comes nearest to Monte Plata center

COORDINATES



Zoom in and precisely measure along the road to the offset distance stated (toward the city of Bayaguana); capture coordinates

RADIAL

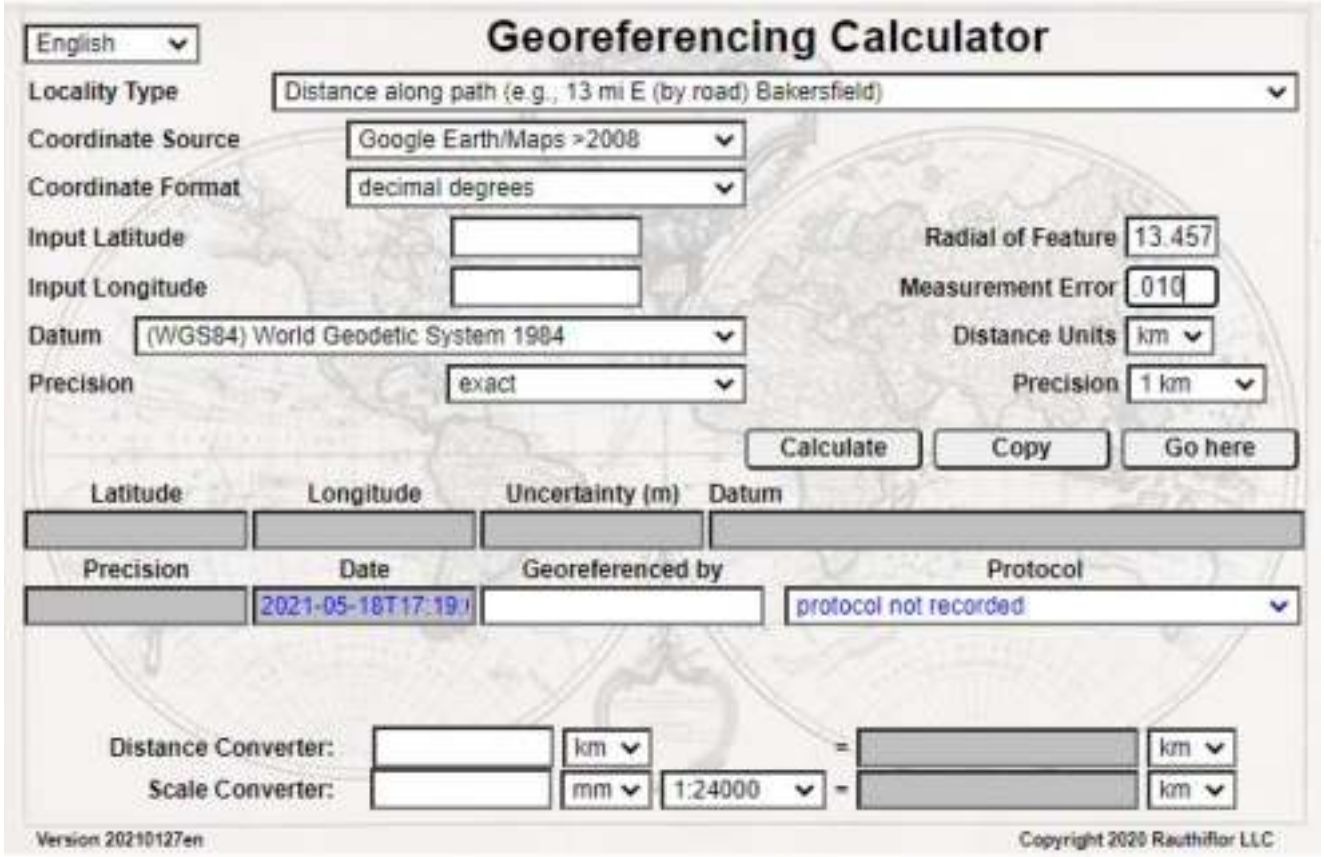
The starting node of the ruler (1) marks the starting location for the offset, the second node (2) marks the farthest reaches of the road within city limits.

CALCULATOR PROCEDURE

LOCALITY TYPE	CALCULATION PROCEDURE (instructions on how to use the Georeferencing Calculator)
Offset **Offset along a path** *Examples: "7.9 mi N Beatty, on US 95", "3 km en el Rio Jimenez arriba de Anita Grande", "left bank of the Mississippi River, 16 mi downstream from St. Louis", "Ruta Nacional 81, 8 km W de Ingeniero Guillermo Nicasio Juárez"*	~~**Calculation Type**: "Error only - enter Lat/Long for the actual locality"~~ **Locality Type**: "Distance along a Path" ← **Coordinates**: Find the center of the named place as you would for **Named Place – Bounded Area** or **Named Place – Undefined Area**, as appropriate. Use a measuring tool on a printed or digital map to follow the specified route for the given distance. Use the end point as the coordinates. If no specific path is specified in the locality description, be sure to note in **georeferenceRemarks** which path was measured. **Extent**: As for **Named Place – Bounded Area** or **Named Place – Undefined Area**, as appropriate.

LOCALITY TYPE

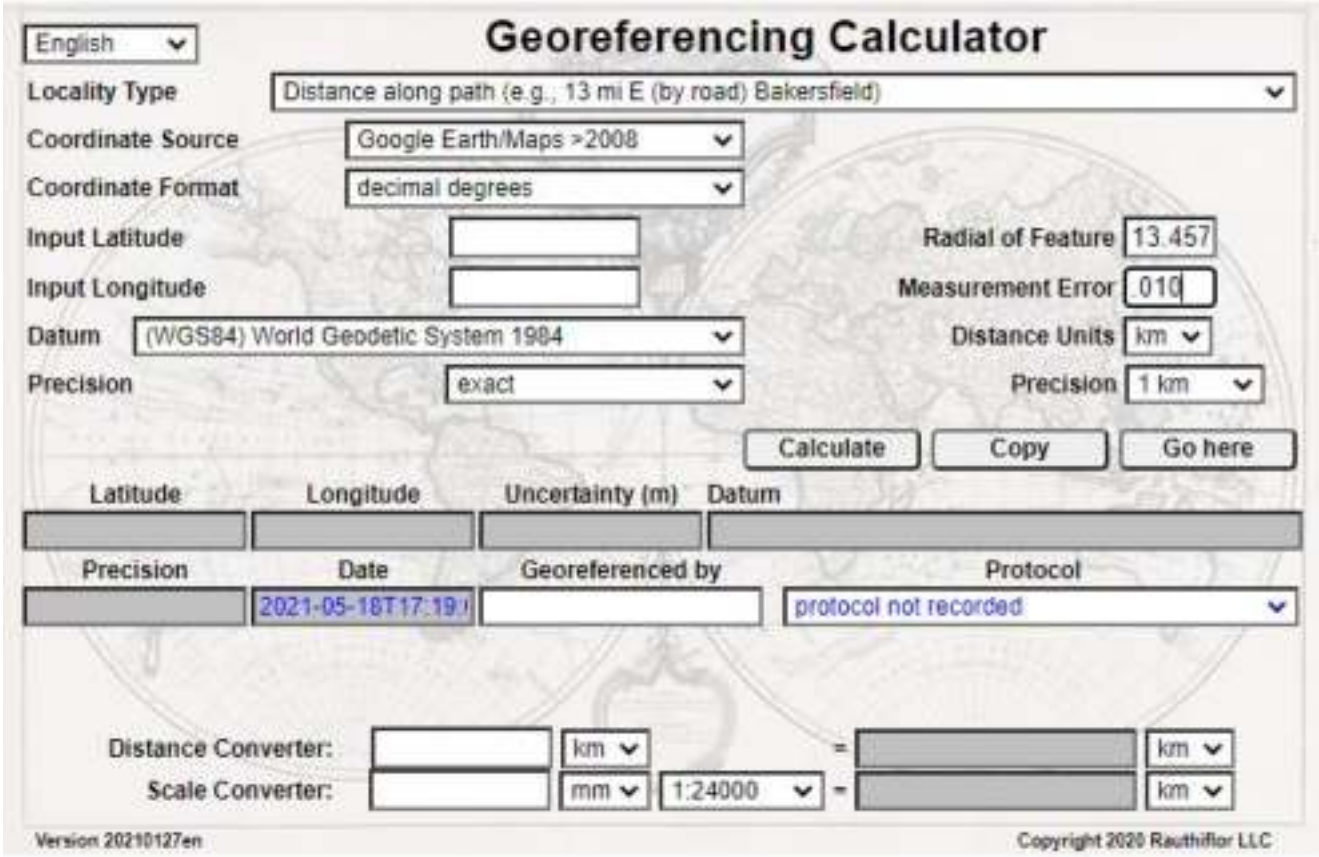
Locality Type: Distance along a path



Offset Along a Path: 3km along Monte Plata – Bayaguana road (road 23) in D.R.

COORDINATE SOURCE, FORMAT, DATUM, PRECISION

- Coordinate Source: Google Maps > 2008
- Coordinate Format: Based on coordinate source (Google Maps) = decimal degrees
- Datum: WGS84 (Google Maps)
- Precision (of the coordinates): exact (Google Maps)



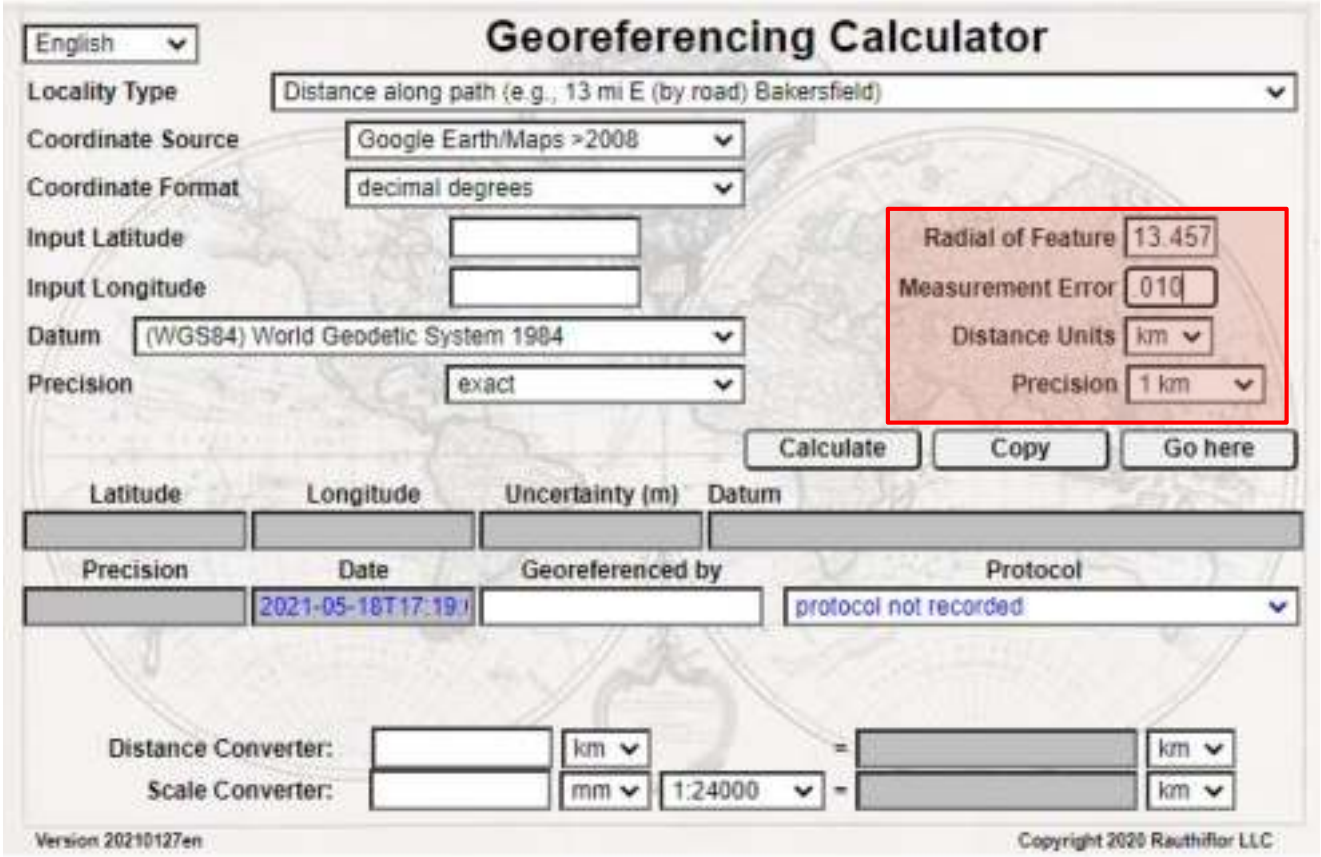
Offset Along a Path: 3km along Monte Plata – Bayaguana road (road 23) in D.R.

RADIAL

Radial of Feature: Extent of the linear feature within the bounds of the starting location (city of Monte Plata). Enter extent in the same units as the offset distance

Measurement Error: Use 10m (= 0.010km)

Distance Precision: Dependent on the offset distance. The 3km offset = 1km distance precision.



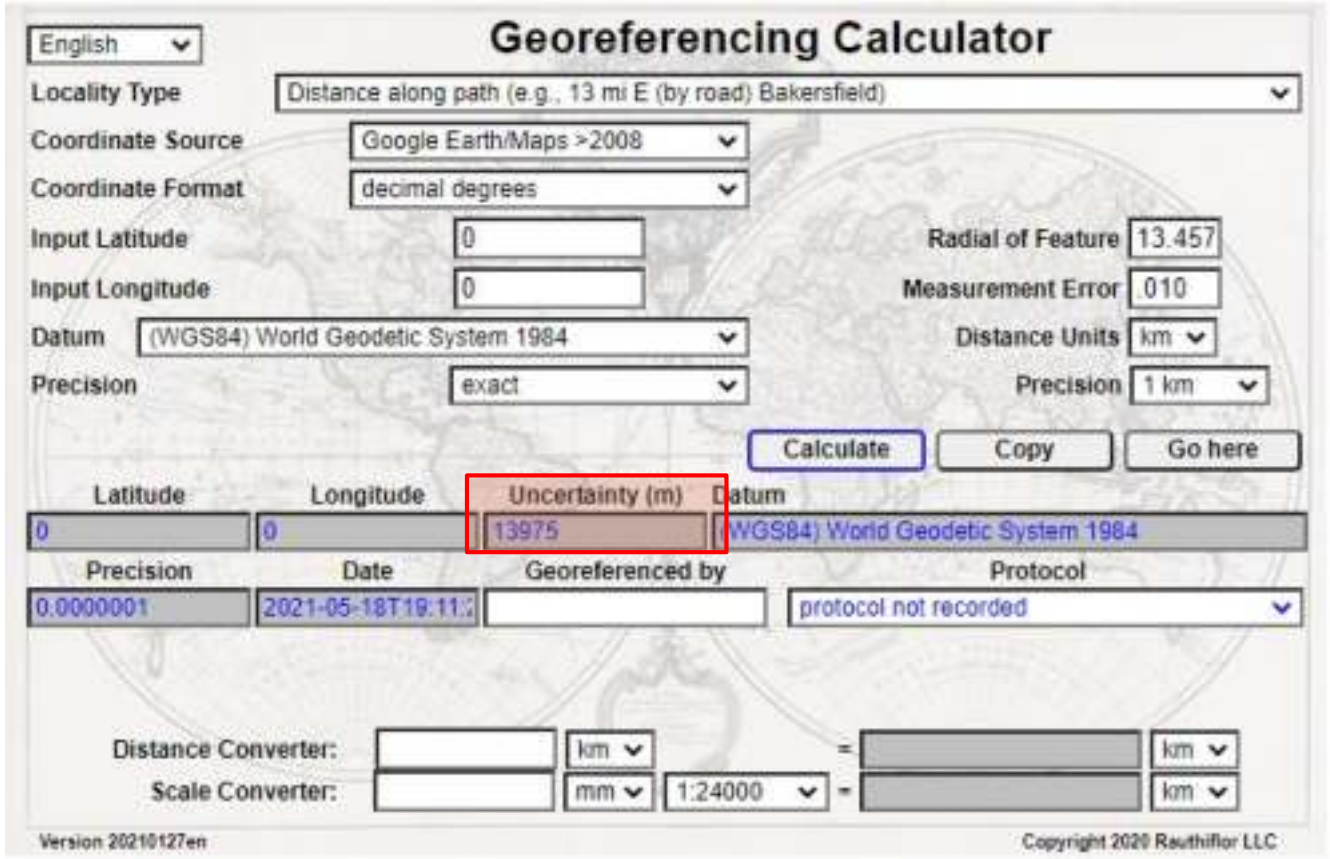
Distance Precision

3km → 1km

Offset Along a Path: 3km along Monte Plata – Bayaguana road (road 23) in D.R.

MANIS: CALCULATE

Uncertainty radius provided in meters



Offset Along a Path: 3km along Monte Plata – Bayaguana road (road 23) in D.R.

QUESTIONS?

Google Maps
GEOLocate Web Application
MaNIS Georef. Calculator
Georef. Quick Ref. Guide

NYBG

CREDITS

This is an updated compilation of information provided by the iDigBio's first Train-the-Trainers Georeferencing Workshop (put together by K. Watson, S. Gottschalk, S. Ascencio, 2013), altered to fit NYBG georeferencing needs over the years (https://www.idigbio.org/content/idigbios-first-train-trainers-georeferencing-workshop)

Georeferencing Quick Reference Guide (2020)
Zermoglio PF, Chapman AD, Wieczorek JR, Luna MC & Bloom DA. 2020. Georeferencing Quick Reference Guide. Copenhagen: GBIF Secretariat. https://doi.org/10.35035/e09p-h128

Georeferencing Quick Reference Guide (2012): consolidated guide for inputs for the MaNIS Georeferencing Calculator
Wieczorek J, Bloom D, Constable H, Fang J, Koo M, Spencer C & Yamamo K (2012) Georeferencing Quick Reference Guide, version 2012-10-08. https://www.idigbio.org/wiki/images/1/1e/GeoreferencingQuickReferenceGuide.pdf

BioGeomancer Guide to Best Practices for Georeferencing (2006) is a basis for documentation of collecting & georeferencing protocols: Chapman, A.D. and J. Wieczorek (eds). 2006. Guide to Best Practices for Georeferencing. Copenhagen: Global Biodiversity Information Facility. https://www.gbif.org/document/80536/biogeomancer-guide-to-best-practices-in-georeferencing (2006 version). Chapman AD & Wieczorek JR (2020) Georeferencing Best Practices. Copenhagen: GBIF Secretariat. https://doi.org/10.15468/doc-gg7h-s853
(2020 version)

The MaNIS Georeferencing Calculator is a JavaScript application used in finding an uncertainty radius that incorporates all possible sources of error in the georeferencing process (tool: http://georeferencing.org/georefcalculator/gc.html, manual: lhttp://georeferencing.org/georefcalculator/docs/GeoreferencingCalculatorManual.pdf)

RESOURCES

Bloom DA, Wieczorek JR & Zermoglio PF (2020) Georeferencing Calculator Manual. Copenhagen: GBIF Secretariat. https://doi.org/10.35035/gdwq-3v93

Chapman AD & Wieczorek JR (2020) Georeferencing Best Practices. Copenhagen: GBIF Secretariat. https://doi.org/10.15468/doc-gg7h-s853

Spencer C, Yamamoto K, Fang J, Constable H, Koo M, & Wieczorek J (2008) Georeferencing for Dummies. http://georeferencing.org/docs/georeffordummy.xls

TDWG (2018) Darwin Core quick reference guide. Biodiversity Information Standards (TDWG). https://dwc.tdwg.org/terms/

Wieczorek J (2001) MaNIS/HerpNET/ORNIS Georeferencing Guidelines. University of California, Berkeley: Museum of Vertebrate Zoology. http://georeferencing.org/georefcalculator/docs/ 52 GeorefGuide.html

Wieczorek J & Bloom DA (2015) Manual for the Georeferencing Calculator. University of California, Berkeley: Museum of Vertebrate Zoology. http://georeferencing.org/gci2/docs/ GeoreferencingCalculatorManualv2.html

Wieczorek J, Guo Q & Hijmans R (2004) The point-radius method for georeferencing locality descriptions and calculating associated uncertainty. International Journal of Geographical Information Science. 18: 745-767. https://doi.org/10.1080/13658810412331280211