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Premises Data Collection:

A Brief Overview of Premises

Location Data Collection for VS

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Contents

Revision History

Version	Date	Details	Author/Reviewer
1.0	1/18/2011	Original document	Bill Kelley

Definitions

Coordinate pair – The two numeric values used to find a point in two dimensions. In Cartesian systems these are represented by the X and Y values. In planar systems these are represented by Easting and Northing values. In geographic systems these are represented by Longitude and Latitude.

Datum – A mathematical model of the Earth's surface, used as the reference base for coordinate systems and their coordinate pairs.

Front Gate location – The point where vehicle access to a premises leaves a public road and enters private property.

Geocodable Address – An address that contains all of the required elements for successful geocoding. These elements include:
1. House/Building number
2. Street name
3. City/Town
4. State
5. Zipcode

Geocode – A process to identify a coordinate pair that represents an address' location. This process uses a geocodable address with a properly attributed geospatial street database to approximate the point on the street segment that the address is located.

GIS – A Geographic Information System. This is a system of people, data, hardware, software, and policies used to convert geospatial data into information.

GIS Professional – An individual who has the training and experience with GIS to be considered an expert.

GPS – The Global Positioning System. A system of satellites and ground control stations that uses signals from the satellites to determine a GPS receiver's location.

GPS Receiver – A device used to read signals from the GPS satellites and calculate the location based on these signals.

Map Interpolation – A method for determining a location's coordinate pair by identifying the location on the digital map and using the map coordinates to calculate the coordinate pair.

Premises – A facility of interest to VS.

Introduction

Purpose

To help animal health officials better understand premises data collection methods in the early stages of an animal health incident.

Scope

This document is intended for the initial responders to an animal health incident before a GIS professional is consulted. Additionally, this document only addresses data collection for premises represented by points.

Overview

VS uses three general methods for collecting premises point locations. The first, and preferred, method is using a GPS receiver to collect a coordinate pair. The second method is geocoding the premises' address. The third, and least desirable, method is finding the premises location through map interpolation.

Refer to Figure 1 in the Appendix for a graphical representation of the collection methodology decision tree.

Collection Methodology

Is a GPS receiver available?

The first choice for collecting premises location information is to use an appropriate GPS receiver. If one is available then proceed through this section. If one is not available then move to the next section and try to geocode the premises address.

What is the appropriate location to collect?

VS represents premises using the "front gate" location. There are, however, cases where the front gate is not apparent, or where the premises is discontinuous, or where the front gate may just not be as useful as another location for the particular disease in question.

For the vast majority of cases where the front gate is appropriate, collect the coordinate pair at the front gate. For the few other cases, collect the coordinate pair at the location that is appropriate and then make a note of what the collected location is.

For example, suppose there is an infected horse at a large racing complex, and the animals are housed significantly far away from the "front gate." Perhaps it is more important to know where the animals are than the front gate. Use the GPS receiver to collect the coordinate pair at the stables and then note in the investigation documentation that the point represents the stables.

What are the appropriate data to collect with the GPS receiver?

Regardless of what location is used all GPS coordinate pairs will be collected using the following parameters:

1. Measure – Use Latitude and Longitude.
2. Units – Use Decimal Degrees as the units for the coordinate pair.
3. Precision – Record the Latitude and Longitude to one millionth of a degree (six decimal places).
   a. Northern Hemisphere Latitudes are recorded as positive values and Southern

Hemisphere Latitudes are recorded as negative values.
   b. Western Hemisphere Longitudes are recorded as negative values, and Eastern Hemisphere Longitudes are recorded as positive values.
4. Datum – Use the WGS 84 Datum as the base for the coordinate pair.

For example the front gate location for the WR headquarters is: 40.560285° Latitude and -105.085275° Longitude based on the WGS 84 Datum.

If a GPS is not available, geocode the address

While the preferred method is to use a GPS receiver, there are going to be occasions where this is not possible. For these occasions, the next best method is geocoding the premises address.

Check for a geocodable address

A geocodable address is required for a geocoding service to work properly.

Sticking with the WRO premises example, the geocodable address is: 2150 Centre Ave., Fort Collins, CO 80526.

Be aware that post office boxes and rural route boxes will not work. Additionally, be aware that just

because the address looks like it is geocodable does not mean that the service will provide a good coordinate. Working through geocoding errors is beyond the scope of this document. Leave it to the GIS professional to work it out.

If a geocodable address is not available, then do not bother trying to geocode. Go directly to map interpolation to obtain the premises coordinate pair.

Geocode the address

VS uses the TeleAtlas North America geocoding service. Access the service at the following URL:

http://www.geocode.com/EZLI/

Use the following information to access the service:
User name = APHIS_VetS
Password = F0C02011

Note – This is not a free service. It is only to be used by VS for animal health incidents.

What constitutes a "good" geocoding result?

If the service returns a coordinate pair classified as a **segment match**, then it is a "good" result. If the service returns a zip code match or no coordinate pair, then it is not a "good" result. For those cases that do not return a good result, move on to map interpolation, but do not discard the coordinate if one was produced, it may be useful in the map interpolation process.

If nothing else works, use map interpolation!

For those situations where a GPS receiver is not available and geocoding is not working,

then the last option is to use a map to identify a location and get the coordinates for this location.

It is important with map interpolation to identify what the point represents. The following list contains the available options ranked from the least to the most desirable:

1. State Centroid – the center of the state. This is appropriate if only the State is known.
2. County Centroid – the center of the county. Appropriate when only the State and County are known.
3. Zip-Code Centroid – the center of the zip-code. Use the zip code coordinates returned during geocoding if the city/town is not included in the map.
4. City Centroid – the center of the city/town.
5. Intersection – the nearest intersection of two or more identifiable roads.
6. Premises Front Gate – our typical premises geographic feature.

In addition to documenting what the point represents, it is important to document what application you used to obtain the coordinate. A couple of useful applications for this are the National Map (http://viewer.nationalmap.gov/viewer/) and Google Maps (http://maps.google.com/).

A final note for all collection methods

Regardless of the method used to collect the premises location data, include a brief note on the directions to the premises in the investigation report. This little bit of information will save time for both the GIS professionals and the field staff later on in the data management process. The GIS professional managing the data likely has no idea where these premises are, so by including these directions to the premises it helps answer questions about locations during the quality assurance process. The more questions that the GIS professional can answer in the office, the fewer questions the field will have to answer, and time can be spent reconciling locations that have real issues.

Additional Assistance

It is important to get a GIS professional involved as soon as possible to help manage the geographic data. The sooner one is brought on board the easier managing geographic data will be for everyone involved.

Questions or Comments

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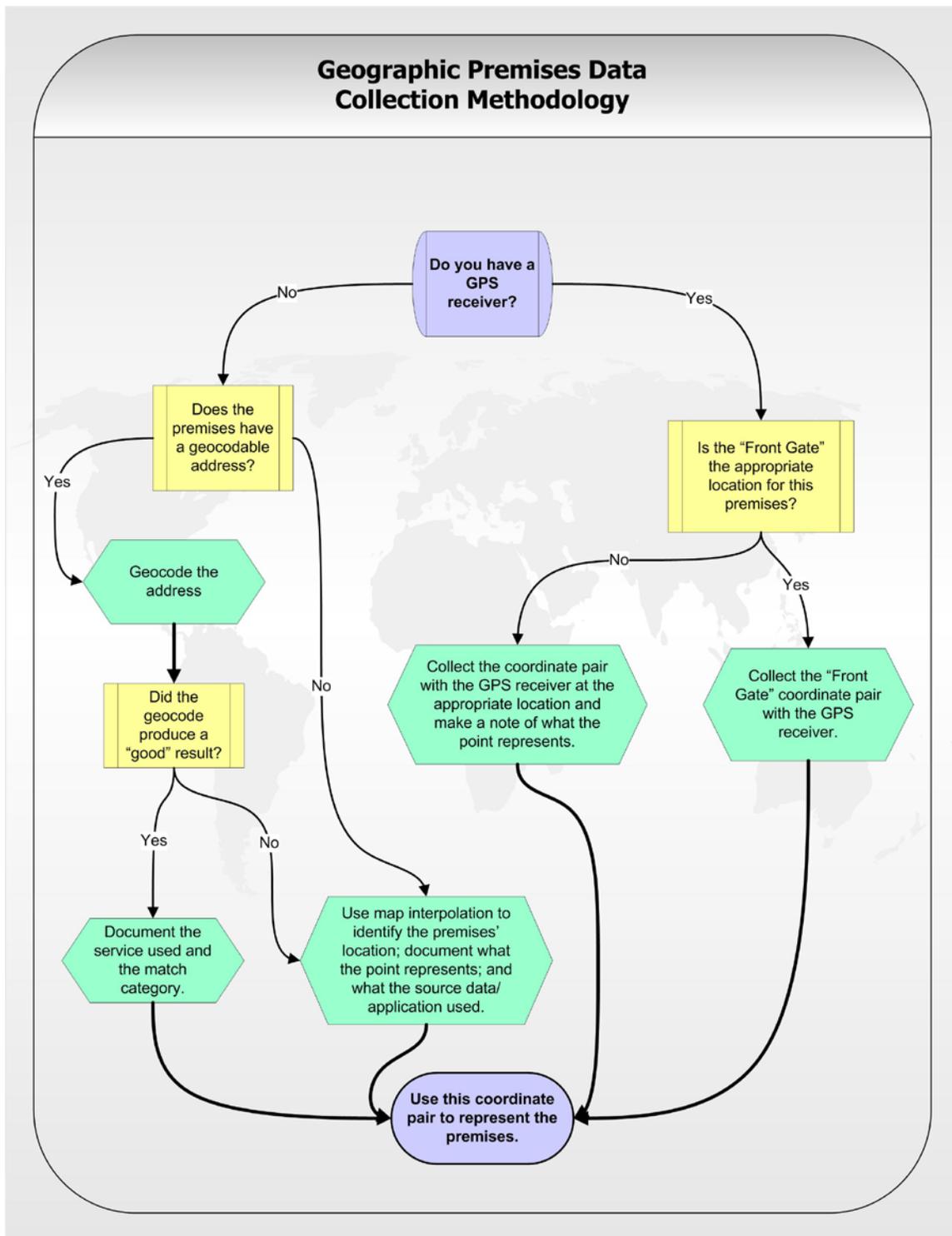William.N.Kelley@aphis.usda.gov
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Appendix I

Geographic Premises Data Collection Methodology

Do you have a GPS receiver?
— No → Does the premises have a geocodable address?
— Yes → Is the "Front Gate" the appropriate location for this premises?

Does the premises have a geocodable address?
— Yes → Geocode the address
— No → Use map interpolation to identify the premises' location; document what the point represents; and what the source data/application used.

Geocode the address → Did the geocode produce a "good" result?
— Yes → Document the service used and the match category.
— No → Use map interpolation to identify the premises' location; document what the point represents; and what the source data/application used.

Is the "Front Gate" the appropriate location for this premises?
— No → Collect the coordinate pair with the GPS receiver at the appropriate location and make a note of what the point represents.
— Yes → Collect the "Front Gate" coordinate pair with the GPS receiver.

Use this coordinate pair to represent the premises.

Figure 1