

Vector Analysis Lab Exercise

Background

The Museum of Southwestern Biology at University of New Mexico houses natural history collections from around the world. These collections serve as a record of flora and fauna through time. In this exercise you are given a file of the bat specimens in the museum from Bernalillo County. You will be determining how many of these bats were collected within 100 meters of water. Bats are nocturnal, flying mammals and as a general rule must drink water, so are sometimes intentionally captured over water, but they are sometimes captured at homes and other buildings.

The bat locality records were downloaded from the Museum of Southwestern Biology database that can be accessed on-line (<http://arctos.database.museum/SpecimenSearch.cfm>) use of this database is free and open to the public, however to download records you need to create an account (also free). There are also records from other museum collections available through the Arctos database.

Data:

Bernalillo_Co_Bat_records.xls – Excel file of bats in the Museum collection from Bernalillo County. The geographic coordinate system for this file is WGS 1984. The latitude is in the Dec_Lat field and the longitude is in the Dec_Long field.

Bernalillo Water – you must retrieve this file from the RGIS website

Water Resources ->2006seTIGER -> Bernalillo County, only download the Hydrography for Bernalillo County file.

1. Add the bat records file to ArcMap.
2. Display the data as X,Y coordinates and export as a new data file. Add that to the data frame.
3. Add the Bernalillo County water layer.
4. Create a buffer of 100 m for the bat records. The collection localities for the bats are given as very precise geographic coordinates, however there is likely some amount of error. We will assume that the error is 100m or less.
5. Conduct a spatial join of the bat buffer and the water layer.
6. Use the summarize function on the join layer to determine if there are any species of bats that all the records were near water, and if there are any species of bats where none of the records are near water. (Hint- conduct the summarize on the Scientific Name field, you will need at least the minimum and the maximum summarized for the Count field).

Questions

How many bat records are within 100 m of water?

How many bat species are from Bernalillo County in the Museum's collection?

Were there any bat species for which all the records are within 100m of water? If so, which?

Were there any bat species for which none of the records are within 100 m of water? If so, which?