Project Tutorial: Example 2

TUTORIAL FOR GIS PRESENTATION

Introduction to GIS
Geography 104
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The purpose of this project is to establish a system using ArcGIS that will demonstrate the paleontological resource potential for a proposed development project in costal San Diego County. Determining the paleontological resource potential for a given project will be based on fossils recovered from nearby localities which have been discovered from the same sedimentary deposits as the proposed project. These near by localities will give insight to the types of fossils that may be discovered. This system is set up for any potential project within coastal San Diego County, however, this system will be demonstrated for a specific example project - Pacific Coast Business Park in Oceanside, CA.

Assumptions:

- A review of fossils collected within a mile radius of a project site is an adequate distance to measure of the resource potential for that proposed site.

- The formation(s)underlying a project site will potentially yield similar fossils as localities discovered in the same formation.

1. Establish base maps for project
    a. Open new blank map
    b. Download base map for San Diego County from SANDAG (http://www.sandag.org/resources/maps_and_gis/gis_downloads/basemap.asp)
    c. Add base map for San Diego County through the add data button. This map is in NAD_1983_StatePlane_California_VI_FIPS_0406_Feet projection system, which will establish the data frame coordinate system for the entire map. Any data not in NAD1983 will be projected on the fly.
    d. Download city boundaries for San Diego County from SANDAG and add them as a layer
    e. Create categories for symbology for cities to have each city a unique value, choose basic random
    f. Download major roads from SANDAG, add them as a layer, and clip them to the County Boundary (analysis tools/extract/clip)

2. Create point data shape file for San Diego Natural History Museum fossil localities
    a. Retrieve a recent copy of locality data as a .dbf file from San Diego Natural History Museum. Locality data was recovered in NAD27 coordinate system
    b. Open locality dbf. file in excel and delete last column titled “loc_desc”
    c. All other field names are already converted to acceptable format for ArcGIS
    d. Save file as .csv (comma delimited) then close

e. In windows explorer change extension to .txt format
f. In ArcMap add data through add XY data. The x value is UTM_EAST and the y value is UTM_NORTH. The spatial referencing is projected coordinate system/UTM/NAD1927/NAD 1927 UTM Zone 11N.prj
g. The layer is then converted to a shape file by right clicking on the layer/ data/ export data/
h. Localities layer is then clipped (analysis tools/extract/clip) to the county boundary to show only San Diego County localities.

3. Add base maps for city of Oceanside
    a. To determine the extent of the boundaries of the City of Oceanside, export just the Oceanside record from the cities layer. This is done by opening the attribute table for cites, highlighting only the Oceanside record and then clicking show selected records. Close the table and right click on Cites layer and select data/export data. This will export only the Oceanside record as a shape files. Go to the newly created layer and select no color in the fill option and increase the outline with thickness.
    b. Download the two USGS 7.5 minute topo maps for the portion of Oceanside that SDNHM has localities. Oceanside & San Luis Rey Quads are retrieved from the CaSIL site (http://casil.ucdavis.edu/mapsurfer/). Download the trimmed NAD83 which is proper projection system for map project which is NAD_1983_StatePlane_California_VI_FIPS_0406_Feet
    c. Add the USGS topo quads for Oceanside and San Luis Rey
    d. To cover areas of USGS maps that are not in San Diego County, use the union tool to combine the City and County layers to one layer. Add all values for symbology, then select no color for the fill and outline for Oceanside. This will show only the portions of the topo maps are within Oceanside
    e. Add scanned jpg. Geologic map for Oceanside and San Luis Rey Quads.
    f. Map is georeferenced by using the georeferenced tif maps and increasing the transparency of the geologic map to 50%. Rectify the map to establish a coordinate system for the layer. Geologic map will be darker than original. To fix it, right click on layer, properties/symbology tab/RGB composite/stretch type should be none.
    g. Move new georeferenced map under county+city union layer.

4. Add development project spatial data : three ways to do it
    a. Project location is presented as an address
        1. Create a new address locator in ArcCatalog. The address locator style is US streets with zone (file). Download the reference data from J. Curran's site as roads all shape file. The address fields are filled in based on the reference data fields: House from left = LLOWADDR, house to left = LHIGHADDR, house from right = RLOWADDR, house to right = RHIGHADDR, prefix direction = RD20PRED, street name = RD20NAME, street type = RD20SFX, left zone = L_ZIP, right zone = R_ZIP. Input address fields for zone from the reference table fields for zone.

2. Add the all roads layer to the map
3. Add the address locator to the map – tools/geocoding/address locator manager/add address locator
4. Using the find (binoculars), under address tab, enter the address and zip code for the project site.
5. Create a new point shapefile, add it to the map, using the editor add a point on the one selected from the address locator

b. Project location and extent is presented on a map
1. Create a new polygon shape file in ArcCatalog
2. Add the new shapefile to the map.
3. Use the editor tool to create a polygon for the project boundaries

c (used for this example). Project location is given as a georeferenced from the engineering company
1. Data for proposed project: Pacific Coast Business Park is obtained from engineering firm contracted by the developer. These are shape files in NAD_1983_StatePlane_California_VI_FIPS_0406_Feet coordinate system
2. Shape file for the project boundary is added to the map

5. Create a new locality dataset based on a 1 mile radius around the project site
   a. Create a new polygon shape file to delimit the project impact area and add in locality point data.
   b. Show geology layer and determine formational outcropping as it relates the project boundaries.
   c. Buffer (analysis\proximity\buffer) the new polygon shape file for a 1 mile radius around the project.
   d. Then clip localities within the buffer and examine attribute table of new dataset
   e. Select by attributes only localities within the formation that underlies the project boundaries ('formation'='Santiago Formation"). This will select 63 of 65 localities.
   f. This new table will be of only localities in the formation underlying the project: Santiago Formation

6. Create a specimen dataset based on buffered localities
   a. Create a new relate (relate 1) from the buffered locality dataset. This relate will use the number field as the relate field. This field occurs in both the locality and specimen tables.
   b. Create a output table by option/related tables/relate 1. This is the entire set of specimens recovered from the buffered localities within the formation of the project area.
   c. Export the data into a .dbf file, open in excel and save as an .xls file, and then open in access.
   d. Design a query that will count the numbers of specimens for records in each phylum, class, order, family, genus, and species field.
   e. Run the query and this will produce a reduced table showing the potential

fossil groups for the proposed development project.

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