GEOG 385: Final Project Documentation
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Cycling Around Sacramento

...a GIS map guide to current and future bicycling infrastructure

Summary:
The City of Sacramento is in the process of adding additional bicycle infrastructure in the form of on-street and off-street options. This web application uses GIS data provided to the public by the City of Sacramento to show existing bicycle infrastructure and proposed projects. Related data includes light rail, existing city parks, neighborhoods, schools, hydrology, and available funding information.

Purpose:
The purpose of this web application is to compare the bike infrastructure of Sacramento (both existing and proposed) with other existing transportation options (light rail), as well as show proximity to destinations easily accessible by bicycle (parks & schools), and locate what is planned in specific neighborhoods.

Project:
I started by going to http://www.cityofsacramento.org/gis/data.html and seeing what data was available. I decided to start with the Bike Master Plan data. The bikemasterplan.shp contains the current Sacramento, CA 2010 Bikeway Master Plan status, updated as of 2/22/2011. I took note of the 'TYPE' and 'FUND_SRCE' attributes. In addition to the bikemasterplan.shp, I downloaded citybndy.shp, Hydro.shp, lightrail.shp, neogh_hd.shp, Parks.shp, schools.shp, and additionally zoning.shp which I later discarded.

In ArcCatalog, I organized all the data and created a 'BikePlanSac' geodatabase. I then opened a new ArcMap document and did the following:

1. Added 'City Boundary' layer
   - changed symbology to thin dashed outline and white fill
   - added the 'Streets' basemap from ArcMap's 'Add Basemap' feature
   - changed transparency of boundary layer to display as an overlay over basemap
2. Added 'Neighborhoods' layer
   - symbolized using unique values using the 'NAME' attribute
3. Added 'Parks' layer
   - exported new parks layer including only existing parks and changed symbology
4. Added 'hydro' layer
   - clipped layer with city boundary and symbolized as water
5. Added 'Schools' layer
   - changed symbology to school symbol
6. Added 'Bike Master Plan' layer
   - exported Existing On & Off-street bike paths and Proposed On & Off-street bike paths as separate layers
   - changed symbology (existing: green, proposed: red)
   - exported bike plan paths with listed funding sources as separate layer
   - symbolized by funding source using a color ramp
7. Adjusted the 'scale range' for each layer to improve viewing for the web application
8. Added the basemap (streets) and saved the .mxd

Geoprocessing
I wanted to highlight sections of bike path within a .25 mile buffer zone of light rail, parks, and schools, receptively.

- Light Rail: I created a model using the merge tool to combine Bike_Existing with Bike_Proposed, dissolved the product (Bike_All) using the Project Name field, created a .25 mile buffer with the LightRail feature class, and clipped the Bike_All using LightRail_Buffer to get BikeNearLightRail.
- Parks: I created a model merge tool to combine Bike_Existing with Bike_Proposed, dissolved the product (Bike_All) created a .25 mile buffer with the Parks_Existing feature class, and clipped the Bike_All using Parks_Buffer to get Bike_NearPark.
- Schools: I created a model merge tool to combine Bike_Existing with Bike_Proposed, dissolved the product (Bike_All_N) created a .25 mile buffer with the Schools feature class, and clipped the Bike_All using Schools_Buffer to get Bike_Near_Schools.

I then made a copy of the main .mxd file and saved a version for each geoprocessing model tool, which had been added to the layers tab in their respective file.

Using ArcCatalog, I added a new service to the server. I created a map service for the original .mxd (SacramentoBikePlan_KS.mxd), and three geoprocessing services for each geoprocessing tool (SacramentoBikePlan_GEO1.mxd (Light rail), SacramentoBikePlan_GEO2.mxd (Parks), & SacramentoBikePlan_GEO3.mxd (Schools)).

I then logged into ArcGIS Server Manager and 'started' the services, and then created a new Application (SacramentoBikePlan). I added the three geoprocessing tasks, as well as Print and Search tasks. Then, I deployed the application and checked to make sure it worked in Internet Explorer, testing each of the tasks.

Difficulties:
I didn't have many difficulties until I started dealing with the server side part of the project, other than a few minor things building the geoprocessing models. Once I tried to upload them to the server, it kept using the file paths from my home computer for the input and output fields which caused them to blow up. I ended up having to go into the models and re-inputting the file paths to match the correct one for the server (lab computer). Also, when run in the published map service, the geoprocessing tasks would display all created feature classes when complete, instead of only the final product.

Conclusion:
This project turned out well, despite a few hang-ups. In the future, I would figure out how to prevent the extra geoprocessing task created layers, and streamline the tasks themselves to be more suited to the online platform as they take longer than a user should be required to wait to process. Otherwise, it was quite the learning experience, and maybe someday with a more user friendly server set-up I would like to do more.