Students as GIS Consultants to the U.S. Fish and Wildlife Service

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Students at the Metropolitan State College of Denver acted as GIS consultants for a project with the U.S. Fish and Wildlife Service, as part of a cost-share agreement between the Service and the College. Students involved in the project were responsible for building a basis for digital data infrastructure for the Browns Park National Wildlife Refuge (NWR) in Northwestern Colorado. Students directed all aspects of data and metadata collection and organization. Digital data included commercial and government sources as well as field data collection.
Objectives

• Describe Unique Learning Opportunity
• Describe Browns Park GIS Project
  – Overview, Objectives, Methods, Results, Conclusions
• Discuss Challenges and Opportunities of Collaborative Projects
• Discuss Pros and Cons of Group Project Within GIS Curriculum
Unique Learning Opportunity

- Project began through a Cost-Share Agreement between the U.S. Fish and Wildlife Service and Metropolitan State College of Denver, in September, 2002
  - Costs are equally shared by each party.
  - Costs include hardware, software, infrastructure, personnel, travel expenses, and data
- Metro students are required to participate in a senior experience class in their discipline
- The senior experience class is well suited for investigatory and group projects where students demonstrate GIS proficiency and problem solving.
Browns Park Digital Data Project Overview

- Browns Park is a National Wildlife Refuge in NW Colorado.
- The primary purpose of the refuge is to provide high quality nesting and migration habitat for the Great Basin Canada Goose, ducks, and other migratory birds.
- Managing the refuge requires consideration of multiple natural and human resources, all within a geographic context.
- Using digital databases within a GIS system should greatly facilitate the management process.
- GIS digital data resources were not well developed or operational within the refuge.
Browns Park Digital Data Project

Objectives

• Compile a digital data infrastructure for the refuge
• Acquire existing digital datasets from various sources
• Create digital datasets of various land and water features on the refuge using GPS data
• Convert all data to ESRI shapefiles and/or other ESRI compatible formats.
• Deliver digital data, document our work, create metadata, and produce maps for the project.
Browns Park Digital Data Project
Methods Overview

- Determine digital data needs
- Acquire existing digital datasets
- Acquire field data
- Convert vector data to desired formats.
  - Vector data to shapefiles and raster data to grid, tiff, or img file formats in UTM zone 12N map projection, scale of 1:24,000 or larger.
- Compile individual work into a written document, and compile metadata, and maps
- Copy data to CDs
Browns Park Digital Data Project
Division of Methods Tasks

• Determine digital data needs
  – Identified as a group and through class conversations with U.S. Fish and Wildlife staff.

• Acquire existing digital datasets
  – Each student choose one or more datasets for which to be responsible, and researched and acquired these datasets.

• Acquire field data
  – Field data needs were assessed as a group as a result of individual reports, and further class consultation with U.S. Fish and Wildlife staff.
  – Students determined responsibilities for field work.
Browns Park Digital Data Project
Division of Methods Tasks Cont.

• Convert vector data to desired formats.
  – Each student choose one or more datasets for which to be responsible, and converted these datasets.

• Compile individual work into a written document, and compile metadata, and maps
  – Each student choose to write one or more sections, compile metadata and/or produce maps.

• Copy data to CDs
  – Once the data was centrally located, CDs were created by the professor and students.
Browns Park Digital Data Project

Results

- Acquired existing datasets
  - Bureau of Reclamation
    - Hydrology
    - Vegetation
    - Roads
    - Park Boundary
  - Natural Resources Conservation Service
    - Soils
  - U.S. Geological Survey
    - Digital Raster Graphics (DRGs)
    - Digital Elevation Models (DEM)
  - Browns Park National Wildlife Refuge
    - Wildlife Sightings (EXCEL spreadsheet)
Browns Park Digital Data Project
Results Cont.

- **Field Collected Datasets**
  - Buildings
  - Utilities
  - Signs
  - Trails
  - Historical Sites
  - Non-biological Infrastructure: boat launches, piers, wells, hunting blinds, propane tanks, weather stations
  - Cattle Guards
  - Water Pumps
  - Burn Areas
Browns Park Digital Data Project Results Cont.

- Derived Datasets
  - Fire Districts
    - Districts were delineated from hand drawings on paper maps using a combination of road, rivers, and landscape features.
  - Color-Infrared Orthophoto
    - Hardcopy color-infrared photographs were scanned to produce .tiff files.
    - Tiffs were mozaiced and orthorectified with the cooperation of Pixures, Incorporated.
Browns Park Digital Data Project
Conclusions

• Students were able to succeed as GIS consultants.
• This project fulfilled the objectives of the cost-share agreement and provided a good basis for developing a digital data infrastructure for the refuge.
• The project provided the opportunity to demonstrate proficiency in GIS and develop new skills.
Opportunities of Collaborative Projects

• Cooperative projects between Academia and government are win-win situations.
• Real-life projects are always more credible to students while producing results that are needed by government and/or industry.
• Interfacing with the Refuge staff allowed them to tell us the Refuge story and it became ours.
• The development of relationships between individuals in the cooperating agencies is the largest benefit of these projects.
Pros of Group Projects Within a GIS Curriculum

- Group projects far exceed the scope and depth possible with individual projects.
- Group projects require that students communicate with each other to reach a common goal.
- Group projects result in a better understanding of the organizational and data requirements necessary to put together a comprehensive project.
- Group projects foster camaraderie between students.
Cons of Group Projects Within a GIS Curriculum

• Students are not equally interested in the overall objectives and scope of the project.
• Student assignments must be flexible to accommodate changes in the project as it progresses.
• Continual group and agency coordination and assessment of the project objectives relative to results is required.
• Individual efforts are more difficult to assess within a group context as they vary considerably in scope, depth, and complexity.
SUMMARY

• It was a lot of work – but it was worth it!
• GIS is fun!
• Have fun with it and enjoy teaching!
Browns Park Digital Data Project

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