Enviromaps

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Potential Future Habitat Land for the Guadalupe-Blanco River Trust

Prepared by **Enviromaps**, a GIS Analyst Service

September 2011

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1. Introduction

1.1 Summary

The proposed project incorporates three phases: database management, potential whooping crane habitat location and creating digital data of currently managed conservation easements from survey field notes. The final goal of the project is to provide a detailed database in GIS of the Guadalupe-Blanco River Trust's (GBRT) 13 counties. This will include all boundaries, protected areas, important agricultural areas, priority terrestrial and aquatic wildlife habitats and current land easements. This database can then be used as an efficient source of data and geographic information for the future projects of the GBRT.

The second phase of this project will be to locate potential land easements along the Texas coastal region of the GBRT's extent, in order to create optimal habitats for migrating whooping cranes. Building the comprehensive database of the 13-counties will assist us in identifying whooping crane habitats along coastal areas and will also distinguish potential wildlife refuges and habitat sites within the GBRT's study area.

The final phase of the project is in conjunction with database management in creating the geodatabase for the GBRT.

1.2 Purpose

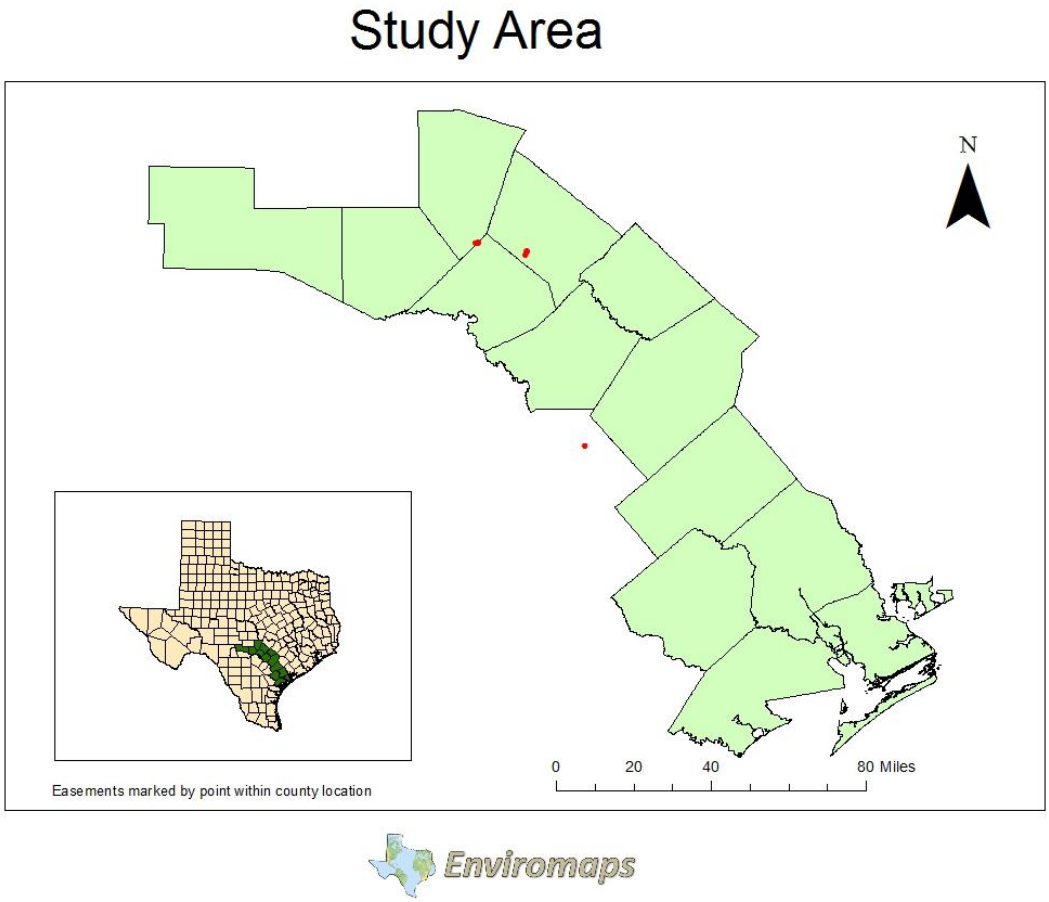
The Guadalupe-Blanco River Trust has taken the necessary precautions to protect the land around our rivers here in the Central Texas Region. By attaining conservation easements, the trust has been able to help protect natural, recreational, scenic and productive areas of land along our river systems that feed into the aquifer. With the drought that is weighing heavily upon us, the trust is looking to expand so that more conservation easements could be in place, especially along the Texas Coastal Regions in order to preserve and enhance the endangered whooping crane population. With a total of 574 wild and captive whooping cranes around the United States (WCEP, 2001), there is a definite need for more adequate space so that these creatures may find a habitat to sustain them in order to meet the goal number of 1000 birds this winter.

Our goal as Enviromaps is to assist the Guadalupe-Blanco River Trust by creating a database that will be efficient for further studies of the area that is being protected. This database will be able to be expanded as the study area grows and more conservation easements are acquired. The extinction of whooping cranes could be imminent without the help of groups such as the GBRT and as a part of our philosophy Enviromaps' objective is to help enhance the quality of life through Geographic Information Systems. With the map of areas that could be attained for easements we would have contributed to the survival of the whooping crane.

1.3 Scope

Our study area extends from the coastal region of Calhoun to Kerr Country with a total of 13 counties that run the length of the GBRT (Figure 1).

Figure 1:



2. Literature Review

The Guadalupe-Blanco River Authority and Trust are looking to help reverse the extinction of the magical creature that we know as the whooping crane. These birds migrate to our shores seeking habitats that sustain them for the winter until they head back to breed (Cathey, 2007). The whooping crane used to be found throughout Midwestern America, but because of hunting and the destruction of their natural habitat, these animals are unable to maintain their numbers. According to Allen (1952) from the late 1800s to the early 1900s, there were 254 documented shootings of cranes. The reproductive cycle of these creatures are slow so these numbers were devastating to the whooping crane population. The Fish and Wildlife Service's Corpus Christi Ecological Services Field Office in conjunction with the Aluminum Company of America (ALCOA), the National Oceanic and Atmospheric Administration, the General Land Office, and the Texas Commission on Environmental Quality sought to restore the cranes' habitat and preserve these animals by creating an artificial estuarine habitat (USFWS 2007). The Aransas National Wildlife Refuge consists of 22,500 acres of marshes and salt flats and about 14,250 acres of grassland that are maintained for waterfowl, cranes and other wildlife on the preserve (Darnell 2004). These types of efforts have allowed the cranes to grow in numbers and as of September 30, 2010 there are 263 total whooping cranes at this location. The problem the cranes are facing is the overcrowding of the areas that are designated. The Aransas Refuge has built areas specifically for this creature and adjacent and privately owned areas are utilized in preservation efforts (USFWS 2007). The GBRT would like to acquire easements to also contribute to the whooping crane population. A conservation easement is an agreement that is tailored to each land owner and the GBRT, which restricts a degree of development on that land while restricting the public's access to the area that is being preserved (GBRT).

Throughout history, environmental management has been the motivator for major developments in GIS (Goodchild, 2003). In order to pin-point specific locations for this site, we will be performing a suitability analysis. This analysis is defined as a tool used to identify suitable places for locating future land uses (Collins, 2001). According to Malczewski (2004) and the North Carolina GIS department's user guide (2005) our team must follow a certain procedure, outlined later in the methodology section of our proposal, when running the suitability analysis. As previously discussed, the GBRT is looking to acquire land that is suitable for these animals. By providing detailed criteria of what is crucial in the potential habitats for the whooping crane we will be able to locate areas along the coast that are acceptable.

3. Proposal

3.1 Data: GBRT: Who they are and what they need

The Guadalupe-Blanco River Trust, henceforth referred to as GBRT, was established 10 years ago as an extension of the Guadalupe-Blanco River Authority. The Trust extends into 13 counties, and has a main goal of acquiring large tracts of land, donated by the owner, for a conservation easement in order to ensure that the land they are monitoring stays free of urban development in the future. In order to

insure the health of the rivers within their authority, keeping the landscape as natural as possible is of primary importance. In their first 10 years of operation the GBRT has acquired 10,000 acres of land as a statement to protect and conserve the natural habitat of these particular areas. By the desire to acquire more conservation easements in the area, GBRT has also taken the initiative in attempting to solve the problem of a growing whooping crane population within the fast ever-expanding urban area of the Southern Coastline of Texas. A GIS base system will allow you to visualize and analyze the areas you have contracted to manage and will be an important step in the growth of GBRT.

Enviromaps: Who we are and what we can do for you

Enviromaps is a company with a passion for spatially solving questions about the environment and how to best retain it in its natural state. We would be honored in putting our analysis skills to work for a company such as the GBRT, as we agree with the direction the Trust is heading in protecting our state lands. As we are a newly founded organization, with limited staff resources, we will rely on the partnership with environmental experts to analyze the whooping cranes optimal site analysis. We have compiled data information such as species habitat locations, wetland information, protected easements currently being managed by other land conservation organizations, zoning information, as well as county CAD data to locate land owners currently in possession of large tracts of land. We will count on speaking with Steve Jester, Executive Director of GBRT, in order to better understand what makes a site optimal for whooping crane habitats.

The Trust will need a base layer GIS to house locally in order to map anything within the state or their county authority extent. In working with the GBRT we have pinpointed several different aspects of the data they are presently using, as well as data that may become useful in the future. We propose to set up three geodatabases, in order for easy access; state wide, 13-county extent of GBRT land, and data relevant to the question of a growing whooping crane population in Southern Coastal Texas.

The state wide database and the 13-county extent database will be relatively similar. The purpose of these will be to create a base map at any point in time, and will include items such as roads, county boundaries, precipitation levels, agricultural areas, vegetation types, and any other data we come across relevant to GBRT during our process of analysis. The 13-county extent database will need county County Abstract Data data for each county, in order for the GBRA to easily map new and existing conservation easements. We have compiled data from several state and private agencies in order to create these base level geodatabases of information including but not limited to, Texas General Land Office, Texas Parks and Wildlife, Texas Department of Transportation, and Texas Natural Research Information System. This state wide and county based information center will be useful in the future anytime GBRT is interested in creating a map for any purpose, the data they need, and the extent they need it in will be readily available for use by anyone with access to it.

We will need to take the environmental information related to the whooping crane and select certain parts of this data pertinent to our analysis; the rest of the information is just filler and may be excluded. Our layer for the GBRT easements will need to be updated as the Trust acquires new

properties within their Authority region. As GBRT requires prospective land owners to conduct a survey of the land applying for an easement, the easiest way to update this layers data will be to request digital data along with paper field survey notes.

3.2 Methodology

The first phase of our project is to build a basic GIS database for the GBRT. This would consist of gathering necessary data and then compiling them into an operational GIS. The GBRT has given a list of features that they would like to be displayed on the map and would be accessible for the future usage. The data being projected on the map are areas such as political boundaries, protected areas (parks & refuges), vegetation types, important agricultural areas, land ownership data and priority terrestrial and aquatic wildlife habitats. This is crucial in order to portray the full extent of the GBRT's area and gives the GBRT a look at other areas that may need protecting in the future.

Phase two of our project is locating potential habitats for whooping cranes and for this we will be performing the suitability analysis. Many researchers have compiled a protocol list to aid in this analysis, some of which include, defining the criteria. In our case we will be looking for certain factors which consist of vegetation, topography, proximity to other habitats, highly saline conditions, food supply, and property data. All of the criteria will be given to our team by the GBRT. After the criteria are defined, we will begin to locate the data necessary for this project. Figure 2 shown below shows the basic steps we will be performing for in order to attain the necessary map.

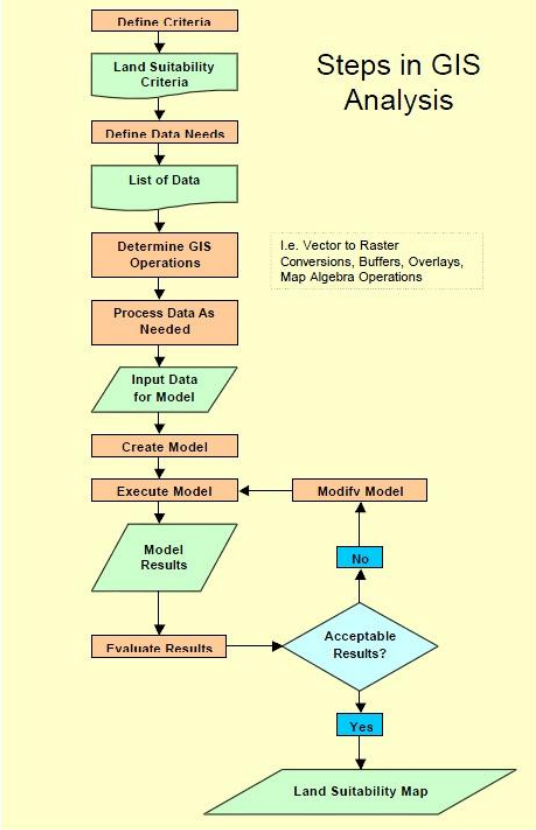


Figure 2. The steps in GIS Analysis pertaining to suitability (NCGIS 2005)

3.3 Implications

This project will provide the Guadalupe-Blanco River Trust (GBRT) with necessary spatial data to identify a multitude of potential land easements suitable for conservation and wildlife habitat. The database will include layers such as political boundaries, protected areas (parks and wild life refuges), vegetation types, priority of aquatic and terrestrial habitats, important scenic and agriculture areas, and landownership data. The layers added together will create a solid database that will assist the GBRT in future projects. The provided data and analysis will be used as a guiding basis for obtaining optimal land easements throughout the 13 county extent of the GBRT. Greater community awareness of the optimal whooping crane habitat as well as the GBRT's expansion and protection of this habitat may be derived from the final GIS analysis and database building provided by Enviromaps.

3.4 Environmaps Proposed Budget

Service	Cost	Amount	Totals
Management			
Assistant Manager Duties	$25/hr	3hr/wk x 10wks	$750
Assistant Manager as Analyst	$20/hr	7hr/wk x 10wks	$1400
Project Manager Duties	$32/hr	5hr/wk x 10wks	$1600
Project Manager as Analyst	$26/hr	5hr/wk x 10wks	$1300
Management Sub-Total			$5050
Analysis			
Two GIS Analysts	$15/hr	Two people @ 10hr/wk x 10wks	$3000
Equipment			
Workstations	$450 per Workstation	Four Stations	$1800
Software License	$1,500	Four Copies	$6000
MISC(office supplies, domain, etc)			$125
Equipment Subtotal			$7925
Total Costs-			**$15975**

3.5 Timetable

Activity	Initiation date	Completion date
Form teams	August 29	August 29
Data Collection	August 31	September 28
Create GBRA GIS	September 14	September 21
Data Pre-processing	September 14	October 19
Data interpretation	September 28	November 21
Create website	November 16	November 30
Prepare final deliverables	December 6	December 12
Final Presentation	December 12	December 12

3.6 Final Deliverables

Final deliverables will include:

- A Detailed Final Report (2 copies)
- Professional Poster for display in the Geography Department
- Website
- CD (2 copies) containing
    - All data
    - Metadata
    - Proposal, Progress, and Final reports
    - Poster
    - Power Point presentation
    - Instructions on how to use CD (readme file)

4. Conclusion

This proposal has defined the methods that will be used in creating a GIS database for GBRT, finding suitable habitats for the endangered whooping crane, and assisting their organization in creating a GIS from field notes for the 13 county-region. Included in our study is a conscripted literature review describing in detail possible suitable locations for the whooping crane, and general issues allocated with their extinction. The data was collected through government resources in order to ensure the best possible results and accuracy. A GIS will also be created with the intended criteria GBRT requests and from the field notes, and finally a map of potential habitats for the whooping crane. The proposal also includes a proposed budget, estimated timeline, and the final deliverables. We are glad to be a part of GBRT and their mission in maintaining the integrity and beauty of Texas.

5. Participation

Team member	Contribution
Megan Foster, Manager	• Planned content of the proposal • Designed and Implemented team logo • Implications
Layne Duesterhaus, GIS Analyst	• Planned content of the proposal • Proposal for spatial data • Implications
Matthew McCracken, GIS Analyst	• Planned content of the proposal • Budget Plan • Timeline • Conclusion • Reviews/Edits
Adriana Fernandez, Assistant Manager	• Planned content of the proposal • Literature review • Methodology • References • Reviews/Edits

6.References

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