



REPORT OF ACTIVITIES

Peninsular Florida Landscape Conservation Cooperative (PFLCC) Climate Scenarios and Species Vulnerability Assessment

Prepare by GeoAdaptive LLC and in Cooperation with Florida Atlantic University – Center for Environmental Studies

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Project Overview:

The Peninsular Florida Landscape Conservation Cooperative (PFLCC) is faced with a number of threats including but not limited to climate change and urban development rates at unprecedented levels. These threats will directly and indirectly impact 67 T&E and candidate species and numerous habitat types. Landscape level conservation tools are critical for the overall protection and preservation of these species and habitats. This project proposes to expand the geographic extend of the socioeconomic and climate scenarios previously developed for south Florida and the Greater Everglades Landscape by the Massachusetts Institute of Technology (MIT) between 2008-2010. The MIT scenarios which currently cover the most southern 30 counties of Peninsular Florida Landscape Conservation Cooperative (PFLCC) will be expanded under this grant to match the 40 counties of the FLCC. This will require the engagement of stakeholders through workshops and individual consultations, data acquisition and processing and simulation modeling for the additional counties leading to the development of visualization of a set of “Alternative Futures” for the PFLCC region. The technical assistance will be to work with the PFLCC coordinator, scientists and steering committee to develop priority conservation areas within the scenarios.

Partnerships Institutions:

FWS Project Officer: Steve Traxler, Senior Fish and wildlife biologist.
USGS Principal Investigator: Dr. Stephanie S. Romañach. Ecologist. USGS.
FAU Principal Investigator: Dr. Leonard Berry, Director Center for Environmental Studies

During the past few months the research team has been working three task group efforts leading to the completion of the baseline data and validation for the project approach and simulation process. The following have been the most relevant activities developed in the recent months:

TASK GROUP 1:

LOCATION AND ACQUISITION OF BASELINE DATA:

We have re-obtained and re-processed the full parcels data for the state. This accounts for approximately 10 million parcels downloaded from the Florida Department of Revenue (DOR). This data has been processed and merged to create a unified the most complete socio-economic data for the project region.

DATA PROCESSING

The DOR data is available in the form of raw text tables and GIS shape files. These are voluminous, and require pre-processing before they can be cleanly joined together. Once joined, the county level data must be merged into a single statewide coverage. These are too large for normal ArcGIS operations, and so have been done using scripting.

FIRST ROUND DATA CLEANING

- The data contain a number of anomalies which must be corrected before use. Because of the size of the data (millions of records), manual data cleaning was judged impractical, and automated routines developed. The most common data errors found are small “sliver” polygons at the edges between normal polygons (an artifact of CAD conversion without proper topology-checking). In addition, there are numerous small polygons which have inappropriate replications of attributes, presumably from their original parent parcels. A filter was designed to search for polygons with replicate attributes. An additional filter was created for those polygons whose stated acreage is significantly different from a fresh independent calculation of their acreage. Just over 5,000 such cases were found.
- Those representing parcels less than 1/10 acre, or whose geometric width to breadth was more than 10:1 were dropped from the database. Surrounding parcels were snapped together over the created gaps. Errors on parcels greater than 1/10 acre were fixed by merging the parcels into a disjoint polygon, and then applying the attributes from the first parcel within these sets to the new disjoint polygon.

- To reduce geometric data volume, intermediate polygon node points were removed with a tolerance of 0.5m. The resulting parcels were run through ArcMap's topological cleaning tools to ensure that a contiguous parcel fabric without gaps was generated.

DESCRIPTIVE STATISTICS AND SECOND ROUND ATTRIBUTE CLEANING

Once parcel geometry and based attribute replication were corrected, a second round of attribute cleaning was conducted. This consisted of running descriptive statistics for the critical columns used in further processing or modeling, and screening for anomalously low or high values. This was done on a column by column basis. In general, data values greater or less than three times the standard deviation in any attribute were further scrutinized. Coding in which "0" values showed up in cases where no data were apparently available were changed to "null" values in the database to avoid further errors. Values which were blank in many cases represented public lands, and these were separated using a newly generated attribute.

RASTERIZATION

A set of raster grids was created at 15 meter resolution, corresponding to the highest resolution statewide land cover data available. Grids were snapped to the land cover extent to ensure correct alignment at the grid cell level. In most cases in which multiple vector polygons occurred within a single grid cell, the "largest" or "highest density" or value was specified to be the raster cell value. An exception was made in the case of "water or wetland" features, and for "beaches and dunes" features. These were given priority in rasterization so as to maintain key habitat types which are legally undevelopable.

TASK GROUP 2:

HYDROLOGY AND SEA-LEVEL RISE SIMULATION

TASK DESCRIPTION

Part of the analytical components of the project is to create a series of Sea-Level Rise simulations for the project region under different IPCC inundation scenarios. In order to accomplish these spatially-explicit simulations, the research team has to acquire the most recent and reliable data to create a digital elevation model. The team decided to use the Light Detection and Ranging Data (LIDAR) created by an optical remote sensing technology that can measure the distance to, or other

properties of a target by illuminating the target with light, often using pulses from a laser. The data used was produced by Florida Department of Environmental Protection (FDEP). Once data was collected, it has to be process, supplemented by other data source and calibrated to create a hydrolytically corrected DEM. The three SLR simulations are: 0.52m, 078m, and 1.04m

This task group was coordinated by GeoAdaptive and developed by Florida Atlantic University – Center for Environmental Studies.

The following are the tasks that have been accomplished:

- The best vertical resolution digital elevation model (DEM) was located and acquired
- A prototype of the method for calibration was tested in Miami-Dade, and Broward County that considers the possible effects the groundwater can have on determining SLR inundation in low elevation areas (especially inland areas). This is important since a “bathtub inundation model” only considers the elevation of the ground above and not the inland groundwater. This missing factor in which the groundwater builds up due to friction while traveling toward the low lying hydraulic base (to the sea) is fundamental in some areas of the PFLCC since the buildup of water creates a scenario that is not captured in the bathtub model in that the soil storage capacity is reduced and in some cases permanent inundation will occur in regions prior to when it would be expected to occur under a bathtub model.
- Creation of a model that incorporates a groundwater surface elevation (hydraulic gradient) surface into the model. This was accomplished by determining if a current potentiometric model for peninsular Florida.
- Data points for determining the potentiometric surface was created by using the historical USGS well site records groundwater levels in the surrounding area. The records results had to be tabulated into a new database to allow functional transformation into a geographical information system (GIS).
- Based in the results of the database and large seasonal swings in the potentiometric surface three separate scenarios were determined to be considered to encompass the effects of different SLR intervals. The determined levels consisted of the fiftieth percentile monthly average values for June and October which showed to the low level and high level extremes respectively. The point of including three scenarios was deemed necessary due to the large regional fluctuations experienced at the different gage stations.
- The model results were corrected to the database values to convert hydraulic head values from NAVD 1928 to NAVD 1988. The conversion process relied on determining the

conversion factors created by NOAA of transformation values at the georeferenced well sites between datum's.

- Various interpolations methods were used to determine the surface that produced the best results. Some of the interpolation methods considered Inverse Distance Weighting (IDW), Ordinary Kriging, Co-kriging, and kernel density functions.
- The final inundation model was created in GIS by subtracting the potentiometric surface models from the digital elevation model as shown in Figure 1.

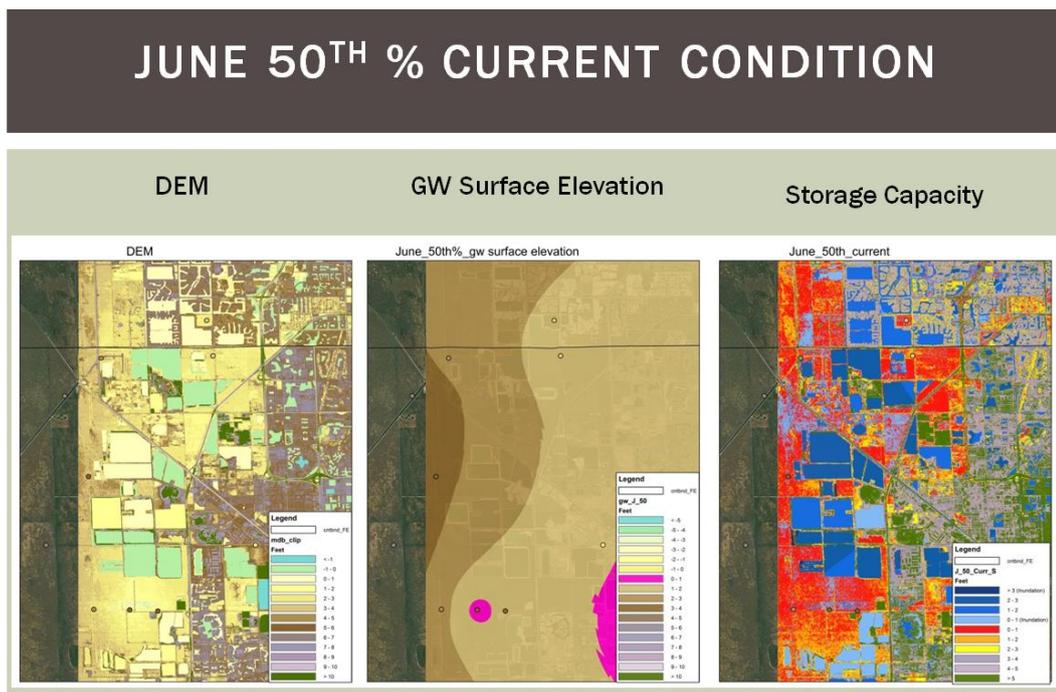


Figure 1: Example model process

- Different SLR scenarios were created by creating modified potentiometric surface grids that represented the different combinations of initial potentiometric surfaces with added incremental sea level rise values considered.

TASK GROUP 3 :

CONSULTATION PROCESS

A consultation process was undertaken in the months of April and May to validate the project approach to the particularities of the PFLCC study region conditions.

The following are the task accomplished:

- Travel to project region in company of Steve Traxler (US-FWS). Visit the northern section of the project region including locations in Tallahassee and Gainesville. The visit was instrumental in identifying additional project challenges but also additional partners and stakeholders (UF, Florida Forestry Association, and Florida Farm Bureau).
- GeoAdaptive participated at the PFLCC Steering Committee Meeting and provided with a project overview. In addition a consultation and definition of focal areas was conducted. The two areas identify were: The area north of Lake Okeechobee (Lake Wales) and the Area west of the Everglades agriculture area.
- Over 24 meetings with different organizations were conducted over a period of 3 days to the project region that help define overall treatment of the northern areas and of important conditions such as forestry or ranching.
- A fact sheet for the project was developed in order to increase the awareness of the project goals and methodological approaches.
- A literature review of Methods of Private, Voluntary Land Conservation was conducted as part of the resulting strategies derived from the field visit. The literature review help to identify empirical and specific approaches to increase conservation participation in areas where forestry and ranching are predominant. These included: Agricultural and Conservation Land Tax Incentive Programs, Conservation Easements, Payment for Ecosystem Services (PES), Targeting and Outreach
- Developed a Survey and Interview based on literature review and the possible sample population to study in the PFLCC (the survey will be conducted electronically in the summer of 2012 using the Florida Farm Bureau and the Florida Forestry Association email list).

MATERIALS ADDED TO THIS PROGRESS REPORT:

- Fact Sheet + Map of the Study Region
- List of Groups and Stakeholder Contacted and Visited during field work.
- Agenda for the PFLCC Steering Committee Presentation and Field Visit.

Peninsular Florida Landscape Conservation Cooperative ADDITIONAL STUDY REGION COUNTIES

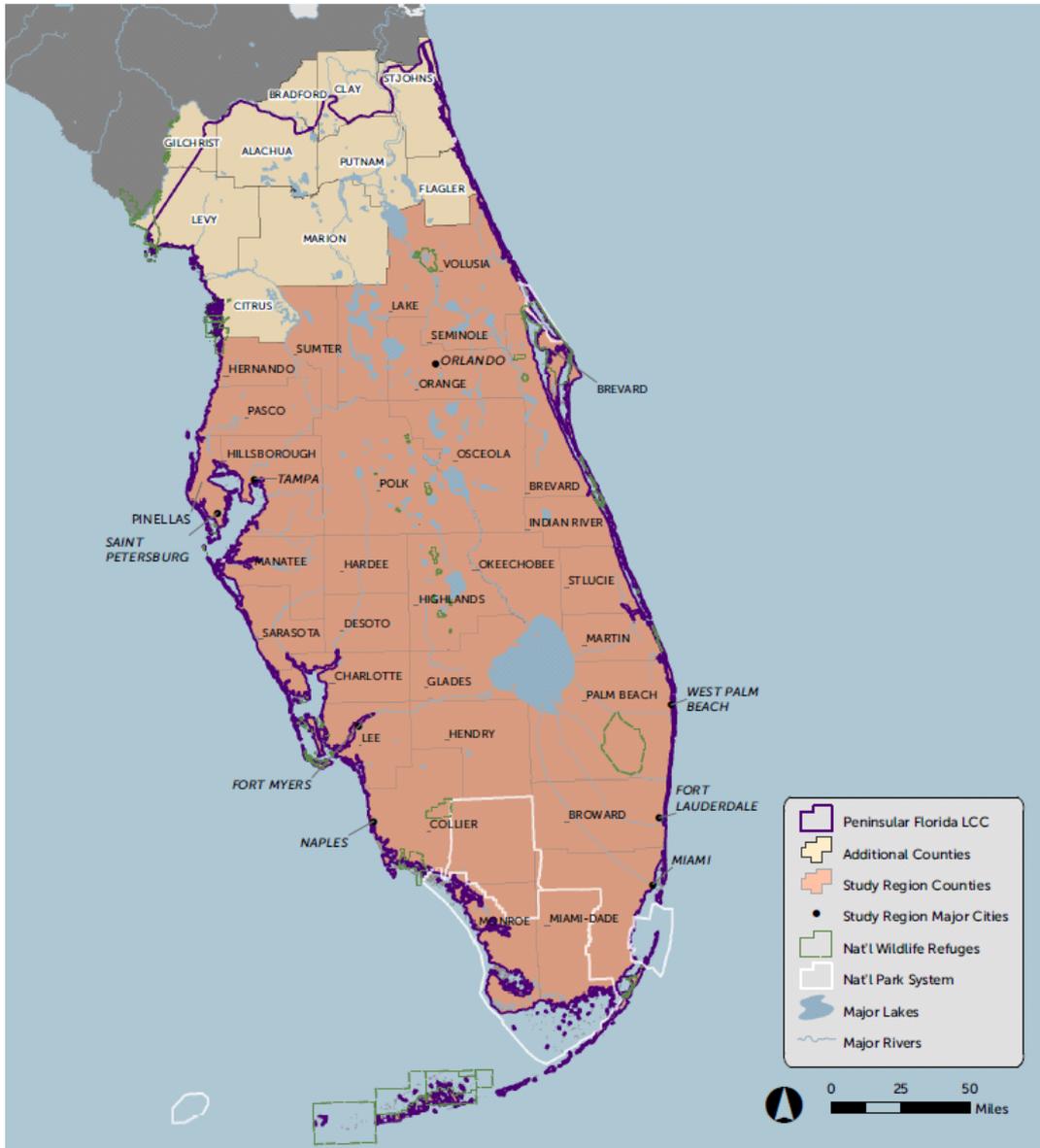


Figure 1: Expansion of geography of study from 30 to 40 counties (PFLCC)

SCHEDULE FIELD VISIT AND STEERING COMMITTEE MEETING | NORTH FLORIDA

Sunday	Monday April 2	Tuesday April 3	Wednesday April 4
		7:30am Doria Gordon	8:00am Phil Gornike
	9-11:30 Coordination (with Steve)	9:30am Meeting with Wendy and Lissette	10am Tom Logan
	11:30am Meeting with Craig Concilman	11am Revise presentation and strategy for LCC or Possible Meeting with Paul Zwick UF	11am Review finding and Summary with Steve
	Lunch	Lunch	Lunch
Fly to Gainesville	1:30 T. Hoctor and Oetting	1-2:00 pm LCC Steering committee	Depart to airports/vero
	2:15: Hoctor Interview	2:00 to 3:00 Available	
	3pm Jim Jones	3:00pm Staci Braswell	
	4pm Available	4:30pm Kat Diersome	
	6:00pm Carl Petrick	6:00 Leave to tallahasie.	
	8:00pm Ernie Cox		
Hotel: Hilton University of Florida Conference Center Gainesville	Hotel: Hilton University of Florida Conference Center Gainesville	Hotel: Residence Inn by Marriott	

Contact List



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Landowner Committee
TMDL Water Quality Program
BMP Issues
Water Management Districts
Tree Farm
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