

31st Annual Louisiana Remote Sensing and GIS Workshop
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Pennington Biomedical Research Center
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Abstracts

Oral Presentations

Session 1: Geologic Mapping

Research and GIS Development of the "Base of Holocene" for the, Louisiana Coastal Plain and Adjacent Continental Shelf

Robert Paulsell, Paul Heinrich, John Snead, Riley Milner, and Hampton Peele
Louisiana Geological Survey

As part of a two-year project for the Coastal Protection and Restoration Authority (CPRA), the Louisiana Geological Survey (LGS) undertook compilation and development of a three-dimensional GIS dataset of a regional unconformity at the "Base of the Holocene" of the Louisiana coastal plain including the adjacent continental shelf. This fulfills the need of a single comprehensive map of the Holocene-Pleistocene surface of Louisiana coastal plain. Historically the available data consists of maps created by various authors at different times in different study areas, and using different criteria, resulting in gaps of coverage and conflicting interpretations. The objectives of this project were to compile the Holocene geology of the study area and prepare the map of base of the Holocene-Pleistocene Surface on an intermediate-scale in GIS environment. This will provide a geologic framework on GIS platform needed to make geologic assessments in a format that can be used with engineering, environmental, socio-political, and other data appropriate for coastal planning and restoration. This research will provide a surface model showing the depth of the buried Holocene-Pleistocene contact. This study consisted of (1) developing inventory and subsequent compilation of existing published and unpublished boring data (2) analyses of collected data (3) development of the GIS dataset of the Holocene-Pleistocene surface within the study area (4) assessment of the accuracy of the source data, and (5) preparation of deliverable as a 3-D surface GIS dataset and also as cartographically developed and georeferenced PDF and TIFF files.

Aquifers, Faults, Subsidence, and Lightning Databases

Kathleen S. Haggar, Les R. Denham, H. Roice Nelson, Jr.
Dynamic Measurement LLC

In discussing characteristics of aquifers, faulting, subsidence, and lightning databases, we recognized similar measurement and monitoring issues and solutions. Lightning data occurs everywhere, covering the spatial extent of aquifers. In this paper, we highlight lightning attribute maps at regional and prospect scales, and relate these maps to aquifer and subsidence maps. Lightning strikes cluster, these clusters are somewhat consistent over time, and the resulting lineaments tie to fault lines. Lightning strikes are impacted by earth tides, and the impact of tides on marshes and swamps increases with increasing subsidence. Lightning databases open new ways to measure and monitor natural resources, including aquifers, faults, and subsidence. Lightning data are evergreen, in that new lightning strike measurements are added to lightning databases every time there is a thunderstorm. Lightning strikes are primarily controlled by earth currents. Earth currents are modified by aquifers (resistive, if fresh water, and more conductive with increased salinity), faults (disrupting lateral flow of electrons along conductive layers), and subsidence (changes in compaction change conductivity).

Mapping of Late Quaternary Paleovalleys on the Outer Continental Shelf Offshore Louisiana

Paul V. Heinrich¹, Richard P. McCulloh¹, Michael Miner², Robert Paulsell¹ and Riley Milner¹

¹Louisiana Geological Survey

²Marine Minerals Program, Bureau of Ocean Energy Management, Gulf of Mexico Region

Pleistocene continental glaciation repeatedly lowered global sea-levels by ~120 m below present. Alternating

lowstands and highstands resulted in the deposition of shelf-phase deltas and valley incision on the exposed southwest Louisiana shelf. Stratigraphic units and their bounding surfaces associated with these deltas and within paleovalleys represent depositional environments and potentially, preserved paleolandscapes that survived postglacial sea-level rise. Sediments filling paleovalleys are potential sand sources for coastal restoration. This project entails review of 350 legacy paleovalley interpretations from cultural resource and hazard-survey maps prepared since 1975, and digital synthesis of 122 of these. A Geographic Information System (GIS) was developed for data integration, analysis and management. This required digitization of raster maps originally provided in Portable Document Format. Lack of consistency in classification schemes and nomenclature inhibited comparison between maps so a major component has involved reinterpreting and proposing a common standard. Preservation potential of landscapes favorable for hosting shelf archaeological sites is determined by incision depth of prospective-aged drainage courses sufficiently deep for terraces in paleovalleys to have escaped subsequent destruction during ravinement. Interpretation of geophysical records traversing the southwestern Louisiana OCS study area show preserved channel fills beneath the uppermost transgressive unit. Interpretations were based on seismic facies indicating (a) valley wall settings, (b) lenticular channeloid features, (c) mounds and adjacent sags, and (d) rollover structures adjacent to faults. The seismic-record intercepts were then synthesized into polygons in a paleolandscapes map. Results show that fluvial systems cluster densely in association with the paleovalleys of the Sabine and Calcasieu river systems.

Louisiana Geological Survey 30 × 60 Minute Surface Geologic Map Coverage of Louisiana

R. Hampton Peele, Richard P. McCulloh, Paul V. Heinrich, John Snead, Robert L. Paulsell, Lisa Pond
Louisiana Geological Survey

Geologic maps produced by the Louisiana Geological Survey (LGS) in the past two decades mostly were prepared with support from the STATEMAP component of the National Cooperative Geologic Mapping Program, begun in 1993 and administered by the U.S. Geological Survey (USGS). The program has made possible the completion of statewide coverage of 30 × 60 minute geologic quadrangles at 1:100,000 scale totaling 30 sheets with a mix of published lithographs (22) and draft open-file maps (eight), as 25 of these compilations originally were prepared under STATEMAP cooperative agreements with the USGS. These cooperative agreements have led to discoveries and furthered investigations of previously unknown features of particular geologic interest, including the state's only known impact crater and numerous surface traces of reactivated growth faults in south Louisiana. Following STATEMAP guidelines, LGS has developed these geologic mapping data in GIS format. Beginning in the late 1990s, LGS undertook the construction of GIS data of the surface geology of Louisiana, using light tables, mylar and colored plastic lead mechanical pencils to draw the geologic contacts and faults. The mylar sheets were then scanned and digitized using Intergraph MGE software. Years later, ESRI ArcGIS was selected as the software of choice for digitizing the mylar sheets. Subsequently, the geologists began using ArcGIS to digitize the geology in a "heads-up" GIS environment. The GIS mapping was the initial stage of data development producing open-file geologic map publications, available as plots on demand. Final reviews and edits are made when 30 x 60 minute quadrangles are selected to go through cartographic design and publication as color lithographs. The geologic lithographs are then uploaded to the LGS website for download, in PDF format. In the final stage, GIS data are edited according to the final reviews; and FGDC-compliant metadata files are populated in final preparation for GIS data release.

Session 2: Emergency Response

Quest for the Holy Grail: Current Water Management and Protection Systems Data for Coastal Louisiana

Maurice Wolcott, Louisiana State University Agricultural Center

Coastal Louisiana has a dynamic geography – both natural and artificial. The tropical events impacting coastal Louisiana in 2005 and subsequent years has brought a renewed awareness of the vulnerabilities of this region to the impacts of storm surge and sea-level rise. This awareness has prompted local governments to increase efforts to improve flood protection infrastructure. Existing structures, such as levees and floodwalls, have been raised to higher elevations to restore levels of protection that have been degraded by years of subsidence, compaction, and consolidation. And new structures have been, and are continuing to be, put in place to increase the level of protection to additional vulnerable areas. The issue is whether the necessary data for these improvements is being incorporated into the models used by planners and emergency personnel, such as sea-level rise modeling and storm surge modeling. Computational models to predict storm surge impacts, such as the ADCIRC (Advanced

Circulation) model, have seen many improvements in recent years, and the need for accurate modeling is ever increasing. Post storm surge field verification efforts by personnel with the LA Sea Grant Program and the LSU Agricultural Center have demonstrated the existence of deficiencies in the current ADCIRC operational grid. The recent trend in improving local flood protection infrastructure has, in many locations, added to these deficiencies. This presentation will focus on efforts over the past 3 years to create a comprehensive database of levees and drainage pump stations in coastal Louisiana. This effort has been funded primarily by a grant through the Louisiana Department of Natural Resources Coastal Management Division from the NOAA Office of Ocean and Coastal Resources Management.

Regional GIS for Emergency Response

William Meyers, LEO, LLC

Southeast Louisiana Risk Assessment Map

Andrew Lade, University of North Carolina Wilmington

Sea level rise and increased storm frequency associated with climate change could cause dramatic changes in low-lying, coastal regions. Southeast Louisiana is a topographically low, deltaic plain situated on the northern Gulf of Mexico. Low elevations, high populations, and geographic location on a common storm path make this region highly vulnerable to inundation by sea level rise and storm surges. In order to effectively prepare for flooding events, the risk of the region ought to be determined. By combining economic, social, and environmental factors, risk can be quantified. The aim of the project is to create a coastal vulnerability index (CVI), which combines environmental and human factors, in order to create an accurate southeast Louisiana risk assessment map (SEL-RAM). Elevation, subsidence, land use-land cover, and population data were combined to create a vulnerability index, with topographically low areas, highly compactable soils, highly urbanized areas, and highly populated areas having the highest risk levels. SEL-RAM shows the New Orleans area at the highest risk due to extremely low elevation, intense urbanization, and high population density. Overall, SEL-RAM combines four integral attributes of coastal vulnerability and provides insight into the overall risk of the region. SEL-RAM aims to effectively communicate environmental risks to the public and to encourage economically viable actions to sustain coastal communities in southeast Louisiana.

The First Ever “Louisiana Geographic Response Plans”

David Gisclair, Louisiana Oil Spill Coordinator’s Office (LOSCO)

This presentation will discuss the political and technical issues associated with the creation and implementation of the first ever Louisiana Geographic Response Plans (LA GRPs). The presentation will cover two major development aspects of LA GRPs. The first aspect deals with the political issues associated with GRP development and how these issues were addressed. The second aspect deals with technical issues which were further divided into Phase I and Phase II. Phase I addresses the development of Sensitive Site Identification (SSI) parameters and methodology for capturing highly sensitive environmental sites including the methodology for setting a site priority level. Phase II addresses Tactical Protection Strategy (TPS) issues including the development of a Job-Aid to determine an appropriate booming protection strategy and the geodatabase model used to capture site specific information required in assigning a protection strategy.

Session 3: Coastal Mapping

Methodology Used to Summarize Channel Dimensions in Mardi Gras Pass, a Recently Formed Distributary of the Mississippi River

Felix Cretini, Lake Pontchartrain Basin Foundation

Mardi Gras Pass breached to the Mississippi River in March of 2012 near Point a La Hache, LA becoming a continuously flowing channel. This provided an opportunity to document the geomorphological changes in channel depth and width. The Lake Pontchartrain Basin Foundation is conducting an ongoing monitoring program to understand the geomorphic processes at work on a newly formed distributary of the Mississippi River. A survey grade GPS in combination with an echo sounder is used to measure channel dimensions. This presentation will summarize the results of the bank and bathymetric surveys completed from May 2012 to February 2015.

Using Landsat Imagery to Monitor the Colored Dissolved Organic Matter Absorption Coefficient in Barataria Bay

Ishan Joshi, Eurico D'Sa

Department of Oceanography and Coastal Sciences, School of the Coast and Environment, Louisiana State University

Coastal bays are important transition zones between marine and terrigenous environments with elevated amounts of sediments, dissolved organic matter, nutrients and primary productivity, making them optically complex and challenging for the ocean color remote sensing applications. In this study we investigate the possible use of Landsat imagery to monitor colored dissolved organic matter in Barataria Bay despite its limited spectral and temporal resolution for ocean color analysis. An empirical band ratio (B2/B4) algorithm developed using the Landsat-5 TM showed good association with aCDOM-355 ($r=0.85$) in Barataria Bay. The performance of the algorithm showed promising results ($R^2=0.63$, $RMSE=1.46$), however, discrepancy in the match-up comparison occurred likely due to the time differences between in-situ and satellite observations, limited number of Landsat images, and light attenuation by particulate matter in highly turbid water. A tree based statistical analysis of aCDOM-355 showed that the different parts of the bay are influenced by various factors such as wind speed, wind direction, the Mississippi river discharge, and the discharge at Davis Pond Flood Diversion. Although, some uncertainty exist in the empirical relationship, the CDOM maps successfully captured major details of CDOM distribution and seasonal influence in Barataria Bay.

Spatial and Temporal Trends in Storm Surge Dynamics in Lakes Pontchartrain and Maurepas

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Most storm surge risk communication and coastal protection strategies rest on a static depiction of a storm surge's maximum inundation depth. Examples include forecast storm surge inundation maps, which guide evacuation decision making, and 1% annual levee heights, which impact coastal planning. However, storm surges in Lakes Pontchartrain and Maurepas are highly dynamic. Various physical processes are active when the storm surge interacts with the landscape, resulting in distinct spatial and temporal trends that impact surge risk and risk management strategies. These patterns have been explored in both empirical and modelling based studies. Temporal patterns include a lag in the timing of peak surge at different locations due to "sloshing" (or "tilting") as winds change direction, seiches, and extended surge hydrographs due to impeded drainage through tidal passes. Spatial patterns include focusing mechanisms that cause the highest surges in the northeast and southwest corners of Lake Pontchartrain, fetch and depth influences on wave action, and the Maurepas Landbridge's influence on fetch. Understanding these patterns is important for emergency planning/response activities, coastal protection/restoration strategies, and ultimately reducing storm surge impacts.

Session 4: Geospatial Applications & Technology

The 3D Elevation Program

Chris Cretini, U.S. Geological Survey

The U.S. Geological Survey National Geospatial Program is developing the 3D Elevation Program (3DEP) to respond to growing needs for high-quality topographic data. The primary goal of 3DEP is to collect 3D elevation data in the form of light detection and ranging (lidar) data over the Nation over an 8-year period. The 3DEP initiative is based on the results of the National Enhanced Elevation Assessment that documented more than 600 business uses. Fully funded and implemented, 3DEP would provide more than \$690 million annually in new benefits. This would result in a nearly 5:1 return on investment, save lives, and improve our environment through informed decisions. Key components of 3DEP are a cooperative funding model, options for data quality upgrades to meet State and local needs, and partnerships designed to bring Federal agencies, academia, corporate entities, states, tribes, and communities together to develop advanced 3-dimensional mapping data of the United States.

A Geographic Information Systems Based Location Information Correction Framework for Crash Data

Omer M. Soysal, Highway Safety Research Group, Louisiana State University

The Highway Safety Research Group (HSRG) at Louisiana State University collects and report crash data for the state of Louisiana. In addition, as part of the improving data quality initiative, the HSRG supports analysis efforts with more accurate data. An integral part of this initiative is collecting and reporting accurate location information that matches Department of Transportation and Development (DOTD) base-map including GPS-coordinates (latitude and longitude), road names, reference roads, being at an intersection or not, distance to the reference point, parish, and city. The main challenges are due to inaccurate coordinates and variety of discrepancies between the officer's entry and the DOTD base-map. The aim of this presentation is to introduce our Geographic Information System (GIS) based framework for correction of location related information of crash data. The framework is composed of two main processes, namely, 1) automated validation and correction and 2) manual map-spotting. The automated process is consisted of several modules: 1) creating road-intersection network, 2) pre-processing of crash data, 3) validation, 4) and correction. The manual map-spotting involves correction of GPS location by human intervention. The framework is implemented on a desktop and web-GIS environment using C#.NET and Python with ESRI ArcGIS libraries.

Edward Wisner Donation: Using GIS for Land Management

Mark Mitchell, Pond & Company

The Edward Wisner Donation, responsible for the management of land interests in Jefferson, Lafourche, and St. John the Baptist Parishes, required an updated, digital dataset to accurately represent parcel locations and ownership. To address this need, Pond & Company created an updated GIS dataset for all lands managed by the Donation through an evaluation of historical records and field assessments. An online mapping environment was developed to interactively display managed lands, and delineate lease areas, pipelines, and coastal restoration projects. The resulting Land Management Application serves as a tool for the organization to view, maintain, and edit data; and provides the ability to share information with regional research institutes and academic groups to enhance discussions and collaborative efforts in ongoing environmental planning initiatives. This presentation provides an overview of the data creation and web-based application development, a review of the final product, and highlights the role of GIS technology within the Edward Wisner Donation.

Live Demo of the The Nature Conservancy's Louisiana Freshwater Assessment

David Harlan, The Nature Conservancy

Louisiana is a water state. With over 125,000 miles of rivers, bayous, and streams and abundant annual rainfall (48 – 70 in yr-1), water has been and will continue to be important and inextricably linked to our fish and wildlife resources, economy, and culture. The future sustainability of Louisiana's natural resources, its drinking water, and economic development, will be only be realized by guaranteeing a high quality and sustainable freshwater supply. To aid in the conservation of freshwater resources, the Louisiana chapter of The Nature Conservancy has developed the Louisiana Freshwater Assessment, a scientifically sound evaluation of watershed health, including landscape integrity (i.e., land use and cover, dams, channelization), water quality, river and stream flow, and biological health (i.e., trends in species diversity indicators,) for all 57 watersheds in the state. The Freshwater Assessment is a publically facing web platform that is free for researchers, policy makers and the public at large. We are currently working to replicate the assessment in other geographies to build a freshwater network (freshwaternetwork.org). This presentation will demonstrate what data we have on the Assessment now and where we would like to go in the future.

Session 5: Health and Environment

Health Applications in GIS: Exploring Maps to Guide Health Actions

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During a disaster response, the Louisiana Army National Guard (LANG) tracks the progress of numerous mobile assets. This includes the transportation of aid such as water and food, as well as the movement of response personnel and civil evacuation. LANG desired a means to identify, in real-time, the location of all of these assets in order to coordinate relief efforts. Commercial off-the-shelf products which would provide the geo-location services proved cost-prohibited. Military solutions prove incompatible with existing civilian and law enforcement applications and are not easily acquired for non-military assets. However, by using the freely-available open-source geospatial data server GeoServer and developing an Android-based mobile application, Geocent quickly provided a cost-effective solution for real-time asset tracking. The system combines a Geocent-developed Android Application (App) providing user input and location services with a visual representation on a common operational picture (COP) to improve situational awareness and decision making. The icons displayed on the COP include detailed information as to the vehicle type, departure and destination information, and a detailed cargo listing. The data is then served out by GeoServer in multiple formats for consumption by applications such as Google Earth or any ESRI-based system, allowing for coordination between multiple agencies involved in the relief effort. This information is then combined with road/bridge observations and distribution sites supply conditions to dynamically re-task assets on demand. A recent demonstration of the system was held, with very positive results, at the Louisiana National Guard Hazard Exercise on March 22-23 of this year.

Associations between childhood obesity and food environment in China

Peng Jia, Department of Geography and Anthropology, Louisiana State University

Childhood obesity used not to be considered a health problem in China until the end of 20th century. The local food environment has been partly attributed to shaping children's certain dietary behavior and impacting their food intake, ultimately leading to disparities in weight status. The China Health and Nutrition Survey (CHNS) data were used in this study, eight waves of which between 1991 and 2011 provide the prevalence of childhood overweight and obesity, defined by the Chinese Body Mass Index (BMI) cut-offs standard, and numbers of a wide array of food outlets within neighborhoods, as well as within five kilometers centered on neighborhoods in nine provinces of China. The obesity rates were compared over time and across gender, location of residence, and province. The variations in food environment over time and across province were examined and associated with the prevalence of overweight and obesity. The prevalence of childhood obesity in the urban and rural has escalated from 1991 to 2011 in both boys and girls of all nine provinces but urban regions of Guizhou. The northern provinces generally had a higher prevalence and average BMI than southern provinces. Nevertheless, the consistent changing trend was not found in food environment, and the temporal changes varied by type of food outlet. The changing trends in the obesity prevalence and food environment varied in each province of China, and did not parallel each other at the province level in the past two decades, which may be attributed to various effects of behavior, geographical, and policy factors and need more future efforts to answer.

Ethnography, Historical GIS, and the Narrative of the Shifting Nightlife Landscape of West Baton Rouge Parish, Louisiana

John W. McEwen, Independent Scholar

This project demonstrates how collecting historical ethnographic data may be paired with GIS to create an ethno-historical-GIS narrative of the nightlife landscape of West Baton Rouge Parish, Louisiana. Utilizing ethnographic methods, this research gathered historical data from the collective knowledge of residents of West Baton Rouge Parish to understand the nightlife landscape of the parish as it shifted from the 1920s to the early Twenty-First Century. The result is a historical geographic database of the historic and contemporary locations within the parish of places of drink that did not rely solely on official government records. Using GIS, the locations of the over 30 bars, lounges, and daiquiri shops are mapped to visualize how West Baton Rouge Parish nightlife shifted from the area known as the Gold Coast in the mid-Twentieth Century to the southern portion of the parish in the early Twenty-First Century.

Session 6: Public Safety

Cleaning up your GIS Data for NextGen911

Sandi Stroud, Michael Baker Jr., Inc.

The Next Generation 9-1-1 propels locally maintained and authoritative GIS data into a mission critical role like no

other business driver has supported before. It's critical for all GIS stakeholders (local, regional and state level) to begin the education process around the levels of standardization, spatial precision, data quality and spatial extent that will be required to support the 911 call routing workflow. The aim of this session is to begin the discussion to this critical stakeholder group.

GIS for Day to Day and Large Scale emergencies in West Baton Rouge Parish

Anthony Summers, West Baton Rouge Parish Communication District

Achieving Location Accuracy in 9-1-1 GIS

John Adams, Orleans Parish Communication District

First responders need to arrive at the correct location in the shortest amount of time given any reasonable input into the 9-1-1 Computer Aided Dispatch (CAD) system. In New Orleans, the address landscape is constantly changing due to rebuilding after hurricane Katrina and there is additional longstanding confusion relating to some street names and suffix types. Being prepared for whatever the citizen may say, and how the call takers enter that information within the limits of the CAD software and GIS, is key to a successful and timely outcome. This presentation will explore the variety of means used in Orleans Parish to improve our 9-1-1 data including use of different types of imagery and demonstration of an address management tool.

Surveying the Louisiana 911 Community

Kathrine Cargo, Orleans Parish Communication District

Session 7: Mapping the Landscape

Mapping the Spatial Distribution of Bottomland Hardwoods in the Tensas River Basin, Louisiana: 1829 - 1855

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⁴U.S. Fish & Wildlife Service, Planning and Resource Management, Southeast Region

Public Land Survey data were recorded in the Tensas River Basin, Louisiana between 1829 and 1855. Surveyors' notes recorded during section line surveys provide detailed spatially-referenced information related to tree species distribution and dominance. Our goal was to map the distribution of the tree species and forest types that existed in the Tensas River Basin; a secondary goal was to understand the ecological factors that govern that distribution. Green ash (*Fraxinus pennsylvanica*) and sugarberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*) and oaks (*Quercus* spp.) were the most frequently occurring species throughout the study area. A cluster analysis was used to derive four major forest types. They include groups dominated by ridge oaks and gum (ROG), heavy gum and ash (HGA), mixed oak (a mix of ridge and low oaks) and gum (MOG), and ash, low oaks, hackberry (ALOH). Mapping the data provided by the surveyors allowed us to map the species and forest types at a scale of one mile intervals. To examine the influence ecological factors have on distributions and map the species and forest types at a finer scale, we performed multinomial logistic regression to produce probabilities of occurrence for each tree species and forest type for each section line as a function of elevation, geomorphology and soil composition. We used inverse distance weighting to map the predicted probabilities of each forest type and tree species represented in the Public Land Survey of the Tensas River Basin, LA.

Surface Salinity in Lake Pontchartrain Basin Foundation's Hydrocoast Maps

Aimee Preau, Lake Pontchartrain Basin Foundation

Lake Pontchartrain Basin Foundation (LPBF) produces a biweekly set of "Hydrocoast" maps that depict a summary of conditions in the basin based on data collected by LPBF and supplemented by federal, state, and local information. For each Hydrocoast, isohalines are created based on collected data, wind patterns, bathymetry, and staff knowledge of currents and other geologic processes in the Basin. In an effort to characterize change in salinity patterns occurring over time, LPBF is deriving interpolated salinity surfaces basin-wide, based on collected data and isohalines. These surfaces will be used in further analyses of the dynamic interactions between land, water, and

estuarine and marine life occurring in the region.

Spatial Analysis of the Arctic Delta Lakes

Molly McGraw, Southeastern Louisiana University

Arctic river deltas are complex environments that are the result of both surface and sub-surface processes. Lake that reflect the presence of permafrost include polygonal ponds and thermokarst lakes. Other types include abandoned river channels, perched ponds in dune areas, and orientated lakes that may be influenced by prevailing winds. Each of these lakes exhibit unique morphologic characteristics that can be described using simple mathematical algorithms. These algorithms combined with Geographical Informations Systems (GIS) can be used to identify and classify the different types of lakes. This ongoing project focuses on the lakes in the Colville River Delta located on the North Slope of Alaska. The first phase of the project used satellite imagery and DOQQs to quantify the lakes within the delta. The second phase is the development of algorithms to identify and classify the different types of lakes based on their morphology. This presentation will discuss the quantification process and the ongoing algorithm development and implementation.

Session 8: Local Government

GIS Needs Assessment for Small Urbans

Lynn Dupont, Clare Brown, Alison Maulhardt

Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany and Tangipahoa Parishes

There is a difference between GIS needs for large urbans and areas with population under 50,000. Over the decades St. Bernard Parish has used GIS and housed a parish GIS manager. Many events have occurred which resulted in the parish request to the RPC to help them revisit their GIS needs in light of 21st century solutions and the desire to share and integrate data across departments and through other supporting state and federal agencies housed and working within the parish. Lynn Dupont, Clare Brown and Alison Maulhardt of the RPC set out on this very short-noticed 8 week adventure. The findings may be helpful to other smaller populated areas with similar goals.

Data Sharing Best Practices

Warren Kron, City of Baton Rouge and Parish of East Baton Rouge

GIS has a relatively long history in the City of Baton Rouge and Parish of East Baton Rouge, Louisiana. Its roots stem from the City-Parish's first comprehensive plan in 1992, and its foundation was established with assistance through the US Army Corps of Engineers. Great strides and advancements were made during the 2000's, transforming what began as a modest project into an institutional part of City-Parish government. In recent years, the demand for high quality geospatial data has become much more prevalent, particularly with the rapid growth and development in the Baton Rouge area. While the City-Parish collects and maintains a tremendous amount of data, it has traditionally been challenging to convert the data into a format that is easily usable and accessible to the general public. However, thanks to a recently announced Open Government initiative by Mayor-President Holden led by the January 2015 launch of Open Data BR, many City-Parish datasets are now available in the public domain – and more are on the way. Adopting an open data policy is a great achievement, but realizing this goal required extensive collaboration, interagency coordination and compromises. These experiences prove how critical it is to foster effective working relationships with the full spectrum of stakeholders – from the general public, to the software development community, to internal users and City-Parish employees. Without these relationships in place, such collaboration could never take place and thus will cause projects and new system implementations to fall short of desired goals. From a public-facing perspective, sharing data and creating applications to engage users is an effective way of reaching large and diverse audiences. Furthermore, granting citizens open access to authoritative data not only makes City-Parish government more transparent, but it makes it possible for the public to be part of the decision making process relative to City-Parish operations, investments, and policies. This presentation will describe the challenges and success stories of the eBRGIS Program and Open Data BR, as well as where both programs are headed in the near future.

Crash Analysis for Regional Planning

Clare Brown, Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany and Tangipahoa Parishes

RPC has historically been a recipient and data geocoder and cleaner of state and local crash data in support of transportation analysis on the regional transportation network. The state has now begun to provide the crash report data in standardized geo-coded tables which allows RPC to work more directly with DOTD in slicing and dicing the data. Clare has provided an in-house application for staff to more easily query the data to answer common transportation questions.

Posters

10 Years of the Louisiana Coastwide Nutria Control Program

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The Coastwide Nutria Control Program (CNCNP) aims to significantly reduce damage to Louisiana's coastal wetlands resulting from nutria herbivory by removing 400,000 nutria annually. The nutria (*Myocastor coypus*), native to South America, is an introduced and invasive semi-aquatic rodent. Populations in coastal Louisiana began from escapes and possible releases from nutria farms in the 1930s. Nutria overpopulation and ongoing herbivory damage has impacted as much as 80,000 acres of Louisiana coastal wetlands annually. The CNCNP was implemented in order to manage the threat of nutria damage and help to stabilize the coastal ecosystem. Since the introduction of the CNCNP, the estimate of impacted acres has been reduced to under 10,000 acres annually. Incentive payments are offered to registered trappers/hunters for each legal nutria tail delivered to established collection centers across south Louisiana. Trappers/hunters are required to report harvest location for each transaction. These locations are tracked by individual hunting lease and reported weekly. The project is funded by the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) through the Natural Resources Conservation Service (NRCS) and the Louisiana Department of Natural Resources (LDNR) with the Louisiana Department of Wildlife and Fisheries (LDWF) as the lead implementing agency.

A Comprehensive Assessment of Deltaic Baldcypress-Water Tupelo Forested Wetland Condition in Louisiana's Coastal Zone

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¹School of Renewable Natural Resources, Louisiana State University Agricultural Center

²Coastal Studies Institute, Louisiana State University

Much of the effort to mitigate anthropogenic impacts to the Mississippi River deltaic plain has focused on marsh and nearshore systems, but forested wetlands also play a fundamental role in the ecological and hydro-geomorphic structure of coastal basins. Forested wetlands in the Pontchartrain, Barataria, and Terrebonne basins have experienced widespread degradation in response to flood and salinity stress caused by hydrologic modifications within the Louisiana Coastal Zone and to the Mississippi River system as a whole, but spatially explicit data on forest condition and the extent of degradation is incomplete. Thus, we developed a classification of coastal baldcypress-water tupelo forest condition for the coastal deltaic plain (outside of the Atchafalaya Basin). Forested wetlands were classified as undegraded, intermediate, or degraded using ordination of multitemporal reflectance (Landsat Thematic Mapper) based on statistically significant gradients in forest structure among classes. Overall, approximately 29, 50 and 21% of coastal cypress-tupelo forest in the Pontchartrain, Barataria and Terrebonne basins was classified as undegraded, intermediate, and degraded, respectively. In general, undegraded forest occurs near major ridges and toward the landward margins of the baldcypress-water tupelo zone, and degradation increases seaward.

Hot-Spot Analysis of Racial/Ethnic Diversity in Louisiana: 2000 to 2017

Mark Schafer, Huizhen Niu

Louisiana State University Agricultural Center

Louisiana's diversity exceeds the national average and hinges around black/white distinctions with the 2013 estimates of 63.5% white, 32.4% black, and all other races comprising less than 5% of the population. The Esri Diversity Index provides a way "understanding the shifting demographics of race and ethnicity in the United States". We have examined the Diversity Index at the block group level. The Diversity Index ranges from 0 to 100 and can be interpreted as the probability that any two people living in a census block group are from different racial or ethnic groups. Scores closer to 0 indicate low diversity while higher scores indicate high diversity. We use ArcGIS Hot Spot Analysis (Getis-Ord G_i^*) in order to examine Diversity Index clustering at the block-group level from 2000 to 2017 in Louisiana. Our poster will illustrate the changes using maps of the Diversity Index, as well as Hot Spot maps showing areas of hot (high diversity) and cold (low diversity) clustering. Moreover, we discriminate between low-diversity white and low-diversity black clusters. We discuss implications of Ethnic diversity clustering at the block-group level and suggest avenues for future research.

Road Home Recovery and Reinvestment in the Lower Ninth Ward/Holy Cross

Michelle M. Thompson, Derreck Blake

University of New Orleans Department of Planning & Urban Studies

The poster will provide an examination of Road Home property locations and potential investment opportunities in the Lower 9th Ward and Holy Cross in New Orleans, LA in 2015. The research has been conducted by Derreck Black Deason and Dr. Michelle M. Thompson representing WhoData.org and the University of New Orleans Department of Planning & Urban Studies.

Estimating Suspected Sediment Loading in the Bayou Des Cannes Watershed using ArcSWAT

Andy Venuto, John Sheehan

Louisiana Department of Environmental Quality - Nonpoint Source Pollution

As part of the Clean Water Act Section 319, the Louisiana Department of Environmental Quality (LDEQ) Nonpoint Source Pollution (NPS) Section sets priorities for the locations of Best Management Practices (BMP) within the state. As a part of the effort to target and prioritize areas for BMP implementation within a specific watershed, the ArcSWAT (ArcGIS Soil and Water Assessment Tool) model is utilized. Using an array of GIS inputs, as well as climate data and agricultural management practices, an estimate of suspected sediment loading can be generated.

Student Poster Competition

Analyzing the Spread of Black Willows through Terrestrial LiDAR Survey

Yirui Deng, Department of Geography & Anthropology, Louisiana State University

Black willow is one of the two main tree species in Louisiana that grow in frequently flooded area, which stabilize sediment and help prevent land loss. Terrestrial LiDAR provides high precision measurements and very precise data to enable scientists to build high-resolution three-dimensional models. In order to map the forest distribution and figure out how black willow spread, we use terrestrial LiDAR to scan and measure the trees. DEM, tree height, and tree DBH are measured in point cloud. By analyzing the data we figure out the relationships between tree parameters such as tree height and DBH, DBH and density, distance to levee and tree height. The success of this study means using terrestrial LiDAR to do forest study is feasible and have some primary result of how black willows spread.

A Pilot Study of Nationwide Spatio-temporal Distribution of Human Brucellosis in China

Peng Jia, Department of Geography & Anthropology, Louisiana State University

Brucellosis, an infectious disease that occurs from contact with animals carrying Brucella bacteria, such as cattle, goats, sheep, etc., remains a major source of diseases in both domesticated animals and humans, especially in the Asia, Mediterranean region, the Middle East, Sub-Saharan Africa, Latin America and the Balkan Peninsula. As a large agricultural nation, the history of human Brucellosis in China will be greatly helpful for the combat with Brucellosis and policy-making in many countries of the world. Previous studies indicated that human Brucellosis

was endemic in 25 of 32 provinces of mainland China. Prior to a nationwide spatio-temporal distribution of human Brucellosis in China, we conducted a pilot study in Inner Mongolia of China, which is considered an appropriate area for the study of human Brucellosis due to its provision of a suitable environment for animals most responsible for human Brucellosis outbreaks. The yearly aggregated numbers of human Brucellosis cases at the county level from 2006 to 2010 were collected. Geographic Information Systems (GIS), remote sensing (RS) and ecological niche modeling (ENM) were integrated to predict the probability of potential presence of human Brucellosis cases in Inner Mongolia and surrounding areas. Results indicate that areas of central and eastern Inner Mongolia provide a long-term suitable environment where human Brucellosis outbreaks have occurred and can be expected to persist. Other areas of northern Hebei, Shanxi and Shannxi of China and central Mongolia also contain similar environments. This study is the first to combine advanced spatial statistical analysis with environmental modeling techniques while examining human Brucellosis outbreaks, which will help inform decision-making in the field of public health, especially Inner Mongolia, and lead to a nationwide study in China.

Investigation of the Spatial Distribution of Water Stress in Bottomland Hardwoods Using 7 Years of MODIS Thermal Infrared Imagery

Mary Grace Lemon, Richard F. Keim, Brandon Edwards, Scott T. Allen
School of Renewable Natural Resources, Louisiana State University

In floodplains, surface water, soil water, and shallow groundwater form an interconnected system that varies temporally and spatially, controlling the availability of water to vegetation. Changes in floodplain hydrology associated with altered surface flooding regimes, groundwater decreases, and climate change can disrupt the architecture of these water connections, threatening the trajectory of current bottomland hardwood (BLH) forest communities. Although little information about the relative contribution of different sources of water (e.g. precipitation, surface flooding, and groundwater) to soil moisture is known, identification of areas of water stress within a floodplain can provide valuable information about floodplain hydrology that can lead to improvements in BLH forest management. Canopy temperature is a useful indicator of moisture stress and has long been used in agricultural and natural landscapes. Accordingly, thermal infrared (TIR) remote sensing data (spatial resolution of 1 km) from NASA's MODIS sensor was used to examine patterns of spatiotemporal variation in floodplain forests. Old Sabine Wildlife Management Area and White River National Wildlife Refuge were used as study sites. Intra annual spatial patterns of hot (water stressed) versus cold pixels were evaluated for a period of 7 years (2007-2014) to map spatial distributions of presumed water stress and analyze inter annual variation in the spatial distribution. This spatial analysis compared well with a thermal inertia analysis in which nighttime TIR data was compared to daytime TIR data over the same 7 year period as an independent measure of water availability. Magnitude of spatial variability in canopy temperature increased during periods of low precipitation and low water; we interpret this as the manifestation of developing water stress patterns across the floodplain. Results from this analysis will provide valuable guidance about where to focus management resources and ground based monitoring.

Analysis of Urban sprawl and its effect on Urban Environmental characteristics using spectral reflectance and Landsat Data

Gilbert Saah
Texas Southern University

Urban landscapes are a complex combination of buildings, roads, pavements, roofs, vegetation, soil, and water, each of which exhibits unique spectral reflectance and thermal properties. To understand the interactions and impact of these heterogeneous urban landscapes on their environmental surroundings, more precise urban mapping techniques are of essential importance. Several studies have demonstrated that spectral reflectance characteristics (in the range of 350-2500 nm) of the different urban landscapes are varied and distinctly different. However the application of this spectral information to map and accurately classify the urban features at local, regional and global scales has rarely been explored. The goal of this research project is to investigate the effects of urban landscape features on the local and regional environmental quality in Houston, Texas. The specific objectives of the study are, 1) to develop a spectral library of the urban landscape features, 2) Identify and analyze the spectral characteristics of the urban features, 3) Use of multi spectral and multi temporal Landsat imagery to accurately classify and map the urban features and 4) Identify and map the effects of urban sprawl on environmental quality.