POSTER SESSION: Tuesday, 3:30 to 5:30

MAPPING SHORELINES AND INTERTIDAL ZONES WITH MULTITEMPORAL LANDSAT IMAGES

Presented by Rob Abileah, jOmegak

The work presented here was spurred by a research program on the relationship between environmental changes and biodiversity. The program collected sediment cores at various points in the intertidal zone. The researchers required accurate intertidal maps for their field sampling strategy. The question was how to map the intertidal zone with high resolution and inexpensively. The novel solution developed for this purpose and presented in this paper uses multitemporal panchromatic LANDSAT images. Previous methods of shoreline mapping relied on thermal infrared contrast (60 m resolution) or the combinations of midwave- and near-IR bands (30 m). The panchromatic images have greater resolution (15 m) but are poor for water-land delineation. This disadvantage was overcome by using multiple LANDSAT revisits, in essence using temporal change in lieu of spectral information. Accurate atmospheric correction is critical for multitemporal detection of the water-land boundary. An algorithm was developed using both deep water and land features for calibration. The water cover was then determined by change in radiance with tide level. The method is illustrated on images of the Upper Gulf of California where the biodiversity research was done. The 15 m resolution was achieved with about 10 images spanning over a year. There are 6-15 images in the LANDSAT archives for most CONUS locations. The data is accessed by ftp downloads from a USGS web site. Image cost is no longer an issue since the USGS instituted the policy making all archived scenes free to the public by the end of 2008.

CREATING GEOTIFF PHOTO MOSAICS FROM SEAFLOOR VIDEO

Presented by Seth Ackerman, Massachusetts Coastal Zone Management

The Massachusetts Coastal Zone Management - U.S. Geological Survey (USGS) Seafloor Mapping Cooperative has collected geophysical and sampling data over 1350 sq km of seafloor in five survey areas within coastal Massachusetts since 2003. While most of the spatial data (bathymetry grids, backscatter imagery, survey tracklines, sediment sample and bottom photograph locations) are easily distributed in USGS Open-File Reports, there has not been, until now, an efficient method for distributing the vast amount of seafloor video collected by the USGS's SEABed Observation and Sampling System (SEABOSS). In a typical survey, 10-15 hours (>60GB) of video is recorded, but the large file sizes prevented these data from being included in publications. Creating GeoTIFF photo mosaics from the SEABOSS videos has emerged as the most promising method for managing and distributing the video imagery. The creation of photo mosaics from the seafloor videos has been streamlined using a series of video mosaicking programs developed at the University of New Hampshire's Center for Coastal and Ocean Mapping. The mosaicking software performs an automated frame-to-frame registration, which can be reviewed and manually revised in a standalone program. Coordinates parsed from the ship's Global Positioning System are used to georeference the final TIFF images. The mosaics can be viewed within a GIS enabling end-users to identify video segments of interest quickly and efficiently, eliminating the need to review hours of video. The full-resolution, raw videos are archived and can be requested from the USGS - Woods Hole Science Center Data Library.

SPATIAL MODELING AND VISUALIZATION FOR THE NORTH CAROLINA COASTAL HAZARDS DECISION PORTAL (NCCOHAZ)
Presented by Thomas Allen, East Carolina University

The vulnerability of North Carolina's coast prompts our research on mapping, modeling, and visualizing chronic coastal hazards. East Carolina University geographers and geologists have teamed up to develop the North Carolina Coastal Hazards Decision Portal (NCCOHAZ), a GIS-based framework for new approaches to the risks associated with long-term beach erosion, overwash, storm surge, and inlet- opening potential, initially for the Outer Banks, NC. The modeling incorporates a range of LiDAR-derived digital elevation models, time series shoreline and beach transects, and volumetric, rule-based GIS models of coastal processes. Through NCCOHAZ, these information products are disseminated using a variety of mapping technologies, including GoogleMaps mashups, GoogleEarth, and ArcGIS Server web mapping. The development of these models and their dissemination, supported by general hazard and emergency information, will hopefully guide the public, planners, and policymakers in wise decision- making. The Renci @ ECU Viswall also provides an innovative means of visualizing these coastal hazards, including 3D stereoscopic projection, 3D modeling of buildings and storm surges, and distributed visualization of risks using KML and GoogleEarth. The associated database and portal development support the academic development of ECU's GIScience and Technology degree program, as well as the research opportunities for graduate students. The GIS database and webmapping platform also provide a research tool for evaluating the effectiveness of alternative hazard representation, communication, and visualization.

GEOVISUALIZATION OF AUTONOMOUS UNDERWATER VEHICLE OPERATIONS USING GOOGLE EARTH
Presented by Jason Benda-Joubert, Naval Under Warfare Center

Organization, analysis, and visualization of data collected using Autonomous Underwater Vehicles (AUVs) is a challenge to the geospatial user community. A common set of visualization tools that can be used by non-GIS professionals to display geospatial data was a requirement of the AUVfest 2008 project. AUVfest 2008 took place in May 2008 in Narragansett Bay, Rhode Island. The goal of the project was to test 14 AUV technologies at six locations within the Bay in order to: 1) test the diverse developing capabilities of AUVs in a common, marine environment, 2) apply AUV technologies to marine archaeological features representing a variety of material types and conditions, and 3) integrate the technological and marine archaeological communities to gain operational experience in AUV technology and the interpretation of non-typical targets. To achieve the geovisualization goal, a combination of ESRI tools and Google Earth were selected for both organization and visualization of data. Utilizing the analysis tools in ArcGIS for geospatial data creation and the use of KML export tools in ArcGIS 3D Analyst, it was possible to develop a data package compatible with Google Earth for a user-friendly geovisualization experience that has proven to be effective for data collected during AUVfest 2008.

MARINE INVADER TRACKING INFORMATION SYSTEM (MITIS)

Presented by Gregory Booma, MIT Sea Grant College Program

MITIS The Marine Invader Tracking Information System (MITIS) is a web-based data integration and access service hosting information on marine invasive species in the northeast United States. It houses observation and ancillary data collected as part of two ongoing formal monitoring programs, as well as by volunteer groups and individuals. Data entry is done through a simple form-based interface. Members of formal survey teams may enter and edit survey sites, surveyor information, and data observations. Invasive sightings entered by individuals are automatically reported to experts via email. Data are viewable on the Web in tablular form (html) and via a Web Mapping Service (WMS.) Improvements to the MITIS service are underway. While data entry will remain relatively unchanged, more robust data access and visualization functions are are in pre-production stages.

PERFORMING INITIAL DAMAGE ASSESSMENT - USING CUSTOM MOBILE MAPS WITH DAMAGE ASSESSMENT FORMS WITH ESRI ARCPAD 7.1
Presented by Christopher Caird, Town of Hilton Head Island

Abstract Summary: In 2007, GIS was asked to design a "mobile map" to function on Panasonic Tough Books that would allow Inspectors and Building Staff to perform an initial damage assessment in the field and then automatically populate required South Carolina Damage Assessment forms. The intent was to improve the flexibility and automate some of the functions present in Residential Substantial Damage Estimator (RSDE)(FEMA forms)while incorporating the data collection of the necessary County and Town of Hilton Head forms. Brief Materials and Methods: GIS created two forms: 1. Rapid Damage Assessment 2. Detailed Damage Assessment GIS used in house data and software to create mobile maps that contain the basic elements of the South Carolina Emergency Management Division (SCEMD) forms and the specific criteria in RSDE forms. Software: ESRI-ArcPad, ESRI-Application Builder, Visual Basic Summary of Project Goals: 1. Quickly determine where and to what extent damage has occurred to structures on HHI. (Rapid Assessment) 2. Quickly allow managers and decision makers to determine best course of action based upon GIS data from these applications Query, Analyses, leverage in Permits Plus, etc 3. Populate required forms to submit to the County and ultimately the State 4. The tool to obtain further detailed information regarding where and to what specific extent each damaged structure has sustained. (Detailed Assessment)

DECISION SUPPORT FOR WATER RESOURCE MANAGEMENT
Presented by John Cartwright, Mississippi State University

The Northern Gulf Institute (NGI), a National Oceanic & Atmospheric Administration (NOAA) Cooperative Institute operates an integrated research and transition program focused on filling priority gaps and reducing limitations in current Northern Gulf of Mexico awareness, understanding and decision support. Partnering with five academic institutions and NOAA, the institute is a collaboration led by Mississippi State University (MSU) that includes the University of Southern Mississippi (USM), Louisiana State University (LSU), Florida State University (FSU) and the Dauphin Island Sea Lab (DISL). One objective of the MSU NGI research projects is the development of a framework for a decision support system (DST) for water resource managers. The DST will provide a

single interface to the disparate sources of available water resource data and models, including both measured and model data. It will also integrate an inference component with 2D Geographic Information System (GIS) for enhanced data analysis capability. Rather than develop a draft framework and retroactively have users test it, we are following a rigorous usability process model. This process entails engaging potential users from the first steps in defining requirements through design, development and then testing. Following this model, we have begun engaging stakeholders in requirements gathering workshops and related activities. From these activities, initial interface designs and prototypes are being developed. We will engage users in reviewing these prototype designs and expect to iteratively refine the prototypes into a fully functional system.

CHARACTERIZATION OF LAND COVER IN THE WATERSHEDS OF THE NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM

Presented by Christopher Clement, NOAA/NOS/ERD – NRAP

The goal of this study is to provide a characterization and analysis of land cover in the NERRS watersheds to support the needs of the NERRS management, research, stewardship, education, and coastal training program sectors. The primary source of data for this study is provided through the NOAA Coastal Services Center (CSC) coastal change analysis program (C-CAP). The C-CAP program has provided processed satellite land cover data for each reserve watershed (except Jobos Bay and Kachemak). The data were obtained and then further processed and analyzed to quantify and characterize existing land covers and land cover change in the reserve watersheds. The land cover characterization provides a foundational data set that the various NERRS sectors can draw upon for planning and management purposes. The results of this analysis will be presented and illustrated in this poster and will include analyses at the national level, regional comparisons, and examples of reserve level characterizations. The analyses presented will include current land cover characterizations and land cover change analyses. Comparisons will also be drawn between large and small scale watershed analyses.

DETERMINING THE DIRECT UPLAND HYDROLOGICAL CONTRIBUTION AREA OF ESTUARINE WETLANDS USING ARCGIS TOOLS

Presented by Patrick Clinton, U.S. Environmental Protection Agency, ORD, NHEERL, Western Ecology Division, Pacific Coastal Ecology Branch

Patrick Clinton1 and Christine Weilhoefer2 1U.S. Environmental Protection Agency, Pacific Coastal Ecology Branch, Newport, OR; 2 North Central College, Department of Biology, Naperville, IL The delineation of a polygon layer representing the direct upland runoff contribution to esturine wetland polygons can be a useful tool in estuarine wetland assessment. However, the traditional methods of watershed delineation using pour points and digital elevation models (DEMs) break down when the pour point is actually a polygon and is often situated at or near zero elevation. Results usually include the entire watershed of the estuary, wildly improbable portions of the entire watershed, or simply the wetland polygon itself. To solve this problem the upland contribution layer was created using available ArcGIS Spatial Analyst and ArcHydro tools. The solution lies in the conversion of zero DEM values to NODATA and the use of the "Batch -Delineate Watersheds for Polygons" ArcHydro tool. The layer created was intersected with several raster and vector layers to obtain spatial information about landscape context and

anthropogenic parameters that may directly affect the estuarine wetlands. These include the 2001 Multi-Resolution Land Characteristics (MRLC) land cover and impervious surface layers, the Parameter-elevation Regressions on Independent Slopes Model (PRISM) gridded precipitation of annual precipitation for the climatological period 1971-2000 layer, the 2000 U.S. Census block population layer, a degrees slope layer generated from the 10m DEM, 1:24000 roads DLG layer, 1:24000 water courses DLG layer, and the National Pollutant Discharge Elimination System (NPDES) discharge point layer. The entire process is represented as an ArcGIS Geoprocessing Model.

PIECING TOGETHER A DIGITAL AREA CONTINGENCY PLAN
Presented by Ryan Druyor, Fish and Wildlife Research Institute (FWC)

Since the inception of the area contingency planning process mandated by the federal government in the Oil Pollution Act of 1990, the Coast Guard and other federal and state agencies have written area contingency plans (ACPs) to prepare for oil and hazardous material spills in the coastal regions of the United States. ACPs are living documents prepared by the Coast Guard's planning division in cooperation with the Area Committee. Under grant funding from the Coast Guard, the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWC-FWRI) utilizes the plan and adds to it geospatial and cartographic elements to create a digital area contingency plan. The digital area contingency plan is a CD/DVD with an HTML front end that provides access to documents, maps, data, hazmat computer applications, and GIS tools. Each Sector of the Coast Guard has their own area contingency plan that outlines all resources within the area of responsibility (AOR). Geographic Response Plan maps are created for the entire coastal region of the Sector AOR outlining the oil spill sensitive areas and socio/economic resources that could be compromised by hazardous material spills. This lecture will detail each piece of the digital area contingency plan and outline GIS's role in the planning process of gathering and/or creating the geospatial elements and preparing them for presentation and easy end-user access.

DEVELOPING A MODEL TO ASSESS THREATS TO RAINBOW SMELT (*OSMERUS MORDAX*) SPAWNING HABITAT IN THE GULF OF MAINE
Presented by Claire Enterline, Maine Department of Marine Resources

Maine Department of Marine Resources is working with New Hampshire Department of Fish & Game and Massachusetts Division of Marine Fisheries to gain a better understanding of the declining rainbow smelt population in the Gulf of Maine, as part of a National Marine Fisheries Species of Concern Grant. Rainbow smelt (*Osmerus mordax*) populations on the Atlantic Coast of the United States have been declining in range over the last century. Historically, rainbow smelt populations were found from Chesapeake Bay to Labrador, but are now only found east of Long Island Sound. Rainbow smelt (*Osmerus mordax*) are anadromous fish that live in near-shore coastal waters, and spawn in the spring in coastal rivers immediately above the head of tide in freshwater. A Geographic Information System (GIS) is being used to delineate the drainage area above known spawning locations, and to gather information about the land use, amount of impervious surface, flow diversions, discharge, obstructions, soil buffering capacity, population density, and other parameters within the drainage area. Within each of these parameters, we are attempting to determine an allowable range, past which spawning habitat is threatened. A ranking system will then applied to the range, and the drainage

areas assigned within the ranking system, based on their watershed characteristics. GIS will then used to model possible changes, e.g. in land use, that may result in the spawning grounds becoming compromised, changing the rank of the watershed. The model may be extended to watersheds in which the success of spawning populations is unknown.

USING GIS TO ANALYZE SLOPE STABILITY IN PONTE VEDRA BEACH, FLORIDA
Presented by Bryan Flynn, PBS&J

During 2007 and the early part of 2008, St. John's County beaches has experienced severe erosion due to high winds and large waves. PBS&J's Coastal & Waterways Group was tasked by the Florida Department of Environmental Protection (FDEP) Bureau of Beaches and Coastal Systems (BBCS) to perform a beach slope stability study. As part of this study, a set of criteria needed to be established to discern whether properties were critically eroded and therefore qualify for shoreline stabilization in the form of dune nourishment or armoring. Williams Earth Sciences, a geotechnical engineering firm, was hired by PBS&J to establish these criteria. This analysis was performed with sophisticated geotechnical software and presented in narrative format, which can be hard to understand. This poster serves to depict the results of Williams Earth Sciences analysis in graphical format for easier explanation to County Board members and residents. Objectives ▪ Import beach profile survey data ▪ Create a Digital Terrain Model (DTM) from the data ▪ QA/QC data for accuracy through sampling DTM along R-monuments along profile lines. ▪ Analyze surface for various slopes, visually display using color banding ▪ Identify slopes that are unstable based on criteria by Williams Earth Sciences ▪ Display properties that are critically eroded.

INTERNET-BASED, GEOSPATIAL PLANNING TOOLS FOR WATERSHED-SCALE STORMWATER MANAGEMENT
Presented by Scott Haag, Rutgers University Institute of Marine and Coastal Sciences

Increasing development of coastal watersheds and barrier islands has altered groundwater and surface runoff patterns, and led to the progressive eutrophication of freshwater tributaries and adjacent coastal waters. Effective and properly engineered stormwater management systems represent one of the most important water resource protection strategies. Scientists and educators from Rutgers University and the Jacques Cousteau National Estuarine Research Reserve (NERR) are filling that gap by building and piloting the StormWater Management Information System (SWMIS), a suite of internet-based geospatial tools coupled to a database management system. When completed, SWIMS will provide a watershed-wide, geospatial inventory of existing stormwater management infrastructure such as catch-basins, detention ponds, and infiltration areas, as well as models to evaluate the impact of proposed development and mitigation projects on water resources. SWMIS will be geared to meet the needs of municipalities and counties in sitting new development and planning storm- water management infrastructure. In addition, natural resource protection and land use planning professionals will be able to use SWIMS to determine when existing stormwater infrastructure needs restoration due to changes brought about by the expansion of impervious surfaces like roads, parking lots, and buildings.

SPATIAL ANALYSIS OF 25 YEARS OF SEA TURTLE STRANDING RECORDS
Presented by Robert Hardy, Florida Fish and Wildlife Conservation Commission

Marine animal mortality datasets can provide researchers with information about trends regarding potential threats to the survival of a species. When spatially-referenced, these data also afford researchers the opportunity to analyze these trends geographically. We present a spatial analysis of twenty-five years of sea turtle stranding data (n > 25,000) collected by the Florida Sea Turtle Stranding and Salvage Network. Strandings include sea turtle mortalities as well as records of sick or injured animals that wash ashore alive or are incidentally captured. Although sea turtles may strand along any marine shoreline in Florida, stranding events are not uniformly distributed throughout the state. The geographic distribution of strandings is influenced by many factors ranging from the likelihood of a carcass being discovered to the characteristics of nearby in-water sea turtle aggregations. The identification of areas where strandings tend to occur more frequently holds important coastal conservation implications, allowing research and management efforts to be directed towards areas where they may have the greatest influence. We present the distributions of sea turtle strandings by species at multiple spatial scales. We identified several areas of significantly high clusters of strandings using cluster-analysis and point-density spatial statistics functions. Our methodology provides a framework for the processing and analysis of point-event data that could be applied to other marine animal mortality datasets resulting in the identification of areas where conservation efforts might have the greatest effect.

THE PADDLE-TO-THE-SEA GOOGLE LIT TRIP: USING VIRTUAL GLOBES TO BRING NEW LIFE TO A CHILDREN'S BOOK ABOUT THE GREAT LAKES
Presented by David Hart, University of Wisconsin Aquatic Sciences Center

Paddle-to-the-Sea is a book written by Holling Clancy Holling in 1941 about the journey of a carved wooden boat through the Great Lakes. Many of us who grew up in the region fondly remember this book from story time in elementary school. It taught children and adults alike about the natural and cultural wonders of the Great Lakes. COSEE Great Lakes drew on the book as inspiration for linking the Great Lakes to the ocean and to guide its five- year schedule of Lake Exploration Workshops linking teachers and scientists. The Google Earth application for Paddle-to-the-Sea was developed to bring the power of a virtual globe to simulate Paddle's journey to the sea and to relate real-time data about the Great Lakes to the conditions that Paddle experienced. Each of the 27 chapters has an entry that includes key words, discussion questions, and links to relevant websites and Great Lakes data. The Google Earth file was submitted to Google Lit Trips – a web site that features Google Earth applications that provide a different perspective on great works of literature. Google Lit Trips was established by a high school English teacher from California. Finally, the application was the catalyst for a Great Lakes Curriculum Development course offered at Ohio State University's Stone Lab last summer. Five teachers learned how to use virtual globes to develop lesson plans for Great Lakes topics. One of the teachers developed a web site titled "Earthquests" to share the innovations developed in the class.

PHYSICAL OCEANOGRAPHIC SUBSETTING TOOLS AT PO.DAAC
Presented by Jessica Hausman, JPL/NASA

Wave activity, temperature change, sea level rise, and high winds all have significant impacts on the coastal environment. To better understand how oceanic processes have effected coastal regions and predict future impacts on the local ecology and human population, it is important to look at multiple physical parameters over a long time period. The Physical Oceanographic Distributed Active Archive Center (PO.DAAC) is the NASA-designated archive center for its satellite missions and has accumulated over twenty years of oceanographic satellite data. PO.DAAC is developing a Level 2 subsetting tool to extract desired subsets from large swath data holdings. A user can employ this tool to obtain sea surface temperature (SST), ocean winds, sea surface height, and/or waves for any given region and time frame, without the need to transfer entire files via ftp.

PAGER: A SYSTEM FOR DETERMINING AND DISTRIBUTING EARTHQUAKE IMPACT INFORMATION

Presented by Michael Hearne, Synergetics, Inc. under contract to USGS

PAGER (Prompt Assessment of Global Earthquakes for Response) is an automated system developed by the US Geological Survey (USGS) to assess the regions and number of people exposed to severe earthquake shaking, shortly after the earthquake occurs. PAGER informs emergency responders, government agencies, and the media to the scope of the potential disaster. PAGER monitors the USGS's near real-time U.S. and global earthquake detections and automatically identifies events that are of societal importance, often well in advance of ground-truth or news accounts. PAGER's output includes maps, lists of affected cities, and a description of past earthquake effects in the area. These results are presented in a one-page report and posted on the USGS earthquake program website. Planned enhancements of this system include probabilistic estimates of fatalities, injuries, and financial loss incurred by shaking damage. Other systems exist that meet some of these needs, but unlike them, PAGER's methodology, data, and source code are all publicly available and open to scrutiny, and development has included widespread interaction with the earthquake engineering community. PAGER relies on seismological tools operated by the USGS and contributing regional networks in the Advanced National Seismic Network (ANSS), culminating in the ShakeMap program which supplies PAGER with ground shaking estimates. The system is primarily built using the Python programming language, and SciPy, an advanced set of Matlab(TM)-like scientific libraries. These tools make implementation of complex scientific models simple and maintainable.

PO.DAAC WEB-BASED VISUALIZATION TOOLS

Presented by Matthew Henderson, Jet Propulsion Laboratory

The NASA Physical Oceanography Distributed Active Archive Center (PO.DAAC) is responsible for archiving and distributing satellite observations relevant to the physical state of the ocean, particularly for NASA's physical oceanography missions such as Jason-1 and SeaWinds on QuikSCAT. We present several tools that facilitate the access and visualization of data available through PO.DAAC. ▪ The PO.DAAC Ocean ESIP TOOL (POET) is a WMS-compliant web interface allowing users to subset, download, and create images, animations, and time series plots of PO.DAAC data, based upon parametric, spatial, and temporal constraints delivered in any of 14 output formats (scientific, GIS, image, ASCII, etc.). ▪ The PO.DAAC Event Tracker is a web

portal providing access to i) near-real-time and historical hurricane track data, ii) subsetted ocean vector wind and sea surface temperature data centered on storm tracks, and iii) visualized storm tracks co-locating the subsetted data to storm tracks by time. ▪ The Southern California Coastal Ocean Observing System (SCCOOS) web interface allows users to view and download near real-time and historical imagery and data for ocean surface topography, sea surface temperature, and ocean color for the Southern California bight region. ▪ Each of these tools adds the element of visual inspection to the process of locating and obtaining data that best suits their needs.

MAPPING THE COASTAL REGION OF KANYAKUMARI DISTRICT, SOUTH INDIA BY USING GPS, REMOTE SENSING AND GIS

Presented by Conchalish Hentry, St. Jude's College

The coastal zone represents varied and highly productive ecosystems such as mangroves, coral reefs, sea grasses, beach ridges, beaches, swale and sand dunes. These ecosystems are under pressure on account of increased anthropogenic activity on the coast, coastal pollution, natural hazards like erosion, radioactivity, tsunami, storm surges etc. In South India, Kanyakumari district situated in the confluence of Indian Ocean, Arabian Sea and Bay of Bengal. It is necessary to protect these coastal ecosystems to ensure sustainable development. This requires information on habitats, near shore topography, orientation of coastal segment, morphology of the coast , coastal processes, natural hazards on a repetitive basis. The remote sensing data, especially Indian Remote Sensing (IRS) data, having moderate (23-36 m) to high spatial resolution (6 m), have been used to generate database on various components of coastal environment of the study area. However, the moderate resolution data provide macro-level information on 1:250,000 and 1:50,000 scale about the condition of habitats, type of landforms and areas under erosion and deposition. The major advantage of remote sensing data is monitoring of change periodically. Mangrove areas ,various zones of coral reef were identified. The information on sediments provides some insight in to the movement of sediments along the coast. The beach profile survey with GPS control network used to analyse the shoreline data. Satellite-derived derived information were integrated with the other collateral information through GIS to select sites for beach management plans are prepared, zoning of coastal zone for regulatory purpose and assess possible impact of sea level rise.

NATIONAL COASTAL DATA DEVELOPMENT CENTER'S DIVERSITY METADATA SUMMER INTERN PROJECT

Presented by Rita Jackson, Northern Gulf Institute

In "Building the Digital Coasts", any data, digital or hardcopy; metadata is crucial to the validity and usefulness of that data. Education on the importance of metadata is critical so data are collected accurately and properly documented. The National Coastal Data Development Center's (NCDDC) Diversity Metadata Summer Intern Project is one such educational project where interns learned the importance of metadata, and how to develop Federal Geographic Data Committee (FGDC) compliant metadata. The project was created to provide undergraduates and graduate students from diverse populations an opportunity to explore career opportunities in geospatial metadata creation and management for coastal ecosystems. Mississippi State University's (MSU), Northern Gulf Institute (NGI) played a supporting role in the project, as did the National Oceanic

and Atmospheric Administration (NOAA), the Trent Lott Geospatial and Visualization Research Center at Jackson State University, Millsap College and Tugaloo College. Two NGI projects were presented to the interns along with corresponding data. As the interns developed and validated the metadata for the two NGI projects, using NOAA's Metadata Enterprise Resource Management Aid (MERMaid), NGI researchers were doing the same. Throughout the metadata development process, NGI researchers were available to answer questions or to give additional information regarding the data. Before the interns submitted their metadata for publication, NGI researchers reviewed it for accuracy. Not only was (FGDC) compliant metadata data written for these two projects by both the interns and NGI researchers, but a list of lessons learned was generated for more accurate and efficient metadata development in future projects.

ASSESSING HISTORICAL SHORELINE CHANGES AND EROSION HAZARDS USING TOOLS DEVELOPED FOR ARCGIS AND R

Presented by Chester Jackson, Jr., University of Georgia

The compilation of historical shoreline data into a GIS allows for the rapid analysis of shoreline movements and delineation of shoreline erosion hazards. Currently, a number of GIS-based tools, such as the USGS' Digital Shoreline Analysis System (DSAS), provide the ability to quantify historical shoreline changes in such datasets, but tend to offer limited features in terms of analyses and output. A new suite of tools are being developed for ArcGIS and R (www.r-project.org) platforms to aid both coastal scientists and managers better understand shoreline erosion, as well as facilitate better planning and management of select areas and/or resources threatened by such hazards. Tools being developed for ArcGIS center on capturing historical shoreline positions at transects spaced at a user-specified interval along the shoreline and stored in an ESRI shapefile. Subsequently, the resulting shoreline positions are analyzed by tools designed to take advantage of the statistical power and graphics engine of R. The results of the analyses in R are stored in a number of spreadsheets, maps, and graphics, which allow for quick assessment of shoreline change trends. Ultimately, the benefits of using the R software environment to perform analyses are that it is free, open-source, and can be customized to perform not only advance statistics, but also additional geospatial & geostatistical functions.

MODELLING AN ESTUARY OVER LONG TIME PERIODS

Presented by Yuan Yuan Jia

Due to the special geographic features and high rate of biological productivity of the estuary; analyzing the evolution of an estuary over long time periods is important in understanding and predicting environmental changes in the natural ecosystem. To predict the behavior the varied flow conditions in the natural phenomena, a simpler mathematics model is required to analyze it. Averaging methods are extensively used for fluid studies. Based on the changing flow conditions, the time span could be divided into three periods, long time, medium and short period. In this paper, a long-term averaging model for the estuary is introduced to predict the flow variation, sediment transport and bed morphology change. In addition, various variables which may influence the river system are discussed and some reasonable values of these variables are estimated based on the experience. By introducing the time scales and instantaneous variables into the one- dimensional hydraulic equations of momentum, sediment transport and bed

morphology change, three simplified equations are obtained. A case study on the Snowy River is discussed in this paper.

A SYSTEMS ENGINEERING APPROACH TO DESIGNING AN OCEAN AND COASTAL INFORMATION MANAGEMENT STRATEGY
Presented by Katie Komjathy, UNB

With the enactment of the Oceans Act [1996], Canada made a commitment towards the sustainable development of its ocean and coastal resources. The implementation of modern ocean management objectives must take place in an environment surrounded by a complex legal and institutional framework, changing economic priorities, escalating resource use conflicts, and increasing pressure to address problems at the ecosystem level. A review of the existing information services in support of the ocean and coastal stakeholder community revealed a sporadic, disconnected collection of regional and sectoral initiatives without capacity for interaction while often duplicating efforts and expenses. Based on the principles of systems engineering, this presentation provides a conceptual design for an ocean and coastal information management strategy. The design process is based on the following steps: (1) problem statement and translating the problems into measurable requirements; (2) evaluating the existing information environment; (3) investigating the alternatives; (4) modeling the system and integration; (5) launching the system and assessing the performance. The proposed strategy: ▪ commences with cross-referencing requirements with objectives; ▪ supports the coordination of regional and sectoral initiatives with and within the overall strategy; ▪ allows for a gradual introduction of the information management strategy, based on the priority of objectives; ▪ considers all resources, including human, financial, and technological; ▪ builds on the established professional networks; ▪ establishes new arrangements for collaboration amongst the stakeholder groups; ▪ introduces interdepartmental and intergovernmental connections at the early phase of the implementation; ▪ addresses the interdependencies between system elements.

MAP ONCE, USE MANY TIMES: AN INTERAGENCY EFFORT TO IMPROVE THE EFFICIENCY OF OCEAN AND COASTAL DATA-COLLECTION ACTIVITIES AND THE ACCESSIBILITY OF GEOSPATIAL DATA
Presented by Frances Lightsom, U.S. Geological Survey

Many organizations are engaged in mapping ocean and coastal regions: Federal and state agencies, academic institutions, and non-governmental organizations. Increased data-sharing, coordination of mapping efforts, and leveraging of resources can reduce overall costs. In an effort to realize these efficiencies, the Interagency Working Group on Ocean and Coastal Mapping (IWG-OCM) is developing a registry of mapping activities - planned, in-progress, and completed - and a clearinghouse for geospatial data and interpretive information. These services, collectively known as the OCM Inventory, are available through the Geospatial One-Stop portal, www.geodata.gov. "Map once, use many times" summarizes the goals of the project. Ocean and coastal geospatial data will become discoverable so that they can be used by other organizations, for a variety of purposes. When two organizations are planning data acquisition activities or require data in the same area, the activity registry will assist their developing a partnership to leverage their resources and collect data that will meet both organizations' needs. "Collect data once, use it many times" expresses the project strategy. Instead of asking

mapping organizations to submit data inventories and acquisition plans to a single-purpose Website, the project will reuse the up-to-date FGDC metadata that Federal agencies are required to publish to Geospatial One-Stop. "Marketplace" records will show planned data acquisition activities. With www.geodata.gov now hosting the OCM Inventory, over 25,000 metadata records from Federal participants have been added in the project's first 12 months.

NOAA HONUA: USING SPHERICAL DISPLAY SYSTEMS FOR VISUALIZATIONS OF COMPLEX ENVIRONMENTAL INFORMATION

Presented by Matthew McBride, NOAA Pacific Services Center

Many display systems exist for the virtual representation of global environmental data, examples include Google Earth, NASA's WorldWind, ESRI's ArcGIS Explorer and Microsoft's Virtual Earth. All present global data on a virtual 3D platform using industry standard vector and raster data sources. There are products available for the projection of global data on actual 3D spherical platforms: NOAA's Science on a Sphere, Global imagination's Magic Planet and the OmniGlobe spherical display system. These sphere-shaped screens range in size from 16" to 68" and are deployed in a variety of facilities. In response to a need from the spherical display user community, NOAA Pacific Services Center is supporting a data visualization project for spherical presentation of environmental data called NOAA Honua. This project will present science in an intuitive and compelling format that is readily accessible for formal and informal education settings. The current plan to distribute NOAA Honua includes technical features and educational facets. The technical features include detailed visualizations of NOAA science presented through a custom touch screen interface to enhance informal education in public settings. The classroom integration of NOAA Honua includes lesson plans for grades 5-8 which cover a variety of NOAA related science focusing on climate, hazards and marine biology and school participation. Both components are undergoing a review process before disbursal.

DIGITAL TECHNIQUES FOR THE CREATION AND SPATIAL ANALYSIS OF A BATHYMETRIC SURFACE MODEL, GARGATHY-KEGOTANK LAGOON SYSTEM, VIRGINIA, USA

Presented by George McLeod, Old Dominion University, Department of Ocean, Earth, and Atmospheric Sciences

The reliability of volume-driven spatial analyses of tidal basins is a direct function of the methods used to determine basin capacity. Simple box models are prone to gross volumetric exaggeration and reveal nothing of the topographic character of the basin. The development of a high resolution digital elevation model (DEM) representing the benthic surface provides a more precise accounting of basin volume and allows for the analysis of a variety of related basin parameters. In this study, acoustic soundings of the Gargathy-Kegotank lagoon system were recorded in the field, corrected for tidal phase and adjusted to Mean High Water (MHW). These soundings were combined with various digital data sets including high resolution aerial photography, digital topographic maps, and National Wetlands Inventory (NWI) data. Data processing involved the integration of GIS (Geographic Information Systems) methods using ArcGIS 9.3 (ESRI). A bathymetric surface model was produced using spatial interpolation techniques. This digital elevation model (DEM) allowed for the analysis of basin capacity, tidal and residual prism

volumes, flushing character of the basin, and hydro-hypsometric characteristics. Hydraulic turnover time (HTT), hydraulic depth, and the spatial extent of repletion within lagoons were subsequently calculated to provide further spatial characterization of the Gargathy-Kegotank system.

USING THE AUTOMATIC IDENTIFICATION SYSTEM FOR NORTH ATLANTIC RIGHT WHALE RESEARCH AND MANAGEMENT IN THE SOUTHEASTERN U.S. CALVING GROUNDS

Presented by Mark Mueller, FWC, Fish and Wildlife Research Institute

The Florida Fish and Wildlife Conservation Commission, in collaboration with NOAA Fisheries Service, Jacksonville Marine Transportation Exchange and Georgia Department of Natural Resources has developed an innovative system for the collection and analysis of Automatic Identification System (AIS) data to improve our understanding of vessel distribution and movements in the right whale calving grounds. AIS is a system for autonomous reporting of vessel data required worldwide for use by vessels of certain types, minimum lengths or tonnages. Transponder-equipped vessels use VHF to broadcast data that include dynamic information such as latitude/longitude, course, and speed as well as static information such as vessel identification, type, and dimensions. We have established infrastructure for receivers in the ports of Brunswick, GA and Jacksonville, FL to provide standardized coverage. Received signals are archived using specialized commercial software that removes duplicate signals and translates data to tabular format. We designed and continue to improve a multi-step process that uses database management, scripting, and GIS software to create georeferenced points and tracklines for unique vessels and trips. Rule-based filtering criteria reduce irrelevant or duplicative data and improve processing efficiency. Data have been collected since November 2006 and are largely continuous for the winter calving seasons. Preliminary analyses underway are aimed at understanding and reducing whale-vessel collision risk. These include quantification of vessel locations and speeds according to vessel type as well as characterization of vessel response to whale sighting broadcasts. These results will assist managers in evaluating the effectiveness of management efforts.

A SPATIAL BIBLIOGRAPHY TO ASSESS EXISTING INFORMATION ON ATLANTIC COASTAL FISH HABITAT

Presented by David Nelson, NOAA/NOS CCMA Biogeography Branch

The Atlantic Coastal Fish Habitat Partnership (ACFHP) has developed a spatial bibliography to assess relevant existing information and assist conservation planning. The spatial bibliography was created by linking a bibliographic database developed in Microsoft Access, with a spatial framework developed in ArcGIS. The bibliography is a comprehensive, searchable database of selected documents, data sets, and analyses, pertaining to Atlantic coastal habitats. Key information captured for each entry include basic bibliographic data, spatial footprint (e.g. waterbody), species and habitats covered, assessment criteria and other policy-relevant information, contacts and partners, and electronic availability. The spatial framework is a functional ArcGIS digital map based on polygon layers derived from NOAA's Coastal Assessment Framework, Marine Cadastre, and other sources, providing spatial reference for all of the documents cited in the bibliography. Together, the bibliography and its spatial framework provide a powerful tool to query and assess available information. It is being used by ACFHP to develop a

strategy to conserve, protect, restore, and enhance habitat for native Atlantic coastal, estuarine-dependent, and diadromous fish from Maine to Florida. ACFHP is recognized as a 'candidate' Fish Habitat Partnership under the National Fish Habitat Action Plan (NFHAP), with participation from federal and state agencies, tribes, non-governmental organizations, and local entities.

THE CASE FOR A COASTAL FLOOD AND EROSION VULNERABILITY INDEX
Presented by Len Pietrafesa, North Carolina State University

The case is made for coastal states to create a coastal flood and erosion vulnerability index (CFEVI) focused on future coastal to provide an understanding of current and future coastal conditions. The natural course for many areas along the coasts of the United States is that some areas will not exist in the future as sea level continues to rise. The problem will be exacerbated by storm events, such as hurricanes and nor'easters, and subsequent coastal flood and erosion of existing coastal areas. A vulnerability index would be a prudent course of action to inform property owners of the potential dangers of coastal living; particularly ocean front. A comprehensive CFEVI would be beneficial to provide a clearer picture of the particular areas of vulnerability along specific coasts. Designations of areas according to their level of vulnerability could be accompanied by a set of options.

MAPPING THE 2008 DISTRIBUTION OF EELGRASSES, MACROALGAE, AND SALTMARSH IN PADILLA BAY, WASHINGTON USING THE AUTOMATED FEATURE ANALYST EXTENSION
Presented by Suzanne Shull, Padilla Bay National Estuarine Research Reserve

True-color, scanned aerial photography (acquired on Sept 11, 2008 on a 0.2' tide and orthorectified in-house) was used to map the intertidal vegetation in the Padilla Bay National Estuarine Research Reserve (NERR) of Washington State. The protocols used to map, classify, and accuracy assess the vegetation polygons met the requirements of the NERR System Wide Monitoring Program (SWMP) III Habitat Mapping and Change Plan (i.e. 0.1 ha minimum mapping unit, NERR habitat classification scheme, and accuracy of the image rectification). Polygon delineation included interpretation using the automated Feature Analyst extension by Overwatch. About 400 groundtruth data points were acquired throughout the summer low-tide days and were used for driving the classification or for the accuracy assessment of the results. The data acquisition efforts were focused on the subtidal edge of the eelgrass and on the interface between the two eelgrass species Zostera marina and Zostera japonica. The results are intended to be used as a basemap to detect future change relative to Climate Change effects and for comparison to earlier map products created from aerial photo interpretation using zoom-transfer scope in 1989 (Bulthuis 1995) and on-screen digitization in 2000 and 2004 (Bulthuis and Shull 2002, 2006).

THE ASSEMBLAGE LAYER AS AN INDEPENDENT VARIABLE IN LAND COVER UPDATING
Presented by Francois Smith, MDA Federal Inc.

MDAF uses a procedure to update C-CAP land cover data that involves detecting the areas of change first, then using regression tree analysis to develop a ruleset using the original land cover as training in areas of NO-change. Then these rules are applied to the change areas. MDAF has tested this procedure using many different layers to use as independent variables. MDAF has settled on using the MRLC imagery and date files, the DEM and derivatives, and an assemblage layer as the independent variables. This study describes and tests the use of the assemblage layer. The assemblage layer is a recoding of the original land cover that focuses from-to change possibilities in the change area classification by stratifying by class groupings. Using this layer as an independent variables increases the likelihood certain classes will go to certain other classes, and reduces the likelihood of illogical class changes in the update product. However it does not prohibit any changes. It is one of the simplest ways to reduce the amount of necessary hand edits of the raw classification. The assemblage layer is made by hierarchically grouping classes that often change to one another erroneously. In the C-CAP classification urban classes are grouped together, pasture/hay and cultivated classes are grouped together, forest classes are grouped, and wetlands are grouped. During the regression tree analysis, pasture and cultivated will often get confused in the update classification depending on the season of the late-date imagery and thus show up erroneously as a change of category. Most change detections dramatically over-estimate the change in pasture and cultivated areas. This layer limits much of that over-estimation. This does the same for the other groupings as well. This procedure will be studied by running a land cover update classification using regression tree analysis once with the assemblage layer and once without. Then the raw results will be compared statistically to the refined results created previously. The raw layer that most resembles the refined layer is most likely the more correct.

DEVELOPMENT, VALIDATION, AND VULNERABILITY ASSESSMENT OF AN OVERWASH MODEL OUTER BANKS, NORTH CAROLINA
Presented by Carrie Tragert, East Carolina University

The understanding of barrier islands and the processes which shape them is imperative due to a growing and increasingly vulnerable coastal population. With over 40, 800 permanent residents, and approximately seven million visitors each year, the Outer Banks of North Carolina are both physically and socially vulnerable to the coastal processes that shape the barrier islands. While other potential hazards such as storm surge, coastal flooding, erosion, and sea-level rise are often studied, very little research has been done on modeling and predicting the impacts of overwash. The hydrodynamic and morphologic conditions of barrier islands create particularly favorable environments for overwash to occur. Overwash can damage roads and property, creating a need for better modeling for prediction. Various modeling techniques, including transect models, hydrologic models, and unique models created in ArcGis Model Builder, were explored to determine the most accurate methods for overwash modeling. Storm hindcasting methods and field work were used to assess the validity of the models. The findings of the models are then discussed in terms of their accuracy, and implications for vulnerability along the Outer Banks.

UTILIZING SPATIAL EXTRACT TRANSFER AND LOAD SOFTWARE TO SIMPLIFY THE COMPLEXITIES OF NEAR SHORE FEATURE MANAGEMENT
Presented by Kyle Ward, NOAA/NOS

Surveying the steep rocky shores of Alaska and the Pacific Northwest is a complex and potentially hazardous undertaking. Accurate charting of near shore features is essential for maritime safety and protection of the marine and coastal environment. The complicated process of surveying these areas has now been simplified by supplying field units with a composite (charted) source feature _le produced with spatial extract transfer and load (ETL) technologies. In the past the myriad of sources for near shore feature information-including raster and electronic charts, prior hydrographic surveys, aerial and satellite derived shoreline files and LIDAR have complicated the process of verifying or disproving these features. Analyzing and manipulating these various sources from their diverse formats into a useable format is a complex and time consuming task often completed by shipboard personnel. This paper addresses the process used to manipulate these sources into a composite source file in IHO S-57 standard exchange format prior to delivery to the field unit. This file is then easily ingested into shipboard processing and acquisition systems. Efficiencies created in data integrity and processing time will be addressed.

SMALL SATELLITE TECHNOLOGY FOR COASTAL AND OCEAN APPLICATIONS
Presented by Louis Wasson, Mississippi State University

Over the last 40 years space satellite technology has revolutionized our spatial perspective of global systems. The view from earth orbit by an increasingly diversified suite of instruments is providing a range of information for basic research to the millions of people watching weather on their television sets. But spaceflight is not cheap and the environment is harsh. Satellite platforms usually take years to design, build and launch resulting in astronomical costs and research programs placed in stand-by mode. Mississippi State University (MSU) has created a small satellite (smallsat) program designed to change space economics using rapidly designed and built small satellites derived from proven commercial off-the-shelf Earth-observing technology. This approach makes flight missions dramatically more affordable for customers who: have budgets that must stretch ever further or couldn't afford satellite-based missions. Smallsats are defined as weighting < 500kg, placed in a low earth orbit with life expectancies of 5 to 7 years. These low-cost, rapidly deployable spacecraft can meet critical near-term coastal observation needs while lowering the agency's cost, and improving long-term operational effectiveness. MSU has teamed with strategic industrial partner Surrey Satellite Technology Limited (SSTL) who has a strong history of smallsat performance having placed 27 operational smallsats in orbit and gaining nearly 200 years of orbit experience. Mississippi State University is constructing an operational ground station for satellite uplink and downlink communication and data processing. Exploring specific coastal/ocean observation research efforts Mississippi State is building a team to bring this proven technology as solutions.

GEOGRAPHIC NAMES: WHO CARES ABOUT STANDARDIZATION?
Presented by Meredith Westington, NOAA/NOS/Office of Coast Survey

As a critical frame of reference, geographic place names provide position details that many individuals utilize every day and take for granted to communicate and share experiences. In the 1800s and with the expansion of surveying and mapping of the U.S., the need for uniformly documented geographic names became more apparent. Charts,

maps, and other geographical publications produced by at least eight different bureaus and departments were found to have inconsistent applications of geographic names. Recognizing the need to resolve conflicts at this relatively early stage in U.S. history and harmonize the use of geographic names across all government publications, President Harrison created the Board on Geographic Names (BGN) in 1890, and named Dr. Thomas C. Mendenhall, Superintendent of the U.S. Coast and Geodetic Survey, as its first chairman. Today, the BGN remains as an inter-departmental organization that serves to standardize-- not regulate-- the use and application of geographic names, including domestic, foreign, Antarctic, and undersea names, for all federal products. Each year, the BGN resolves hundreds of proposed geographic names issues in an effort to record local usage and promote the U.S. policy of "one feature, one name." Compiled from past BGN decisions and state partnerships, domestic geographic names are officially recorded and promulgated online through the Geographic Names Information System (GNIS), which is hosted by the U.S. Geological Survey. This presentation will introduce the history of the BGN and its role in maintaining a standardized and up-to-date repository of geographic names, GNIS.

BATHYMETRIC EFFECTS OF CATCHMENT FLOODING AT A MODIFIED COASTAL LAGOON ENTRANCE: GIS-BASED ANALYSES OF MAJOR EVENTS
Presented by Peter Wheeler, Monash University

Regular hydrographic monitoring of the Reeves and Entrance Channels at the Gippsland Lakes artificial entrance (Victoria, Australia) in the period pre/post two major catchment flood events (in June/July 1998 and 2007) has allowed the construction of an extensive digital spatial database, which can be queried using GIS to provide accurate bathymetric change quantification from an extensive back-barrier flood-tide delta. During and immediately after both flooding events, the scouring effects of catchment floodwaters escaping to Bass Strait caused extensive sediment removal from the flood-tide delta. However, flood-tide dominance restoration, and resultant deposition of sediment upon the flood-tide delta has followed each flooding event, necessitating the continuation of expensive sediment management operations. Underlying reasons for continued flood-tide dominance and resultant channel infilling refer to significant long-term changes in catchment-to-coast environmental interrelationships, which are likely to continue to evolve in response to future climate change scenarios.

EVALUATION OF COLOR IMAGERY AND DIRECT REFERENCING FOR MAPPING SUBMERSED AQUATIC VEGETATION IN CHESAPEAKE BAY
Presented by David Wilcox, VIMS

Submersed Aquatic Vegetation (SAV) is one of the key indicators used to assess the health of the Chesapeake Bay ecosystem and to help evaluate the effectiveness of management practices. Black and white aerial photography has been used to annually assess the distribution and abundance of SAV in the Bay and tributaries since 1984, providing 22 years of data. In 2001, the project implemented soft-copy photogrammetry and aerial triangulation to scan and digitally process the images into a series of orthophoto mosaics. This eliminated the need for physical maps and digitizing of manually interpreted polygons. We are again considering incorporating new technology. Recognizing the potential benefit of directly referenced imagery and color photography, we acquired test imagery over two regions, one dominated by seagrass and the other by

freshwater species, during the summer of 2008. The images were captured simultaneously on black and white film and color film. In addition, GPS/IMU direct referencing data was acquired for the camera containing the color film. We document the advantages and disadvantages of these two technologies as they are applied to our annual SAV monitoring effort. Each step of the project is being studied carefully to estimate differences in processing time, total cost, and interpretation accuracy. The project is still underway, but preliminary analysis suggests that direct referencing could significantly reduce processing time. The results of this study will be evaluated and used to guide the 2009 monitoring plan with careful consideration to maintaining consistency within this key multi-decadal SAV monitoring dataset.

COASTAL ECOSYSTEM MANAGEMENT: INFORMATION IS POWER
Presented by Robb Wright, National Ocean Service

Our coastal marine ecosystems are being chronically stressed by numerous anthropogenic and natural factors such as overfishing, climate change, disease outbreaks, coastal pollution, and ecosystem phase shifts. Public participation in management decisionmaking is needed to address these problems and balance extractive practices and ecological processes. We are exploiting Google Maps and similar web-based mapping capabilities to provide the public, scientists, and resource managers with timely monitoring and descriptive information in a user friendly way. Providing these products may empower local residents, visitors, and politicians to become more involved in the current and future conservation and management decisionmaking process and help alter perceptions about the cultural, social, economic, and ecological value of these ecosystems.

STUDY OF ESTUARY ENTRANCES THROUGH ONE DIMENSIONAL MODELLING
Presented by Bing Yan

This paper investigates the use of a one dimensional hydrodynamic model, 'Dynlet' in analyzing rivers that are highly mobile and prone to closure. Wairoa river, located in Hawkes Bay, New Zealand has a gravel barrier beach seperating the estuary from the sea and is often closed or near closed during low flow events. The river has to be dredged regularly to prevent flooding and as such, it is of interest to the research to study the behavior of the entrance. A one dimensional model has been created using data provided by Hawkes Bay regional council and from the model, a method is proposed allowing for the prediction of entrance dimensions. In addition, the equilibrium flow area of the river is used as a comparison with other researchers in this field.