Conference Program

2009

COASTAL GEOTOOLS

Kingston Plantation
Myrtle Beach, South Carolina
March 2 to 5, 2009

www.csc.noaa.gov/GeoTools/

Conference Goals

To help the constituents of the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center address coastal resource management issues through the effective use of geospatial data and tools.

Conference Objectives

- Participants learn about emerging tools and techniques, and their benefits and applicability.
- Participants learn about the resources that are available to them, including training, data, and technology.
- Participants share best practices in the areas of geospatial data access, interoperability standards, and application development.
- The conference provides a forum to encourage the development of public and private partnerships that use geospatial technologies.

Table of Contents

A Message from the Director of the NOAA Coastal Services Center

Dear Colleagues:

More and more, coastal resource managers need easy access to organized—and relevant—data, tools, and technology. Attending Coastal GeoTools 2009 is one of the best and easiest ways to explore existing and emerging technology, and discover how it is being successfully used for the wise management of the nation's coastal resources.

Coastal GeoTools '09 will focus on "Building the Digital Coast," a new technological gateway to important tools, training, and information for coastal managers being developed by the National Oceanic and Atmospheric Administration's Coastal Services Center and many partners.

Throughout this exciting and inspiring conference, coastal management professionals will be sharing their technical knowledge and experiences, engaging new tools and techniques, developing contacts and partnerships, and learning about available training, data, and technology resources.

There will be a special Technology Help Clinic open daily where attendees can bring their questions and get one-on-one assistance with issues related to remote sensing, geographic information systems (GIS), the Global Positioning System (GPS), software, and more.

Participants will leave this conference with many ideas for using—and contributing to—the Digital Coast to address issues and showcase solutions in their coastal communities.

This innovative conference is one you don't want to miss.

Sincerely,

Margaret Davidson
Director
NOAA Coastal Services Center

GeoTools '09 Conference Exhibitors

3001 International, Inc.
Avineon, Inc.
BAE Systems
The Baldwin Group, Inc.
Booz Allen Hamilton
Dewberry
ERDAS
ESRI
Federal Geographic Data Committee
Fugro EarthData
GeoVantage, Inc.
Google
I.M. Systems Group
IVS 3D, Inc.
Myriax, Inc.
Photo Science
Sanborn
Tenix LADS, Inc.
Wilson & Company
Woolpert

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NOAA Coastal Services Center

External Committee

Kurt Allen	Photo Science
Bill Burgess	National States Geographic Information Council (NSGIC)
Braxton Davis	South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management
Naomi Detenbeck	U.S. Environmental Protection Agency, Atlantic Ecology Division
Zach Ferdana	The Nature Conservancy, Global Marine Initiative
Tanya Haddad	Oregon Department of Land Conservation and Development
Anne Hale Miglarese	Booz Allen Hamilton
David Hart	University of Wisconsin Sea Grant
Grant Larsen	Mississippi Department of Marine Resources
Jeff Lillycrop	U.S. Army Corps of Engineers
Alan Lulloff	Association of State Floodplain Managers
Dave Maune	Dewberry
Zsolt Nagy	NSGIC, Center for Geographic Information and Analysis
Henry Norris	Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission
Ed Saade	Fugro EarthData
Daniel Sampson	MassGIS
Jim Schriever	Sanborn
Sheila Siemans	California Coastal Conservancy
Lynda Wayne	Federal Geographic Data Committee, GeoMaxim
Sally Yozell	The Nature Conservancy, Eastern Resource Office

CONFERENCE OVERVIEW

Monday, March 2

Special Interest Meetings – 8:30 to 11:30 a.m.
(See descriptions on page 14)

Tools to Enhance Community Resilience:
Collaborative Approaches to Planning through Technology ..... Windsor A
Coastal Inundation Mapping Workshop ..... Windsor B
Participatory GIS: Theory and Practice ..... Windsor C
Data and Web Services – When to Use, How to Use, Why to Use ..... Hampton
Finding and Being Successful with Geospatial Grants ..... Somerset

Special Interest Meeting – 1:00 to 2:30 p.m.
(See descriptions on page 16)

Coastal Geospatial Services Contract ..... Winchester

Special Interest Meetings – 1:00 to 4:00 p.m.
(See descriptions on page 16)

Coastal and Marine Ecological Classification Standard: A National Approach ..... Windsor A
Coastal Inundation Mapping Workshop (repeat of morning session) ..... Windsor B
Participatory GIS Case Studies ..... Windsor C
Data and Web Services –
When to Use, How to Use, Why to Use (repeat of morning session) ..... Hampton
Assessing GIS for Your Organization ..... Somerset

Exhibitor Reception, Kensington D and E – 6:00 to 8:00 p.m.

Tuesday, March 3

Welcome and Keynote Address
Kensington Ballroom – 8:30 to 10:00 a.m.

NOAA Coastal Services Center Welcome
Nicholas Schmidt, Chief, Coastal Geospatial Services, NOAA Coastal Services Center

Keynote Address:
Leveraging Resources and Strengthening Partnerships through the Digital Coast
Dave Carter, Coastal States Organization, Delaware Coastal Management Program
Zsolt Nagy, National States Geographic Information Council, Center for Geographic Information and Analysis

Margaret Davidson, Director, NOAA Coastal Services Center

Break – 10:00 to 10:30 a.m.

Tuesday, March 3

Morning Sessions – 10:30 a.m. to 12:00 p.m.
See abstracts on page 18.

Coastal Mapping: Land Cover I Kensington A	Marine Planning: Ecosystem Based Management (EBM) Kensington B	Data Sharing: International Coastal Atlas Network (ICAN) Kensington C	Visualization: Sea Level Rise Kensington F
A01. C-CAP High Resolution Product Line: Example for Hawaii	A04. The Marine Ecosystem-Based Management Tool Innovation Fund: Supporting the Development of New Software Tools and Tool Functionality to Help Implement Marine Ecosystem-Based Management	A07. Building the Digital Coast with the International Coastal Atlas Network	A10. SLAMM-View: A Tool for Visualizing SLAMM Simulation Results
A02. Object-Oriented Land Cover/Land Use Mapping of Coastal Horry County, South Carolina	A05. Open OceanMap: Open Source Tool for Capturing Spatially Explicit Socioeconomic Knowledge to Inform Marine Ecosystem-Based Management	A08. The Washington Coastal Atlas and the International Coastal Atlas Network: Connecting to the ICAN Prototype	A11. Managing South Carolina Coastal Habitats in Light of Climate Change Impacts
A03. Creation of Semi-Automated Land Use Mapping for Rhode Island and Massachusetts, and Land Use Updates for Delaware	A06. Gulf G.A.M.E. (Geospatial Assessment of Marine Ecosystems) – Data Discovery	A09. Transitioning to FOSS in the Oregon Coastal Atlas	A12. Processing and Accuracy of Topographic Lidar Data in Coastal Marshes and Use in Sea Level Rise Studies

Exhibitor Lunch, Exhibitor Hall Open, Kensington D and E – 12:00 to 1:30 p.m.

Tuesday, March 3

Afternoon Sessions – 1:30 to 3:00 p.m.
See abstracts on page 28.

Coastal Mapping: Land Cover II Kensington A	Marine Planning: Marine Protected Areas (MPAs) Kensington B	Data Sharing: Partnerships Kensington C	Visualization: Real-Time/Rapid Kensington F
B01. Land Cover Maps and Change Metrics for the Chesapeake Bay Watershed, 1984–2006	B04. Ocean Information Products in Support of Oregon's Marine Reserve Planning Process	B07. Coastal GEMS: A Tool for Coordinated Coastal Planning and Education	B10. Beach Conditions Reports for the Gulf Coast of Florida: Constructing a Collaborative Tool for the Dissemination of Real-Time Environmental Conditions Using Open-Source Software
B02. Multi-temporal Coastal Change Analysis Program (C-CAP) Land Cover Products for Assessment of Geospatial Wetland Distribution in Michigan	B05. Zoning for Marine Protection in California: Applying Ecological and Socioeconomic Criteria to Marine Protected Area Design	B08. Accessing Coastal Datasets and Map Services through the Geospatial One Stop Portal	B11. Spatially Explicit Flood Warning System for the Meadowlands District of New Jersey
B03. Characterizing Land Cover Change in Coastal U.S. Based on C-CAP Results	B06. MarineMap: Participatory Marine Protected Area Design Using an Web-Based Open Source Tool	B09. Award Winning Coastal Geospatial Projects: A Successful Public-Private Partnership	B12. Enhanced Prediction and Visualization of Coastal Inundation along the New England Coast Due to Extra-Tropical Storms

Break – 3:00 to 3:30 p.m.

Poster Reception, Windsor Ballroom – 3:30 to 5:30 p.m.

Wednesday, March 4

Early Morning Sessions – 8:30 to 10:00 a.m.
See abstracts on page 37.

Coastal Mapping: Benthic Kensington A	Land Use Planning Kensington B	Data Organization and Management Kensington C	Visualization: Mash-ups Kensington F
C01. Improving an Object-Oriented Methodology for Mapping Texas Benthic Habitats	C04. A Sprawl Pattern Assessment Tool Applied to Residential Development in Coastal North Carolina	C07. Preservation of Coastal Community Geospatial Content: What's Your Long Term Care Plan for Aging Data?	C10. GIS, Virtual Reality, and Coastal Communities: A Role in Coastal Management
C02. Comparison of DMC, UltraCam and ADS40 Imagery for Benthic Habitat and Propeller Scar Mapping	C05. Using Deterministic Models for Long Range Future Growth in an Urban/ Rural Watershed	C08. A Pragmatic Cycle for On-going Water Resources Research, Development, and Management	C11. Getting Versatile Informatics into the Hands of Coastal Decision Makers
C03. Mapping Subaqueous Soils in Rhode Island: Integration of Pedologic and Acoustic Approaches	C06. A Multi-scale Analysis of Land Cover Change and Land Protection Policies along the Chesapeake Bay Shoreline	C09. The Great Lakes Regional Coastal Data Model	C12. Visualizing Dynamic Weather and Ocean Data in Google Earth

Break – 10:00 to 10:30 a.m.

Wednesday, March 4

Late Morning Sessions – 10:30 a.m. to 12:00 p.m.
See abstracts on page 45.

Coastal Mapping: Sediment Management Kensington A	Hazards and Resilience Kensington B	Data and Planning Resources Kensington C	Marine Planning: Recreational Boating Kensington F
D01. Planning a Beach Nourishment Project Using GIS in Ponte Vedra Beach, Florida	D04. Development of a quantifiable Community Resilience Index Toolkit	D07. E-Estuary: Developing a Decision-Support System for Coastal Management in the Conterminous United States	D10. The Great Lakes Observing System's HarborView Application: A Mapping Mashup that Supports Recreational Boating
D02. eDredge: an Enterprise GIS Application for Planning, Monitoring, and Management of Dredging Operations	D05. Tropical Storm / Hurricane Impacts: Real-Time Tools for Grappling with Uncertainty When Making Decisions in the Midst of Significant Hazard Events	D08. The New York Ocean &and Great Lakes Atlas: Supporting New York's Mandate to Implement Ecosystem-Based Management Statewide	D11. Recreational Boating Safety Risk Analysis
D03. Hawaii Regional Sediment Management Internet Mapping Service	D06. FEMA's Digital Vision for Flood Mapping Products	D09. Supporting Coastal Hazards Planning in Connecticut: The Connecticut Coastal Hazards Portal and Visualization Tool	D12. Boating Characterization in Florida's Coastal and Marine Waters

Plenary Lunch, Kensington Ballroom – 12:00 to 2:00 p.m.

Coastal GeoTools – Looking Back, Assessing the Present, Predicting the Future

Chris Friel, Environmental Systems Research Institute
David Hart, University of Wisconsin Sea Grant
Anne Hale Miglarese, Booz Allen Hamilton
Henry Norris, Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission
Lynda Wayne, Federal Geographic Data Committee, GeoMaxim

Wednesday, March 4

Early Afternoon Sessions – 2:00 to 3:30 p.m.
See abstracts on page 53.

Coastal Mapping: Structures Kensington A	Ecosystem Based Management (EBM) Tools I Kensington B	Data Sharing: Conservation Kensington C	Water Quality Monitoring Kensington F
E01. Geospatial Management of Temporary Erosion Control Structures (Sandbags) along the Oceanfront Shoreline in North Carolina	E04. Facilitating Planning across the Land-Sea Interface Through Interoperation of Three Decision Support Tools	E07. Florida's Ocean and Coastal Council: Resource Assessment	E10. Seagrass Monitoring as a Complement to Water Quality Monitoring in Coastal Embayments of Southern Massachusetts
E02. GIS Management of New York City's Waterfront Infrastructure	E05. Application of the NOAA Habitat Priority Planner Tool for the Advancement of Restoration Goals of the Great Lakes Regional Collaborative	E08. Design and Application of the Great Lakes Habitat Initiative (GLHI) Database	E11. Using Moored Arrays and Hyperspectral Aerial Imagery to Develop Eelgrass-based Nutrient Criteria for New Hampshire's Great Bay Estuary
E03. Assessing Condition of Coastal Structures	E06. Multi-criteria GIS Analysis in Conservation of Coastal Lands	E09. Internet-based, Geospatial Planning Tools for Watershed-scale Stormwater Management	E12. GLENDA-GIS: An On-Line, Interactive GIS Tool for Accessing, Viewing and Using Great Lakes Water Quality Monitoring Data

Break – 3:30 to 4:00 p.m.

Wednesday, March 4

Late Afternoon Sessions – 4:00 to 5:30 p.m.
See abstracts on page 62.

Coastal Mapping: Topo/Bathy Kensington A	Ecosystem Based Management (EBM) Tools II Kensington B	Data Sharing: Standards I Kensington C	Coastal and Marine Boundaries Kensington F
F01. Bare Earth Classification Tools for Coastal Conservation	F04. Software Tools for Coastal-Marine Ecosystem-Based Management: Do We Have the Tools Practitioners Are Asking For?	F07. Classifying and Mapping Benthic Data Using the Coastal and Marine Ecological Classification Standard (CMECS)	F10. Application of the United Nations Convention on the Law of the Sea to the Delimitation of U.S. Maritime Zones and Boundaries
F02. Charts Data Fusion: Multi-Sensor Imagery Co-Registration	F05. Habitat Modeling with Marine Geospatial Ecology Tools: An Open-source, Interoperable Geoprocessing Toolbox for Coastal and Marine Conservation and Research	F08. The Significance of Standardized Wetlands Mapping Data in Building the Digital Coast	F11. A Cadastral Geodatabase for the U.S. Fish and Wildlife Service
F03. Using a Topobathy Surface to Inform Coastal Decisions	F06. MAPTITE: DEM Water Level Analyzer for Habitat Restoration Projects	F09. Supporting Coastal Conservation with New and Improved Geospatial Metadata	F12. The Multipurpose Marine Cadastre

Reception in the Palmettos Pavilion – 7:00 to 10:00 p.m.

Thursday, March 5

Early Morning Sessions – 9:00 to 10:30 a.m.
See abstracts on page 70.

Coastal Mapping: Shoreline Change I Kensington A	Physical and Biological Characterizations I Kensington B	Integrating Local Perspectives Kensington C	Data Sharing: Standards II Kensington F
G01. Using Lidar to Determine Lake Erie Bluff Recession Rates	G04. The Nature Conservancy's Northwest Atlantic Marine Ecological Assessment: Integrating and Distributing Spatial Data for Complex Decision Making in Marine Systems	G07. Coastal Resilience: Using Marine Spatial Planning to Support Decisions that Address Both Natural and Human Communities	G10. Standards-Based Data Models and Web Services for Coastal Ocean Observations
G02. Digital Shoreline Analysis System (DSAS) 4.0: An Efficient and Repeatable Method for Computing Shoreline Change Rates in ArcGIS	G05. South Carolina Coastal Waterbody Classification	G08. California Ocean Uses Atlas Project: Using Technology to Incorporate Traditional Knowledge into Ocean Management	G11. Development of a Near Real-time Geospatial Data Aggregation and Service Architecture for the SouthEast Coastal Ocean Observing Regional Association
G03. Where Is the Shoreline?	G06. Measuring the Rough with the Smooth: Using LiDAR Bathymetry to Predict Fish and Coral Distributions in the U.S. Caribbean	G09. Participatory GIS: Evaluation and Comparison of Two Coastal Case Studies	G12. Integrated Ocean and Coastal Mapping: Pilot Projects and Initial Results

Break – 10:30 to 11:00 a.m.

Thursday, March 5

Late Morning Sessions – 11:00 a.m. to 12:30 p.m.
See abstracts on page 78.

Coastal Mapping: Shoreline Change II Kensington A	Physical and Biological Characterizations II Kensington B	Remote Sensing Data Acquisition Kensington C	Data Sharing: Ocean Observations Kensington F
H01. Cascading Scales of Beach Analysis within a Regional Coastal Monitoring Programme	H04. Building a GIS-Based Analytical Framework for Coastal and Estuarine Study	H07. Hurricane Ike: Shoreline High-Resolution Emergency Digital Imagery Data (SHREDID)	H10. Coastal Situational Awareness via nowCOAST's Web Mapping Services and Map Viewer
H02. Beach-Dune System Susceptibility Assessment: A Geospatial Approach to Regional Scale Analyses	H05. Characterizing Fish Communities Across Three Florida Embayments	H08. Spatial Data Needs for the Development and Management of Offshore Aquaculture in the U.S. Exclusive Economic Zones	H11. Southeastern Marine Weather Portal: NWS and COOS Working Together for the Benefit of the Marine Community
H03. Measuring Geomorphological Changes at Sandy Hook, Gateway NRA	H06. Coastal Changes: Observation of Seafloor Change in Santa Barbara Channel After 25 Years	H09. Constructing Adaptive Mission Planning and Real-Time Control Systems for Autonomous Underwater Vehicles with Open-Source Software	H12. Environmental Response Management Application (ERMA) – Web-Based GIS Data Display and Management System for Oil Spill Planning and Environmental Response

Conference Adjourns – 12:30 p.m.

CONFERENCE ABSTRACTS AND DETAILED AGENDA

Monday, March 2

Special Interest Meetings
8:30 to 11:30 a.m.

Tools to Enhance Community Resilience: Collaborative Approaches to Planning through Technology
Windsor A

This special interest meeting will focus on tools provided by the NOAA Coastal Services Center that help coastal communities understand and increase their resilience to natural coastal hazards. In the first part of the session, an overview of each tool will be given. During the second half, attendees will break into groups for detailed tool demonstrations, rotating to different stations to learn about each tool.

Tools Included:

- *Habitat Priority Planner (HPP)* – This is an ArcGIS toolbar used as an aid in resource prioritization. Users can classify habitats according to their goal and run pre-packaged ecological metrics. Site-specific data sets can be incorporated, and the tool allows stakeholders to develop their own prioritization criteria.
- *Risk and Vulnerability Assessment Tools (RVAT) and Hazard Assessment Template (HAT)* – A risk and vulnerability assessment helps identify people, property, and resources at risk from natural hazards. Hazard assessment templates are easy-to-use Internet mapping applications for visualizing risk and vulnerability results and identifying potential hazards for specific locations.
- *Nonpoint Source Pollution and Erosion Comparison Tool (N-SPECT)* – A geographic information system (GIS) extension that helps decision makers predict potential water-quality impacts from nonpoint source pollution and erosion.
- *CanVis* – CanVis allows users to visualize the potential impacts of development or sea level rise on their communities. The software was developed by the U.S. Department of Agriculture.

Coastal Inundation Mapping Workshop
Windsor B

This workshop introduces participants to coastal inundation and inundation mapping. A combination of lectures and interactive demonstrations will help attendees understand the different types of inundation as well as the appropriate data sets and spatial methodologies used to delineate coastal flood areas

Participatory GIS: Theory and Practice
Windsor C

A participatory geographic information system (GIS) is a popular mechanism used to generate maps that contain the local knowledge needed for effective decision-making. The use of a participatory GIS can foster collaboration among stakeholders, capture important knowledge that might otherwise be missed, and provide a focal point for productive discussions. This session will cover participatory GIS basics—defining the practice, addressing social and cultural considerations, and outlining a range of methods. Participants will have the opportunity to engage in several of the methods presented.

Data and Web Services – When to Use, How to Use, Why to Use
Hampton

Quality data is an important component of decision-support tools. We will assess the current state of Web services technologies including SOAP, REST, RSS, KML, and ArcWeb services, as well as Web-based geoprocessing and GIS-based applications using distributed data models. These technologies will be assessed for hosting and consuming considerations and potential limitations. Special attention will be applied to appropriate and inappropriate uses of the various data sharing methods, lessons learned from past experiences, and the potential of newer methods.

Finding and Being Successful with Geospatial Grants
Somerset

This session covers geospatial grant opportunities and techniques for submitting competitive applications. The first part will include a demonstration of *Grants.gov* and how use of the Catalogue of Federal Domestic Assistance (an interactive website) can enhance *Grants.gov* applications. The second half will cover how grantees can use NOAA's Grants On-line system to manage awards and address best grants management practices (including post-award grant requirements).

1:00 to 2:30 p.m.

Coastal Geospatial Services Contract
Winchester

In 2005, the NOAA Coastal Services Center awarded an Indefinite Delivery, Indefinite Quantity contract vehicle to purchase geospatial services, which range from data acquisition and processing to application development and training. One of the primary purposes of this contract vehicle was to provide a resource for other federal, state, and local governments to use for their geospatial contracting needs. To date, 12 state and local agencies have taken advantage of this service. In 2009, the Center will begin the process of re-competing this vehicle. The purpose of this special interest meeting is to provide the coastal resource management community with information about the Center's current contract vehicle and obtain feedback on how the Center can make the vehicle more applicable to the community's needs in the future. More information on the Center's current contract vehicle can be obtained at *www.csc.noaa.gov/crs/cgsc.html*.

1:00 to 4:00 p.m.

Coastal and Marine Ecological Classification Standard: A National Approach
Windsor A

The goal of this interactive session is to educate and receive input from stakeholders on the emerging national standard for classifying coastal and marine habitats. Organizers will present the facts about the Coastal and Marine Ecological Classification Standard (CMECS), address concerns, and clarify assumptions. There will be implementation demonstrations representing different geographies, habitat types, and technologies. Participants are encouraged to bring their own data for a classification walk-through. In the end, participants will have increased knowledge and confidence with regard to the Federal Geographic Data Committee endorsement of CMECS.

Coastal Inundation Mapping Workshop (repeat of morning session)
Windsor B

This workshop introduces participants to coastal inundation and inundation mapping. A combination of lectures and interactive demonstrations will help attendees understand the different types of inundation as well as the appropriate data sets and spatial methodologies used to delineate coastal flood areas.

Participatory GIS Case Studies
Windsor C

Using several examples from the NOAA Coastal Services Center, this session will showcase participatory GIS projects, including a discussion about the methods selected, resulting products, and lessons learned. The level of technologies covered will range from the use of paper maps to Google Earth and other software applications. To wrap up the session, representatives of each project will be available for a panel discussion or questions and answers.

Data and Web Services – When to Use, How to Use, Why to Use (repeat of morning session)
Hampton

Quality data is an important component of decision-support tools. We will assess the current state of Web services technologies including SOAP, REST, RSS, KML, and ArcWeb services, as well as Web-based geoprocessing and GIS-based applications using distributed data models. These technologies will be assessed for hosting and consuming considerations and potential limitations. Special attention will be applied to appropriate and inappropriate uses of the various data sharing methods, lessons learned from past experiences, and the potential of newer methods.

Assessing GIS for Your Organization
Somerset

This workshop demonstrates to the nontechnologist the usefulness of a geographic information system (GIS). This is an excellent opportunity to ask questions related to GIS and spatial technologies, since small group discussions and activities are included. After completing this workshop, participants will understand the five fundamental GIS components: software, hardware, data, people, and applied uses.

Exhibitor Reception
Kensington D and E

6:00 to 8:00 p.m.

Meet the exhibitors in Kensington D and E and the Cambridge Hall area at Kingston Plantation for an informal reception and viewing of the conference exhibits. Light hors d'oeuvres and a cash bar will be provided. Note that nonregistered guests will incur an added cost of $50 per person.

Tuesday, March 3

Welcome and Keynote Address

Kensington Ballroom – 8:30 to 10:00 a.m.

NOAA Coastal Services Center Welcome
Nicholas Schmidt, Chief, Coastal Geospatial Services, NOAA Coastal Services Center

Keynote Address: Leveraging Resources and Strengthening Partnerships through the Digital Coast

Dave Carter, Coastal States Organization, Delaware Coastal Management Program
Zsolt Nagy, National States Geographic Information Council, Center for Geographic Information and Analysis

Margaret Davidson, Director, NOAA Coastal Services Center

The Digital Coast initiative is bringing together various coastal organizations to address coastal issues. One of the first byproducts of this effort is a new system that provides not only the data needed by the nation's coastal resource managers, but also the tools, training, and information needed to turn data into useful information. The Digital Coast partnership members, most of which are represented by GeoTools attendees, are shaping the content and focus of this effort. During this address and throughout this conference you will learn more about the Digital Coast and how you can benefit from this initiative.

Break

10:00 to 10:30 a.m.

Morning Sessions

10:30 a.m. to 12:00 p.m.

Coastal Mapping: Land Cover I
Kensington A

A01. C-CAP HIGH RESOLUTION PRODUCT LINE: EXAMPLE FOR HAWAII
Lisa Erickson and Andrew Brenner, Sanborn
Chris Robinson, I.M. Systems Group at NOAA Coastal Services Center

NOAA's Coastal-Change Analysis Program (C-CAP) has monitored land cover changes across the U.S. over the last few decades. However, there has been an increasing demand for a higher-resolution product. Sanborn, working with the NOAA Coastal Services Center, has developed and produced standardized high-resolution impervious and land cover for Oahu and Maui Counties, Hawaii. The product continues the pedigree of the C-CAP classification scheme but has minimum mapping units of 0.25 acres and 0.05 acres for land cover and impervious respectively. The maps are created from 2.4 meter multispectral Quickbird (QB) imagery and ancillary imagery and datasets. Sanborn uses an object-based classification approach that combines medium-resolution information with high-resolution imagery. First an impervious data set is created, and then the QB imagery is segmented creating the basic unit of analysis. Information from a 30 meter classification is complemented with classification of segments using image-derived band ratios, vegetation indices, and texture. For further refinement, contextual-based models were developed according to rules agreed upon by NOAA and Sanborn. These models combined several data sets including the National Wetlands Inventory, ownership, slope, aspect, and texture. Manual edits increased map accuracy and issues dealing with inconsistencies caused by image variations, clouds, and cloud shadows. This process has demonstrated the ability to use high-resolution imagery to develop a high-resolution land cover product that complements the ongoing medium-resolution C-CAP program.

A02. OBJECT-ORIENTED LAND COVER/LAND USE MAPPING OF COASTAL HORRY COUNTY, SOUTH CAROLINA
Chad Lopez, Fugro EarthData, Inc.
Kass Green, Kass Green and Associates
Mark Tukman, Tukman Geospatial
Debbie Wenner, Fugro EarthData, Inc.
Tom Garigen and Leon Scott, Horry County Government

The county government of Horry County, South Carolina, recently contracted Fugro EarthData, Inc. and its partners Tukman Geospatial and Kass Green and Associates to collect 4-band digital ADS40 aerial imagery of the entire county and produce a land cover/land use map from the orthorectified imagery. Horry County

will primarily be using this data for hydrologic watershed modeling, but other potential uses include future land use planning, fire fuels modeling, and hurricane debris estimating. Leaf-off imagery was collected in February 2008 at 6 inch resolution. The processed 4-band orthos were resampled to 48 inch resolution and mosaicked into nine processing regions for image classification. The classification scheme used was derived from the Anderson land cover/land use classification and the minimum mapping unit was 1 acre. Land cover and land use classes were mapped using a combination of Definiens Professional for image segmentation and Classification and Regression Tree (CART) analysis for classifying the image segments (polygons). Polygons were created that adequately captured the low, medium, and high density built-up urban classes as well as the vegetation classes by including a near-infrared adaptive texture band in the segmentation process. Initial CART classifications have yielded very good results in part by including recent leaf-on Landsat 5 imagery and a Lidar height difference layer created from Lidar data collected in 2005. The Lidar data has been pivotal in distinguishing trees from shrubs. For this paper we will present final project results and methods.

A03. CREATION OF SEMI-AUTOMATED LAND USE MAPPING FOR RHODE ISLAND AND MASSACHUSETTS, AND LAND USE UPDATES FOR DELAWARE

Andrew Brenner, Sanborn
Christian Jacques, MassGIS
Mike Mahaffie, State of Delaware

Many federal agencies are primarily interested in land cover mapping. However, at the state, county and city level, land use has been and will be used as a planning tool rather than land cover. Land cover is often classified using automated processes, but land use is usually digitized by hand. Sanborn, working with the States of Rhode Island and Massachusetts, has developed an approach that allows the rapid development of land use maps using a combination of automated processing and image segmentation, buffering and overlaying the data with supporting datasets. This approach has led to the development of consistent state-wide datasets that are an improvement over previous efforts in terms of consistency, accuracy and repeatability. The datasets were also produced quicker and at a lower cost than previous land use datasets. These datasets also produce a high resolution statewide impervious dataset that has been proven useful to the states. The presentation will review the approach used and how it its well into an automated update approach used in Delaware and the uses that these datasets are now being put to by the states. This approach can also be leverage off the high resolution C-CAP land cover being developed by NOAA.

Marine Planning: Ecosystem Based Management (EBM)
Kensington B

A04. THE MARINE ECOSYSTEM-BASED MANAGEMENT TOOL INNOVATION FUND: SUPPORTING THE DEVELOPMENT OF NEW SOFTWARE TOOLS AND TOOL FUNCTIONALITY TO HELP IMPLEMENT MARINE ECOSYSTEM-BASED MANAGEMENT

Daniel Dunn, Duke University Marine Geospatial Ecology Lab

Coastal and marine resource management is naturally fraught with unique challenges due to the complex interconnections of marine ecosystems and the dynamic nature of ocean environments. The move to Marine Ecosystem-Based Management seeks to address this by expanding our current focus from single-species management and discrete area protection to a broader evaluation of ecosystem functions, flows and services. The demands on coastal and marine managers, conservation planners, government agencies and academic analysts to develop new methods to address the complexities and interconnections of marine ecosystems are very challenging. The current software tools available to help implement a M-EBM approach are fundamentally insufficient to meet the challenges managers and policy-makers face. Successful implementation of M-EBM practices requires a diverse toolbox of novel, modular, interoperable tools that can grow with the marine resource management and conservation community to meet future needs. To stimulate the development and dissemination of creative software tools for M-EBM, the David and Lucile Packard Foundation sought out the Duke Marine Geospatial Ecology Lab to initiate a Marine Ecosystem-based Management Tool Innovation Fund. This 2-year long program seeks to expand the network of M-EBM tool developers through the establishment of ~$1,000,000 of targeted small grants to a broad range of organizations and developers. Here we review the tools that have been or are being developed (or added to) through the Fund's grants. The tools cover a diverse set of sectors and needs, including: boating, fisheries, MPAs, stakeholder engagement, government policy analysis, and network modeling.

A05. OPEN OCEANMAP: OPEN SOURCE TOOL FOR CAPTURING SPATIALLY EXPLICIT SOCIOECONOMIC KNOWLEDGE TO INFORM MARINE ECOSYSTEM-BASED MANAGEMENT

Charles Steinback and Tim Welch, Ecotrust
Aaron Racicot, Z-Pulley Inc.
Mike Mertens, Sarah Kruse, Jon Bonkoski, and Astrid Scholz, Ecotrust

A key component of successful marine ecosystem-based management is the inclusion of social and economic considerations that allow for a) differing priorities from various stakeholders, b) the ability to meet biological/physical habitat objectives while minimizing the impacts on fisheries and fishing communities, and c) the assessment of the potential socioeconomic impacts resulting from various area based management initiatives (i.e., marine protected areas). To date, Ecotrust has developed methods, analyses, and tools aimed at supporting specific needs of MPA processes, like California's Marine Life Protection Act Initiative (MLPAI). In particular, our work has focused on the development of a participatory tool, Open OceanMap to gather spatially explicit data that informs socioeconomic considerations and assessments (e.g., fishing grounds, cost/earning). Open OceanMap was developed using open source software that frees users from the ties of proprietary software and allows for the development of truly open and community-driven software tools. Open OceanMap, which is both a desktop and web-based application, has allowed us to actively engage the fishing communities through the MLPAI process by not only collecting spatially explicit socioeconomic data that otherwise does not exist, but the interview process also provides necessary outreach to potentially affected coastal communities and individuals. To date, we have interviewed approximately 1000 commercial and recreational fishermen in three study regions of the MLPAI process. The application of Open OceanMap has demonstrated that the inclusion of socioeconomic considerations of fisheries, fishermen, and coastal communities can be fully realized and integrated in marine ecosystem-based management.

A06. GULF G.A.M.E. (GEOSPATIAL ASSESSMENT OF MARINE ECOSYSTEMS) – DATA DISCOVERY

David Reed, Florida Institute of Oceanography
Cristina Carollo and John Ogden, Florida Institute of Oceanography
David Palandro, Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute

One approach to ecosystem based management of oceans and coastal resources is the formation of a geospatial framework that identifies ecological similarities in marine habitats and enables the application and development of new tools and programs. The Gulf GAME project is intended to support the "Gulf of Mexico Alliance Governors' Action Plan", Identification and Characterization of Gulf Habitats Priority Issue. The aim of this project is to develop an inventory of habitat-related information within the Gulf of Mexico. In particular, the project will provide database infrastructure for "identification, inventory and assessment of nearshore and offshore Gulf habitats to inform resource management decision". This will serve as a foundation to develop a spatial framework for ecosystem-based management associated with regulatory and planning programs and areas of government coordination. Information gaps will be identified and footprint maps produced; the initial focus being on seagrass beds, identified by EPA as being a critical concern. The availability of updated maps derived from a spatially organized database can allow rapid access to the information needed to enhance the understanding and protection of habitats and their associated marine resources. By providing data layers to illustrate the current spatial extent of seagrass beds, oyster reefs, coral reefs, and other benthic or deep-sea habitats as well as other habitats associated with the water-column, managers will be able to investigate loss or degradation of these habitats, protect and/or conserve them, and help maintain the ecological integrity of Coastal areas in the Gulf of Mexico.

Data Sharing: International Coastal Atlas Network (ICAN)
Kensington C

A07. BUILDING THE DIGITAL COAST WITH THE INTERNATIONAL COASTAL ATLAS NETWORK

Dawn Wright, Oregon State University
Ned Dwyer, Coastal and Marine Resources Centre, University College Cork, Ireland
Tanya Haddad, Oregon Coastal Management Program
Liz O'Dea, Washington Department of Ecology
David Hart, University of Wisconsin Sea Grant
Tony LaVoi, NOAA Coastal Services Center
Tim Nyerges, University of Washington
Marcia Berman, Virginia Institute of Marine Science

The International Coastal Atlas Network (ICAN) is a newly-founded informal group of organizations that have been meeting over the past two years to scope and implement data interoperability approaches to coastal web atlases (CWAs). The mission/strategic aim of ICAN is to share experiences and to find common solutions to CWA development (e.g., user and developer guides, handbooks and articles on best practices, information on standards and web services, expertise and technical support directories, education, outreach, and funding opportunities, etc.), while ensuring maximum relevance and added value for the end users. This includes a long-term view toward U.S. national and global-level operational interoperability, which will evolve as the ICAN community strives to increase awareness of the opportunities that exist for increased coastal and marine data sharing among policy makers, resource managers, and other strategic users of a CWA. We see ICAN participants as playing a leadership role in forging international

collaborations of value to the participating nations and optimizing regional governance in coastal zone management. A major long-term goal is to help build a functioning digital atlas of the worldwide coast based on the principle of shared distributed information. This has been initiated by a prototype interoperability tool and network for the integration of locally maintained CWAs as a detailed and reliable source of spatial information about coastal zones throughout the world, as well as a basis for rationally-informed discussion, debate, and negotiation of sustainable management policies for regional governance.

A08. THE WASHINGTON COASTAL ATLAS AND THE INTERNATIONAL COASTAL ATLAS NETWORK: CONNECTING TO THE ICAN PROTOTYPE

Elizabeth O'Dea, GIS Services, Washington Department of Ecology
Kathy Taylor, Shorelands and Environmental Assistance Program, Washington Department of Ecology
Daniel Saul and Darby Veeck, GIS Services, Washington Department of Ecology
Deborah Purce, Shorelands and Environmental Assistance Program, Washington Department of Ecology

The Washington Coastal Atlas, first established in 1995, has proven to be a valuable resource to coastal and environmental managers. The Washington Department of Ecology developed the online atlas to assist local governments with their Shoreline Management Planning efforts. Interest and use of the atlas now extends to a broad audience, ranging from policy makers to the general public. Data layers available on the site include biological features such as wetlands and eelgrass beds, and physical features including drift cells and slope stability data. The atlas also includes 60 years of oblique aerial photos to view other shoreline features such as the level of development and presence of any shoreline modification. Coastal management issues do not stop at borders. The Washington Coastal Atlas is joining its neighbor, the Oregon Coastal Atlas, in the International Coastal Atlas Network (ICAN) prototype to illustrate the practical benefits of collaboration and metadata/data sharing for coastal management on a regional and international level. The Washington Coastal Atlas will be the first to join the prototype using ESRI technology, providing a robust demonstration of how Open Geospatial Consortium (OGC) Catalog Services for the Web (CSW) and Web Map Services (WMS) are able to connect atlases built on either open source or proprietary software. This talk will present the Washington Coastal Atlas, the steps that will be taken to connect it with the ICAN prototype, and the expected benefits for coastal management in the Pacific Northwest region.

A09. TRANSITIONING TO FOSS IN THE OREGON COASTAL ATLAS

Tanya Haddad, Oregon Coastal Management Program
Dawn Wright, Oregon State University
Bob Bailey, Oregon Coastal Management Program

In early 2008 the Oregon Coastal Atlas completed a major transition to FOSS (free and open source software). While the previous version of the Coastal Atlas had relied on the open source University of Minnesota Mapserver for its online maps, all other aspects of the website such as content management, informational databases, scripting language and web server software had been non-open source in origin. At present all of these functions have been transitioned to FOSS equivalents. General website content management is now handled by Joomla CMS. Informational databases—including some simple spatial databases—are handled by MySQL. More complex geospatial datasets utilized in online analysis tools are stored in PostGIS. Interactive maps continue to be handled by UMN Mapserver on the server side, with ka-Map or OpenLayers on the client side, depending on the context. In addition, as part of the current process to connect the Oregon Coastal Atlas to the newly emerging International Coastal Atlas Network (ICAN), Web Map Services (WMS) and Web Feature Services (WFS) will be handled by UMN Mapserver, and both metadata and Catalog Services for the Web (CSW) will be handled by GeoNetwork–an open source catalog application to manage spatially referenced resources through the web. This presentation will discuss the background of the Oregon Coastal Atlas, the FOSS packages now in use, lessons learned from this transition, and future goals of the project. For more information on the Oregon Coastal Atlas, please visit *www.coastalatlas.net*.

Visualization: Sea Level Rise
Kensington F

A10. SLAMM-VIEW: A TOOL FOR VISUALIZING SLAMM SIMULATION RESULTS

Bill Wilen, U.S. Fish and Wildlife Service
Jeff Ehman, Image Matters LLC

The Sea Level Affecting Marshes Model (SLAMM) simulates the dominant processes involved in wetland conversions and shoreline modifications during long-term (~100 years) sea level rise (SLR), to predict changes in tidal marsh composition and configuration. For nearly 20 years, SLAMM output has been made widely available only through tabular results and static maps, often only subsets of larger

regions due to high resolution of the inputs (typically 30 m) relative to the extent of the model domains. While conducting research under an EPA Star Grant on the SLR impacts on the coastal wetlands of Georgia and South Carolina, SLAMM-View was developed to facilitate visualization and more broad distribution of our SLAMM simulation results. More recently SLAMM simulations have bee posted on SLAMM-View for Puget Sound and Chesapeake Bay. SLAMM-View is a web browser-based application that portrays pairs of simulation results in conjunction with other thematic layers which provide context. SLAMM produces a time series of geospatial output for each different simulation scenario. SLAMM-View displays two "live" maps: either from the same year (e.g., 2100) but from different scenarios (e.g., a 0.5 m SLR and a 1 m SLR), or from different years within the same scenario (e.g., base year 2000, and year 2100 under a 1 m SLR). One unique aspect of this web-mapping tool is that the dual maps are geographically-linked: zooming or panning in one map causes an identical action in the other map. SLAMM-View can be accessed at this URL: *www.spea.indiana.edu/wetlandsandclimatechange/.*

A11. MANAGING SOUTH CAROLINA COASTAL HABITATS IN LIGHT OF CLIMATE CHANGE IMPACTS

Jennifer Spicer, North Inlet–Winyah Bay National Estuarine Research Reserve
Bethney Ward, NOAA Coastal Services Center

The North Inlet–Winyah Bay National Estuarine Research Reserve (NI/WB NERR) encompasses 12,327 acres of tidal marshes and wetlands. With a relatively flat elevation relief across this portion of coastal South Carolina, the NI/WB NERR is very concerned about potential impacts of predicted sea level rise on critical habitats and surrounding coastal communities, which are rapidly growing in the Southeast resulting in more people at risk. By using spatial data and tools, the NI/WB NERR, local managers, and stakeholders can explore conservation and other habitat management actions to begin planning for and adapting to predicted sea level rise, rising temperatures, and other climate change stressors. The NI/WB NERR is currently working with the neighboring Waccamaw National Wildlife Refuge and the NOAA Coastal Services Center to 1) identify coastal habitats potentially influenced by sea level rise, and 2) evaluate the resulting changes on quality and connectivity of the habitats across the landscape–seascape. To accomplish this, the partners are utilizing the Sea Level Affecting Marshes Model (SLAMM), NOAA's Habitat Priority Planner (HPP) tool, high resolution elevation data (e.g., LIDAR), the best available land cover or habitat data, and other relevant data sets for the study area. The outputs from SLAMM, along with other relevant data, will be used with HPP and community input to identify and prioritize areas for management action based on potential climate change impacts to the coastal habitats.

A12. PROCESSING AND ACCURACY OF TOPOGRAPHIC LIDAR DATA IN COASTAL MARSHES AND USE IN SEA LEVEL RISE STUDIES

Keil Schmid and Brian Hadley, I.M. Systems Group at NOAA Coastal Services Center
Rebecca Mataosky and Robert McGuinn, The Baldwin Group at NOAA Coastal Services Center
Rebecca Love, I.M. Systems Group at NOAA Coastal Services Center

Scientific literature suggests that physical changes to coastal marshland habitat and associated vegetation will be early indicators of accelerated sea level rise rates. Such changes include vertical accretion, marsh habitat translation, increased erosion, and loss of vegetation. Because marsh habitat and vegetation are strongly linked to substrate elevation and local drainage patterns, accurate high-resolution representations of vegetation and surface elevations are requisite components for their analysis and monitoring. Lidar data provide an avenue for measuring vegetation and surface elevations, are becoming widely available in coastal regions, and span over a decade in some locations. While lidar data can measure vegetation and bare earth surface elevations, the ability to discern the two surfaces with enough accuracy to examine centimeter-level variation is still being resolved; this is the primary goal of this study. Marsh surface, vegetation canopy heights, and marsh species will be measured in-situ at several locations. These variables will be used to assess the lidar data's relative accuracy and fine-tune processing to generate marsh-couple surfaces (i.e., bare earth and canopy). The results from the site-specific process will be tested against various "generic" processes to measure and evaluate applicability of common techniques. Results are expected to (1) produce high quality marsh surfaces for site-specific sea level rise models, (2) examine long-term marsh surface changes in study areas, and (3) expand the use of generic lidar processing techniques in marshes. Techniques, both for site-specific and generic processes, their vertical accuracies, and character will be documented for increased applicability at other marshland locations.

Exhibitor Lunch

12:00 to 1:30 p.m.

Exhibitor Hall Open:
Kensington D and E

Afternoon Sessions

1:30 to 3:00 p.m.

Coastal Mapping: Land Cover II
Kensington A

B01. LAND COVER MAPS AND CHANGE METRICS FOR THE CHESAPEAKE BAY WATERSHED, 1984–2006
Frederick Irani and Peter Claggett, U.S. Geological Survey
Francois Smith, MDA Federal Inc.

To better understand how the land is changing and to relate those changes to water quality trends, the U.S. Geological Survey funded the production of temporally comparable land cover datasets for the target dates: 1984, 1992, 2001, and 2006. The data consist of 16 classes and encompass the entire Chesapeake Bay watershed with the 2001 target year established as the base layer. The updates (year 2006) and retrospective updates (years 1984 and 1992) to the base layer were produced through identifying significant spectral changes between image pairs within the range of spectral values for each land cover class in the 2001 base layer. Classification and Regression Trees were used to assign land cover classes to 1984, 1992, and 2006 pixels exhibiting significant deviations from their 2001 expected spectral values. These datasets provide unprecedented opportunities for understanding and forecasting regional land cover change, interpreting water quality trends, and for designing multi-scale sampling frameworks for characterizing land change using high-resolution imagery. In addition, by quantifying the various change trajectories and patterns over time, the data can be further interpreted to discern various land uses and management practices. For example, changes from forest to shrub-scrub to forest might identify areas where forestry activities occur. The above applications of these datasets are discussed in this paper along with the characteristics of the data, change metrics, and challenges encountered during the production process.

B02. MULTI-TEMPORAL COASTAL CHANGE ANALYSIS PROGRAM (C-CAP) LAND COVER PRODUCTS FOR ASSESSMENT OF GEOSPATIAL WETLAND DISTRIBUTION IN MICHIGAN
Benjamin Koziol, Nancy French, Colin Brooks, and Michael Billmire, Michigan Tech Research Institute

C-CAP (Coastal Change Analysis Program) land cover products offer a novel opportunity to investigate spatiotemporal wetland distribution and pattern. This presentation discusses methods and findings from a joint riparian adjacency and fragmentation study for the Tittawabassee watershed in northeast Michigan. For the adjacency study, a riparian buffer model targeting effectiveness relative to a reference buffer was implemented. Model parameters include soil conductivity and water capacity, slope, hydraulic flow, and drainage basin land cover composition. National Hydrographic Dataset stream vectors were merged with the C-CAP open water class to form the underlying stream and water layers. Land form and land cover were effectively combined providing information on the position of the wetland in a watershed, and its potential influence on water quality. Wetland spatial pattern was evaluated from diversity, isolation, and connectivity metrics in a hierarchal analysis for the target watershed. All available C-CAP classifications (1996, 2001, and 2006) were processed using the designed iterative geospatial toolkit. The presentation will highlight interesting results observed in the temporal and spatial trends analysis, identify challenges encountered, and describe future research opportunities incorporating the framework developed here for future wetlands research.

B03. CHARACTERIZING LAND COVER CHANGE IN COASTAL U.S. BASED ON C-CAP RESULTS
Francois Smith, MDA Federal Inc.
Nate Herold, NOAA Coastal Services Center

The Coastal Change Analysis Program (C-CAP) is a nationally standardized database of land cover and change information for the coastal regions of the U.S. C-CAP products inventory coastal intertidal areas, wetlands, and adjacent uplands with the goal of monitoring these habitats by updating the land cover maps every five years. The development of such standardized, regional land cover enables managers to coordinate the planning of shared resources to better address issues that transcend regulatory boundaries, may be used as a screening tool or context for more detailed studies, and is meant to aid in improving scientific understanding of the linkages between coastal wetland habitats, adjacent uplands, and living marine resources. This effort is conducted in close coordination with state coastal management agencies, the U.S. Geologic Survey and other federal programs in support of the National Land Cover Database effort, the National Map, and NOAA's Digital Coast. The Coastal Services Center has completed two time periods of C-CAP mapping for the Conterminous United States, and is currently

working with MDA Federal, Inc. to update these products, through use of MDA Federal's Cross-Correlation Analysis, to reflect 2005/06 condition by 2010. This presentation will highlight product availability, provide examples of the data, and summarize major changes that have been observed to date.

Marine Planning: Marine Protected Areas (MPAs)
Kensington B

B04. OCEAN INFORMATION PRODUCTS IN SUPPORT OF OREGON'S MARINE RESERVE PLANNING PROCESS

Andrew Lanier, Tanya Haddad, and Bob Bailey, Oregon Coastal Management Program

The State of Oregon is currently in the process of establishing marine reserves within its Territorial Sea. The public process initiated by the Governor, supported by state agencies and steered by the states Ocean Policy Advisory Council (OPAC), has included multiple demands for supporting data and information. To answer that call, the Oregon Marine Mapping Group was formed during the fall of 2007. The group—which consists of state and federal agencies, academic researchers, and non-profit organizations—undertook an extensive search to find existing and available GIS data that would serve as a backbone of information for the marine reserves spatial planning effort. Once compiled, the data was used in several different ways to support the marine reserves process including: traditional cartographic products, online interactive web mapping, and report generation. As there have been many different levels of assistance demanded by the process, the range of uses for the data has varied widely. The creation of a thematic chart series provided a unifying platform for discussion and work in support of the process. Support activities ranged from helping users understand how to read data presented on a map, to providing guidance on how to correctly query the GIS data for information about a site. While the effort expended has led to the creation of products specific to Oregon's marine reserve process, the database of information generated by the process will continue be used in conjunction with other analysis tools for Oregon's upcoming and more comprehensive territorial sea spatial planning effort.

B05. ZONING FOR MARINE PROTECTION IN CALIFORNIA: APPLYING ECOLOGICAL AND SOCIOECONOMIC CRITERIA TO MARINE PROTECTED AREA DESIGN

Carissa Klein, Centre for Applied Environmental Decision Analysis, The University of Queensland
Charles Steinback, Ecotrust
Matt Watts, Centre for Applied Environmental Decision Analysis, The University of Queensland
Sarah Kruse, Mike Mertens, and Astrid Scholz, Ecotrust
Hugh Possingham, The Ecology Centre, The University of Queensland

The establishment of marine protected areas is often viewed as a conflict between conservation and fishing interests. We considered multiple commercial and recreational fisheries in the systematic design of a network of marine protected areas along California's coast in the context of The Marine Life Protection Act Initiative. Three types of marine protected areas are under consideration, each with different levels of protection that allow varying degrees of extractive and non-extractive activities, ranging from no-take marine reserves (high protection) to conservation parks (low protection). With advice from managers, administrators, and scientists, a representative group of stakeholders defined biodiversity conservation and socioeconomic goals that accommodated social needs and conserved marine ecosystems, consistent with legal requirements. Using a simulated annealing algorithm, we produce several possible zoning configurations that satisfied both biodiversity and socioeconomic goals and objectives. The zone assignments are driven by the fishing restrictions in each zone and are informed by fine-scale spatially explicit data on multiple commercial and recreational fisheries. Previous methods for systematically designing marine protected areas could not simultaneously consider multiple types of conservation zones and activities; they were limited to including or excluding a planning unit from a single type of zone (e.g., reserved or not reserved). We compare the effectiveness of marine protected area networks designed using our approach with these previous methods and conclude that design methods with the ability to consider multiple zones reduce the potential impact to the fisheries substantially more than design methods without consideration of multiple zones.

B06. MARINEMAP: PARTICIPATORY MARINE PROTECTED AREA DESIGN USING A WEB-BASED OPEN SOURCE TOOL

Matthew Merrifield, The Nature Conservancy
Will McClintock, University of California at Santa Barbara
Charles Steinback, Ecotrust
Dennis Wuthrich, Farallon Geographics

The California Marine Life Protection Act Initiative (MLPAI) is currently working toward establishing a network of Marine Protected Areas (MPAs) for the entire state. Since 2005, we have developed several web-based decision support tools for stakeholders to visualize and analyze geospatial information within California state waters. In 2008, we released a new web-based decision support tool for stakeholders to (a) visualize geospatial data layers, (b) draw prospective MPA boundaries with attributed information, (c) assemble prospective MPA boundaries into arrays, (d) share MPA boundaries and arrays with other users, (e) generate graphs and statistics to evaluate MPAs based on science-based guidelines, and (f) share results with users in a place-based discussion forum. Based on Open Source technologies, the MarineMap decision support tool is well documented, freely distributed and modifiable for any area-based planning effort. We will demonstrate the major features of the tool and illustrate how it was used in the MLPAI.

Data Sharing: Partnerships
Kensington C

B07. COASTAL GEMS: A TOOL FOR COORDINATED COASTAL PLANNING AND EDUCATION

Nick Meade, Virginia Coastal Zone Management Program

Coastal Geospatial and Educational Mapping System (Coastal GEMS) is a dynamic Internet mapping application that serves as a gateway to information about Virginia's coastal resources. Coastal GEMS is a collaborative effort, including the data of multiple natural resource agencies and other partnering coastal organizations. The application is designed to create a stronger understanding of how activities on the land and in the water affect one another, highlight the best remaining coastal resources in one big picture, and simplify management decisions by displaying data from all partners in one place. Coastal GEMS includes conservation planning tools and resource "fact sheets," allowing users to better understand coastal resource use and values and enabling them to protect and manage these resources in a sustainable fashion.

B08. ACCESSING COASTAL DATASETS AND MAP SERVICES THROUGH THE GEOSPATIAL ONE STOP PORTAL

Sam Wear and Rob Dollison, U.S. Geological Survey

The new capabilities of Geospatial One-Stop (GOS) portal, (*www.geodata.gov*) are helping improve the quality and strength of the National Spatial Data Infrastructure and these efforts will directly benefit the discovery and use of geospatial data over our nation's costal zones. GOS and the Interagency Working Group on Ocean and Coastal Mapping (IWG-OCM) are moving forward together to improve the inventory of costal data through The Ocean and Coastal Mapping (OCM) Inventory Project. The project offers a clearinghouse for geospatial data and interpretive information, and a registry of mapping activities that will help effectively leverage the high value of Federal, State and local data. New features of the GOS portal include a new search result interface and the capability to check the status and response of published web map services. Also included in the recent version of the GOS portal is expanded access to local government "best available data" map services located in the nation's coastal areas. Available as ArcIMS Image or Web Map Services (WMS), these services can be "fused" with other live map services (federal, state) covering the same geographic footprint. This presentation will provide an overview of new enhancements and functionality to the Geospatial One Stop which provides a wider range of geospatial products and services to support critical programs in coastal zone areas. Several coastal community geospatial datasets and map services will be highlighted. More information can be found at the Oceans and Coasts Community at Geospatial One-Stop (*www.geodata.gov*).

B09. AWARD WINNING COASTAL GEOSPATIAL PROJECTS: A SUCCESSFUL PUBLIC-PRIVATE PARTNERSHIP

John Palatiello, MAPPS

The 2008 MAPPS Geospatial Products and Services Excellence Awards featured two projects in which MAPPS member firms partnered with the NOAA Coastal Services Centger. The 2008 Grand Award winner was Fugro EarthData for the "Mapping a vital marine resource in Texas." Fugro EarthData was given the challenge of creating benthic habitat maps to support the Texas Seagrass Monitoring Program. The goal of the project was to protect the shallow marine environment in the estuaries along the Texas Gulf Coast. The project covered 1,400 square miles of Texas coastal estuaries and involved three elements: high-resolution aerial mapping, object-oriented classification, and quantitative accuracy assessment. Fugro EarthData project was the category winner among Remote Sensing project entries. MAPPS also presented awards in four categories. Photo Science won the

award in the GIS/IT category for the "Legislative Atlas" it developed for NOAA CSC. These projects demonstrate how public sector agencies, working with private sector professional services firms, can successfully serve the public interest and benefit society, particularly coastal environments, through innovative, quality based projects.

Visualization: Real-Time/Rapid
Kensington F

B10. BEACH CONDITIONS REPORTS FOR THE GULF COAST OF FLORIDA: CONSTRUCTING A COLLABORATIVE TOOL FOR THE DISSEMINATION OF REAL-TIME ENVIRONMENTAL CONDITIONS USING OPEN-SOURCE SOFTWARE

Robert Currier, Barbara Kirkpatrick, and Kate Nierenberg, Mote Marine Lab

Driving to your favorite beach only to find it covered with dead fish is no fun. Scientists at Mote Marine Laboratory have eliminated the guessing game by using Linux and open source software to give residents some cool tools for picking the best beach. The Beach Conditions Reports for the Gulf Coast of Florida is a product of Mote Marine Laboratory's Environmental Health Program. The goal of the site is to provide beach goers with near real time beach conditions to optimize their beach selection and enjoyment. These reports are subjective and are provided as a courtesy to the public. The system began in September 2006 with Sarasota County and since that time has expanded to 5 counties in Southwest Florida and 6 counties in the Florida Panhandle, with more areas, counties, and individual beaches being added regularly. Beach reporters patrol the public beaches seven days a week and make assessments of dead fish, water color, respiratory irritation, wind direction, and surf conditions. While the reports are subjective, with no measurements taken, they provide an eyewitness account of current beach conditions. In this presentation we will document the design and implementation of the beach conditions reporting system, provide sample source code and provide links to the open source software used to construct the application. We will discuss the next generation of our application, currently under development, which will provide resource managers with in-depth data mining capabilities and output data in an IOOS-compliant format using advanced web services.

B11. SPATIALLY EXPLICIT FLOOD WARNING SYSTEM FOR THE MEADOWLANDS DISTRICT OF NEW JERSEY

Francisco Artigas, Dom Elefante, Eric Yadlovski, and Alex Marti, Meadowlands Environmental Research Institute
Nicholas Agnoli, New Jersey Meadowlands Commission

Low-lying residential and industrial areas are of great concern to emergency managers because of their susceptibility to tidal flooding and sea level surge. In the northeast, few spatially explicit warning systems are currently in operation despite the fact that fairly accurate warnings on water levels are published and broadcasted a few hours ahead of time. Similarly, comprehensive, detailed spatial information on properties and infrastructure at risk to flooding is also available. This project integrates information from a variety of sources into a real-time ocean surge warning system for the Meadowlands Estuary of New Jersey (District). The system takes into account the predicted flood level broadcasted by federal and state agencies, the existing conditions of tide gates and highlights on a map the residential properties and facilities that keep hazardous materials at risk. Before an event occurs, and once the surge level is known, the system produces detailed maps for 14 District Municipalities which are then made available at least two hours in advance of high water. Flooded areas are then inspected in the field while the event takes place and the location, timing and water elevation is recorded at 14 pre-defined locations. The accuracy of the model is increased by continuously recalibrating the predictions based on this field information. The study describes how the flood maps are calculated, how the model is recalibrated and how the warning is integrated into a system that creates these maps and communicates to emergency management officials the potentially affected areas.

B12. ENHANCED PREDICTION AND VISUALIZATION OF COASTAL INUNDATION ALONG THE NEW ENGLAND COAST DUE TO EXTRA-TROPICAL STORMS

Matthew Pendleton, I.M. Systems Group at NOAA Coastal Services Center
Doug Marcy, NOAA Coastal Services Center

Coastal New England is one of the most densely populated coastal areas in the nation, which is frequently threatened by harsh extra-tropical storms or

"Northeasters." More notable Nor'easters include the devastating blizzard of 1978, the Perfect Storm of 1991, and the more recent Patriots day storm in 2007. These storms wreaked havoc along the New England coast, taking lives, destroying property, and causing billions of dollars in damages. Currently, the effectiveness of warning procedures for storm surge in New England is limited and communicated through broad brush Coastal Flood Warnings, issued by the National Weather Service (NWS), that often cover hundreds of miles of coastline. Previous NOAA assessments conducted with Northeast users in 2005 in Stamford, Connecticut, and Cambridge, Massachusetts, indicated a need for NOAA customers to be able to visualize coastal inundation impacts in graphical, GIS-based formats. An experimental library of high-resolution still-water inundation layers, depth grids, and historical water-level data have been developed for two pilot locations in New England. FEMA Special Flood Hazard Area layers are now being added to visualize zones affected by wave action. The inundation libraries are being incorporated into an experimental Google Maps mapping application to be embedded in NWS weather forecast office websites for both pilot locations. The experimental mapping application will allow NWS customers to ascertain quickly whether they are in a threatened area and to clearly depict both the most probable outcome, and the potential worst-case scenarios.

Poster Reception

3:30 to 5:30 p.m.

Windsor Ballroom

Meet the poster presenters in the Windsor Ballroom at Kingston Plantation for an informal reception. Presenters will be available in front of their posters to share and discuss their ideas. Hors d'oeuvres will be provided. Note that additional guests will incur an added cost of $25 a person.

Wednesday, March 4

Early Morning Sessions

8:30 to 10:00 a.m.

Coastal Mapping: Benthic
Kensington A

C01. IMPROVING AN OBJECT-ORIENTED METHODOLOGY FOR MAPPING TEXAS BENTHIC HABITATS
Chad Lopez, Fugro EarthData, Inc.
Kass Green, Kass Green and Associates
John Wood, Harte Research Institute
James Simons, Texas Parks and Wildlife
Dan Bubser and Joe Muller, Avineon, Inc.
Mark Finkbeiner, NOAA Coastal Services Center
Chris Robinson, I.M. Systems Group at NOAA Coastal Services Center

The state of Texas recently adopted a Seagrass Monitoring Program that calls for the mapping of seagrass beds along the Texas coast to assess status and trends. The NOAA Coastal Services Center is working cooperatively with the Harte Research Institute at Texas A&M University-Corpus Christi and the Coastal Fisheries Division of the Texas Parks and Wildlife Department to develop benthic habitat data to support this need. The NOAA Coastal Services Center chose Fugro EarthData, Inc. and its partners Kass Green and Associates and Avineon, Inc. to map benthic habitats, primarily seagrass beds, along the coastal bend of Texas using digital aerial ortho imagery. Phase 1 of the project consisted of six bay systems along the southern Texas coast and was completed in 2007. Phase 2, which includes the final two bay systems of San Antonio/Espiritu Santo Bays and Lower Laguna Madre, is scheduled to be completed by the end of 2008. The phase 2 project builds upon the semi-automated methods developed for phase 2 by using multiple scales of habitat polygons for mapping, which significantly decreased the amount of manual editing required compared to phase 1. For this paper we will present the updated classification methodology and accuracy results for phase 2 bay systems.

C02. COMPARISON OF DMC, ULTRACAM AND ADS40 IMAGERY FOR BENTHIC HABITAT AND PROPELLER SCAR MAPPING

Kass Green, Kass Green and Associates
Mark Tukman, Tukman Geospatial
Mark Finkbeiner, NOAA Coastal Services Center

This presentation compares the use of ADS40-53, DMC, and UltraCam digital airborne camera imagery for mapping benthic habitat and identifying boat propeller scars in seagrass habitats. The three image data sets were collected over Redfish Bay, Texas, on the same day, under almost identical environmental conditions. Next, the data sets were compared to one another using a variety of criteria. Finally, automated methods were used to create maps of propeller scars and the accuracy of each map was analyzed. Significant findings include the following: 1) Digital airborne ADS40-52, DMC, and UltraCam imagery can be used to effectively map benthic habitat and propeller scars; 2) Imagery from the DMC had the highest spatial accuracy; 3) Spectral separability of benthic habitat class and propeller scars is best in the DMC and the ADS40-52 imagery, and 4) The accuracy of propeller scar maps was highest for maps produced from the ADS40-52 data.

C03. MAPPING SUBAQUEOUS SOILS IN RHODE ISLAND: INTEGRATION OF PEDOLOGIC AND ACOUSTIC APPROACHES

Mike Bradley, Bryan Oakley, and Mark Stolt, University of Rhode Island
Jim Turenne, Natural Resources Conservation Service
Jon Boothroyd, University of Rhode Island

Over the past 4 years, the MapCoast Partnership in Rhode Island has been mapping subaqueous soils and benthic geologic habitats (known to geologists as depositional environments) in shallow estuarine and coastal lagoon environments, utilizing separate but complimentary methods and approaches. Subaqueous soil map units are based on the delineation of subaqueous geologic landforms and landscapes using bathymetric data, aerial photography, and shallow cores (1-2m) while largely ignoring backscatter data derived from acoustic surveys (primarily side-scan sonar). Meanwhile, ongoing geologic mapping of the same areas used full coverage side-scan sonar imagery, surface sediment grab samples and underwater video imagery to interpret benthic geologic habitats, while largely ignoring subaqueous soil survey approaches. The interpreted side-scan data from the geologic mapping provides more detail than traditional single-beam bathymetric surveys, allowing for the potential delineation of additional subaqueous soil units and modification of existing soil map unit boundaries. The subaqueous soil mapping provides additional ground-truth for the interpreted geologic units (in the form of map units and interpretations) as well as additional sediment sample locations. By integrating these approaches, a highly accurate GIS map of subaqueous soils and benthic geologic habitats can be produced.

Land Use Planning
Kensington B

C04. A SPRAWL PATTERN ASSESSMENT TOOL APPLIED TO RESIDENTIAL DEVELOPMENT IN COASTAL NORTH CAROLINA

Thomas Crawford, Department of Geography, East Carolina University

High levels of population growth in coastal U.S. settings give cause for concern about development's effects. Sprawling development may contribute to negative environmental impacts. This study describes the development and application of a GIS-based sprawl pattern assessment tool. The tool is developed using the Python scripting language and can be accessed with ArcGIS's ArcToolbox. Output includes metrics measuring land consumption, leapfrog distance, land use diversity, and highway strip development. The tool is applied to a 300,000 parcel data set representing the entire North Carolina land-ocean interface and covering eight counties. Difficulties and data requirements related to assembling appropriate parcel-level databases required as input to the tool are discussed. The tool provides managers a user-friendly method to quantify historical or prospective land use patterns.

C05. USING DETERMINISTIC MODELS FOR LONG RANGE FUTURE GROWTH IN AN URBAN/RURAL WATERSHED

Stephen Sperry, Clemson University

Gentrification of lake, river and coastal resources is a major issue confronting planning. With the baby boomers aging, there is pressure on water resources by retirement homes. In South Caroline, Lakes Jocassee, Keowee, and Hartwell, are experiencing these issues. This paper demonstrates the development of deterministic models to project future scenarios for development growth for the next 20 years in the Seneca Creek Watershed. The study framework follows Carl Steinitz's Alternative Futures for Changing Landscapes. The models explore the criteria underlying land use location for high-end properties in a fragile environmental region through a deterministic approach in which a set of criteria combine to produce a mapped index of priority based on different selected variables by the researcher and not randomly as in a probabilistic model. The

display of the deterministic variables through tables, combined with the mapping capacity of ArcGIS, allow the region's stakeholders to assess the impact of future development decisions in the watershed.

C06. A MULTI-SCALE ANALYSIS OF LAND COVER CHANGE AND LAND PROTECTION POLICIES ALONG THE CHESAPEAKE BAY SHORELINE
Renee Thompson and Peter Claggett, U.S. Geological Survey

This study characterizes land cover changes along the shoreline of the Chesapeake Bay and interprets those changes as indicators of the effectiveness of Maryland's Critical Area Act and Virginia's Chesapeake Bay Preservation Act. Using a geographic information system and regional land cover data produced by NOAA's Coastal Change Analysis Program (C-CAP), land cover changes at the county-scale and within 305-meters of the shoreline of the Chesapeake Bay are characterized for the periods 1996 to 2001 and 2001 to 2005. The nature of these changes and their inferred causes are validated using aerial photography representing similar time periods. Maryland's Critical Area Act restricts development to varying degrees within 305-meters of the shoreline and requires a natural buffer within 30.5-meters of the shoreline. C-CAP data are used to characterize change within the 305-meter buffer and aerial photographs are used within the 30.5-meter buffer. Virginia's Chesapeake Bay Preservation Act requires local governments to designate and protect areas along the shoreline. C-CAP data are used to characterize land change within and surrounding these local preservation areas. Both the Maryland and Virginia laws are implemented and enforced at the county-scale. Therefore, land cover changes along the shoreline are characterized and compared for each county bordering the Bay. Representatives from various counties experiencing the most and least amount of land change along the shoreline will be consulted about the results from this study to better discern the policies and other actions which may have influenced the observed land changes.

Data Organization and Management
Kensington C

C07. PRESERVATION OF COASTAL COMMUNITY GEOSPATIAL CONTENT: WHAT'S YOUR LONG TERM CARE PLAN FOR AGING DATA?
Zsolt Nagy, North Carolina Center for Geographic Information and Analysis

Geospatial technology provides coastal managers the tools to support temporal studies for analyzing trends, assessing historic events, and ideally to predict and plan for future conditions. The tools exist to support the coastal community on pressing matters concerning climate change, land use development, habitat assessment, and hazard mitigation. Temporal studies, however, require the availability of trustworthy geospatial content created in prior collection activities. Too often, temporal analysis is impeded or jeopardized because there are problems surrounding older, superseded content. Valuable data cannot be found, are difficult to access, not understood, lack documentation, stored in obsolete formats or on obsolete or deteriorating media, or are otherwise unavailable and in poor condition. The North Carolina Geospatial Data Archiving Project was created with funding from the U.S. Library of Congress as part of the National Digital Information Infrastructure and Preservation Program (NDIIPP) to address the issues of preservation and long term access to "digitally born" geospatial data. The partnership is led by North Carolina State University Libraries with the Center for Geographic Information and Analysis. The presentation will serve to expose the preservation problem and initiate a discussion among the coastal community. Highlights will include status reports from recent surveys; an overview of how archivists and geospatial specialists are working to leverage resources; distinctions between simple backup processes for disaster recovery versus true archival, and a summary of steps taken in the state to identify best practices for retention and access to older geospatial content.

C08. A PRAGMATIC CYCLE FOR ON-GOING WATER RESOURCES RESEARCH, DEVELOPMENT, AND MANAGEMENT
Thomas Singleton, Stephen Bourne, and John Hampson, PBS&J

Organizations focused on the natural sciences (water resources, ecology, etc) require tools for literature review, data integration, modeling, and decision support. Decision support systems (DSS) meet these needs through 1) data and knowledge integration, 2) assessment of proposed management plans in terms of organizational objectives and risk, and 3) supporting multiple-stakeholder decision making. While it is clear that DSSs are desirable, it is not clear how to build them. This paper discusses a development approach that focuses on the larger cycle of on-going research. The cycle starts with collaborative management of natural environments—by many stakeholders, often with opposing objectives. A common need for DSSs is unbiased models of these systems that lead to new insight. As more insight is sought, new research questions are raised; questions that are answered by the research community. New technology is then driven by research results to facilitate the collaborative management process. Establishing the collaborative management-research-technology cycle requires a pragmatic approach. First, the community must have ownership of the DSS. Stakeholder

workshops to specify the DSS requirements, formulate its design, and review its use are critical. Second, the DSS must be built progressively, first focusing on pilot areas, eventually moving to a larger scope. Third, the DSS must be built with early success in mind to motivate continued development. Rapid prototyping is an ideal tool for achieving such success. Finally, the DSS (and indeed the entire cycle) must be built to be self-maintaining. Two proposed case studies of cycle implementation will be presented.

C09. THE GREAT LAKES REGIONAL COASTAL DATA MODEL

Guan Wang, Great Lakes Commission
Peter Giencke, Google.com
Roger Gauthier, Great Lakes Commission

As part of a Joint Project Agreement between the Great Lakes Commission and the NOAA Coastal Services Center, work has been initiated to design and implement a comprehensive Great Lakes Coastal Data Model (GLCDM). The purpose of the GLCDM is to improve the gathering, accession, integration, management, use and sharing of geospatial datasets for the coastal zones of the Great Lakes and St. Lawrence River system. Full implementation of the GLCDM is expected to enhance the storage, management of and ready access of spatial and temporal datasets used in process modeling, decision support systems and adaptive management approaches. The data model includes enhanced web-based access to a wide array of geospatial and temporal datasets. The GLCDM is a seamless, integrated, and interoperable schema largely built upon the U.S. Geological Survey National Hydrographic Dataset (NHD). A good example to demonstrate the capacity of GLCDM is the development of the Great Lakes Basin Wetlands Spatial Decision Support System (SDSS), which is a GLC project through the 2007 National Spatial Data Infrastructure (NSDI) Category 4 Cooperative Agreement Program (CAP). Great Lakes Basin Wetlands SDSS is a web-based, spatial decision support toolkit for accessing and comparing wetlands datasets, and available information on hydro-soil across the Great Lakes region. Through the normalization and integration of national, state, and provincial sources of historic wetlands data, combined with web-based query and analysis tools, this spatial decision support toolkit is expected to facilitate high priority wetlands protection and restoration efforts conducted by numerous federal, state and provincial agencies.

Visualization: Mash-ups
Kensington F

C10. GIS, VIRTUAL REALITY, AND COASTAL COMMUNITIES: A ROLE IN COASTAL MANAGEMENT

David Green and Margaret Carlisle, Centre for Marine and Coastal Zone Management, Department of Geography and Environment, University of Aberdeen

Geographical Information Systems (GIS) and the related geospatial technologies have been widely applied in numerous coastal applications, including identifying the impact of developments at the coast, supporting the planning and decision-making process, and modelling environmental scenarios. Additionally, and more recently, Virtual Reality (VR) tools have enabled visualisation of such coastal applications, facilitating a more complete and realistic idea of physical, ecological and socio-economic changes to coastal environments. Initially, most such GIS and VR tools have been expensive, technically sophisticated, or both. Recent developments, however, mean that there are now many cheaper and more accessible alternatives to the traditional high budget software and hardware. This paper explores the potential of a number of low-cost software tools, including freeware GIS and Google Earth (GE), as a means to visualise spatial data and information (both raster and vector) for a number of applications relevant to coastal management, including coastal areas at risk from flooding, proposed waterfront developments, user conflicts and marine spatial planning, and the environmental impact of the proposed location of offshore planning applications involving renewable energy. To illustrate, examples are drawn from a number of recent EU-funded projects. The paper also discusses some of the different ways in which such tools might be exploited and packaged in the future.

C11. GETTING VERSATILE INFORMATICS INTO THE HANDS OF COASTAL DECISION MAKERS

Dean Poucher and Dwayne Porter, Belle W. Baruch Institute for Marine and Coastal Sciences

Coastal managers and other relevant officials need information in a format that they can utilize most efficiently for use in management decisions and communication with stakeholders. Not all managers have an extensive technical background in computer programming and modeling so graphic information needs to be available to them in a user-friendly format. The cost to own and support ESRI based products is not always available in the budgets of coastal decision makers. An easy to use extension is available for Arc Map that will quickly

provide output in a Key Markup Language (KML) based format for users in Google Earth. This sub-program takes what are normally ESRI based GIS datasets and outputs them for GE, making them smaller and easier to display at presentations. Google Earth allows for the "whole picture" to be displayed and provides a basic zoom feature in its operation that displays the areas of interest in a form that provides a direct relation to other known landmarks. Real-time and fixed datasets with metadata in the KML format become powerful additions to the communication forum. This allows managers to easily transport, deliver and use them in presentation. This project demonstrates how other datasets can be used in the same environment providing for an enhanced understanding of the tasks or issues at hand on a global level. The end result is to provide managers and other coastal decision makers with the tools to communicate and understand the graphics that illustrate maritime estuarine environment using the common Google Earth desktop engine.

C12. VISUALIZING DYNAMIC WEATHER AND OCEAN DATA IN GOOGLE EARTH
Pete Giencke, Google.com

Katrina. Climate change. Rising sea levels. Low lake levels. These headliners, and countless others like them, underscore the need to better understand our changing oceans and lakes. Over the past decade, efforts such as the Global Ocean Observing System (GOOS) have added to this understanding, through the creation of interoperable ocean observing systems. These systems, including buoy networks, gliders, UAV's, etc, have resulted in a dramatic increase in the amount of Earth observation data available to the public. Unfortunately, these data tend to be restrictive to mass consumption, owing to large file sizes, incompatible formats, and/or a dearth of user friendly visualization software. Google Earth offers a flexible way to visualize Earth observation data. Marrying high resolution orthoimagery, user friendly query and navigation tools, and the power of OGC's KML standard, Google Earth can make observation data universally understandable and accessible. This presentation will feature examples of meteorological and oceanographic data visualized using KML and Google Earth, along with tools and tips for integrating other such environmental datasets.

Break

10:00 to 10:30 a.m.

Late Morning Sessions

10:30 a.m. to 12:00 p.m.

Coastal Mapping: Sediment Management
Kensington A

D01. PLANNING A BEACH NOURISHMENT PROJECT USING GIS IN PONTE VEDRA BEACH, FLORIDA
Bryan Flynn, Jeffrey Tabar, and Todd DeMunda, PBS&J

During 2007 and the early part of 2008, St. John's County beaches experienced severe erosion due to high winds and large waves. PBS&J's Coastal and Waterways Group was hired by St. John's County to perform a beach nourishment feasibility study. As part of this study, PBS&J utilized GIS throughout the project to compare historical data sets, analyze slope stability, plan offshore borrow site sand searches and prepare permit drawings. Historical data was input and catalogued to effectively analyze the rate of shoreline change and quantify the volume of sand lost in 2007. The slope stability analysis using GIS allowed PBS&J to visually display the complex geotechnical software results in terms easy to understand. The planning of offshore bathymetric and sub-bottom survey transects with GIS allowed for optimization of time on site which was critical during the 2008 storm season. Survey transects were converted from shapefiles to Hypack survey software to complete the field investigation. PBS&J created permit drawings and figures with GIS to plan and coordinate with the regulatory agencies (FDEP, ACOE, and MMS). GIS has allowed PBS&J to accurately determine the volume of sand needed, identify the critical areas for nourishment, locate the best borrow material and obtain regulatory permits for our client.

D02. EDREDGE: AN ENTERPRISE GIS APPLICATION FOR PLANNING, MONITORING, AND MANAGEMENT OF DREDGING OPERATIONS
Linda Lillycrop, Rose Dopsovic, and Gregory Dreaper, U.S. Army Corps of Engineers

The U.S. Army Engineer Research and Development Center and the U.S. Army Corps of Engineers, Mobile District, are developing Enterprise Dredge (eDredge), a comprehensive desktop and web-based enterprise GIS application to enhance existing tools, methodologies, and procedures to conduct and monitor dredging operations and related environmental assessments. Currently, dredging data and information are stored in a variety of different databases, servers, warehouses,

and personal computers. Additionally, tools, methods, and procedures for data management, analysis, and visualization of dredging information are not standardized, and additional tools are needed to meet USACE needs. These factors result in inefficiencies in the process to budget, plan, implement, and monitor dredging operations, and related environmental assessments. eDredge will link dredging related information and databases nationwide and provide standardized tools and methodologies for planning, budgeting, monitoring, and management of USACE dredging operations by providing more efficient tools and capabilities to meet today's challenges of reduced budgets and resources.

D03. HAWAII REGIONAL SEDIMENT MANAGEMENT INTERNET MAPPING SERVICE
Thomas Smith, U.S. Army Corps of Engineers

The Honolulu District of the U.S. Army Corps of Engineers has initiated regional sediment management studies (RSM) in the State of Hawaii. The initial region considered by the Hawaii RSM study is located in Southeast Oahu (SEO), Hawaii, along approximately 12 miles of Pacific Ocean shoreline extending from Mokapu Point to the north through Makapu'u Point to the south. RSM activities have been conducted in the SEO region to document long-term trends in wave climate, identify suitable sand sources, and field regional circulation and wave models. Final products of the SEO/RSM investigations include a historical shoreline change analysis, regional sediment budget, sand source inventory, web-enabled geographic information system platform and SEO/RSM Plan. An Internet Mapping Service (IMS) has been launched that provides access to Hawaii RSM study information in a user friendly publicly accessible framework. The IMS is published on the Honolulu District website and allows downloading of study related information in the form of customized maps.

Hazards and Resilience
Kensington B

D04. DEVELOPMENT OF A QUANTIFIABLE COMMUNITY RESILIENCE INDEX TOOLKIT
Chris Renschler, State University of New York at Buffalo
Scott Miles, Western Washington University
Stephanie Chang, University of British Columbia
Ronald Eguchi and Beverly Adams, ImageCat Inc.
John Pine, Louisiana State University
Suzanne Roussie, State University of New York at Buffalo
Adam Rose, University of Southern California

The development and implementation of an integrated Community Resilience Index (CRI) includes quantifying the status, exposure and recovery of physical, economic, socio-cultural, and ecological capital for communities along the coastal regions of the U.S. portion of the Gulf of Mexico. To evaluate our modeling prototype—ResilUS—we developed a pilot study for coastal communities in four parishes in Southwestern Louisiana that are recovering from the impact of Hurricane Rita (landfall September 24, 2005). The toolkit prototype is based on a conceptual framework for measuring, assessing, and monitoring a CRI that integrates quantitative and qualitative methods using spatial and non-spatial data to identify scientifically defensible indicators for community resilience. When implemented the CRI toolkit should enable local and regional stakeholders to continuously monitor and enhance their resilience against episodic and slow-onset coastal hazards.

D05. TROPICAL STORM / HURRICANE IMPACTS: REAL-TIME TOOLS FOR GRAPPLING WITH UNCERTAINTY WHEN MAKING DECISIONS IN THE MIDST OF SIGNIFICANT HAZARD EVENTS
Steven Stichter, Kinetic Analysis Corporation

Accuracy of tropical storm forecasts has increased measurably in the past two decades. However, significant uncertainty remains in storm track and intensity forecasts. KAC provides real-time hazard and impact assessments of the Official forecasts for active storms globally. To better understand the uncertainty in these forecasts (in particular the range of potential impacts), we employ additional approaches to assessing potential storm hazards and impacts, with the aim of assisting emergency and risk managers with their decision-making in the midst of uncertainty. This presentation will review two additional real-time analysis approaches that KAC currently employs: 1) conducting impact analyses for realistic alternative storm forecast tracks and 2) estimating hazard and damage probabilities using an ensemble approach. 1) KAC monitors a wide range of available forecast models for all active storms, selects the forecast model that is currently doing the best job of forecasting the storm track and intensity, and produces hazard and impact assessments for that 'best objective track' using the KAC TAOS model. Once Official forecasts are available for a storm, KAC also produces hazard and impact estimates for the Official track. 2) For the ensemble analysis, KAC applies its TAOS modeling platform to generate a range of synthetic storm tracks, derived from the current Official storm forecast. Each synthetic storm is then modeled to produce hazards and impacts specific to that track. The results from all storm simulations are then used in an ensemble-based analysis to calculate the probability of experiencing or exceeding set hazard or damage levels.

D06. FEMA'S DIGITAL VISION FOR FLOOD MAPPING PRODUCTS

Scott McAfee, Emily Hirsch, and Jonathan Westcott,
Federal Emergency Management Agency

This presentation will provide detailed information on FEMA's digital vision strategy, the new tools, data products, and standards that are integral. FEMA's digital vision strategy attempts to pull together efforts across the Flood Hazard Mapping Program to 1) deliver new digital products that are as useful and consistent as the paper products, 2) ensure that stakeholders are aware of the digital products and their advantages, and 3) streamline production of public flood hazard products. This session will provide an overview of the strategy and an update on status. A major element of the digital vision strategy is to deliver the flood hazard information in new ways that leverage the new digital technologies. This includes new tools for viewing and using digital flood hazards and updating our cartographic and GIS standards to fit with these new approaches. Starting in Fiscal Year 2009, FEMA will kick-off a multi-year effort to update the coastal flood hazard maps for the entire U.S. Coast. FEMA's effort to update the Nation's coastal FIRMs will result in digital geo-referenced flood hazard data available on-line to the public. The underlying data can be utilized for other coastal assessment uses and the maps and data can be used to assist community planning in addition to NFIP uses. As we proceed, we will integrate with other Risk Analysis programs to increase the effectiveness of the local mitigation planning process by providing quality, integrated risk data and assessments and ultimately reduce the loss of life and property.

Data and Planning Resources
Kensington C

D07. E-ESTUARY: DEVELOPING A DECISION-SUPPORT SYSTEM FOR COASTAL MANAGEMENT IN THE CONTERMINOUS UNITED STATES

Naomi Detenbeck, Marguerite Pelletier, Mohamed Abdelrhman, and Steve Rego,
U.S. Environmental Protection Agency (EPA)
Marilyn tenBrink, U.S. EPA/ MIT-USGS Science Impact Collaborative
Jim Latimer, U.S. Environmental Protection Agency

Ready access to geographic information is needed to support management decisions for estuaries at local, state, regional, and national scales. The U.S. Environmental Protection Agency (US EPA) is developing e-Estuary, a decision-support system for coastal management. E-Estuary has three elements: an estuarine geo-referenced relational database, associated watershed GIS coverages, and tools to support decision-making. A population of 300 estuaries with associated watersheds at the HUC-10 scale (16-100 ha) or larger within the conterminous U.S. has been identified for characterization of estuarine geomorphology, tidal and hydrologic regime, and land-use/land-cover of associated watersheds. Historic estuarine water-quality data from Federal and State agencies and local estuarine management groups have been integrated within a geodatabase structure consistent with the WQ-X schema established by US EPA for XML-based data transfer between reporting units and national databases. An ArcHydro-based geodatabase structure is being created to facilitate merger of national hydrographic databases (NHD-Plus) with emerging coastal data models (ACES), to provide linkages with web services for delivery of time series data, and to provide linkages between monitoring data and modeling applications. Tools and associated datasets under development include: 1) nationwide classification schemes to reduce variance in nutrient-response relationships, 2) regional regression relationships to normalize total organic carbon in sediments to sediment grain-size in order to support diagnosis of eutrophication, 3) estuary-scale segmentation and parameterization of simple tidal prism models to refine loading targets, and 4) habitat zonation schemes to help refine aquatic life designated uses.

D08. THE NEW YORK OCEAN AND GREAT LAKES ATLAS: SUPPORTING NEW YORK'S MANDATE TO IMPLEMENT ECOSYSTEM-BASED MANAGEMENT STATEWIDE

Jeffrey Herter and Rebecca Newhall, New York Department of State

Article 14 of New York's Environmental Conservation Law, the New York Ocean and Great Lakes Ecosystem Conservation Act (Act), Section 14-0111, part 4 calls for creation of "...an ocean and coastal resources atlas". New York State Department of State, Division of Coastal Resources, in coordination with GIS representatives of New York Ocean and Great Lakes Ecosystem Conservation Council member agencies, has been working on developing the New York Ocean and Great Lakes Atlas (Atlas) since September 2006, including data collection efforts, application development and infrastructure. Application development started from code for the NYS Digital Orthophoto Application donated by the NYS Office of Cyber Security and Critical Infrastructure Coordination. Currently the Atlas has over 1000 datasets for viewing and download including: biota, boundaries, elevation, bathymetry, environment, geology, imagery, planning, social, structure, and transportation. Data available through the Atlas covers all of New York State with an emphasis on data related to or connected with influences on New York's ocean and Great Lakes ecosystems. Functionalities such as vector data download, user defined searches, book marking views, and attaching images to e-mails, were

built into donated code. Data is provided in open source format so it can be downloaded directly into publicly available geospatial applications such as Google Earth, as well as ESRI and MapInfo products. Progress on development of Atlas v2.0, a web application with enhanced data search capabilities and data published to and ingested from Web Mapping Services and Web Feature Services, will be covered.

D09. SUPPORTING COASTAL HAZARDS PLANNING IN CONNECTICUT: THE CONNECTICUT COASTAL HAZARDS PORTAL AND VISUALIZATION TOOL

Joel Johnson, NOAA Coastal Fellow at Connecticut Dept. of Environmental Protection

Connecticut's coast is densely populated and full of expensive real estate. In some towns, critical infrastructure such as road, rail, and public drinking water and sanitation facilities are close enough to sea level to be threatened by flooding and erosion. Accelerated sea level rise and the potential for stronger, more frequent storms will make these hazards worse. However, Connecticut's current hazards planning does not account for these future scenarios. The Connecticut Coastal Hazards Data Portal and Visualization Tool is a website (currently under construction) that provides a foundation for more comprehensive coastal hazards management planning by centralizing, analyzing, and displaying information about coastal hazards and coastal hazards management for a wide audience, including coastal managers, regional planners, municipal officials, property owners and the general public. In addition to information about coastal hazards in Connecticut, including mitigation and adaptation resources, the contents of a recently completed State of Knowledge Report, photo galleries, links to buoys, webcams, storm prediction centers, and a pithy primer, the website will also contain a map and visualization tool that features two forms of inundation modeling. One model estimates the extent of inundation across various scenarios of sea level rise. Another estimates the extent of inundation from storm surges associated with various hurricane scenarios. In addition to the output from the inundation models, the digital map will include other spatial data such as aerial photography, land-use, historic shorelines, critical infrastructure, FEMA flood zones, etc.

Marine Planning: Recreational Boating
Kensington F

D10. THE GREAT LAKES OBSERVING SYSTEM'S HARBORVIEW APPLICATION: A MAPPING MASHUP THAT SUPPORTS RECREATIONAL BOATING

David Hart, University of Wisconsin Sea Grant
Roger Gauthier and Guan Wang, Great Lakes Commission
Pete Giencke, Bluewater Geospatial
Ben Coakley and Marie Vicksta, University of Wisconsin-Madison

HarborView is an integrated map viewer that supports safe and efficient recreational boating on the Great Lakes. It integrates current observations and information about coastal attractions at a local scale so that boaters can be informed about both weather conditions and the characteristics of their destination. Initial development focuses on five harbor communities on each of the Great Lakes. The HarborView prototype is being developed using the Google Maps Application Programming Interface (API). The Google Maps API seemed a good choice because it provides good base maps, can easily incorporate distributed data sources (interoperable web map services and KML), and supports Google searches for a wide variety of additional map features. Before settling on Google Maps, project staff experimented with open source mapping interfaces including Open Layers and Chameleon. Map layers are categorized by point observations, imagery, model output, and coastal attractions. Point observations include met stations, buoys, and voluntary observing ships, as well as web cams. Imagery layers include MODIS and GOES satellite images and base reflectivity from NEXRAD stations. Model output includes wind direction and wave height generated by the Great Lakes Environmental Research Lab. Coastal attractions include boat access, parks, shipwrecks, lighthouses. There is the potential to add many other map layers. Perhaps the most flexible aspect of HarborView is the ability to use a Google search to discover and map businesses ranging from Italian restaurants to tackle shops.

D11. RECREATIONAL BOATING SAFETY RISK ANALYSIS

Russell Watkins and Charles Sidman, Florida Sea Grant

A prototype risk model was developed to assess and rank the effects of waterway characteristics, marine infrastructure and boater behavior on boating safety. The model was encapsulated in a decision support system framework utilizing geospatial data compiled from multiple government agencies, survey data from

subject matter experts and public input from participatory workshops. The outcome was a numeric weighting and ranking of waterway segments according to perceived risk to boating safety. This outcome guided the establishment of new, and revision of existing boating regulatory areas, by rule adoption, in the Intracoastal Waterway in southeast Florida. A variety of statistical and visualization methods were employed to calculate, display and explain the concepts of perceived risk and waterway risk segments.

D12. BOATING CHARACTERIZATION IN FLORIDA'S COASTAL AND MARINE WATERS
Henry Norris and William Sargent, Florida Fish and Wildlife Conservation Commission

Boating is a key element in Florida's coastal lifestyle and a major contributor to the economy. Florida ranks first in the nation for recreational power boat registrations with over one million registered boats. The Marine Industries Association of Florida estimates the total economic impact of boating to be twice that of the citrus industry. Increasing demands for public access, increasing pressures on the coastal environment, and increasing public awareness for resource protection create a critical need for boating information to be available to the public and for decision makers. Information on topics such as recreational boating traffic patterns, preferred water access points and destinations, preferred recreational boating activities, user conflicts, existing waterway infrastructure, public and private facilities, management areas, and natural resources is required for proactive coastal resource management. The Florida Fish and Wildlife Conservation Commission, the Florida Coastal Management Program and the Florida Sea Grant Program are teaming up to provide state and county planners with an array of information tools to assist in long range planning for adequate access to and protection of local waterways. A map based questionnaire serves as a structured process for boaters to provide information about themselves, their boating preferences, and their travel patterns on the water. This user based boat traffic information is then analyzed with information about waterway infrastructure, natural resources, and existing waterway regulations to produce maps and models for long term planning to provide continued access to waterways while still protecting natural resources.

Plenary Lunch

12:00 to 2:00 p.m.

Kensington Ballroom

Coastal GeoTools –
Looking Back, Assessing the Present, Predicting the Future

Chris Friel, Environmental Systems Research Institute
David Hart, University of Wisconsin Sea Grant
Anne Hale Miglarese, Booz Allen Hamilton
Henry Norris, Fish and Wildlife Research Institute,
Florida Fish and Wildlife Conservation Commission
Lynda Wayne, Federal Geographic Data Committee, GeoMaxim

Early Afternoon Sessions

2:00 to 3:30 p.m.

Coastal Mapping: Structures
Kensington A

E01. GEOSPATIAL MANAGEMENT OF TEMPORARY EROSION CONTROL STRUCTURES (SANDBAGS) ALONG THE OCEANFRONT SHORELINE IN NORTH CAROLINA
Kenneth Richardson and Jeffrey Warren,
North Carolina Division of Coastal Management

This paper will present a spatial data tool developed by the North Carolina Division of Coastal Management (DCM) to manage and enforce oceanfront sandbag structure policy. Although shoreline hardening is banned along the State's oceanfront, sandbags may be permitted as a temporary erosion control measure for imminently threatened structures for periods spanning two to five years. The sandbags must be removed once the threat is removed from the structure (or vice versa) unless the bags have become covered with both sand and stable, natural vegetation (in which case they can remain in place indefinitely). Numerous coast-wide time extensions have been granted for sandbag structures during the past decade, with the last extension expiring on May 1, 2008. To streamline sandbag

management and enforcement procedures after this date, DCM developed a Google Earth-based spatial database to display information such as location, site pictures, and permit information. Numerous other data fields were used to quantify the degree of non-compliance (i.e., numerically rank each structure with an objective index and pursue the most egregious violations first). Of the 358 sandbag structures along 326 miles of oceanfront, 150 were identified as non-compliant and subject to removal. The nine variables used in the removal index were: percentage of exposed bags, percentage of stable vegetation, impedance to public access, integrity of bags, community plans for inlet relocation, community plans for beach fill, age of bags, structure being protected, and public versus private ownership of structure being protected.

E02. GIS MANAGEMENT OF NEW YORK CITY'S WATERFRONT INFRASTRUCTURE
Stephen Famularo, Ocean and Coastal Consultants, Inc.
Brian Craine, New York City Economic Development Corporation
James Hall, Bowne Management Systems, Inc.

Since 2001, the New York City Economic Development Corporation (EDC) has been developing a comprehensive GIS-based map of New York City's Waterfront Assets. This map of the City's digital coast consists of structure types, conditions, and photographs in a geodatabase. This inventory of marine structures requires near constant inspection, maintenance and rehabilitation to keep safe the City's working and recreational link to the harbor. In order to manage these activities, EDC is creating a web-based marine planning application and database called the Waterfront Facilities Maintenance Management System (WFMMS). The WFMMS will assist EDC with managing its waterfront properties and structures, with the future plan to expand the application's reach to other City-owned Waterfront sites. The WFMMS displays a wide range of marine geographic data; allows adding, editing and updating inspection results; and provides rapid querying and visualization of both spatial and non-spatial data. Typical marine data includes structure types, FEMA flood zone maps, berth locations, and bathymetry. This relatively static geographic information is supplemented with more dynamic information on structural condition, status of regular maintenance, and rehabilitation recommendations and costs. Both static and dynamic data sets are brought together in both standard and customizable reports that will assist EDC in planning for inspections, prioritizing resources, and requesting funds for capital and maintenance projects. The WFMMS project is currently in development with final completion scheduled for 2009.

E03. ASSESSING CONDITION OF COASTAL STRUCTURES
Rose Dopsovic, U.S. Army Corps of Engineers

Navigation project maintenance is a continuous process that spans the life of the coastal project. The goal of maintenance is to recognize potential problems and take the appropriate actions to ensure the project continues to function at an acceptable level. The major USACE District and Division commands have responsibility for establishing periodic inspection procedures, intervals, etc., for civil works projects. However, standardized inspection methodology across all USACE Field Offices is lacking. With the inclusion of a GIS component to assist in the condition index reporting, data can begin to be gathered, integrated, and managed for comparisons and change assessments in a more standard approach. GIS provides uniform methodology to organize and maintain data for many years through geodatabases and spatial data standards. With standard databases as the foundation, tools and techniques can be deployed across the Corps to aid in standardizing coastal structure condition assessments and results from these assessments. This will make it much easier to compare the condition of a structure on the Pacific coast with a structure on the Atlantic coast. A key element in a national capability that utilizes standard data formats and supporting analysis tools is standard data about the structures to base analysis on and to support the actual on-site inspection. Using the National Coastal Mapping Program data as a foundation, the Coastal Structures Condition Assessment and Standardized Reporting Application (COSCA) was developed to interpret coastal GIS datasets and translate them into a condition for the selected structure.

Ecosystem Based Management (EBM) Tools I
Kensington B

E04. FACILITATING PLANNING ACROSS THE LAND-SEA INTERFACE THROUGH INTEROPERATION OF THREE DECISION SUPPORT TOOLS
Patrick Crist, NatureServe

Integrating conservation assessment and planning across ecosystems is a highly complex endeavor requiring sophisticated modeling and decision support tools. Existing tools were developed typically to serve single sectors and ecosystems, however. Our objective was to explore and demonstrate how existing tools could be interoperated to support cross sector and cross ecosystem analysis and planning. Among demonstration sites, we interoperated a land use planning tool—

CommunityViz, a conservation planning tool—NatureServe Vista, and a non-point source pollution modeling tool—NOAA's N-SPECT software. These demonstration projects were conducted in realistic decision environments involving stakeholders, decision makers, local scientific organizations, and implementers. We developed an interaction model for the exchange of data and iterative analyses among the tools; populated a common database accessed by each tool; and conducted a series of analyses that integrated inputs and outputs among the tools. We concluded that the interoperability among these tools does substantially increase the decision capability necessary to conduct such cross sector/ecosystem planning and that interoperability is already well supported by their common GIS platform. However, we also identified a number of areas suitable for automating interoperability among the tools to make this process more accessible to local planners and resource managers.

E05. APPLICATION OF THE NOAA HABITAT PRIORITY PLANNER TOOL FOR THE ADVANCEMENT OF RESTORATION GOALS OF THE GREAT LAKES REGIONAL COLLABORATIVE
Richard Garcia, Great Lakes Commission

The Great Lakes Commission (GLC) is working in partnership with the NOAA Coastal Services Center (CSC) to demonstrate the capabilities of the Habitat Priority Planner (HPP). The HPP is a spatial decision support tool designed to facilitate the prioritization of areas in the landscape or seascape for conservation or restoration actions and to engage stakeholders. The HPP tool will be used to highlight its functionality in implementing the Great Lakes Regional Collaborative (GLRC) strategies, specifically the goal to protect and restore 200,000 acres of wetlands in the Great Lakes basin. The HPP will be applied to two projects identified within the U.S. Army Corps of Engineers Great Lakes Habitat Initiative (GLHI) projects database, an Internet-based inventory of high-value projects to protect and restore coastal wetlands and aquatic habitat in the Great Lakes that have been proposed for funding, but not yet implemented. These projects will demonstrate how HPP tools are used to generate output which can better inform stakeholders, build consensus for habitat projects and bridge the gap between the regional needs identified in the GLRC strategies and the programs that provide funding for "on-the-ground" actions.

E06. MULTI-CRITERIA GIS ANALYSIS IN CONSERVATION OF COASTAL LANDS
Yuri Gorokhovich, Lehman College

Multi-criteria GIS analysis includes set of spatial variables and selected criteria that can be used to optimize a decision making. In conservation of coastal lands optimization of decision includes a prioritization of coastal vacant lands scheduled for acquisition. The prioritization should help coastal managers to evaluate possible scenarios and select the most appropriate vacant land parcels. Such spatial variables as proximity of vacant land parcels to the coastline or wetlands or already preserved public lands, size of vacant parcels, etc., play an important role in decision making. Presented study describes methodology based on multi-criteria GIS analysis using size of available vacant parcels in New York coast, their proximities to natural and man-made features and protected lands. In this study the traditional multi-criteria analysis was greatly enhanced by developed scenarios when spatial data were assigned different weights; results of these scenarios were statistically evaluated to create an optimized set of vacant land parcels with highest priority. Developed methodology can be used as a decision-making tool by coastal managers dealing with a problem of prioritization of the coastal vacant land parcels for future acquisitions.

Data Sharing: Conservation
Kensington C

E07. FLORIDA'S OCEAN AND COASTAL COUNCIL: RESOURCE ASSESSMENT
Rob Hudson, Photo Science

The Florida Fish and Wildlife Conservation Commission (FWC) was tasked by the Florida Ocean and Coastal Council (FOCC) to design a Resource Assessment to support the FOCC's mission to "promote innovative research and the use of scientific results to guide management and stewardship of Florida's ocean and coastal resources for future generations." The Resource Assessment is authorized by Florida's "Oceans and Coastal Resources Act" and is envisioned to be a baseline of information to assist with the development of the FOCC's Annual Research Plan. The legislation did not dictate a technical approach on the implementation of the Resource Assessment. The FOCC noted that the Resource Assessment should

be a web enabled information system to provide access to coastal and ocean information created by state agencies and the research community. The Resource Assessment is considered a "portal" that contains, or links to, information regarding coastal resources and human uses. This information includes synthesized products and primary observations. The legislation calls for the Resource Assessment to serve the FOCC, legislators, and their staff. However, all user groups were taken into consideration for the functional requirements. The Resource Assessment is described in terms of a "two-tier" system. The first "tier" would be a simple query and mapping interface that enables end users to obtain information as reports, maps, and summary information. The second "tier" would include more sophisticated capabilities that would result in the retrieval of data/primary observations.

E08. DESIGN AND APPLICATION OF THE GREAT LAKES HABITAT INITIATIVE (GLHI) DATABASE

Roger Gauthier, Guan Wang, Hao Zhuang, and Kristina Donnelly, Great Lakes Commission

In response to needs outlined by the Great Lakes Interagency Federal Task Force, the U.S. Army Corps of Engineers initiated the two-year Great Lakes Habitat Initiative (GLHI) to develop an implementation plan for the protection and restoration of wetlands and aquatic habitat that builds upon the recommendations of the Strategy of the Great Lakes Regional Collaboration. The GLHI includes an integrated web-based data structure that identifies site-specific projects, potential funding sources and restoration objectives. The web-based data entry and query functions are built upon PostgreSQL/PostGIS open source spatial database tools with user selectable queries displayed with Google Earth. The GLHI database automatically populates geospatial datasets for the Great Lakes coastal zones and tributary watersheds, based upon project coordinates selected on-screen by users. These geospatial themes include state/county boundaries, congressional districts, land uses and wetlands classifications (C-CAP, NWI, etc.), SURGGO soils, rare, endangered and threatened species affected, and pre-defined restoration project areas (e.g., TNC Blueprint and IJC Areas of Concern). The presentation will showcase applications of the integrated GLHI database by various Great Lakes state agencies, Native American communities and non-governmental organizations to facilitate and expedite cost-shared ecological protection and restoration projects.

E09. INTERNET-BASED, GEOSPATIAL PLANNING TOOLS FOR WATERSHED-SCALE STORMWATER MANAGEMENT

Scott Haag, Institute of Marine and Coastal Sciences
Richard Lathrop, Center for Remote Sensing and Spatial Analysis

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.

Water Quality Monitoring
Kensington F

E10. SEAGRASS MONITORING AS A COMPLEMENT TO WATER QUALITY MONITORING IN COASTAL EMBAYMENTS OF SOUTHERN MASSACHUSETTS

Charles Costello, Massachusetts Department of Environmental Protection

Eelgrass (*Zostera marina L.*) meadows play an important role in coastal environments by stabilizing sediments, sheltering and nourishing fish, shellfish and wildlife, and preserving water quality while filtering sediments and recycling nutrients. Because they grow in nearshore environments eelgrass beds are

vulnerable to coastal development and since they are responsive to perturbations they can be used as an indicator of ecosystem health. In order to study the correlation between wastewater discharges of nitrogen, degrading water quality and eelgrass declines in southeastern Massachusetts, MADEP undertook a long-term statewide mapping program (commencing in 1994) to evaluate the status and trend of eelgrass abundance. Within MADEP the eelgrass mapping project is being closely coordinated with the Massachusetts Estuaries Project (MEP), a multi-year $12 million collaboration among coastal communities designed to address the impact of excess nutrient loading in Massachusetts coastal watersheds. MADEP is using remote sensing techniques and ground truthing to develop a database of seagrass distribution and abundance and has 12 years of mapping data showing that eelgrass has declined in a majority of 30 estuaries inventoried over a period of 10-12 years. Rates of decline average 3 % y-1 with some declines as fast as 5-8 % y-1. During the 12 year period eelgrass has completely disappeared from some embayments. These declines are accompanied by a loss of important positive naturally occurring feedback loops for maintaining good water quality which led to changes in the bio-physical state of these embayments. MADEP has also been in the forefront of water quality investigations by evaluating the utility of incorporating an optical water quality model into future eelgrass conservation and restoration programs. The optical water quality model is being developed to link eelgrass declines with factors such as chlorophyll, suspended material and dissolved organic matter that influence water transparency and may be responsive to management actions.

E11. USING MOORED ARRAYS AND HYPERSPECTRAL AERIAL IMAGERY TO DEVELOP EELGRASS-BASED NUTRIENT CRITERIA FOR NEW HAMPSHIRE'S GREAT BAY ESTUARY

John Morrison and Shachak Pe'eri, University of New Hampshire
Philip Trowbridge, New Hampshire Estuaries Project
Frederick Short, University of New Hampshire

Increasing nitrogen concentrations and declining eelgrass beds in the Great Bay Estuary, NH are clear indicators of impending problems for the state's estuaries. A workgroup established in 2005 by the NH Department of Environmental Services and the NH Estuaries Project (NHEP) adopted eelgrass survival as the water quality target for nutrient criteria development for NH's estuaries. In 2007, the NHEP received grant from the U.S. Environmental Protection Agency to collect water quality information including that from moored sensors and hyper-spectral imagery data of the Great Bay Estuary. A second grant in 2008 was directed at determining the influence of nuisance macroalgae proliferation on eelgrass bed extent in the context of eutrophication. Here we present the results of these two projects with the spatial distributions of water quality, shallow water bathymetry, and the extent of eelgrass and macroalgae. The results are discussed with respect to eelgrass survivability models, historical eelgrass distributions, and using eutrophication responses in the Great Bay Estuary as a model for other northern, macrotidal estuaries. The expected outcome of this research will support the development of numeric nutrient criteria for NH's estuaries.

E12. GLENDA-GIS: AN ON-LINE, INTERACTIVE GIS TOOL FOR ACCESSING, VIEWING AND USING GREAT LAKES WATER QUALITY MONITORING DATA

Andriy Zhalnin, Department of Forestry and Natural Resources, Purdue University
Jacqueline Adams and Elizabeth Malloy,
U.S. Environmental Protection Agency Great Lakes National Program Office
Richard Farnsworth, Department of Forestry and Natural Resources, Purdue University

The Great Lakes National Program Office (GLNPO) has been collecting environmental data since the early 80s. Currently, users access, query and download subsets of the data of interest to the users via the Great Lakes Environmental Database (GLENDA). One straightforward and overlooked use of the data is its spatial component. GLENDA-GIS is a prototype interactive, on-line GIS tool that allows users to spatially view and analyze Great Lakes water quality data. The map of monitoring stations serves two purposes: spatially display the vast monitoring network and act as an access point to available water quality data by monitoring station. Where sufficient data exist, surface maps of individual water quality variables allow users to view variations within each lake. Users also have access to several GIS tool boxes that allow them to examine interactions among variables, create and annotate maps, export maps and data. Base maps that display lake depth, bathymetry contours, and bottom relief are available for use as background maps or further inputs into modeling efforts. In addition, maps of terrestrial features (e.g., watersheds land cover, streams, wetlands, and topography) of the Great Lakes are available to view and examine lake-land interactions. During phase two of this project, we plan to incorporate other databases and add statistical tools to examine significant spatial relationships within individual data sets and among datasets during a year and across multiple years. Finally, we will link to other Great Lakes map services displaying important data.

Break

3:30 to 4:00 p.m.

Late Afternoon Sessions

4:00 to 5:30 p.m.

Coastal Mapping: Topo/Bathy
Kensington A

F01. BARE EARTH CLASSIFICATION TOOLS FOR COASTAL CONSERVATION
Celeste Rose and Carie Broussard, Bowhead for U.S. Army Corps of Engineers
Chris Macon and Charles Wiggins, U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) Headquarters funded the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) to collect lidar, RGB, and hyperspectral imagery to support the USACE National Coastal Mapping Program . Data were collected using the coastal mapping and charting system Compact Hydrographic Airborne Rapid Total Survey (CHARTS). CHARTS is the U.S. Naval Oceanographic Office program name for an Optech, Inc. SHOALS 3000T20-E. CHARTS comprises a 3 -kHz bathymetric lidar, a 20 kHz topographic lidar, a DuncanTech DT4000 high-resolution digital camera, and a Compact Airborne Spectrographic Imager (CASI) – 1500. A suite of GIS products are generated from the combination of the lidar elevations and hyperspectral imagery collected to reflect a basic land coverage classification. This classification discriminates between land and water; bare earth and vegetated ground; roads and buildings; healthy vegetation and unhealthy vegetation; and trees and shrubs. In the past few years, JALBTCX has evaluated various bare earth classification methods. The investigation focused on accuracy and time required to produce regional scale products. This paper will outline the results of the bare earth classification comparison.

F02. CHARTS DATA FUSION: MULTI-SENSOR IMAGERY CO-REGISTRATION
Shachak Pe'eri and Yuri Rzhanov, University of New Hampshire

The compact hydrographic airborne rapid total survey (CHARTS) is a USACE sensor system that includes a SHOALS-3000 (3-kHz bathymetric laser and a 20-kHz topographic laser), CASI-1500 hyperspectral scanner, and a DuncanTech (DT)-4000 digital RGB camera. The datasets produced from each sensor in CHARTS contributes a specific aspect according to its physical capabilities and limitations. Fusion of data products from a multi-sensor collection has the potential to perform a comprehensive survey and to produce tools for geo-analysis, especially for coastal research. A basic requirement in the data fusion is the co-registration between the datasets. Data from GPS/INS was intentionally ignored to simulate a situation where data can be corrupt or absent and also to check quality of geo-referencing of the products. The pixel resolution of the different datasets should be smaller than a pixel resolution of the highest spatial-resolution data set for the registration. This task is extremely hard to achieve in aerial remote-sensing even when using auxiliary positioning and attitude data such as GPS/INS flight logs. Each of the three sensors operates differently and require a different approach for registration: SHOALS-3000 (whiskbroom), CASI-1500 (pushbroom), and a DuncanTech (DT)-4000 (frame capture). Preliminary results show good results of registration between the different sensors. This study is the first step in the investigation of the CHARTS system to characterize, quantify and monitor the coastal zone.

F03. USING A TOPOBATHY SURFACE TO INFORM COASTAL DECISIONS
Lynne Dingerson, The Baldwin Group at NOAA Coastal Services Center

A topobathy digital elevation model (DEM) is a single surface that combines the land elevation with the seafloor surface and which can be used to examine processes that occur across the coastal and nearshore areas. Using a high-accuracy seamless topobathy DEM is essential to understanding where water will move when modeling processes such as sea level rise and inundation. A Roadmap to a Seamless Topobathy Surface (Roadmap) is a series of documents and maps that seeks to improve and streamline the process of creating a seamless topobathy DEM. It aims to make topographic and bathymetric data and reference information accessible and make connections between data set quality and DEM application. Current emphasis is on describing the coastal management applications of a topobathy surface, including shoreline delineation, wetland mapping, and inundation modeling. In addition, work has just begun on a topobathy demonstration project in the Great Lakes that illustrates how a topobathy surface can be used to assess coastal habitat change in the face of dropping lake levels. These recent efforts will be the focus of this presentation.

Ecosystem Based Management (EBM) Tools II
Kensington B

F04. SOFTWARE TOOLS FOR COASTAL-MARINE ECOSYSTEM-BASED MANAGEMENT: DO WE HAVE THE TOOLS PRACTITIONERS ARE ASKING FOR?

Sarah Carr and Patrick Crist, NatureServe
Dan Dorfman, Intelligent Marine Planning
Lindsay Elder, NatureServe
Patrick Halpin, Daniel Dunn, and Jason Roberts,
Duke University Marine Geospatial Ecology Laboratory

The Coastal-Marine Ecosystem-Based Management (EBM) Tools Network is a voluntary alliance of EBM tool users, researchers, and providers to promote the awareness, development, and effective use of software tools that can help implement EBM in coastal and marine environments and their watersheds. Since its start in 2006, the Network has conducted a survey of the EBM tool needs of EBM practitioners worldwide; hosted six tools awareness workshops at professional conferences in the United States and Australia, two tools awareness "webinars", and a multi-day tools training in Australia for Pacific practitioners; and maintained a publicly-accessible database of EBM tools. This presentation will give a summary of the results of EBM tool needs assessment along with input on tool needs we have received from EBM practitioners at the workshops, webinars, and multi-day training. We will compare these needs to the tools available in the EBM Tools Database to determine areas where EBM tools research and development should be focused in the coming years.

F05. HABITAT MODELING WITH MARINE GEOSPATIAL ECOLOGY TOOLS: AN OPEN-SOURCE, INTEROPERABLE GEOPROCESSING TOOLBOX FOR COASTAL AND MARINE CONSERVATION AND RESEARCH

Jason Roberts and Benjamin Best,
Duke University Marine Geospatial Ecology Laboratory
Eric Treml, University of Queensland School of Integrative Biology
Daniel Dunn and Patrick Halpin, Duke University Marine Geospatial Ecology Laboratory

Marine Geospatial Ecology Tools (MGET) contains over 150 geoprocessing tools designed for conservation planners and coastal and marine researchers. The tools are highly modular and may be linked together in GIS workflows to perform many different spatially-explicit analyses, such as modeling species' habitats, summarizing fishing effort and catch, identifying oceanographic features such as fronts and eddies, and simulating larval dispersal by ocean currents. A novel feature of MGET is its high degree of interoperability. MGET tools are written mainly in the Python and C++ programming languages, but some tools invoke R and MATLAB to perform advanced statistical and mathematical analyses. MGET hides this complexity by wrapping each tool in a user-friendly ArcGIS geoprocessing interface. Through this integration, MGET extends powerful analytic tools to ArcGIS users without requiring them to learn computer programming. For programmers, MGET exposes each tool from a Python module and a COM Automation component, so programmers can invoke the tools directly from code. In this talk, we will give a short tour of MGET by walking through a typical habitat modeling scenario. Starting with point observations of a marine animal and with time series oceanographic data downloaded from NOAA and NASA, we will demonstrate how to batch-sample oceanographic data at the points, build a multivariate statistical model of the presence/absence of the animal, evaluate the model's performance, and generate maps of predicted habitat. We will also describe how MGET integrates ArcGIS with R, and show how to use MGET to execute arbitrary R code from ArcGIS.

F06. MAPTITE: DEM WATER LEVEL ANALYZER FOR HABITAT RESTORATION PROJECTS

Ken Buja, NOAA

Proper integration of accurate land elevation and tide data in the design and planting of marsh restoration sites will increase success rates in terms of marsh stability, primary productivity, habitat value, and a site's ability to keep pace with sea level rise. Accurate predictions of plant ranges will help plants become established more quickly, encourage plant coalescence, site stabilization, and the trajectory toward natural marsh equivalence. A GIS tool for achieving this integration will reduce costs by improving efficiencies in site design and planting and by reducing plant mortality and associated labor costs. MAPTITE (Marsh Analysis and Planning Tool Integrating Tides and Elevations) is an ArcGIS tool that provides restoration managers with a quick way to simulate water level changes on an elevation model for resource management and research issues. Its primary purpose is to automate the process of connecting tidal datums and land elevations to produce sea grass planting zones for coastal habitat restoration projects. The tool requires an elevation model of the project site, offset values to relate local tidal datums to land elevations and the tidal ranges for plant species to be included at the site. Outputs include shapefiles of planting zones on the elevation model for each grass species, overlap areas and statistics such as area of planting zones and numbers of plants in each planting zone.

Data Sharing: Standards I
Kensington C

F07. CLASSIFYING AND MAPPING BENTHIC DATA USING THE COASTAL AND MARINE ECOLOGICAL CLASSIFICATION STANDARD (CMECS)
Kathy Goodin, NatureServe
Becky Allee and Mark Finkbeiner, NOAA Coastal Services Center
Danielle Bamford, The Baldwin Group at NOAA Coastal Services Center
Christopher Madden, NatureServe

Coastal planners and resource managers routinely face challenges in ensuring data availability, quality, and consistency in aquatic environments. This lack of suitable data has prompted the National Oceanic and Atmospheric Administration's Coastal Services Center, in partnership with NatureServe, to develop the Coastal and Marine Ecological Classification Standard Version III (CMECS), a standard ecological classification system that is universally applicable for coastal and marine systems and complementary to existing wetland and upland systems. The CMECS framework accommodates the required physical, biological, and chemical information that collectively determines a marine habitat type. This aids managers in better understanding the processes impacting these habitats. This presentation will focus on a brief introduction to CMECS and a discussion of importance of CMECS as a standard in the Federal Geographic Data Committee. This presentation will also highlight how other frequently used and accepted standards may be crosswalked into CMECS. Since it is also essential that CMECS be a mappable standard, the final portion of the presentation will focus on pilot mapping efforts utilizing CMECS and applications of the standard.

F08. THE SIGNIFICANCE OF STANDARDIZED WETLANDS MAPPING DATA IN BUILDING THE DIGITAL COAST
Marti McGuire, NOAA, member of FGDC Wetlands Subcommittee

The U.S. Fish and Wildlife Service has responsibility for mapping wetlands in the United States as steward of the National Wetlands Inventory (NWI). Heightened awareness of the importance of wetlands in coastal protection, coupled with advances in geospatial technology has led to increased wetlands mapping activities led by local, state and non-governmental organizations. Many of these mapping activities are conducted as a more refined scale than has been available from the NWI., and driven the need for a wetlands mapping standard that everyone can use to map and share wetlands data in a digital format for coastal management. The importance of this wetland data to be compatible with coastal and marine ecological classification activities, and water quality features tied to the National Hydrography Dataset (NHD) becomes paramount for presenting coastal data in a more meaningful, holistic level. This informal presentation will identify the key components of the recently passed FGDC Wetlands Mapping Standard with respect to its ability to support the ability to build a Digital Coast. A brief introduction to the technical and quality components that constitute the standard will be followed with discussion of some of the technical challenges identified during the standards setting process, and workgroup activities in addressing these implementation related issues. Progress towards identifying creative ways of establishing funding coalitions to aid coastal managers, local, state and non-governmental organizations in their wetland mapping efforts will be addressed.

F09. SUPPORTING COASTAL CONSERVATION WITH NEW AND IMPROVED GEOSPATIAL METADATA
Lynda Wayne, Federal Geographic Data Committee, GeoMaxim

Coastal conservation projects require a wide range of geospatial data resources. Locating, assessing, accessing and applying those data resources can prove challenging without robust data documentation. The federal Content Standard for Digital Geospatial Metadata (CSDGM) has been used by coastal data developers in all sectors to capture critical data documentation. However, the CSDGM is undergoing revisions to bring the standard into compliance with international metadata requirements. This session will explore these revisions, provide specific examples as to how the improved standard can directly support a range of coastal conservation efforts, and outline new resources under development by the FGDC to support the implementation of the updated standard.

Coastal and Marine Boundaries
Kensington F

F10. APPLICATION OF THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA TO THE DELIMITATION OF U.S. MARITIME ZONES AND BOUNDARIES
Meredith Westington, NOAA National Ocean Service, Office of Coast Survey

With a greater shift toward conserving and managing our resources, more restrictions are placed on ocean activities. Predictability in locating the bounds of a particular regulatory area will help with compliance and improve enforcement. The United States, pursuant to international law, has established maritime zones

in which various activities are controlled or restricted. The limits of these zones, among a host of other information, have for years been depicted on NOAA's paper nautical charts. NOAA is responsible for depicting on its nautical charts the limits of the 12 nautical mile Territorial Sea, 24 nautical mile Contiguous Zone, and 200 nautical mile Exclusive Economic Zone (EEZ). Additionally, NOAA also charts a Three Nautical Mile Line and a Natural Resources Boundary at 9 nautical miles, which may serve as the inner limit of federal fisheries jurisdiction as well as the outer limit of the states' jurisdiction for certain laws. This session will identify the relevant provisions of the United Nations Convention on the Law of the Sea for determining baselines from which the breadth of these maritime zones are measured and how they were implemented to create a digital baseline for the U.S. It will also briefly describe the status of the U.S. maritime boundaries with neighboring coastal States.

F11. A CADASTRAL GEODATABASE FOR THE U.S. FISH AND WILDLIFE SERVICE
Douglas Vandegraft, U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service "Cadastral Data Working Group," comprised of Cartographers and GIS Specialists from all management Regions, has produced a state-of-the-art database that will store data for all interests in real property in the National Wildlife Refuge System. Upon completion, the Cadastral Geodatabase will become an integral component of the Refuge Lands Geographic Information System (RLGIS) by supplying boundary and parcel information to the biological geodatabases currently within the RLGIS data model. Cadastral data describes the past, current, and future right, title and interest in real property, including the spatial information necessary to describe the geographic extent. The spatial information includes survey and description frameworks such as the Public Land Survey System (PLSS), as well as parcel surveys and boundary descriptions. The geodatabase is the common data storage for attribute tables, geographic features, satellite and aerial imagery, surface modeling data, and survey measurements. A consistent and accurate Cadastral Geodatabase that is common across the nation and can be shared between Regions will enable users to leverage the spatial data to its full potential. Once implemented, the Cadastral Geodatabase will be able to answer boundary and land status queries on a national scale.

F12. THE MULTIPURPOSE MARINE CADASTRE
Christine Taylor, Dept. of the Interior, Minerals Management Service
David Stein, NOAA Coastal Services Center

The Energy Policy Act of 2005 calls for the Secretary of the Interior to coordinate with other federal offshore agencies to establish an interagency comprehensive digital mapping initiative for the Outer Continental Shelf. The Multipurpose Marine Cadastre (MMC) Project is a multi-agency effort, led by the National Oceanic and Atmospheric Administration's (NOAA) Coastal Services Center and the Minerals Management Service (MMS) under the guidance of the Federal Geographic Data Committee's (FGDC) Marine Boundary Working Group (MBWG). The MMC is a spatial data marine information system for the Outer Continental Shelf (OCS) and adjacent state waters whereby rights and interests, restrictions, and responsibilities in the marine environment can be assessed, administered, and managed. The MMC uses data, information, and web map services from authoritative data sources to address a wide range of issues, including the demand for alternative energy, aquaculture, submerged lands leasing, and comprehensive marine spatial planning. What makes this effort unique is its distributed data architecture, which places the data management responsibility with the respective federal, state, or local agency. The MMC provides a single location where managers (without GIS training or software) can go to view all existing activities and infrastructure features needed for decision-making in any U.S. OCS area. Core marine cadastral and supporting data are accessible through Internet mapping applications and a data portal. Key Words: Marine Cadastre, Marine Spatial Planning

Reception in the Palmettos Pavilion

7:00 to 10:00 p.m.

Come to the Palmettos Pavilion for the Wednesday night beach bash. Make sure to bring your dancing shoes, because musical group The Maxx will be playing your favorite tunes. Be prepared for high energy fun and an experience that you will never forget. The reception will include heavy hors d'oeuvres and a cash bar.

No transportation is needed . . . Just walk out the back of the Kingston Plantation. Feel free to bring your spouse or friend, but please note that additional guests will incur an added cost of $75 a person. Attire is casual.

Thursday, March 5

Early Morning Sessions

9:00 to 10:30 a.m.

Coastal Mapping: Shoreline Change I
Kensington A

G01. USING LIDAR TO DETERMINE LAKE ERIE BLUFF RECESSION RATES
J. Samantha Engle, Pennsylvania Coastal Resources Management Program

Coastal hazards are a constant and considerable threat to our nation's coastal resources. Along Pennsylvania's Lake Erie shoreline, fluctuating lake levels and human activity contribute to the erosion and retreat of the land, also known as bluff recession. Bluff recession is a hazard threatening property damage and human health and safety. With the goal of better managing hazards like this, the Pennsylvania Coastal Resources Management (CRM) Program was established in 1980. That same year, a state statute and implementing regulations were passed, requiring structural setbacks in bluff hazard areas. Since 1982 CRM has updated municipal setbacks using on-site field measurements of 130 fixed control points along Lake Erie. The current four-year monitoring cycle has produced reasonably accurate recession rates even though data gaps exist. With the increasing capability and availability of Lidar technology, CRM is exploring the use of these topographic datasets to supplement existing methods field-based. This presentation will review our recently completed pilot analysis examining eight years of recession along Lake Erie. Existing Lidar datasets from 1998 and 2006, made available through NOAA's Coastal Services Center, were analyzed in ArcGIS in their raw LAS and Triangular Irregular Network (TIN) formats. Two delineated bluff lines were compared between the two years and used to derive a rate of erosion. The presentation will conclude with a comparison between the Lidar-derived recession rates and those calculated using field methods.

G02. DIGITAL SHORELINE ANALYSIS SYSTEM (DSAS) 4.0: AN EFFICIENT AND REPEATABLE METHOD FOR COMPUTING SHORELINE CHANGE RATES IN ARCGIS
Emily Himmelstoss, U.S. Geological Survey
Jessica Zichichi, Innovate! Inc.
Robert Thieler, U.S. Geological Survey
Ayhan Ergul, Innovate! Inc.

Digital Shoreline Analysis System (DSAS) is an ArcGIS desktop extension that computes rate-of-change statistics from historic shoreline vector data. It provides an automated method of establishing measurement locations, performs rate calculations, and provides the statistical data necessary to assess their robustness. DSAS 4.0 is the latest release of the software application and is compatible with both Windows XP and Vista platforms. Updates include: 1) an improved workflow that decouples the establishment of measurement locations from the process of computing rates; 2) dynamic topological enforcement that preserves relationships between measurement baseline and transect feature classes during edit sessions; 3) an option to select several different rate calculation methods; 4) an XML interface to MATLAB executables containing DSAS's core statistics; and 5) automatic generation of FGDC-compliant metadata that records all input parameters and statistical analyses. The calculation output is XML-based and enables users to design custom modules and analyses while utilizing measurement positions established by DSAS. Results may be incorporated back into DSAS using documented guidelines. DSAS is a core element of the U.S. Geological Survey National Assessment program addressing coastal hazards. It was designed to aid in historic shoreline change investigations by providing a standardized and repeatable method of analysis for a time series of shoreline positions. These updates benefit the goals of the National Assessment and other DSAS end-users by providing a comprehensive method of assessing shoreline change that meets federal geospatial metadata requirements and supports a wide variety of spatial and temporal data types.

G03. WHERE IS THE SHORELINE?
Tara Miller, I.M. Systems Group at NOAA Coastal Services Center
Lindsay Goodwin, The Baldwin Group at NOAA Coastal Services Center
David Stein, NOAA Coastal Services Center

Shoreline data continues to be one of the most requested, and misunderstood, data sets for coastal resource managers. This presentation will cover some basic concepts about shoreline data, including definitions, standards, and construction. Also, new resources will be highlighted for accessing and interpreting national vector shoreline data. Specifically, one collection of resources is the NOAA Shoreline Website, where vector shoreline data from NOAA and other federal agencies can be accessed and compared from a single location. The website also features frequently asked questions, common uses of shoreline data, shoreline terms, and references.

Physical and Biological Characterizations I
Kensington B

G04. THE NATURE CONSERVANCY'S NORTHWEST ATLANTIC MARINE ECOLOGICAL ASSESSMENT: INTEGRATING AND DISTRIBUTING SPATIAL DATA FOR COMPLEX DECISION MAKING IN MARINE SYSTEMS

Melissa Clark, Jennifer Greene, Sally Yozell, and Mark Anderson, The Nature Conservancy

The Nature Conservancy has developed a science-based ecoregional assessment framework that provides a vision of success for conserving the representative biodiversity of an ecoregion and identifies priorities for conservation action to achieve that vision. A marine ecoregional assessment synthesizes information from oceanography, chemistry, geology, biology, and social science to provide a snapshot of coastal and marine ecosystems. The assessment is designed to identify a portfolio of priority sites for natural resource management and a full range of conservations strategies that will be evaluated based on ecological, social, economic and political needs of individual places. In this presentation, we will review Northwest Atlantic Marine Ecoregional Assessment and we will discuss the data collection, database design and distribution of data. The distribution includes a map service and web map application to allow for easy access of the data. One of the products of the first phase of this plan is a robust, transparent, and distributable data baseline, to serve as an information resource to marine decision makers and managers with a wide range of interests, including marine spatial planning, ecosystem-based management, and regional ocean governance. Additionally, the second phase of the assessment will include the use of decision support tools to integrate information about human uses, economics and biodiversity that will support ecologically identified areas. The outcome of this effort is to create an integrated marine ecosystem assessment or baseline that will be accepted and used by decision makers and partners so as to improve conservation action at all levels of engagement.

G05. SOUTH CAROLINA COASTAL WATERBODY CLASSIFICATION

Shawn Kiernan, South Carolina Dept. of Health and Environmental Control
Rob Hudson, Photo Science, Inc.

The Office of Ocean and Coastal Resource Management (DHEC-OCRM) is providing assistance for the development of local coastal waterbody management plans. These plans enable coastal municipalities to better understand, balance, enhance, and manage land and water uses to reduce the impacts of competing uses. DHEC-OCRM developed indicators and analytical methodologies to evaluate which coastal waterbodies may become threatened due to increased population pressures and related land use change. This project resulted in analytical tools to prioritize technical assistance to coastal municipalities for the development of future coastal waterbody management plans considering the extent of anticipated change and available State and local planning resources. This project represents a geographic approach to a coastal ecosystem vulnerability assessment, or CEVA. The CEVA model represents a spatial analysis method that ultimately produces a map of priority waterbodies. The resultant areas represent possible planning opportunities for DHEC-OCRM to consider advancing with the coastal county or municipality. These coastal waterbodies are evaluated with respect to their vulnerability from additional population growth and urban encroachment. This analysis produced several significant findings; including, a regional clustering of assets and stressors, an absence of extremes in terms of assets and stressors, and population growth patterns as they relate to existing conditions. The model is easily maintained and uses ESRI's Model Builder capabilities. CEVA is comprised of 34 individual sub-models that are accessed by one central model. A simple CEVA Query Interface was built that allows DHEC-OCRM users to query the CEVA data. This interface was built using Visual Basic for Applications within an ESRI Map Document File (MXD).

G06. MEASURING THE ROUGH WITH THE SMOOTH: USING LIDAR BATHYMETRY TO PREDICT FISH AND CORAL DISTRIBUTIONS IN THE U.S. CARIBBEAN

Bryan Costa, Simon Pittman, and Timothy Battista, NOAA

Coral reef ecosystems exhibit complex vertical and horizontal structural heterogeneity at a range of spatial scales. Structural heterogeneity plays an important ecological role in influencing the distribution, abundance and behavior of marine organisms. Traditionally, only relatively fine-scale (centimeters to meters) and spatially discrete measures of structural complexity have been applied to coral reef ecosystems. Remote sensing techniques, such as airborne LiDAR (Light Detection and Ranging), provide spatially-continuous, high-resolution bathymetry from which patterns in surface structure can be quantified. A suite of surface morphometrics was derived from bathymetric LiDAR at multiple spatial scales using a moving window. Simple linear correlation analysis and a nonparametric regression modeling technique were used to examine the relationships between 51 benthic terrain parameters (49 LiDAR and 2 in situ), two coral metrics and 19 fish metrics encompassing several biological levels of organization. LiDAR metrics were more strongly correlated than in-situ chain rugosity with all fish and coral metrics, except coral cover. Slope of the slope, a measure of curvature, quantified at

relatively local spatial scales (15, 25, 50 and 100 m radii) emerged as the single best predictor. The linking of marine faunal survey data to LiDAR data using boosted regression trees demonstrates the utility of airborne LiDAR bathymetry in marine ecology. This technique offers great potential for the future development of high resolution spatial predictions in support of ecosystem-based management and spatial planning.

Integrating Local Perspectives
Kensington C

G07. COASTAL RESILIENCE: USING MARINE SPATIAL PLANNING TO SUPPORT DECISIONS THAT ADDRESS BOTH NATURAL AND HUMAN COMMUNITIES
Zach Ferdaña, Vera Agostini, Mike Beck, and Sarah Newkirk, The Nature Conservancy

The Long Island shores of New York, USA, have highly developed lands in the coastal zone. Much of this private property is only inches above sea level, placing millions of dollars in public and private funds at risk. This also puts coastal wetlands and other ecosystems at risk that provide habitat, natural buffers to storms and other services. Despite a growing awareness of global climate change, local decision makers—the primary regulatory authorities on coastal development—still lack the tools to transparently examine different management objectives such as coastal hazards and conservation. The Coastal Resilience project was designed to address these issues and provide tools and information to better inform decision-making. Coastal resilience describes the self-organizing ability of a coast to respond in a sustainable manner to morphological, biological and/or socio-economic pressures. A primary goal of the project is to design, build and discuss alternative future scenarios that address sea level rise, storm surge, community vulnerability and conservation priorities. The Nature Conservancy is leading this effort, working with project partners including the NASA Goddard Institute for Space Studies, the Pace Land Use Law Center and the Coastal Services Center. We will present our multiple objective, marine spatial planning approach that utilizes geospatial information in support of decisions for conservation action while addressing human needs. The Coastal Resilience project will deliver this information via an internet mapping application that will help local decision makers keep the environment and public safety in mind as sea levels rise and coastal hazards.

G08. CALIFORNIA OCEAN USES ATLAS PROJECT: USING TECHNOLOGY TO INCORPORATE TRADITIONAL KNOWLEDGE INTO OCEAN MANAGEMENT
Jordan Gass, Charles Wahle, and Mimi D'Iorio, NOAA Marine Protected Areas Center
Lance Morgan and John Guinotte, Marine Conservation Biology Institute

The California Ocean Uses Atlas Project, a partnership between NOAA and the Marine Conservation Biology Institute, is filling a critical information gap in ocean management by providing an unprecedented, comprehensive, consistent and spatially explicit picture of human uses for management agencies, policy makers and stakeholders interested in sound and equitable ocean governance. Using participatory GIS concepts and applications, the Atlas Project is generating spatial data and map products illustrating patterns, intensity and temporal changes in a wide range of human uses in three broad categories of use: (i) consumptive, (ii) non-consumptive, and (iii) industrial activities. The resulting maps will depict patterns of ocean use on a broad scale appropriate for a variety of ocean planning and management needs. Through a series of regional expert workshops, the Atlas Project is gathering geospatial data related to human uses of California's ocean environment from the shoreline to the 200 nm EEZ boundary. Coupling standard GIS software, electronic whiteboard technology, and a minimal amount of existing data, this project employs interactive participatory GIS tools to enable invited workshop participants to rapidly generate reliable spatial data based primarily on their individual expertise. The workshops are being held regionally across California and will generate a comprehensive geospatial dataset depicting the patterns of ocean uses important for informing the marine planning process throughout the state. This presentation will focus on the workshop methodology, some preliminary workshop outputs and analytical products, and a discussion of the applicability of the process to other regions.

G09. PARTICIPATORY GIS: EVALUATION AND COMPARISON OF TWO COASTAL CASE STUDIES
Rebekah Szivak, ACE Basin National Estuarine Research Reserve
Danielle Bamford, The Baldwin Group at NOAA Coastal Services Center

Stakeholder participation has become widely recognized as a critical component of natural resource planning, management, and decision-making. Participatory geographic information systems (PGIS), one of many techniques for involving stakeholders, is a practice in which local communities are invited to share their knowledge and opinions to help generate maps for informing management and decision-making. Participatory GIS can foster collaboration among stakeholders,

capture important knowledge from indigenous or underrepresented individuals, and provide a focal point for discussions, among other benefits. This project evaluates and compares two coastal PGIS projects coordinated by the Ashepoo, Combahee, and Edisto Basin (ACE Basin) National Estuarine Research Reserve (NERR), Wells NERR, and the NOAA Coastal Services Center. In one case study, the Center and the ACE Basin NERR supported the nonprofit Edisto Island Preservation Association in making recommendations on an update to the local county comprehensive plan. In the other case study, the Center and the Wells NERR assisted the nonprofit Great Works Regional Land Trust in developing a strategic plan for the land trust's conservation work. Although the goals of the two projects were quite different, the Center employed a similar PGIS framework at both sites. This oral presentation provides an evaluation of that framework and a broad comparison of the two case studies.

Data Sharing: Standards II
Kensington F

G10. STANDARDS-BASED DATA MODELS AND WEB SERVICES FOR COASTAL OCEAN OBSERVATIONS

Surya Durbha, Roger King, Nicolas Younan, Santosh Rajender, and Shruthi Bheemireddy, Mississippi State University

The Open GIS Consortium, Inc. (OGC) is creating and testing a framework to maximize the discoverability and interoperability of sensor systems through standard Web-based services. The information on a variety of marine and meteorological parameters are routinely disseminated by several agencies (e.g., NDBC), regional ocean observing systems (SEACOOS, NC-COOS, etc), however, the data from these networks are constrained by vast heterogeneities and lack of interoperability. Our current work funded by Northern Gulf Institute (NGI) adopts an information semantic approach for resource and knowledge discovery in an Coastal Ocean Observing System and enables the use of real or near real time data derived from coastal buoy sensor networks and dynamic selection and aggregation of multiple sensor systems, meteorological and oceanographic simulations and other decision support systems in a web services-based environment. The emerging Sensor web technology enables collaborative, consistent, and consolidated sensor data collection, data fusion and dissemination. In addition, we pursue the semantic web approaches to understand the context of the data, resolve the meaning, interpretation or usage of the same or related data and develop knowledge-based tools for access to the information sources. It is anticipated that these technologies will drive the next generation of web-based products and services in the coastal zone applications and facilitate better accessibility, distribution of information and improved decision making.

G11. DEVELOPMENT OF A NEAR REAL-TIME GEOSPATIAL DATA AGGREGATION AND SERVICE ARCHITECTURE FOR THE SOUTHEAST COASTAL OCEAN OBSERVING REGIONAL ASSOCIATION

Jesse Cleary, and Chris Calloway, Department of Marine Sciences, University of North Carolina (UNC)-Chapel Hill
Jeremy Cothran, Baruch Institute of Marine and Coastal Sciences, University of South Carolina
Jeff Donovan, College of Marine Science, University of South Florida
Sara Haines, Department of Marine Sciences, UNC Chapel Hill
Dan Ramage and Vembu Subramanian, College of Marine Science, University of South Florida
Sam Walker, SECOORA Ocean Data Partnership

As the southeast regional IOOS component, the SouthEast Coastal Ocean Observing Regional Association (SECOORA) has developed a near real-time data aggregation and service architecture to process coastal observations for distribution into coastal planning, hazard, and environmental GIS applications. This work leverages the Research and Development efforts of the SEACOOS project around dataflow automation, observation geodatabase design, geoweb applications, and map services through a focus on simplicity, performance, and efficient re-use of files and services. The presentation provides an overview of the geospatial framework supporting the SECOORA data management enterprise, a collaborative effort by the SECOORA Data Management Coordinating Committee. Aggregation SECOORA has developed a data content standard for constituent data providers with implementation in multiple formats (NetCDF, XML). The standard relies on a controlled vocabulary that is being expanded to include QA/QC tests, flags, and sensor level metadata. Storage SECOORA has developed an extensible geodatabase schema for coastal observations in various forms. Implementation of this new schema has been in PostgreSQL + PostGIS and the lightweight SQLite database. Discovery Interactive web mapping applications have been developed using OpenLayers to bundle existing OGC web services for data discovery and exploration. SECOORA is developing a service cache mechanism to boost performance and restrict direct connections to the geodatabase. Distribution SECOORA has developed a suite of OGC web services and pre-cached files for distribution. Data services rely on the WMS, WFS, and SOS standards via MapServer and custom scripting. Common file formats are distributed reusing internal transport, storage, and GIS formats.

G12.INTEGRATED OCEAN AND COASTAL MAPPING: PILOT PROJECTS AND INITIAL RESULTS

Maryellen Sault and Christopher Parrish, NOAA National Geodetic Survey

The primary objective of NOAA's Integrated Ocean and Coastal Mapping (IOCM) initiative is to serve the widest possible range of ocean and coastal geospatial data needs by leveraging collaborative partnerships, integration, and new technology. A key underlying concept is the "map once-use many times" paradigm. To support the IOCM initiative, the National Geodetic Survey (NGS) is actively establishing and enhancing collaboration with internal and external partners on various IOCM projects and migrating towards fusion-based operational approaches that exploit data from complementary sensors. NGS and its partners are working to supply new sources of information to diverse internal and external audiences, including researchers and practitioners in the coastal geoscience, coastal ecology, and coastal zone management communities. IOCM data products for portions of coastal Virginia, North Carolina, and New Hampshire are currently available through NOAA's Coastal Services Center "Digital Coast" website. This presentation will describe NOAA's IOCM demonstration projects, preliminary results and a discussion of ongoing research using data collected during these projects.

Break

10:30 to 11:00 a.m.

Late Morning Sessions

11:00 a.m. to 12:30 p.m.

Coastal Mapping: Shoreline Change II
Kensington A

H01. CASCADING SCALES OF BEACH ANALYSIS WITHIN A REGIONAL COASTAL MONITORING PROGRAMME

Andy Bradbury, Channel Coastal Observatory

Coastal evolution information is required at a range of levels of detail to enable development of policy based regional plans, engineering schemes, assessment of engineering scheme performance and operational beach management. Cascading scales of detail are required to deliver the appropriate levels of information to decision makers. This paper focuses on application of a range of web and GIS based analytical and presentation tools, used to deliver the programme outputs at each of the scales of detail, in connection with a large scale long term regional coastal monitoring programme for southern England. A large-scale long-term coastal observation programme was established in the UK in 2002, to provide a systematic approach to collection, management and analysis of data for strategic and operational management of coastal erosion and flood risk. A wide range of observation techniques and analysis procedures have been integrated, to enable monitoring of a variety of coastal-systems and engineering-schemes, over 2000km of the English-Channel coastline. Observation techniques include LiDAR, bathymetric, RTK topographic and aerial surveys, ecological mapping, wave and tide monitoring. A risk based strategic monitoring programme design, based on geomorphology, defence type, erosion and flood risk provides a range of levels of temporal and spatial coverage of each of the variables. Observations are integrated into a web-based GIS data delivery system (www.channelcoast.org), which is now being used as the basis for development of a digital coast for England.

H02. BEACH-DUNE SYSTEM SUSCEPTIBILITY ASSESSMENT: A GEOSPATIAL APPROACH TO REGIONAL SCALE ANALYSES

Daniel Barone and Robert Koch,
The Richard Stockton College Coastal Research Center
Rob Hudson and Raphael Coutin, Photo Science, Inc.

New Jersey beach-dune systems are vital natural resources that protect shore communities against storm damage. Assessments of beach-dune systems are necessary for effective management and facilitate more efficient use of limited State and municipal resources. The Coastal Research Center (CRC) has developed a GIS-based beach-dune system susceptibility assessment. The assessment incorporates multiple geospatial and Remote Sensing (RS) techniques (primarily the use of coastal LiDAR elevation data) into a knowledge-driven spatial data integration method. The goal of the assessment is to evaluate the performance of the oceanfront beach-dune system in response to various storm events. The storm event simulations used in the CRC beach-dune susceptibility assessment are consistent with FEMA storm classifications (i.e., 2-, 5-, 10-, 20-, 50-year storm events). In addition, the beach-dune susceptibility assessment provides federal, state, and local entities a useful tool to better manage a state's valuable coastal economy. The Richard Stockton College is automating this process in an effort to maximize available resources and provide timely results to decision-makers and the public. The Beach-Dune Susceptibility Application is comprised of four parts: 1) data preprocessing; 2) interaction with the U.S. Army Corps of Engineers SBEACH

application; 3) data analysis; 4) and visualization. This stand-alone application is streamlining each of the major components of data processing and analysis through the use of ESRI's Spatial Analyst and 3-D Analyst. The application's code was written in C# and relied upon ArcObjects to semi-automate all aspects of the assessment process.

H03. MEASURING GEOMORPHOLOGICAL CHANGES AT SANDY HOOK, GATEWAY NRA

Tanya Silveira and Norbert Psuty, Institute of Marine and Coastal Sciences, Rutgers University

Sandy Hook, a 18 Km long spit at the northern end of New Jersey coastline, is a highly dynamic coastal system. Different approaches are used to assess the coastal geomorphological changes that are occurring in the National Park Service part of Sandy Hook, northern 10 Km, both spatially as well as temporally. A GPS system is used to track the shoreline position along the entire peninsula, providing a relative measurement of shoreline displacement along time (one-dimensional change). Benchmarks have been established in specific locations along the ocean and estuarine side of the peninsula, from which profiles are surveyed and cross-shore variations are evaluated (two-dimensional change). A GPS RTK unit is used to conduct topographical surveys, which are then used to create Digital Elevation Models of selected coastal stretches previously identified as critical in terms of morphodynamical behavior in relation to the rest of the peninsula. These data sets provide the means to calculate volumes and sediment budgets in cross and along-shore components (three-dimensional change). The surveys are both periodic and event-driven. The outcomes of the data sets are used to establish sediment budgets along the peninsula, as well as to determine the beach's morphodynamic behavior under different frequency environmental forcing agents. This information is used by the National Park Service as a scientific foundation for their management decisions.

Physical and Biological Characterizations II
Kensington B

H04. BUILDING A GIS-BASED ANALYTICAL FRAMEWORK FOR COASTAL AND ESTUARINE STUDY

Sandra Fox, St. Johns River Water Management District
Stephen Bourne, Post, Buckley, Schuh, and Jernigan
Clay Montague, University of Florida
Palmer Kinser, St. Johns River Water Management District

Assessment of coastal system health is difficult due to complex geomorphology, hydrodynamics and biogeochemistry, and has been traditionally tackled with commensurately complex supercomputer-based modeling techniques. While these technologies are useful, their computational, intellectual, and financial expense renders them unavailable to most coastal professionals. In a pioneer effort a team of academic, governmental, and industry experts developed an ArcMap-based extension to support estuarine and coastal studies for the St. Johns River Water Management District. This extension is composed of 1) a GIS-based database of spatial and temporal data that describe the environment, and 2) an accompanying ESRI ArcMap-based toolset. The methodology focuses on first-principles-analysis of the estuary. First, a control volume is defined by intersecting the tidal-plane and estuary bathymetry. Boundaries of the control volume are user-defined through qualitative knowledge of the flow field, which is used to determine the area of intersection of the DEM (terrain and bathymetry) with a NOAA tidal datum (establishes the tidal-plane). Estuarine bulk parameters related to shape, residence time, and flushing potential are derived. Then, the relative importance of tidal versus terrestrial flow is assessed using the bulk parameters derived from geomorphology and measured flows in the estuary. Regression or other model approaches are available to assess various influential factors effecting water quality. The coastal extension has been designed to augment the successful Arc Hydro data model that falters in coastal applications by creating a coastal feature dataset that works with the Arc Hydro schema.

H05. CHARACTERIZING FISH COMMUNITIES ACROSS THREE FLORIDA EMBAYMENTS

Shannon Whaley, Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute

We used spatial relationships between estuarine habitat structure and nekton in three of Florida's largest embayments (Tampa Bay, Charlotte Harbor, and Indian River Lagoon) to help describe and map estuarine nekton communities for use in conservation planning and in assessing impacts of coastal development projects. We used available GIS maps describing the distribution of estuarine habitats (salt marshes, mangroves, and seagrass) to measure habitat structure at multiple scales across the three areas. Nekton data were collected monthly throughout the year by Florida's Fisheries-Independent Monitoring Program during a seven-year time period (1997-2003). We examined relationships between nekton community composition and habitat structure, spatial location, and local habitat characteristics measured in the field at the time of nekton sampling. Analysis revealed that a landscape-scale gradient was most related to nekton community structure in all three embayments. In each embayment, this gradient was best represented and

modeled using a unique combination of predictor variables related to the unique geomorphology of each embayment. We used these models to develop GIS maps describing seasonal nekton species composition and nekton density patterns across the three embayments.

H06. COASTAL CHANGES: OBSERVATION OF SEAFLOOR CHANGE IN SANTA BARBARA CHANNEL AFTER 25 YEARS

Jerry Wilson and Edward Saade, Fugro Pelagos

The California State Coastal Conservancy is conducting a comprehensive mapping program for all state waters. Recent results were obtained in the Santa Barbara Channel in an area that had been surveyed in 1983 for seafloor geological conditions. The 2008 multibeam echosounder data set records apparent changes on the seafloor over this period. There was a high level of geological survey activity in the Santa Barbara Channel in response to offshore lease sales during the 1960's and extending into the 1980's. Much of this seafloor information has been scattered over time; however one proprietary data set was uncovered. It focuses on offshore reefs and outcrops in varying depths and includes mosaicked side-scan sonar images of the seafloor in 1983. Some of these outcrop areas are within state waters and have been re-surveyed using multibeam echosounding technology. The multibeam data also include acoustic backscatter, therefore allowing a direct comparison with the previous side-scan sonar data set. The analyses of these data sets are being done using GIS technology. The mapping program for California state waters is providing comprehensive coverage out to the three-nautical-mile boundary using the latest technologies. The accuracy and coverage of the new data set matches NOAA's hydrographic standards. Further, the acoustic backscatter data have the benefit of recent advances in data processing. The analysis will address 1) the apparent seafloor changes over this quarter-century period, 2) possible processes that account for the observations, and 3) the changes in survey technology over this period. This presentation will report on the status of the unique California waters mapping program.

Remote Sensing Data Acquisition
Kensington C

H07. HURRICANE IKE: SHORELINE HIGH-RESOLUTION EMERGENCY DIGITAL IMAGERY DATA (SHREDID)

Jeff Lovin and John Gerhard, Woolpert, Inc.

When Hurricane Ike threatened the Galveston/Houston, Texas area, and over one million people evacuated from the storm's path, a number of people prepared by mobilizing aircraft with digital sensors and headed directly toward the storm. As the storm developed, flight plans were prepared to cover areas impacted by the storm once it hit landfall, staff was scheduled to immediately process the data, and the storm was tracked continuously. Once the storm passed over the coast and the weather improved to allow for safe aerial operations, aircraft were airborne in the Galveston area, collecting mutlispectral digital imagery. The digital imagery was flown directly to the production office, so that on-call staff could immediately begin post-processing SHREDID within hours of the acquisition. The digital imagery was post-processed and rectified to a planar surface. Once rectified, the individual flight strips of imagery were loaded onto a server for Internet access. The goal of this project was to provide Internet access to SHREDID within 24 hours of acquisition. Based on the project timeline evaluation, the digital imagery was available within 18 hours of the aerial imagery acquisition. This presentation will review the challenges of collecting SHREDID in the post-storm environment.

H08. SPATIAL DATA NEEDS FOR THE DEVELOPMENT AND MANAGEMENT OF OFFSHORE AQUACULTURE IN THE U.S. EXCLUSIVE ECONOMIC ZONES

James Kapetsky, Consultants in Fisheries and Aquaculture Sciences and Technologies
Jose Aguilar-Manjarrez, Food and Agriculture Organization of the United Nations

Progress is being made to set the stage for the development of offshore aquaculture in the U.S. Exclusive Economic Zones, but is impeded by a lack of technologies to cope with open ocean conditions and because of the need for an enabling environment to coordinate development and to allocate ocean space to aquaculture among many other competing and conflicting uses. GIS and remote sensing have important roles to play in the development and management of offshore aquaculture, but data needs have to be satisfied for them to be most effective. Our recent findings on coastal and offshore aquaculture potential, based on the growth of indicative species—cobia, Atlantic salmon and blue mussel—as well as on the present depth capabilities of cage and long line culture structures, suggest that there are vast areas with good potential in the U.S. Atlantic area Exclusive Economic Zones. However, economic considerations related to rising costs with increasing depth and distance from shore make it clear that, for now, development will have to be in relatively close proximity to the coast and near to ports that can provide essential services. Consequently, there is a need for relatively high resolution coastal data for spatial analyses to support offshore aquaculture zoning and site selection and for real time remote sensing for aquaculture operations. We match offshore aquaculture spatial and attribute data needs in terms of kinds and resolutions with the availability of data from NOAA and other sources and call attention to the gaps.

H09. CONSTRUCTING ADAPTIVE MISSION PLANNING AND REAL-TIME CONTROL SYSTEMS FOR AUTONOMOUS UNDERWATER VEHICLES WITH OPEN-SOURCE SOFTWARE

Robert Currier and Gary Kirkpatrick, Mote Marine Laboratory

Mission planning for autonomous underwater vehicles currently relies on a complex mix of proprietary software from vehicle manufacturers, commercial off-the-shelf analytical systems such as MATLAB, and a hodge-podge of custom scripts developed by end-users. None of these systems interoperate with each other in a graceful manner, preventing mission controllers from quickly adapting to changing environmental conditions. Mote Marine Laboratory has developed a glider mission planning tool using open-source software including python, MySQL and JavaScript. This application integrates real-time glider data, optical phytoplankton discriminator (BreveBuster) data, MODIS chlorophyll images and sea surface temperature images into a single, easy-to-use, browser-based display. AUV waypoints can be loaded with the click of a button and then modified by dragging and dropping. The new waypoints can be transferred to the deployed glider by simply clicking the Submit button, greatly reducing the time needed to modify the glider's flight path. Decision making for mission planners and scientists is facilitated by being able to overlay chlorophyll and sea surface temperature imagery by selecting check boxes. These images are updated on a regular basis from the USF MODIS site. In this presentation we will document the design and implementation of our system, provide sample source code and provide links to the open source software used to construct the application. We will discuss the next generation of our application which will provide adaptive mission planning by suggesting new waypoints after autonomously analyzing chlorophyll imagery, sea surface temperature and BreveBuster data.

Data Sharing: Ocean Observations
Kensington F

H10. COASTAL SITUATIONAL AWARENESS VIA NOWCOAST'S WEB MAPPING SERVICES AND MAP VIEWER

John Kelley, Micah Wengren, and Jason Greenlaw, Coast Survey Development Lab, NOAA National Ocean Service
Sree Dadisetty, NOAA–University of New Hampshire Coastal Response Research Center

NowCOAST is a GIS-based Web mapping portal developed by the National Ocean Service's (NOS) Coast Survey Development Laboratory that provides users with situational awareness of current and future environmental conditions for U.S. coastal areas. nowCOAST accomplishes this by integrating selected near-real-time data, satellite imagery, warnings, and forecasts of meteorological, oceanographic, and river conditions from NOAA's Weather, Ocean, and Satellite Services, NOAA's Research, other federal agencies, and regional ocean observing systems. nowCOAST makes the observations, imagery, warnings, and forecasts available to users via on-map display and geo-referenced hyperlinks. Coastal users can display nowCOAST products via its Web map viewer (http://nowcoast.noaa.gov) or by connecting to nowCOAST's map service. Users can access nowCOAST's map service directly from desktop GIS applications (e.g., ArcMAP and ArcGIS Explorer) and from ArcGIS Server-based or ArcIMS-based web mapping sites and overlay nowCOAST map layers with their own data layers. Recently, a nowCOAST Open Geospatial Consortium-compliant Web Map Service has been implemented to allow non-Arc-based desktop GIS applications and web mapping software (e.g., MapServer) to access nowCOAST products. nowCOAST will be enhanced to support several collaborative projects including the Coastal and Inland Flood Observation and Warning project, the Environmental Response Management Application web mapping portal project, and the Southern California Weather and Hazards Viewer. nowCOAST uses Arc Internet Map Server, Arc Spatial Data Engine, ArcGIS Engine and an Oracle database. NowCOAST will be migrated to the ArcGIS Server platform during the coming year.

H11. SOUTHEASTERN MARINE WEATHER PORTAL: NWS AND COOS WORKING TOGETHER FOR THE BENEFIT OF THE MARINE COMMUNITY

Jennifer Dorton, University of North Carolina, Wilmington
Dwayne Porter, Belle W. Baruch Institute for Marine and Coastal Sciences
Charlton Galvarino, Second Creek, LLC
Steven Pfaff, NOAA
Vembu Subramanian, University of South Florida

The regional and sub-regional coastal ocean observing systems, as part of the NOAA Integrated Ocean Observing System, have provided opportunities for increased access to coastal meteorological and oceanographic data. One of the most efficient ways for coastal ocean observing systems to disseminate marine information to the public is through partnerships with the NOAA National Weather Service since the commercial and recreational marine communities already rely on these NWS Forecast offices for their marine observations and forecast needs. The NWS Experimental Southeastern Marine Weather Portal (MWP) was developed by forecasters, web designers, data managers, and outreach personnel working in

UNCW, USC, USF, Second Creek Consulting, and NOAA NWS Eastern and Southern Region Headquarters as well as the NWS Office of the Chief Information Officer. The MWP allows users access to: standardized map-based marine weather pages; color coded active hazards; marine observations; point-and-click coastal waters forecasts; streaming NOAA weather radio; and detailed five-day marine forecasts. The MWP was developed with input from a recreational marine focus group; therefore, the site incorporates other features that were deemed necessary by the boating/marine community. Examples of these features include sea surface temperature, wind barbs and barometric pressure overlay maps, and radar and bathymetry imageries. The experimental MWP site is found at http://forecast.weather.gov/mwp/ and WFO's with coastal marine forecasting responsibilities in NC, SC, GA, FL, AL, MS, and LA link to the site from their homepages as well. Funding for this project was provided by NOAA IOOS.

H12. ENVIRONMENTAL RESPONSE MANAGEMENT APPLICATION (ERMA) – WEB-BASED GIS DATA DISPLAY AND MANAGEMENT SYSTEM FOR OIL SPILL PLANNING AND ENVIRONMENTAL RESPONSE

Michele Jacobi, NOAA Office of Response and Restoration
Rob Braswell, University of New Hampshire
Amy Merten, NOAA Office of Response and Restoration
Nancy Kinner and Kurt Schwehr, University of New Hampshire

NOAA's Office of Response and Restoration (ORR) in a partnership with the University of New Hampshire Coastal Response Research Center (CRRC), is leading an effort to develop an Open Source GIS system that is accessible to both the command post and to assets in the field during a response. The ERMA (Environmental Response Management Application) system is an integrated data management platform that uses MapServer and Open Layers software to combine real-time and static regional geospatial data sets. Data available include: weather and forecasts, ESI maps, IOOS buoys, modeled spill trajectories, real-time tracks of vessels, response plans, navigational charts, bathymetry, restoration projects, water quality and sediment chemistry data, protected and economically important areas, and other natural resource information. The application is able to upload, manipulate, analyze and display spatially referenced data for solving complex resource issues. The web-based nature of ERMA is critical as it allows for the integration and synthesis of various types of information, provides a common operational picture for all individuals involved in an incident, improves communication and coordination among responders and stakeholders, and provides resource managers with the information necessary to make faster and better informed decisions. In terms of pre-planning and preparedness for oil spill response, this system is nearly as important as any oil spill detection or response technique. The pilot site was developed for Portsmouth, New Hampshire, and now NOAA is partnering with other entities to develop an ERMA system for locations such as the Caribbean and Arctic.

Poster Presentations

Windsor Ballroom

Climate Change

P01. PHYSICAL OCEANOGRAPHIC SUBSETTING TOOLS AT PO.DAAC

Jessica Hausman, NASA Jet Propulsion Laboratory

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.

Coastal Conservation

P02. MARINE INVADER TRACKING INFORMATION SYSTEM (MITIS)

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 in pre-production stages.

P03. DETERMINING THE DIRECT UPLAND HYDROLOGICAL CONTRIBUTION AREA OF ESTUARINE WETLANDS USING ARCGIS TOOLS

Patrick Clinton, U.S. Environmental Protection Agency, ORD, NHEERL, Western Ecology Division, Pacific Coastal Ecology Branch
Christine Weilhoefer, North Central College, Department of Biology

The delineation of a polygon layer representing the direct upland runoff contribution to estuarine 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.

P04. DEVELOPING A MODEL TO ASSESS THREATS TO RAINBOW SMELT (*OSMERUS MORDAX*) SPAWNING HABITAT IN THE GULF OF MAINE

Claire Enterline and Seth Barker, Maine Department of Marine Resources

Maine Department of Marine Resources is working with New Hampshire Department of Fish and 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.

P05. SPATIAL ANALYSIS OF 25 YEARS OF SEA TURTLE STRANDING RECORDS

Robert Hardy, Allen Foley, and Luke McEachron,
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.

P06. THE PADDLE-TO-THE-SEA GOOGLE LIT TRIP: USING VIRTUAL GLOBES TO BRING NEW LIFE TO A CHILDREN'S BOOK ABOUT THE GREAT LAKES

David Hart, University of Wisconsin Sea Grant
Noah Hart, Madison West High School
Rosanne Fortner, Centers for Ocean Sciences Education Excellence (COSEE) Great Lakes

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.

P07. MAPPING THE COASTAL REGION OF KANYAKUMARI DISTRICT, SOUTH INDIA BY USING GPS, REMOTE SENSING AND GIS

Conchalish Hentry, St. Jude's College
Nainarpandian Chandraseka, Sakthivel Saravanan, Manoharan Rajamanickam, and Jeyaraj Dajkumar Sahayam, Centre for Geotechnology, Manonmanium Sundaranar University

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.

P08. MODELLING AN ESTUARY OVER LONG TIME PERIODS

Yuan Yuan Jia and Jonathan Hinwood, Monash University

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.

P09. USING THE AUTOMATIC IDENTIFICATION SYSTEM FOR NORTH ATLANTIC RIGHT WHALE RESEARCH AND MANAGEMENT IN THE SOUTHEASTERN U.S. CALVING GROUNDS

Mark Mueller, Stephanie Cain, and Leslie Ward, Florida Fish and Wildlife Conservation Commission , Fish and Wildlife Research Institute
Barbara Zoodsma, NOAA Fisheries Service

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.

P10. A SPATIAL BIBLIOGRAPHY TO ASSESS EXISTING INFORMATION ON ATLANTIC COASTAL FISH HABITAT

David Nelson and Adam Zitello, NOAA Ocean Service, Center for Coastal Monitoring and Assessment, Biogeography Branch
Emily Greene, Atlantic States Marine Fisheries Commission

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 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.

P11. COASTAL ECOSYSTEM MANAGEMENT: INFORMATION IS POWER

Wright Robb, Erick DiFiore, John Hayes, and Steve Rohmann, 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 decision-making 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 decision-making process and help alter perceptions about the cultural, social, economic, and ecological value of these ecosystems.

P12. MAPPING SHORELINES AND INTERTIDAL ZONES WITH MULTITEMPORAL LANDSAT IMAGES

Ron 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.

P13. PO.DAAC WEB-BASED VISUALIZATION TOOLS

Charles Thompson, Eric Rigor, and Robert Raskin, 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: 1) 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.); 2) 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; 3) 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.

P14. SMALL SATELLITE TECHNOLOGY FOR COASTAL AND OCEAN APPLICATIONS

Louis Wasson and David Shaw, 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.

P15. EVALUATION OF COLOR IMAGERY AND DIRECT REFERENCING FOR MAPPING SUBMERSED AQUATIC VEGETATION IN CHESAPEAKE BAY

David Wilcox, Robert Orth, Jennifer Whiting, and Anna Kenne, Virginia Institute of Marine Science

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.

P16. STUDY OF ESTUARY ENTRANCES THROUGH ONE DIMENSIONAL MODELLING

Bing Yan and Jonathan Hinwood, Monash University

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 separating 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.

Hazards and Resilience

P17. SPATIAL MODELING AND VISUALIZATION FOR THE NORTH CAROLINA COASTAL HAZARDS DECISION PORTAL (NCCOHAZ)

Tom Allen, Tom Crawford, J.P. Walsh, Reide Corbett, and Stephen Sanchagrin, 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 Google Maps mashups, Google Earth, 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 at 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 Google Earth. 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.

P18. PIECING TOGETHER A DIGITAL AREA CONTINGENCY PLAN

Ryan Druyor, Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute

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.

P19. USING GIS TO ANALYZE SLOPE STABILITY IN PONTE VEDRA BEACH, FLORIDA

Bryan Flynn, James Patanio,and Matt Starr, 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 and 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.

P20. PAGER: A SYSTEM FOR DETERMINING AND DISTRIBUTING EARTHQUAKE IMPACT INFORMATION

Michael Hearne, Synergetics, Inc. under contract to U.S. Geological Survey
Paul Earle and David Wald, U.S. Geological Survey
Kishor Jaiswal and Trevor Allen, Synergetics, Inc. under contract to U.S. Geological Survey
Keith Porter, University of Colorado, Boulder

PAGER (Prompt Assessment of Global Earthquakes for Response) is an automated system developed by the U.S. 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.

P21. ASSESSING HISTORICAL SHORELINE CHANGES AND EROSION HAZARDS USING TOOLS DEVELOPED FOR ARCGIS AND R

Chester Jackson, Jr., University of Georgia
Clark Alexander, Jr., Skidaway Institute of Oceanography
David Bush, University of West 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 and geostatistical functions.

P22. THE CASE FOR A COASTAL FLOOD AND EROSION VULNERABILITY INDEX

Len Pietrafesa, Machuan Peng, and Bao Shaowu, North Carolina State University
Tom Karl and Dave Levinson, National Climatic Data Center

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.

P23. DEVELOPMENT, VALIDATION, AND VULNERABILITY ASSESSMENT OF AN OVERWASH MODEL OUTER BANKS, NORTH CAROLINA

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.

P24. UTILIZING SPATIAL EXTRACT TRANSFER AND LOAD SOFTWARE TO SIMPLIFY THE COMPLEXITIES OF NEAR SHORE FEATURE MANAGEMENT

Kyle Ward, NOAA National Ocean Service

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.

Land Use Planning

P25. CHARACTERIZATION OF LAND COVER IN THE WATERSHEDS OF THE NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM

Christopher Clement, NOAA Ocean Service Emergency Response Division, NOAA Rotational Assignment Program

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 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.

P26. THE ASSEMBLAGE LAYER AS AN INDEPENDENT VARIABLE IN LAND COVER UPDATING

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 variable 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.

Marine Planning

P27. CREATING GEOTIFF PHOTO MOSAICS FROM SEAFLOOR VIDEO

Seth Ackerman, Massachusetts Coastal Zone Management
Yuri Rzhanov, University of New Hampshire, Center for Coastal and Ocean Mapping
Walter Barnhardt, U.S. Geological Survey

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.

P28. GEOVISUALIZATION OF AUTONOMOUS UNDERWATER VEHICLE OPERATIONS USING GOOGLE EARTH

Jason Benda-Joubert, Naval Undersea 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.

P29. A SYSTEMS ENGINEERING APPROACH TO DESIGNING AN OCEAN AND COASTAL INFORMATION MANAGEMENT STRATEGY

Katie Komjathy and Susan Nichols, Geodesy and Geomatics Engineering, University of New Brunswick

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.

P30. 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

Frances Lightsom, U.S. Geological Survey
Roger Parsons, NOAA
Dennis Krohn, 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.

P31. GEOGRAPHIC NAMES: WHO CARES ABOUT STANDARDIZATION?

Meredith Westington, NOAA, National Ocean Service, 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.

P32. BATHYMETRIC EFFECTS OF CATCHMENT FLOODING AT A MODIFIED COASTAL LAGOON ENTRANCE: GIS-BASED ANALYSES OF MAJOR EVENTS

Peter Wheeler and Jim Peterson, 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.

Water Quality

P33. MACROALGAE AND EELGRASS MAPPING IN GREAT BAY ESTUARY USING AISA HYPERSPECTRAL IMAGERY

Shachak Pe'eri, John Morrison, Frederick Short, and Arthur Mathieson, University of New Hampshire
Philip Trowbridge, New Hampshire Estuaries Project

Increases in nitrogen concentration and declining eelgrass beds in Great Bay Estuary have been observed in the last decades. These two parameters are clear indicators of the impending eutrophication for New Hampshire's estuaries. The NH Department of Environmental Services (DES) in collaboration with the Piscataqua Region Estuaries Partnership adopted the assumption that eelgrass survival can be used as the target for establishing numeric water quality criteria for nutrients in NH's estuaries. One of the hypotheses put forward regarding eelgrass decline is that an eutrophication response to nutrient increases in the Great Bay Estuary has been the proliferation of nuisance macroalgae, which has reduced eelgrass area in Great Bay Estuary. To determine the extent of this effect, mapping of eelgrass and nuisance macroalgae beds using hyperspectral imagery was suggested. A hyperspectral image was made by SpecTIR in August 2007 using an AISA Eagle sensor. The collected dataset was then used to map eelgrass and nuisance macroalgae throughout the Great Bay Estuary. Here we outline the procedure for mapping the macroalgae and eelgrass beds. Hyperspectral imagery was effective where known spectral signatures could be easily identified. Comprehensive eelgrass and macroalgae maps of the estuary could only be produced by combining hyperspectral imagery with ground-truth information and expert opinion. Macroalgae was predominantly located in areas where eelgrass formerly existed. Macroalgae mats have now replaced nearly 9% of the area formerly occupied by eelgrass in Great Bay.

P34. NATIONAL COASTAL DATA DEVELOPMENT CENTER'S DIVERSITY METADATA SUMMER INTERN PROJECT

Rita Jackson, Richie McComas, and Sharon Hodge, 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.

P35. DIGITAL TECHNIQUES FOR THE CREATION AND SPATIAL ANALYSIS OF A BATHYMETRIC SURFACE MODEL, GARGATHY-KEGOTANK LAGOON SYSTEM, VIRGINIA, USA

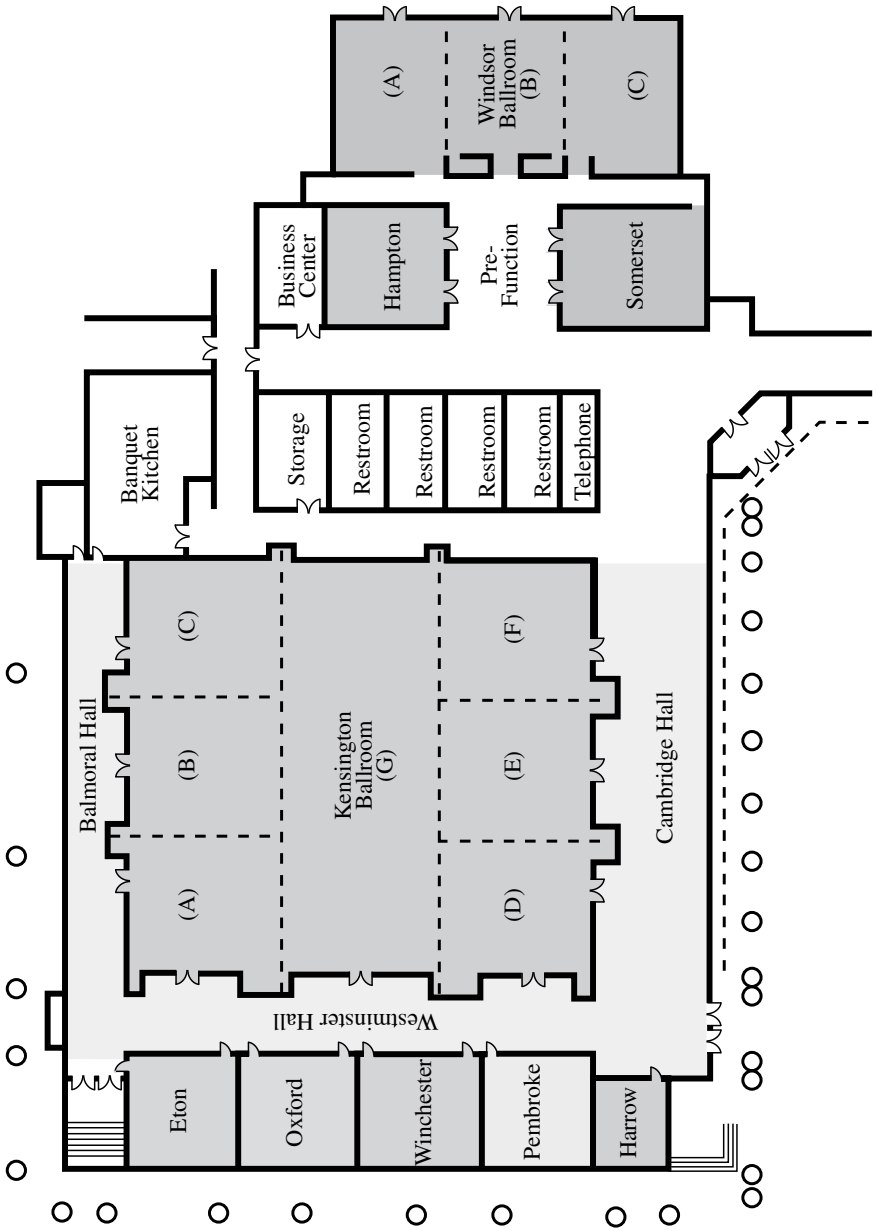
George McLeod, Loretto Herraiz-Gomez, and George Oertel,
Old Dominion University, Department of Ocean, Earth, and Atmospheric Sciences

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.

Author Index

Author Index

Embassy Suites Conference Center Floor Plan



About the NOAA Coastal Services Center

The National Oceanic and Atmospheric Administration (NOAA) is a world leader in coastal science and management. NOAA's Coastal Services Center provides the up-to-date technology, information, and management strategies needed to address complex coastal issues.

The Center is housed within NOAA's National Ocean Service and has offices and staff members throughout the coastal zone. Constituents include local and state governments, coastal regulatory programs, land trusts, Sea Grant, floodplain managers, research reserves, and emergency managers.

To access the Center's products and services, visit the website or e-mail the organization at *csc@csc.noaa.gov* to learn more.

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