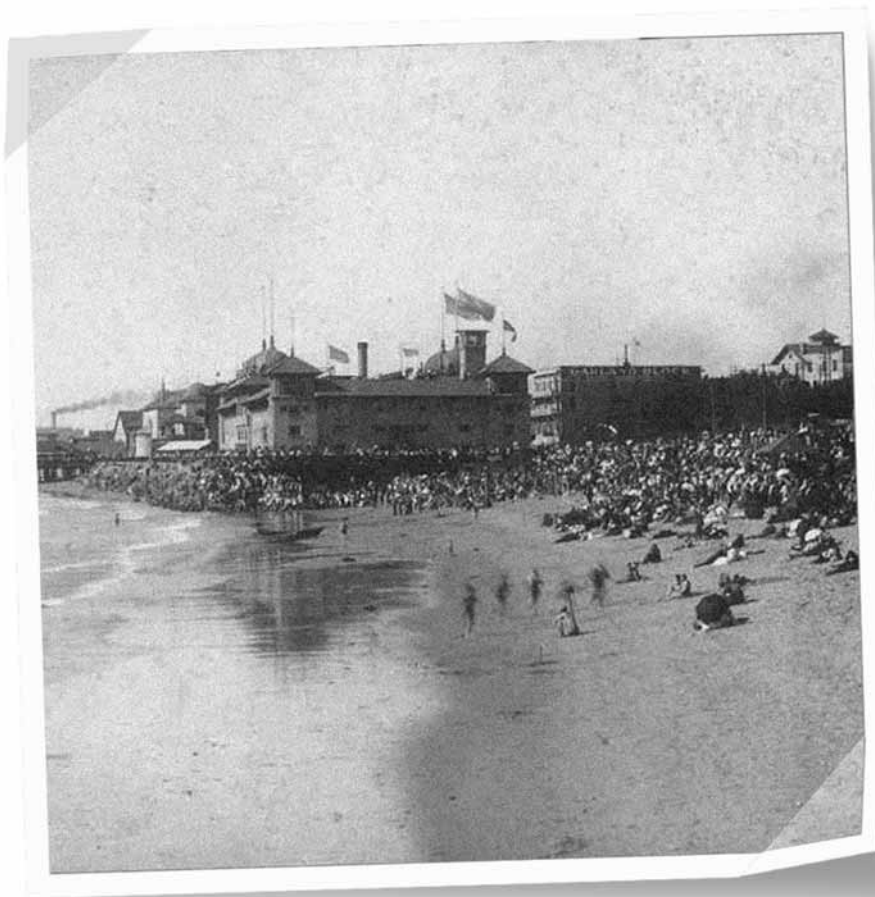
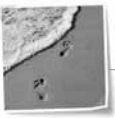




Presentation Abstracts





TCS 21 Posters

The Possibility of Using Mangrove Forests as Natural Fortress to Tsunami Impacts on Indonesian Coasts: A Preliminary Study
Achmad Yasir Baeda, Hiroshima University, Graduate School of IDEC

Sand, Not Just Beach Fill and Toejam
Justin Boevers, University of Washington School of Marine Affairs

Meeting the Needs of Coastal Communities in the Face of Climate Change: Creating a National Model of State-Based Outreach
Jenna Borberg, Oregon State University, College of Oceanic and Atmospheric Sciences

Examining the Efficacy of Coastal Restoration in Louisiana
Rex H. Caffey,* Christiane Aust, and Hamady Diop, Center for Natural Resources Economics and Policy, Louisiana State University

The Gulf of Mexico at a Glance: A Presentation of Selected Regional Socioeconomic Variables Developed in Support of the Gulf of Mexico Alliance
Kristen Crossett, NOAA / NOS Special Projects Division

You Can Lead Horses to Ballast Water Information, But You Can't Make Them Remember It: Evaluating the WCBOP's Aquatic Invasive Species and Ballast Water Outreach
Alisha Dahlstrom, University of California Sea Grant

Financing Coastal Protection: Tools and Ideas That Can Help You Finance Your Program
Tim Jones, EPA Office of Wetlands, Oceans, and Watersheds

Connecticut Coastal Hazards Data Portal and Visualization Tool
Joel Johnson, Connecticut Department of Environmental Protection, Office of Long Island Sounds Program

A Google Earth Picture is Worth a Thousand Words: An Oregon Coastal Atlas Module
Andy Lanier, Oregon Department of Land Conservation and Development, Coastal Management Program

Implications of Development as Indicated By Permitting Trends on Coastal Erosion in Florida Coastal Areas
Ariana Marshall, Florida A&M University NOAA Environmental Cooperative Science Center

An Organizational Framework for Strengthened Links Between Science and Policy in Coastal Zone Management
Melissa Rada, South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management

The Subtidal Habitat Goals Project: Working Towards Ecosystem-Based Management (EBM) in San Francisco Bay
Daniel Robinson, San Francisco Bay Conservation and Development Commission

Developing a Beachfront Digital Inventory to Enforce South Carolina's 40-Year Retreat Policy
Matthew Slagel, South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management

Status of Beach and Inlet Management Planning in the U.S.: A Review of the Current Literature
Lauren Theodore, North Carolina Department of Environment and Natural Resources, Division of Coastal Management

A Conservation Practitioner's Toolkit: Leasing and Ownership Within Ocean and Coastal Waters
Jay Udelhoven, The Nature Conservancy – Global Marine Initiative

Evolution of Maritime Transportation in Chang Shan Islands, China
Haizhuang Wang, School of Urban & Environment, Liaoning Normal University

Development and Evaluation of Management Measures for Erosion Response in 25 Coastal States
Rick Wilson, Surfrider Foundation



■ Incorporating Aquatic Habitat Values in Working Waterfronts

Ronald Alevras* and Sarah Zappala
 HDR LMS
 One Blue Hill Plaza
 P.O. Box 1509, 12th Floor
 Pearl River, New York 10965
 ralevras@hdrinc.com

Existing port facilities, encompassing major features such as dredged channels, piers and bulkheads, were seldom, if ever, designed to incorporate elements that would protect or enhance habitat for fish or shellfish. Of necessity, port facilities dominate a coastal area and the adjacent upland, but aquatic life resources remain viable, although generally highly impaired. Major port facilities occur in urban areas, which have universally experienced water and sediment quality degradation over extensive areas. However, in many ports of the world, improvements in water and sediment quality provide conditions suitable for the development of diverse aquatic communities. Physical habitat diversity is now the limiting factor for the continuing development of complex communities. Modifying in-water structures (i.e. bulkheads, support piles and fendering systems) associated with ports and waterfront planning and development projects will help increase the habitat complexity and potential ecological value of nearshore waters. For example, the addition of artificial reef elements to existing bulkheads or incorporated into a bulkhead design can add physical habitat diversity which promotes biological diversity and an increase in biological productivity. In addition, inwater structure can be used to control current flow which can be used to manipulate sedimentation rates and substrate types. An example of habitat development using reefballs in New York Harbor is presented to demonstrate possibilities in this area. In addition, other concepts for enhancing habitats within working waterfronts are presented.

■ Spatial Metrics of Surface Runoff and Flood Modeling in a Coastal Barrier Environment

Thomas R. Allen
 Department of Geography
 East Carolina University
 Greenville, NC 27858
 allenth@ecu.edu

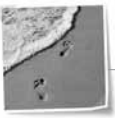
Coastal development that increases imperviousness exacerbates surface runoff, creating a need for stormwater infrastructure and measures to protect water quality for ecological and recreation uses. Growing communities in coastal North Carolina must adapt to rapid population growth and mitigate increasing vulnerability

to flooding. The situation prompts the need for geographic analysis of coastal hydrology at the site, watershed, and landscape scale. A geographic information system and remote sensing techniques were integrated to characterize the landscape hydro-ecological pattern and socio-economic dynamics of chronic runoff-related flooding on North Carolina's Outer Banks. The GIS allowed the exploration of spatial relationships between runoff potential, flood risk, municipal stormwater control policy, and hazard management. Sources of coastal impervious spatial data, including satellite and aerial remote sensing are also reviewed. A predictive model of coastal flooding was developed using high-resolution topographic LiDAR. This model incorporated standard topographic derivatives (slope, contributing area, flow accumulation) and was expanded to incorporate soils and vegetation cover. A separate model of runoff was constructed for impervious flowpaths (e.g., rooftops, streets, driveways) using hydrologic models and spatial pattern metrics of feature connectivity, density, and other geomorphometry metrics. The GIS-based hydrologic modeling and connectivity and spatial pattern metrics applied to coastal development provide a means to target areas for potential retrofit or alternative policies to reduce chronic vulnerability to flooding.

■ Expanding Lateral Access along Rhode Island's Shoreline Using the Doctrine of Custom

Amanda J. Argentieri
 Roger Williams University School of Law
 Marine Affairs Institute
 Ten Metacom Avenue
 Bristol, RI 02809
 Aargentieri698@hawks.rwu.edu

The issue of lateral access to the Rhode Island shoreline has recently been described by a state congressman as being "out of control," particularly along the state's southern coast. Many private property owners have installed fences extending down to the water, preventing the public from passing along the beach laterally. Under the Public Trust Doctrine, Rhode Island citizens have the right to pass along the shore up to the mean high water mark as codified in the Rhode Island Constitution Article 1, Section 17. Recently, the Lateral Access Commission was created specifically to study the issue of lateral access along the shoreline. Members of the legislature, along with the Rhode Island Coastal Resources Management Council, the state's coastal zone management agency, have set out to prove that a constitutional easement exists above the mean high water mark up to the vegetation line, thus allowing public passage along the dry sand areas without trespassing. The Commission has chosen to focus on the Custom doctrine to support a constitutional easement. In order to invoke the doctrine of custom, seven elements must be established by evidence: 1)



antiquity, 2) continuity, 3) freedom from dispute, 4) reasonableness, 5) certainty, 6) obligation, and 7) consistency with the law. The presentation will highlight the intentions of the Lateral Access Commission by analyzing the likelihood of the satisfaction of each of these elements. The analysis applies a framework similar to that used by the Oregon courts when presented with the same lateral access/custom doctrine legal quandary.

■ Cooperation, Community and the Commons: Building Equity and Protecting Reefs in Bocas Del Toro, Panama

Robert "BJ" Atanasio
146 Henry St
San Francisco, CA 94114
bjatanaz@earthlink.net

Ethnographers have described many communities that manage and sustain important resources through traditional tenure regimes. However, many of these communities have a homogenous composition, with the members sharing cultural and social norms, and the local economy is not strongly tied to external markets. In many other instances, communities remain dependent upon natural resources, but lack an identifiable regime to manage them. These communities are often more diverse. They often are mosaic of newer arrivals or immigrants and lack the social capital created by customary management practices. In these cases, it may be helpful to identify institutions that have the potential to function like long-established tenure practices. The Unión de Pescadores Artesanales Bocatorenos (UPESABO) provides micro-loans and small business training to a small community of artisan fishermen in the Bocas del Toro archipelago in the Republic of Panama. This case study examines UPESABO's efforts to improve the standing of fishermen in the community; to create fair market value for fishery products; and to manage fishing impacts on local coral reefs. Institutional objectives and goals are identified through document analysis. Implementation of practices and policies are evaluated through participatory observation and interviews of UPESABO members, the community and organizers. In addition, the author surveyed a sampling of members regarding ethnic identity and demographic attributes. The analysis of questionnaire results did not indicate correlations between ethnicity and selected attributes, suggesting that differing social norms do not hinder participation in the coop. This case study indicates that UPESABO's institutional organization lends itself to supporting conservation behaviors. In communities without traditional tenure regimes, organizations that create resource equity may provide similar benefits.

■ Bureaucratic Expertise, International Advocacy, and Policy entrepreneurs: Re-Zoning the Great Barrier Reef

Betsi Beem
University of Sydney
b.beem@usyd.edu.au

In 2003, the Great Barrier Reef Marine Park was re-zoned, increasing the "no-take" areas of the park from 4.5% of the area (6,200m²) to 33% (44,000m²). This change embodied a new way of thinking about the Reef and its management. It shifted the focus from protecting specific habitats (the "pretty, hard bits") and individual species to ensuring that there was adequate representation of each of the unique bioregions in the Great Barrier Reef Region and that a sufficient area of each region would have pressure reduced. This reflected a fundamental change in how scientists and the Great Barrier Reef Marine Park Authority (GBRMPA) understood ecological processes of the Reef. The fundamental question that this paper addresses is: how did those ideas become animated in actual policy outcomes? Explaining the factors that contributed to this change is complex and rooted in not only changed understandings of ecosystem interaction, but also the different ways that bureaucrats exercise leadership, the intersection of international and domestic science and advocacy groups, and how issue frames and alternate policy venues were used to apply pressure and legitimize a change of this magnitude.

■ Using Social Marketing to Augment Effective Growth Management in Coastal Maine

Stacy Benjamin*, John Weber, and Patrick Wright
Land Use Program
Maine State Planning Office
38 State House Station
Augusta, ME 04333
Stacy.benjamin@maine.gov

A foundation of the Maine Coastal Program (MCP) has been technical planning assistance for coastal communities aimed at balancing growth to protect important coastal resources while enhancing coastal community character. Since the passage of the Growth Management Act in 1988, a major focus of the program has been on growth management by assisting with the development of local comprehensive plans and land use ordinances. Maine's growth management program has achieved some successes, but land development and changing development patterns continue to negatively impact Maine's coastal resources and coastal community vitality. Local comprehensive plans are inconsistently implemented, and have not made the impact on development patterns that were anticipated. Maine needs a clear strategy to convince municipalities to allow and encourage the pattern of development that will protect the coastal environment and water-dependant economy.



MCP, with funding through the NOAA Coastal Fellow Program, initiated an evaluation of the implementation and effectiveness of local comprehensive plans in 13 Maine coastal communities. All strategies from each comprehensive plan were identified and categorized using a variety of filters. Local officials were interviewed to identify the degree to which each strategy had been implemented. Strategies were statistically analyzed to determine which factors influenced implementation. Results from this analysis are being used to develop a social marketing strategy focusing on improving implementation of local comprehensive plans by targeting the local officials and volunteers responsible for this work. The framework for the marketing campaign will be in place and some field-tested examples ready to present by June 2008.

■ Restoring Santa Monica Bay's Largest Wetland: Ballona Wetlands Restoration Planning

Sean Bergquist
 Santa Monica Bay Restoration Commission
 320 West 4th St. Suite 200
 Los Angeles, CA 90013
sbergquist@waterboards.ca.gov

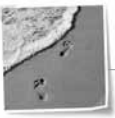
In 2004, the State of California took title to 600 acres of the former Ballona Wetlands in Los Angeles. The property is owned by two state agencies, the Department of Fish and Game (DFG) and the State Lands Commission. The State Coastal Conservancy (Conservancy) has funding for planning and restoring the property. Together, the three agencies are working with stakeholders and other agencies to develop a plan for restoration of this extraordinary resource. The Conservancy provides funding for the planning effort and manages the work plan, budget, and schedule. As the landowner, DFG will be the applicant for any permits needed for the restoration project and the lead agencies for purposes of California Environmental Quality Act. A restoration plan will be developed for all of the lands owned by the state. Planning is being conducted within the landscape and watershed context, incorporating adjacent and ecologically related resources. The agencies and stakeholder have established restoration goals, which include: 1) Restore and enhance salt-water influenced wetland habitats to benefit endangered and threatened species, migratory shorebirds, waterfowl, seabirds, and coastal fish and aquatic species. Restoration of seasonal ponds, riparian and freshwater wetlands, and upland habitats will be considered where beneficial to other project goals or biological and habitat diversity; 2) Provide for wildlife-dependent public access and recreation opportunities compatible with the habitats, fish and wildlife conservation; 3) Identify and implement a cost-effective, ecologically beneficial, and sustainable (low-maintenance) habitat restoration alternative. In addition to restoration goals, guiding principles for the restoration

planning process have been established, and include: The planning process will, 1) Be based on the best available science, developed with technical and scientific expertise; 2) Be transparent and will allow all stakeholders input; 3) Respect the decision-making bodies of each of the State Agencies.

■ Measuring the Impacts of Sea Level Rise on Coastal Real Estate in North Carolina

Okmyung Bin*, Ben Poulter, Chris Dumas, and John Whitehead
 Department of Economics
 East Carolina University
 Greenville, NC 27858
bino@ecu.edu

This study uses a unique integration of geospatial information and economic data to estimate the impact of sea level rise on North Carolina coastal real estate. North Carolina's coastal plain is one of several large terrestrial systems around the world threatened by rising sea levels. Rates of sea level rise in this region are approximately double the global average due to local isostatic subsidence. Projected sea level rise is expected to significantly affect the natural and economic systems. We use high-resolution topographic LIDAR (Light Detection and Ranging) data to provide accurate inundation maps in order to identify all property that will be lost under different sea level rise scenarios. The sea level rise scenarios adjusting for regional subsidence include an 11 cm increase in sea levels by 2030, a 16 cm increase by 2030, a 21 cm increase by 2030, a 26 cm increase by 2080, a 46 cm increase by 2080, and an 81 cm increase by 2080. Geocoded parcel data from the county tax office provide assessed property values measured in 2004. Additional geospatial attributes that describe the distance of a property to shoreline and elevation are also generated using GIS and entered into a database of corresponding property values. The results indicate that the northern part of the North Carolina coastline is comparatively more vulnerable to the effect of sea level rise than the southern part. Low-lying and heavily developed areas in the northern coastline of North Carolina are especially at high risk from sea level rise.



■ Best Management Practices for Adaptive Management of Large-Scale Restoration Programs

Justin Boevers
Master's Candidate
School of Marine Affairs
University of Washington
3707 Brooklyn Ave. NE
Seattle, WA 98105
jboevers@u.washington.edu

This analysis identifies best practices of adaptive management (AM) from existing large-scale restoration programs. Successfully applying AM increases in difficulty and complexity with the size of the physical and political area being proposed for restoration. Uncertainty, natural variation, and confounding factors are just some of the variables that become harder to resolve from project to program level. The case study approach to identify best practices is applied to the Bay-Delta Authority (CALFED), the Chesapeake Bay Program (CBP), the Comprehensive Everglades Restoration Plan (CERP), the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), and the Lower Columbia River Estuary Program (LCREP). There are three AM best practices identified that reduce program-scale challenges. First, the scope of institutional buy-in in large-scale restoration can be substantial. It takes collective institutional buy-in for AM to realize its potential, which is often hard to identify and achieve. The second challenge is the need for infrastructure. It proved to be important to limit the disconnect in the AM process between setting measurable objectives in a centralized program and evaluating progress towards objectives with decentralized projects. Infrastructure linking program and project evaluation prove critical for success in adaptive management of restoration programs. Third, monitoring is critical for adaptive management, however it receives low priority and attention in restoration. Effectiveness monitoring is necessary for evaluating restoration efforts, and programs committed to monitoring are closer than the others to realizing the potential of AM. These best practices should provide restoration program planners insight into increasing effectiveness of restoration.

■ Sand, Not Just Beach Fill and Toejam

Justin Boevers
Master's Candidate
School of Marine Affairs
University of Washington
3707 Brooklyn Ave. NE
Seattle, WA 98105
jboevers@u.washington.edu

Sandy beaches are habitat to a wide diversity of species and play a critical role in linking marine and terrestrial food webs. However, current beach management practices and policies usually fail to adequately consider sandy beach ecology in decisions. Beach management actions are often driven by erosion control, and the understanding of beaches is limited to geologic properties. Sandy beach ecology as a discipline is new in recognition and is limited in both practicing sandy beach ecologists and published literature in academic journals. Sandy beach ecology literature has identified at least 600 invertebrates, and has confirmed that beaches are necessary habitat for forage fish, shorebirds, sea turtles, and marine mammals. Shoreline structures such as sea walls, groins, and jetties threaten natural sandy beach ecosystems. However, the biggest threat to sandy beach ecology may be beach dredge and fill projects, often referred to as '(re)nourishment,' that do not account for beach ecology. Grain, and specifically its size, is the most important element in sandy beach ecosystems and changing the grain on a beach will impair or even eliminate existing ecological processes. Many fill projects arbitrarily replace grain irrespective of existing size, color, and composition. This failed integration of science and policy results in beach management decisions that do not adequately consider impacts on sandy beach ecology. This analysis presents different habitat roles that sandy beaches play, identifies threats to natural sandy beach ecosystems, and provides a case study from Tybee Island, GA that illustrates sandy beach habitat considerations in beach management.

■ Meeting the Needs of Coastal Communities in the Face of Climate Change: Creating a National Model of State-based Outreach

Jenna Borberg*, Joseph Cone, and Michael Harte
College of Oceanic and Atmospheric Sciences
Oregon State University
104 COAS Administration Building
Corvallis, OR 97331-5503
jborberg@coas.oregonstate.edu

The impacts of climate change on coastal communities are amplified as coastal populations increase and coastal use and development expand. For communities to increase resilience to climate change and its impacts, coastal stakeholders need to understand likely impacts and where appropriate take adaptive action. Oregon Sea Grant addresses this imperative by developing



and testing a national model of state-based outreach involving public and private decision makers in specific at-risk coastal communities of Oregon and Maine. The project is funded by NOAA Sectoral Applications Research Program. Climate change outreach material is riddled with misinformation and disinformation. Media hype often exacerbates this situation. Outreach practitioners often have preconceived notions of what coastal communities need to know. Even when outreach effectively disseminates climate change information and tools, this does not always eventuate in a conscious choice to take action or not. We call for climate change outreach efforts to be better grounded in the psychological sciences. Two psychological frameworks are being examined for their usefulness: an integrative model of behavior prediction, and risk perception and communication. We will undertake qualitative studies of Oregon and Maine coastal communities (i.e., focus groups, interviews) in an effort to better understand individual and group attitudes, beliefs, and peer-group norms about climate change vulnerabilities and adaptive actions. From this understanding, we are designing outreach materials on climate change which address the psychological “background” factors and social “foreground” decisions of our target audiences, thus providing relevant and enabling information as communities plan to adapt.

■ Lessons Learned at Fishtown: Preserving Heritage Fishery Tourism in Leland, Michigan

Mark A. Breederland* and Amanda Holmes
Michigan Sea Grant
Michigan State University Extension
520 W Front St, STE A
Traverse City MI 49684
breederl@msu.edu

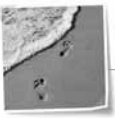
In 2007, a non-profit community-led effort has preserved a unique working waterfront in Northwest Lower Michigan. Leland is a small historic unincorporated village on the shore of Lake Michigan which contains Fishtown, a rare example of a traditional cultural landscape in the Great Lakes region. Established in the late 19th century, Fishtown has developed and evolved around commercial and sports fishing, as well as other water-transportation and recreation-related activities. The Fishtown Preservation Society (FPS) not only purchased the site and its weathered structures, but also two viable commercial steel-hull fishing vessels. FPS also recently acquired an authentic hand-crafted wood fish tug which fished from Fishtown from 1927 through the late 1950s. The Society plans to use the site and vessels to promote the Great Lakes commercial fishing industry and its heritage. Many valuable lessons have been learned in the process of a new non-profit becoming responsible for a working waterfront, from creating an effective Board of Directors to the use and maintenance of historic structures, fishing boats, tools and equipment. Information will be shared on issues

including transfer of commercial fishing licenses, insurance, liability, the Jones Act, maintenance of historic objects and structures, and visitor policy implementation (example of new policy in 2007: “Smoke Fish, Not Tobacco!”), all of which have applicability for other areas and groups involved in coastal heritage tourism.

■ Wave Energy on the Oregon Coast: New Developments and Alternative Environmental Planning Processes

Holly V. Campbell*, Finlay Anderson, Gail Achterman, and Michael Harte
Marine Resource Management Program
College of Oceanic and Atmospheric Sciences
Oregon State University
COAS Administration Building
Oregon State University, Corvallis, 97331
hcampbell@coas.oregonstate.edu

Ocean and wave energy in Oregon’s territorial sea (0-3 nm) will be licensed through the Federal Energy Regulatory Commission (FERC). Absent for both emerging wave energy technologies and their placement in coastal waters is the cumulative experience and knowledge held by FERC, stakeholders, and developers for conventional hydropower. Development of hydrokinetic power beyond territorial waters will require federal licenses or permits under multiple laws. Notwithstanding regulatory complexity, proposals for wave energy projects are proceeding in Oregon and elsewhere in North America. Intending to manage the tension between needing to know potential impacts before licensing and the need to deploy wave energy devices to understand potential impacts, FERC proposed in 2007 (and further refined in April 2008) an expedited process for permitting the installation of pilot projects of 5 megawatts or fewer for a period of five years. The new process is intended to give developers of wave energy technologies access to coastal waters and may help attract the capital necessary to launch viable commercial-scale projects. During 2008, progress is being made regarding the long-range permitting process for hydrokinetic power in state and federal waters. We review environmental impact and risk identification and assessment processes in the Pacific Northwest and California with regard to wave energy’s long-term deployment (or build-out). We will include discussion of alternative regulatory approaches, analyzing options for integrated, expedited permitting, ultimate licensure, and management of wave energy projects.



■ Envisioning the Future of Coastal and Ocean Management: Bringing Science to Management

Ralph Cantral* and Joelle Gore

NOAA

Office of Ocean and Coastal Resource Management

1305 East-West Highway

SSMC4, 10th Floor

Silver Spring, MD 20910

Ralph.central@noaa.gov

The release of landmark recommendations for improving ocean and coastal management by the U.S. Commission on Ocean Policy and Pew Oceans Commission have prompted discussion within the coastal management community on ways to improve the National Coastal Management Program. In response, the Coastal States Organization (CSO) and the National Ocean Service of the National Oceanic and Atmospheric Administration (NOAA), with leadership from the Office of Ocean and Coastal Resource Management, embarked on a project, called *Envisioning the Future of Coastal Management*, to gather innovative ideas for improving coastal management in the United States. The project engaged coastal managers and stakeholders in the spring and summer of 2007 to identify priority coastal issues and innovative ideas that will be considered in the design of legislation for a reauthorized Coastal Zone Management Act (CZMA) and improvements to the National Coastal Management Program. Since its passage in 1972, the CZMA has provided an important foundation for federal, state, and local partnerships for improved planning and management in the U.S. coastal zone. Efforts supported under the CZMA have produced a wide variety of successful institutional relationships and results that have proven difficult to capture in any one story or summary. At the same time, there is growing pressure to better calculate the impacts of the CZMA, realign the priorities of state and federal programs, define specific management targets, clarify program activities and jurisdictions, and strengthen the federal-state partnership. Using a set of cornerstones and core principles identified in the *Envisioning* effort, NOAA drafted a legislative framework which outlines key changes that should be considered for a new CZMA. Some of these concepts include the development of integrated and comprehensive assessments to identify threats at various scales, development of state management strategies targeted at national priorities, improved links to local governments and non-governmental organizations through funding and partnerships, and improved integration of NOAA science and technical assistance to address state and regional efforts. The panel will discuss proposed concepts for the reauthorization of the CZMA, and any proposed legislative bill language for the CZMA introduced prior the conference.

■ Technology Tools for Coastal-Marine Ecosystem-Based Management

Sarah Carr

NatureServe

1101 Wilson Blvd, 15th Floor

Arlington, VA 22209

sarah_carr@naturereserve.org

Human activities on land and in the ocean are changing coastal and marine ecosystems and threatening their ability to provide important ecosystem services such as healthy and abundant seafood, clean beaches, and protection from storms and flooding. Ecosystem-Based Management (EBM) is an innovative management approaches to address these challenges. It considers whole ecosystems, including humans and the environment, rather than managing one issue or resource in isolation. Innovative technology tools for planning for and implementing EBM are emerging in regional coastal-marine resource planning and management efforts across the globe. For example, EBM tools can help predict ecosystem response to human and natural disturbances, select optimal areas for conservation or restoration, visualize the impact of development and resource-use scenarios on an ecosystem, collect local knowledge about a resource, and facilitate stakeholder voting on management alternatives. The EBM Tools Network is an international alliance of government, non-profit, academic, and private tool developers, users, and training providers to promote awareness and support the effective use of these tools and methods for EBM. This presentation will provide an overview of the work of the EBM Tools Network and information on the range of technology tools available for planning for and implementing EBM, the benefits and limitations of using technology tools, and how to use EBM tools effectively. We will also describe an on-line resource for comprehensive information on EBM tools (www.ebmtools.org) and provide information on EBM tool training opportunities.



■ Trends in Coastal Community Vulnerability in the State of Hawai'i Based on Multitemporal Land Cover Characterizations

Jamie Carter*, Christine Feinholz, and Matt McBride
Perot Systems Government Services at the NOAA Pacific Services Center
737 Bishop St., Suite 2250
Honolulu, HI 96813
Jamie.Carter@noaa.gov

The State of Hawai'i has experienced deleterious impacts from natural hazards regularly throughout history. Coastal communities in island environments are particularly vulnerable to tsunamis and other coastal flooding given a finite land base for development, increasing pressures from population growth, and climate change. Coastal land use planning must therefore address a wide variety of socioeconomic, cultural, and environmental concerns. The purpose of this project was to characterize the landscape in tsunami-evacuation zones of the State of Hawaii and to evaluate community vulnerability based on land cover and change information. Land cover information developed by the NOAA Coastal Services Center was used to characterize the island of Oahu as it was in 2000 and again in 2005. A community-level assessment using geographic information systems (GIS) technology and freely available data was used to describe the trends in vulnerability of coastal communities based on the distribution of characteristic land cover types. Results indicate that several coastal communities in Hawaii are particularly vulnerable to tsunamis and that development trends in some communities are increasing their vulnerability to tsunamis.

■ Partnering For Collaborative Coastal Conservation

Brooke Chakides*, Nancy Cofer-Shabica and Lori Cary-Kothera
NOAA Coastal Services Center
2234 S. Hobson Avenue
Charleston, SC 29405
Brooke.Chakides@noaa.gov

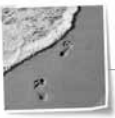
Strategic conservation planning views land use decisions through a conservation lens. Conservation ensures that coastal resources are maintained in the healthy and resilient conditions that are needed to provide the cultural, economic, and ecosystem services we depend on. The process of achieving these goals can be complex, expensive, and controversial. Partnering for collaborative coastal conservation may not make it easier, but collaborative efforts produce many benefits, including expanded expertise, support, and resources. Are there lessons learned to light the way? In this session, the National Oceanic and Atmospheric Administration's (NOAA) Coastal Services Center provides examples. The Center routinely reaches across traditional lines with partners solving complex conservation challenges in the coastal zone. Case study

examples of Center conservation partnerships that include geographic information system (GIS) technical support, training, and collaborative processes will highlight successes of diverse groups that are increasing their networking, cooperation, and technical capacity to achieve strategic conservation of critical coastal resources and the services they provide. This presentation will highlight successes and lessons learned from the Maine Coast Protection Initiative, where 70 member organizations came together to increase the pace and quality of conservation along Maine's coast. Examples will also be drawn from a green infrastructure-based GIS training course and a Web resource that provides information about effective networking and strategic partnerships. The presentation will show how the strength and resources of diverse organizations can accomplish multiple objectives, stretch limited resources, and lead to improved solutions to complex and multifaceted conservation and land use decisions in the coastal zone.

■ Sea Grant's Role in Improving Coastal Management in Hawaii

Chris Conger
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawaii 96813
conger@hawaii.edu

Many of Hawaii's government agencies, operating in or near the coastal zone, are currently directed by statutes, rules, and ordinances that were drafted with the implicit assumption that neither sea-level nor the climate were undergoing long-term change. As a result, Hawaii's Sea Grant College Program has actively supported placing scientists in positions where they may assist coastal management agencies, at county and state levels, with interpreting and revising these documents within the context of modern scientific knowledge. Currently, there are two coastal lands specialists working directly with State agencies, and one specialist working with the Maui County. Their work, and the work of their predecessors, associate faculty, and Sea Grant-funded researchers, has helped both Maui and Kauai Counties to rewrite their coastal construction setback ordinances to utilize scientifically-derived erosion rates. Their ongoing work provides decision makers a scientific basis for determining shoreline locations, reviewing environmental assessments and impact statements, coastal lands program management, and beach nourishment and erosion response project design and monitoring. Additionally, they routinely work with various state and county agencies on coastal restoration and preservation projects. Hawaii's Sea Grant also supports programs and research targeting improved understanding of Hawaii's coastal hazards and hazard mitigation techniques. It



appears that many of the impediments to adopting science-based policies result from individual or group perception. Consequently, Sea Grant has had success through supporting a wide spectrum of education and outreach focused on the introduction and use of modern scientific knowledge in the coastal environment.

■ **Maine’s Working Waterfront Access Protection Program: Lessons from the Waterfront**

Jim Connors
Maine Coastal Program
#38 State House Station
Augusta, Maine 04333
jim.connors@maine.gov

Passage of the \$12 million Land for Maine’s Future Bond in November of 2005 established a unique working waterfront protection program, funded by a \$2 million set-aside for projects that protect strategically significant working waterfront properties whose continued availability to commercial fisheries businesses is essential to the long-term future of this economic sector. The Maine Working Waterfront Access Pilot Program is aimed at protecting coastal waterfront land with the facilities, capacity, and services needed to support commercial fisheries businesses. Commercial fisheries businesses include commercial fishermen, aquaculturists, individuals and businesses providing them direct services, fishermen’s cooperatives and municipal and private piers and wharves providing waterfront access to commercial fishermen and aquaculturists. Permanent protection of working waterfront properties is secured through the use of a Working Waterfront Covenant, a new tool created by statute and applied to program projects for the first time. The WW Covenant assures both future availability and affordability of the protected property for commercial fishing business use. As of November 2007, after two rounds of project solicitation, six projects are working their way through the due diligence process. Each project has presented its own set of issues and considerations unique to its setting and planned uses. This presentation will provide a general overview of the funding program, highlight solutions, and offer lessons learned. The Maine program, aimed at commercial fishing business, is unique in the country and is generating a track record that can be shared with other coastal states contemplating similar programs.

■ **Engaging Coastal Communities in Wave Energy Development**

Flaxen Conway* and Kaety Hildenbrand
Oregon State University
Department of Sociology
307 Fairbanks Hall
Corvallis, OR 97331-3707
541-737-1418
flaxen.conway@oregonstate.edu

The need for renewable energy has emerged at the same time that demand for nearshore ocean “real estate” seems to be growing. The “last frontier,” the ocean, is being zoned. While the potential for economic gain and renewable energy is enticing for coastal communities, there also is a deep fear that wave energy development is essentially replacing one “renewable” industry – fishing – with another. For example, the space desired for renewable energy generation sometimes also happens to be productive crabbing grounds. Thus, from one perspective, renewable energy has become another competitor for an already-stressed industry. In addition, wave energy development is a relatively new in the United States, and the processes for permitting and community involvement are being designed and implemented on the fly. Furthermore, political leaders are striving to make Oregon “the leader” in wave energy development, and the process is moving at an accelerated pace. Coastal communities, particularly user groups such as commercial and recreational fishermen, need to successfully engage in this issue. The need for stakeholder outreach and engagement is clear. This presentation will describe: 1) the challenges and successes in engaging these stakeholders; 2) the progress toward developing systems for working together and ensuring that diverse perspectives are heard; and 3) the slow but steady movement toward informing coastal communities so they may meaningfully participate in the ongoing dialogue.

■ **Walking in Each Others’ Footprints: The Benefits and Costs of Cooperation**

Flaxen D.L. Conway* and Kaety Hildenbrand
Oregon State University / Oregon Sea Grant Extension
307 Fairbanks Hall, OSU
Corvallis, OR 97331
flaxen.conway@oregonstate.edu

Managing the ocean space and its resources feels tough if not impossible at times. Most people involved with making the decisions or operating business in accordance with the policies struggle with complex decisions and ample challenges. Policies may not reach desired outcomes or may have unintended impacts; data are limited and research budgets are declining. There is a lack of understanding of regulations or the rationales behind



them. Cultural differences, miscommunication, and a lack of trust also intervene. One thing is clear: decision makers, scientists, and practitioners (industry or community stakeholders) are inextricably linked. Yet even though the current system has them all operating independently and, at times, feeling at odds, everyone shares the desire for more or better understanding and to be part of the solution instead of the problem. This paper shares several innovative attempts to connect experiential knowledge and scientific knowledge for the benefit of better decision making. Examples include scientists and fishermen exchanging information or partnering in cooperative fisheries research, improving NOAA fishing community profiles via community-based researchers, and engaging stakeholders in the wave energy gold rush. Keys to each of the approaches are cooperation and the recognition that management, science and practice are interdependent. Although occurring in Oregon, the lessons learned from these experimental approaches could be of value to those dealing with coastal issues across the country.

■ **The Gulf of Mexico at a Glance: A Presentation of Selected Regional Socioeconomic Variables Developed in Support of the Gulf of Mexico Alliance**

Kristen Crossett*, Tony Reyer, Brent Ache, Chris David and Alyssa Edwards
 Special Projects Division MB/NOS/NOAA
 1305 East West Hwy, SSMC4 Rm 9524
 Silver Spring, MD 20910
 kristen.crossett@noaa.gov

The Gulf of Mexico Alliance is a partnership among the States of Alabama, Florida, Louisiana, Mississippi, and Texas, with the goal of significantly increasing regional collaboration to enhance the environmental and economic health of the Gulf of Mexico. One objective of the Alliance is to begin to build a regional identity that links the environmental health of the Gulf of Mexico with the watersheds and coasts to the high quality of everyday lives and to the economic vitality of the region and the nation. A requirement of this approach is to be able to highlight significant economic activity that is located in the gulf's coastal watersheds. To this end, *The Gulf of Mexico at a Glance* provides regional aggregations of the selected economic activities in the coastal watersheds of the Gulf of Mexico. These economic activities are not necessarily ocean or coastal dependent, but do occur in the Gulf's coastal watersheds, servicing the residents of and visitors to these watersheds and contributing to our Nation's economy. This report presents digestible, easily understood, non-technical summary information, focused to a general public audience. To learn more about the Gulf Alliance please see <http://www.dep.state.fl.us/gulf/default.htm>.

■ **Economic Indicators for Coastal Communities: The "Bottom Line" of Climate Change for the Nation's Valuable Coastline**

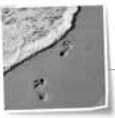
Kirstin L. Csik* and Judith Kildow
 National Ocean Economics Program
 Monterey Bay Aquarium Research Institute
 7700 Sandholdt Road
 Moss Landing, California 95039
 831/775-2024
 kcsik@mbari.org

A framework for collection of data constructed and tested in California depicts the economic vulnerability of vital coastal communities to the environmental hazards caused by climate change. Coastal communities contribute to over three-quarters of the nation's population and economic productivity; however, due to proximity to the coastline and high-occurrence catastrophic events, they occupy some of the most vulnerable land in the nation. Environmental hazards caused by climate change place social, ecological, and economic resources at risk. And while the social and ecological impacts have been thoroughly researched and documented, little work has been done to inform coastal zone managers and policy makers as to the economic vulnerability of these valuable communities. An understanding of the social and ecological impacts of climate change is vital, but economic data can provide the hard evidence for managers and politicians to effect change. Local time-series economic data is crucial to understanding the societal impacts of climate change, but the federal government does not release much economic information at the local level due to disclosure issues: the data available is neither comprehensive nor directly economic. Research sponsored by the National Ocean Economics Program (at the Monterey Bay Aquarium Research Institute) was conducted to identify data needs and the availability of community-level data. The resultant framework for data collection is an invaluable resource to effect political change regarding necessary data collection, and to inform policy decisions that will protect and enhance our nation's priceless coastlines.

■ **Evaluating Management Strategies to Mitigate Impacts of Aquatic Invasive Species**

Alisha Dahlstrom
 1515 Clay Street Suite 1400
 Oakland, CA 94612
 adahlstrom@ucdavis.edu

Introductions of aquatic invasive species (AIS) have severely impacted the ecology, economy, and human health issues in many coastal ecosystems. While ballast water is an oft-recognized vector of AIS introductions, vessel fouling may play an even larger role in certain ecosystems or taxa. In Hawaii, vessel fouling is believed



to be responsible for more successful marine introductions than any other mechanism (Eldredge and Carlton, 2002). In North America, at least 36% invertebrates and algae introduced through the shipping vector arrived via fouling (Fofonoff et al. 2003). The process of vessel fouling is characterized by organisms such as mussels, seaweed, anemones, and sea squirts attaching to vessel hulls, with mobile organisms such as worms and crustaceans inhabiting nooks created by the larger sessile animals, and in sea chests or anchor systems. These species can remain during the voyage, then drop off or spawn upon arrival at a new port or harbor, resulting in AIS introductions. Vessel fouling occurs via recreational and commercial vessel movements, but is only recently emerging as a focus point for AIS prevention. Knowledge (and associated risk assessment and management) of vessel fouling is increasing, but is generally limited (e.g. vessels that move at slow speeds or spend long periods in port tend to accumulate more fouling). As ocean traffic increases, vessel fouling problems will only intensify. Hence, vessel fouling affects the maritime industry, policy makers, regulators, researchers, managers, and the public. This panel will present current research and management strategies (local to international) that are in place to mitigate this threat to coastal ecosystems. Panelists will be: Ian Davidson, The Aquatic Bioinvasion Research and Policy Institute, Portland State University; Oliver Floerl, National Centre for Aquatic Biodiversity and Biosecurity National Institute of Water and Atmospheric Research (NIWA); L. Scott Godwin, Hawaii Biological Survey; and Leigh Taylor Johnson, Sea Grant Extension Program.

■ You Can Lead Horses to Ballast Water Information, But You Can't Make Them Remember It: Evaluating the WCBOP's Aquatic Invasive Species and Ballast Water Outreach

Alisha Dahlstrom
1515 Clay Street Suite 1400
Oakland, CA 94612
adahlstrom@ucdavis.edu

A primary goal of the West Coast Ballast Outreach Project (WCBOP) is outreach about ballast water management and treatment technologies, vessel fouling and aquatic invasive species (AIS) along the West Coast of the North America. Outreach materials include a "Stop Ballast Water Invasions" poster, a companion brochure, a biannual newsletter, *Ballast Exchange*, and a website. While these materials have reached thousands of individuals, this alone does not indicate assimilation and use of the information. To determine the effectiveness of the WCBOP's outreach materials, feedback on the materials and resulting changes in AIS knowledge/awareness will be obtained using online and emailed surveys, personal interviews, and presence/absence surveys, depending on the audience. Our audience includes the maritime industry, research sector, port/harbor

staff, instructors, regulators, and legislators. Evaluation is an essential aspect of any outreach project. Our poster will present lessons learned from our evaluation process that will help guide future outreach efforts for a wide variety of AIS projects, leading to enhanced AIS spread prevention and improved management of new invasions.

■ Developing a Program for Improving Compliance with the California Coastal Act

Elijah A. Davidian
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105
edavidian@coastal.ca.gov

This paper outlines a recent effort by the California Coastal Commission, with support from the National Oceanic and Atmospheric Administration, to develop a pilot program for more systematic permit condition compliance monitoring. As part of the California Coastal Management Program, the Commission is charged with ensuring that all "development" occurring within its jurisdiction is consistent with the provisions of the California Coastal Act of 1976. Project review and permit issuance, prior to commencement of coastal development, is the primary method of achieving this objective. To ensure that impacts from coastal development are avoided or minimized, the Commission often approves permits subject to conditions of approval that, if met, will bring development into compliance with the Coastal Act. The vast majority of permits issued by the Coastal Commission contain conditions of approval. Resource constraints and statutory deadlines have historically forced monitoring of condition compliance lower on the list of priority program areas. Highlighting a recent attempt to reverse this trend, this paper addresses hurdles to achieving greater comprehensive monitoring; strategies for improving compliance; a methodology for problem identification and pilot development; and concludes with a discussion of pilot implementation and lessons learned.

■ The Surfrider Foundation's Blue Water Task Force

Mara Dias
Surfrider Foundation
PO Box 6010
San Clemente, CA 92674
mdias@surfrider.org

The Surfrider Foundation is a grassroots, non-profit environmental organization dedicated to the protection and enjoyment of the world's oceans, waves and beaches for all people. The Surfrider Foundation operates through a system of over 80 chapters located in almost every coastal state, as well as internationally. The Blue Water Task Force (BWTF) is Surfrider's volunteer water quality monitoring, education



and advocacy program. It's used by chapter activists to alert citizens and officials in their communities about water quality problems and to work toward solutions. Many chapter programs have been very successful at integrating science with management and public awareness of beach and watershed-scale water quality issues. This presentation will examine case studies in California and Oregon where Surfrider BWTF data have been shared with local municipalities to draw attention to new water quality concerns. Immediate action has included better public notification of contaminated waters and more protective state and local beach monitoring programs. The BWTF has also motivated local governments and stakeholders to locate and take action to eliminate sources of beach water pollution. Surfrider chapters are also helping to get agency beach data out to the public by posting it on websites, sending out email alerts, and putting up posters at beaches, schools, and other community bulletin boards. Through these efforts, the Blue Water Task Force is linking the regulatory agencies with concerned citizens and resource users.

■ Impacts of Climate Change on San Francisco Bay

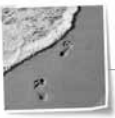
Tim Doherty* and Leslie Lacko
 San Francisco Bay Conservation and Development Commission
 50 California Street, Suite 2600
 San Francisco, CA 94111
 timd@bcdc.ca.gov

The San Francisco Bay Conservation and Development Commission, BCDC, is the California state coastal management agency with jurisdiction over San Francisco Bay. The BCDC's Climate Change Planning Program focuses on comprehensive long-term objectives for the bay region. However, BCDC has accomplished two immediate actions that are critical to the future success of the long-range project: a public outreach strategy has informed the Bay Area public about the impacts of climate change, and a partnership with other regional agencies and stakeholders leveraged BCDC's efforts and created a comprehensive regional approach to addressing climate change. The Bay Area stands to lose valuable real estate, critical public infrastructure, and natural resources as a result of climate change impacts. To raise public awareness, BCDC created a series of maps using geographic information systems technology to illustrate the extent of shoreline vulnerable to inundation with a 1 meter rise in sea level. Historic records show that sea level in San Francisco Bay has risen 18-20 cm (7 inches) over the past 150 years. The 2006 Climate Action Team Report to the California Governor predicts sea level could rise approximately three feet by 2100. The IPCC's recent Fourth Assessment Summary for Policy Makers narrowed the range to between 24 cm and 48 cm (9.45 inches and 18.9 inches) by the end of the 21st century. Through the Climate Change Planning Program BCDC has worked effectively to make the Bay Area public aware of the impacts of climate change.

■ Keeping Vessels at the Water's Edge: Progressive Stewardship of Public Trustlands in Massachusetts

Dr. Dennis Ducsik
 Massachusetts Office of Coastal Zone Management
 251 Causeway Street, Suite 800
 Boston, MA 02114-2136
 Dennis.Ducsik@state.ma.us

As in coastal states everywhere, in Massachusetts the waterfront infrastructure necessary to support fishing, shipping, passenger transportation, and other maritime industry has been difficult to sustain in the face of intense pressure for development of incompatible (usually nonwater-dependent) uses. But we in the Office of Coastal Zone Management, in collaboration with the state Department of Environmental Protection, are pushing back by making progressive use of the Public Trust Doctrine to preserve and enhance vessel-related infrastructure. The waterfront at work in Massachusetts is safeguarded by the so-called "Chapter 91 regulations" which govern permitting of all proposed use changes or structural alterations on tidelands, which in our jurisdiction includes not only waterways but also former ("filled") submerged and intertidal lands. These regulations contain several explicit provisions of both a preventative and promotional nature. Included are standards that reserve the waterway and the immediate waterfront for water-dependent uses exclusively; require development of new facilities for water-based public activity; prohibit certain inappropriate projects on prime port lands called Designated Port Areas; prevent involuntary displacement of existing water-dependent uses; invite "competing party" proposals for higher and better maritime activities; and allow use diversifications so maritime businesses can tap opportunities for internal economic subsidy. This presentation will describe selected provisions of the regulations and will focus on the strengths and weaknesses of centralized regulatory authority under Chapter 91 as the primary means of keeping commercial vessels at the water's edge in Massachusetts. It will also ask: is the Public Trust Doctrine being utilized as fully as it could be for this purpose in coastal states elsewhere throughout the country?



■ Marine Aquaculture: Examples of Emerging Property Interests

John A. Duff
Environmental, Earth and Ocean Sciences Department
UMass/Boston
100 Morrissey Blvd.
Boston, MA 02125
John.Duff@umb.edu

In 1967, economist Harold Demsetz offered “some guidance for investigating the emergence of property rights.” Over the course of the four decades since he issued that guidance, many legal scholars have assessed the tension between public and private interests as they relate to a particular space and/or resource. And, increasingly, economic and legal commentators have been drawn to these issues as they arise in relation to the use of marine areas and resources. Recently, James Anderson and other scholars have been constructing and applying property rights indices to evaluate the influence that property rights play in fish harvesting (wild and aquaculture). While both approaches shed some light on how, when, where and under what circumstances property rights “evolve,” few efforts have been made to employ Demsetz’s guidance in conjunction with Anderson’s index approach. This article represents an effort to examine a discrete set of situations where private property rights have emerged in the context of marine aquaculture development in the United States. It also works to then apply the property rights index approach in an effort to compare and contrast the result of the various emerging aquaculture property rights attributes. This work is the result of research sponsored in part by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce under Grant Number NA16RG1606. Additional support has been provided by the University of Massachusetts/Boston.

■ Climate Change and Tourism: The Case for the Coastline of the Outer Banks, North Carolina

David L. Edgell, Sr.* and Carolyn E. McCormick
Department of Hospitality and Management
The North Carolina Center for Sustainable Tourism at East Carolina University
edgell@ecu.edu

The impacts of climate change are rapidly becoming important factors in sustainable tourism. Regardless of whether climate change is human induced or natural, social scientists in sustainable tourism need to act proactively and lead in creating innovative responses to projected climate changes. One area vulnerable to climate change and important to tourism is the Atlantic Ocean coastline of the Outer Banks, North Carolina. This fragile chain of

barrier islands must strategize now in order to mitigate the negative climate change effects and, at the same time, maintain its positive environment and natural beauty – the major reason that over five million visitors from more than 50 countries visit each year. Recently published research by the World Wildlife Fund documents the ecological footprint of global human activities, and results indicate that the world’s ecosystem is being degraded by humans at an unsustainable rate that risks causing irreversible damage to the planet. In addition, these changes could trigger population declines of about 31 percent in land animals; 28 percent in freshwater creatures; and 27 percent in marine animals, compared in 1970 population levels. One hope is that lessons being learned about climate change are implemented by knowledgeable tourism industry professionals today – through sustainable tourism policies and strategic planning – to provide leadership and management for making a difference for the future. The complexity of the tourism industry provides an opportunity for innovation and adaptation to changing economic, socio-cultural and physical environments.

■ Integrating Cross-Sectoral Watershed Management to Address Land-Based Sources of Marine Pollution: The Case of the Demerara Watershed, Guyana

Arwen L. Edsall
School of Marine Affairs
University of Washington
3707 Brooklyn Avenue NE
Seattle, WA 98105
and
National Oceanic and Atmospheric Administration
National Ocean Service, International Program Office
1315 East West Hwy., 5th floor
Silver Spring, MD 20910
arwene@u.washington.edu

This study examines the idea of integrated watershed and coastal management in the Demerara river watershed, Guyana, to address land-based sources of marine pollution. Integration is defined as a process by which institutions and organizations cooperate and collaborate to protect resources and reduce or solve use conflicts in a comprehensive way across traditional sectors and jurisdictions. The study explores the roles and goals of the governmental, non-governmental, and industry actor perceptions and knowledge. This work is done in conjunction with a National Oceanic and Atmospheric Administration and Centers for Disease Control project to combine watershed management and water safety planning in the watershed. This is one of the first international projects to link marine environmental protection through the UNEP Global Program of Action to Address Land-Based Sources of Marine Pollution, and water health safety



planning using World Health Organization guidelines. Data was gathered from secondary sources and primary interviews with experts working on watershed and pollution issues in the Demerara watershed. The interview results and other data collected are analyzed to determine the level of integration in the region, identify gaps in integration, and examine how these gaps can be bridged. Finally, recommendations are made on how the organizations, agencies, and industries involved can better foster integration to address land-based pollution in this watershed.

■ Exploring Area-Based Management: A Deeper Look at On-the-Ground Examples of Comprehensive Marine Spatial Management

Bud Ehler

Consultant, Intergovernmental Oceanographic Commission of UNESCO

charles.ehler@mac.com

Area-Based Management (ABM) is emerging as an effective management method to address the declining health of marine ecosystems. Using an integrated, ecosystem-based approach to marine management, ABM incorporates environmental, economic, and social objectives. Comprehensive ABM is intended to reduce conflict between competing users and promote conservation by specifying the most appropriate uses for particular marine areas. ABM spatially divides the marine environment for a variety of uses. The result of an ABM process is a science-based and multi-stakeholder management plan that proactively implements sustainable use and alleviates extractive pressure to produce conservation outcomes. The traditional approach to marine resource management has been based on reactive sectoral planning and administrative fragmentation, most often ignoring ecosystem considerations. This patchwork of ocean management has produced a disarray of overlaid, uncoordinated, and collectively unsustainable resource use and conflict between resource users. In addition, these piecemeal ocean management regimes rarely integrate environmental, economic, and social goals in a single framework. In the absence of an integrated ABM approach, these goals conflict and result in unsustainable resource management and degraded ecosystems. The panel will provide a brief conceptual overview of ABM and then delve into the specifics of its implementation in a variety of locations, both international and domestic. The panel will consist of: Bud Ehler, consultant with the Intergovernmental Oceanographic Commission of UNESCO, and formerly with NOAA; Leslie-Ann McGee, Director of Massachusetts Office of Coastal Zone Management; Debbie Sivas, Lecturer at the Stanford School of Law, Director of Stanford's Environmental Law Clinic; and Steve Diggon, Turning Point Initiative – Coastal First Nations, British Columbia.

■ An Interagency Human Dimensions of Natural Resource Management Web Portal: HumanDimensions.gov or HD.gov

Hansje Gold-Krueck, Thomas E. Fish, Fred J. Clark, and Lauren Smith. Presented by Chris Ellis.

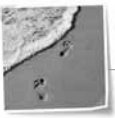
NOAA Coastal Services Center

2234 S. Hobson Ave.

Charleston, SC 29405

hansje.gold-krueck@noaa.gov

A wide variety of human dimensions and applied social science information is available via the Internet. Many of the current online human dimensions resources contain similar information—some overlapping or redundant and others complementary. However, many gaps still remain, and a thread that shows the broad applicability of this information across management contexts is missing. HumanDimensions.gov or HD.gov is an interagency Web portal that aggregates information and provides access to diverse content from natural resource management agencies, nongovernmental organizations, academia, and the private sector in a “one-stop-shop” for human dimensions information. The intent is to provide professionals working in a broad range of conservation and environmental management contexts, geographies, and ecosystems with credible, peer-reviewed case studies, data, tools, methodologies, policy and legislative materials, and other information focused on the application of social science to natural resource management. The portal provides information to users with all levels of knowledge or experience in human dimensions and the social sciences, from novices who wish to learn about terminology, concepts, or methods, to natural resource managers, practitioners of social science methods, and experts. HD.gov is developed, operated, and maintained by a network of partner groups and individuals. As of June 2007, partners and supporters of HD.gov represent more than 150 agencies, universities, and other organizations. The site continues to evolve, with submissions and involvement from an ever-growing list of partners adding visibility and bolstering the community of practice for human dimensions professionals in the U.S. and around the world.



■ **Climate Change on the West Coast: Identified Needs to Increase Community Resilience**

Chris Ellis
NOAA Coastal Services Center
2234 South Hobson Avenue
Charleston, SC 29405
chris.ellis@noaa.gov

In September 2006, the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center began administration of a needs assessment of the three-state West Coast region. The goal of the needs assessment was to gather information about audiences concerned with coastal management issues on the West Coast to inform the design of products and services that support regional ecosystem management and enhance community resilience relative to climate change. This presentation will focus on expressed needs relative to climate change resilience. Data were gathered through various means, including synthesis of existing literature and management reports, data collection at relevant regional meetings, and interviews with key individuals within the West Coast coastal management community. The findings of this assessment will guide the NOAA Coastal Services Center's strategic planning and shape future products, services, and regional partnership efforts. Assessment findings will also be shared with partners across NOAA so that the information can be used by those programs providing assistance on the West Coast. Finally, and equally important, information will be shared with external, non-NOAA organizations that can help address priority needs either directly or by leveraging resources and partnerships across the region. This presentation provides a snapshot of current activities and capacity within the region, and highlights common constraints from various sectors.

■ **Ocean Energy Development: Linking Policy, Science and Industry in California**

Laura Engeman*, Paul Siri and Sheila Semans
California Ocean Protection Council
1330 Broadway, Suite 1300
Oakland, CA 94612
lengeman@scc.ca.gov

California has emerged as a world leader in ocean resource management and meeting the challenges of climate change. With one of the planet's most dynamic wave climate, ocean energy is increasingly being considered a viable form of renewable energy generation for powering California's coastal communities and decreasing the state's reliance on fossil fuel energy generation. Ocean energy pilot projects in California present new environmental challenges and economic opportunities. State policy supports renewable technology development balanced with the

preservation of healthy marine and coastal resources. Ocean energy siting and management will involve adaptive ecosystem based approaches and in particular, reliable and sustained ocean data. Today's ocean observing system information products can provide a critical role in this process. The authors describe several case studies linking ocean data to several scales of energy development and management.

■ **Sailing to Solutions: When New Initiatives Enhance Collaboration, Communication and Participation, Marinas and the Environment Benefit**

Tali Engoltz
New Jersey Department of Environmental Protection
Coastal Management Office
401 E State St. P.O. Box 418
Trenton, NJ 08625
Tali.engoltz@dep.state.nj.us

In recognition of the importance of marinas to the coastal economy, the tourism industry, and the preservation of access for recreational boaters, the New Jersey Department of Environmental Protection implemented several new initiatives to enhance the marina industry while continuing to protect natural resources. In March 2005, the Coastal Management Office, in partnership with other organizations, launched the Clean Marina Program- a voluntary education program providing guidance and technical assistance to marinas regarding effective practices to protect water quality and coastal resources. Ten marinas are certified and the Program continues to develop incentives, rewards, and additional educational materials. The Division of Land Use Regulation designated a marina contact person who is available to answer questions about permitting, rules, and regulations and to assist with the application process. A roundtable was coordinated to provide the opportunity for marina owners to meet one-on-one with NJDEP regulators to answer both specific and general questions. When the Bureau of Nonpoint Pollution Control was developing a revised stormwater permit prohibiting the discharge of power wash water into surface waters, a stakeholder involvement process was initiated to assure that the concerns and suggestions of the marina industry were considered and incorporated into the rule and Guidance documents. The NJDEP hosted several meetings with industry representatives to discuss necessary revisions to NJ's Public Access Rule in order to facilitate implementation of the new policy while mediating any adverse impacts. These steps demonstrate NJDEP's commitment to preserving NJ's recreational working waterfronts, public access, and the environment.



■ Global Sea Level Rise: Policy and Planning Implications for Hawaii's Coastal Communities

Dolan Eversole
University of Hawaii Sea Grant College Program
1151 PunchBowl St Rm 131
Honolulu Hawaii 96813
(808) 587-0321
dolan.eversole@hawaii.gov

The last century has seen a rapid increase in land use around the world's coasts with relatively little regard or recognition for potential natural hazards and shifting ecosystem baselines. Recent global sea level projections for this century range from 0.2 m to 5 m. Rising sea levels will contribute to increased storm surges and flooding, lead to more frequent and destructive damage and contribute to the erosion of the world's sandy beaches. Mapping of potential inundation and erosion-prone areas will improve recognition of these hazards and allow land use planners to evaluate and plan for various response strategies. Significant adaptation measures need to be evaluated and implemented as necessary including updating flood zone maps to include sea level rise projections, enhance coastal building codes, elevation-based building restrictions and relocating and/or hardening critical infrastructure vulnerable to coastal hazards. We will review planning efforts being carried out in Hawaii to address the issue of relative sea level rise and evaluate future assessment needs and goals.

■ Economic Justice Implications of the Effect of Fishery Management Measures on International Trade Flows

Monica Galligan
California State University Monterey Bay
100 Campus Center
Seaside California 93955
monica_galligan@csUMB.edu

This paper examines the economic justice implications of conservation regulations on fisheries in developed and developing countries. A trade flow matrix is constructed to model seafood commodity trade among multiple countries and the effect of fishery management regulations on one country, and to examine the economic effect on the other countries. Next, I consider policy implications beyond conservation and management in the developing countries, focusing on who is affected and how are they affected. International case studies are used to inform a discussion of ways in which the human economic impacts of necessary conservation measures might be mitigated.

■ Lessons Learned: Integrating Geospatial Technology into Local Coastal Zone Management

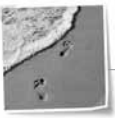
Jordan Gass
NOAA Coastal Management Fellow
Virgin Islands Division of Coastal Zone Management
Department of Planning and Natural Resources
8100 Lindberg Bay, Ste. #61
C.E. King Airport Terminal Bldg., Second Floor
St. Thomas, VI 00802
jordan.gass@dpnr.gov.vi

In the U.S. Virgin Islands, the Division of Coastal Zone Management (CZM) is mandated to regulate coastal zone development and in doing so to consider proposed developments for their potential environmental, social, economic and cumulative impacts. The review process for development applications has a strict series of deadlines to ensure that all permit applications are considered in a timely manner. However, the amount of information provided in the application documentation can be voluminous. This can result in details being overlooked internally, or other governmental agencies not having sufficient time to adequately review and submit comments on all applications thoroughly. As a Coastal Management Fellow, I have been working to create a geospatial database that will improve the review process by streamlining access to the best data available to CZM from our partnering agencies. There are many advantages to using GIS as a tool in the coastal planning process as an analytical aide and as an information tracking system. However, due to the steep learning curve associated with the software, there exists the risk that the software will be ignored in favor of the status quo, or misapplied in the permit review process. This presentation will focus on the lessons learned from my project building GIS capacity at CZM, providing recommendations to aide future projects to incorporate GIS into coastal management.

■ The Biological Aspects of the Biofouling of Maritime Vessels and its Management as an Alien Species Transport Mechanism

Scott Godwin
Hawaii Institute of Marine Biology
PO Box 1346
Kaneohe, Hawaii 96744
lgodwin@hawaii.edu

Ship hull fouling is amongst the most important vectors for the introduction and spread of non-indigenous marine species. To minimize the effects of sessile organisms transported on vessel hulls, it is important to understand the factors that determine their settlement and recruitment to these surfaces. This presentation will outline how factors associated with (i) characteristics of ships, (ii) characteristics of source ports, and



(iii) the biology and physiology of fouling organisms influence the abundance of marine fouling on the hulls of ocean-going vessels. In the Main Hawaiian Islands (MHI), 343 non-indigenous marine species have been documented and inventoried. Invertebrate species dominate with 287 species, followed by algae (24), fishes (20), and flowering plants (12). Populations of nonindigenous marine species that have already colonized areas of the MHI represent the most likely source of invasive species to the remote marine protected areas of the Northwestern Hawaiian Islands (NWHI) Marine National Monument based on the proximity and pattern of ship movements associated with the MHI. Some of the non-indigenous species that have become established in the MHI have dispersed more rapidly to other islands because of anthropogenic interisland transport. The potential of these species to threaten the NWHI Marine National Monument through anthropogenic mechanisms of transport also exists. The management steps being taken to minimize marine alien species transport to the NWHI will be presented in the final section of this presentation

■ **Distribution and Transport of Polycyclic Aromatic Hydrocarbons within Suspended Particulate Matter from the Columbia River and Estuary**

Tiffany Gregg
Graduate Student in Marine Resource Management
College of Ocean and Atmospheric Sciences, Oregon State University
104 COAS Admin. Bldg.
Corvallis, OR 97331
tgregg@coas.oregonstate.edu

This study aims to improve knowledge of the spatial distribution and transport pathway for contaminants within suspended particulate matter (SPM) in Columbia River waters, using polycyclic aromatic hydrocarbons (PAHs) as model compounds. I have hypothesized that PAHs are transported to and concentrated within the estuarine turbidity maximum (ETM), a prime feeding zone in the Columbia estuary, where organisms consume contaminants adhered to particles as part of their diet. During the Center for Coastal Margin Observation and Protection-sponsored cruise in August 2007, water samples were collected from upriver Columbia sites extending from the port of Vancouver down to Columbia River mile 53 and during neap and spring tide ETM events in both the north and south channel of the estuary. The water samples are now being analyzed for SPM concentration, PAH content and composition, organic carbon content and composition and pigment content (chlorophyll – total phytoplankton) and composition (carotenoids – taxon specific phytoplankton). The combined data set from these analysis is providing a better understanding of PAH transport with riverborne SPM and the basis for development of a hydrophobic contaminant model which will be discussed. This model should prove useful in predicting zones within the Columbia River

Basin where organisms may be at high risk to toxic contaminant exposure and thereby benefit development of management strategies aimed at improving water quality.

■ **Developing a Sea Grant Regional Research and Information Needs Strategy for the Pacific Coast**

Phyllis Grifman*, Julie Risien, and Juliette Finzi
University of Southern California Sea Grant Program
Los Angeles, CA 90089-0373
grifman@usc.edu

The four Sea Grant programs in Washington, Oregon and California are working together to develop a Regional Marine Research and Information Plan for the California Current Large Marine Ecosystem. The purpose of this project is to develop a research and information needs portfolio to improve and inform management decisions in the three states, and potentially, in partnership with Canada and Mexico. The most critical part of this process is the inclusion of input from all interested ocean stakeholders – academic researchers, management and regulatory agencies, non-governmental organizations, educators, and the public – gathered through a series of stakeholder workshops held across all three states during the Summer/Fall 2007 and through an online survey. Concurrent with the regional Sea Grant effort, the Governors of California, Oregon and Washington announced in September 2006 the initiation of the West Coast Governors' Agreement (WCGA) on Ocean Health. The Sea Grant programs worked closely with the West Coast Governors' teams to ensure coordination in an initial WCGA "action plan," designed to set forth the first series of state actions to address ocean and coastal issues. The Sea Grant programs are now working to prioritize the identified research and information needs in order to develop an actionable regional plan for research and information strategies. In this panel, we will discuss the different formats that were used to gather input, some identified research and information needs, the linkage between the Sea Grant process and the West Coast Governors' Agreement, and some initial lessons learned.

■ **Pacific Islands Climate Change Portal**

Carrie Hall*, Mary Lou Cumberpatch, Marjorie Ernst, Stephanie Fauver, and Sarah van der Schalie
National Oceanic and Atmospheric Administration
Coastal Programs Division
1305 East West Highway N/ORM3 Rm11212
Silver Spring, MD 20902
carrie.hall@noaa.gov

NOAA has been developing a Pacific Islands Climate Change Portal that will enable Pacific Island coastal managers to incorporate readily accessible climate information and tools into their decision making. Climate-related resources relevant to coastal managers from various



organizations currently exist, but they are scattered in many different locations, making access difficult and time consuming. To improve access to climate resources in the Pacific, NOAA is partnering with the Pacific Region Environment Programme (SPREP) and other organizations in the development of a portal that will be integrated with existing climate change efforts in the region. The Portal is expected to be released in October of 2008. The backbone of the portal will consist of a searchable virtual library that provides links to information and tools on specific subject areas such as sea level rise, drought and water resources, and ocean acidification. The portal will highlight the best decision support tools, case studies, science-based information, information on regional initiatives, climate services, training and education, and will include links to data sources and partnership opportunities. In this session, we will present an overview of the portal and solicit feedback from the audience. NOAA will use the feedback provided by participants to further develop the structure and content of the portal.

■ Participatory GIS: Evaluation and Comparison of Two Coastal Case Studies

Zac Hart*, Chrissa Stroh, and Danielle Bamford
Human Dimensions Program
NOAA Coastal Services Center
2234 S. Hobson Ave.
Charleston, SC 29405
Zac.Hart@noaa.gov

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 NOAA Coastal Services Center. In one case study, the Center and the Ace Basin National Estuarine Research Reserve supported the non-profit 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 National Estuarine Research Reserve assisted the non-profit 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 presentation provides an evaluation of that framework and a broad comparison of the two case studies.

■ Fairness in Coastal Management Decision-Making: Ensuring that Planning Processes are Procedurally Just

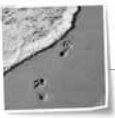
Christopher Hawkins* and David K. Loomis
Human Dimensions of Marine and Coastal Ecosystems
Program
Department of Natural Resources Conservation
University of Massachusetts Amherst
Holdsworth Hall; 160 Holdsworth Way
Amherst, MA 01003
Hawkins@nrc.umass.edu

Despite natural resource management's transition from an expert-based approach to a stakeholder approach, social equity in coastal resource management has thus far been rather limited, due in part to an ecological focus to management training and decision-making. Ensuring greater social equity is contingent upon using tools and frameworks that facilitate broad societal consensus, input, and ownership of coastal management planning. One such framework is that of procedural justice. Procedural justice, in this case, refers to the fairness associated with the procedures used to determine how coastal resources will be managed among competing interests and values. Given that coastal refuges, sanctuaries, MPAs, and fishery reserves remain popular management tools, it is important for coastal resource managers to be knowledgeable about frameworks that provide for more equitable and defensible resource allocations. This paper will introduce procedural justice and discuss existing topical literature from fisheries. While there has been a lack of targeted and complete use of the concept in coastal management, and hence limited research into its efficacy, the authors point to the process undertaken by NOAA in planning the Tortugas Ecological Reserve as a recent example of how the tenets of procedural justice can assist managers in gaining respect and trust in the eyes of disparate user groups. This paper presents the theory of procedural justice in terms of its components and rules: as an applied tool for coastal managers to practice the principles of democracy to garner stakeholder support and achieve superior outcomes.

■ Legal and Policy Impacts of Sea Level Rise to Beaches and Coastal Property

Megan Higgins
Roger Williams University School of Law
Marine Affairs Institute
10 Metacom Avenue
Bristol, RI 02809-5171
mhiggins@rwu.edu

This paper will address the causes of sea level rise; the impacts to beaches and coastal property; state responses to changes in sea level; the legal implications of existing sea level rise policies; outstanding legal issues; and potential solutions. Some coastal states have been proactive in anticipating sea level rise while others



are now drafting policies that incorporate predicted changes. Litigation is more common as regulatory and resilient responses call into question Fifth Amendment takings claims. Unanswered legal questions remain as sea levels rise and climate continues to change, population of coastal communities grows, beaches are lost and coastal properties infringe on public access as the shoreline shifts inland. Are rolling easements effective when homeowners are required to retreat based on setbacks determined by the mean high tide line? What is the effectiveness of erosion rate setbacks versus renourishment? Should there be a standard setback line (e.g., vegetation line)? What are the implications for property rights advocates? Who has the burden of proof? What constitutes a public nuisance regarding encroachment in dunes/beachfront area? There are a number of potential solutions for addressing sea level rise including creating setbacks and rolling easements; preventing armoring; offering financial inducements to move homes; encouraging elevation or employing new construction techniques; and purchasing federal flood and wind insurance. However, when property lines along the coast are determined by the ocean, something that is far beyond the control of the respective state's courts, the future of sea level rise litigation remains uncertain.

■ Dealing with Knowledge and Perceptions in Complex Coastal Issues

Saskia Hommes*, Henriëtte S. Otter, Suzanne J.M.H. Hulscher, Hans Th.A. Bressers, and Jan P.M. Mulder
University of Twente
Water Engineering and Management
P.O. Box 217
7500 AE Enschede
The Netherlands
s.hommes@utwente.nl

Coastal management issues affect a variety of users and they therefore often exhibit complex problems. This complex, unstructured nature of coastal management problems originates from uncertain knowledge and from the existence of divergent perceptions among various stakeholders. Consequently, dealing with these problems is not just a knowledge problem; it is a problem of disagreement and ambiguity too. To arrive at a joint formulation of a problem and its solutions, we claim it is necessary that stakeholders actively participate in one or multiple rounds of interaction. We call this process problem structuring. In this paper, we present guidelines for problem structuring in complex coastal issues. We focus on: stakeholders' perceptions; the knowledge base; and the interpretation and valuation of information by stakeholders. Our methodology is based on literature and practical experiences from two case studies: a fundamental discussion on the future of the Delta region (SW Netherlands) and an impact assessment of the extension of Mainport Rotterdam. In our methodology, we claim that it is necessary

that stakeholders learn about the problem situation *and* about their mutual dependencies. This so-called cognitive and strategic learning *together* enhances the convergence of stakeholders' perceptions. However, to arrive at a joint formulation of a problem and its solutions, this does not suffice. A useful and valid knowledge base needs to be created as well. We state that for this purpose different knowledge sources – scientific and stakeholder knowledge – should be connected, to create a context-specific knowledge base. Such a knowledge base is needed to deal with specific coastal problems, e.g. coastal erosion in an area where different users are in conflict

■ Adapting to Coastal Climate Change and Sea Level Rise to Improve Social-Ecological Resilience

Daniel Huppert*, Marc Hershman, Alexander Petersen, Karen Dyson, and Amber Moore
School of Marine Affairs & Climate Impacts Group
University of Washington
3707 Brooklyn Ave NE
Seattle, WA 98105-6715
huppert@u.washington.edu

Increasing social-ecological resilience to coastal climate change and sea level rise requires effective adaptation. The resilience of coastal communities is determined by the magnitude and type of coastal hazards, the combined social-ecological system's susceptibility to these stressors, and the ability of the system to adapt to environmental changes. The state of Washington contains a diverse set of coastal environments with varying degrees of human modification. Focusing on resilience, the research reported in this paper identifies areas affected by physical climate change threats, investigates characteristics of the surrounding social system, and begins exploring the effectiveness of potential adaptation and policy response options. This study builds upon GIS-based maps, using high resolution digital elevation data (LiDAR), to analyze specific sea level rise scenarios for a variety of regions within Washington. For each of the scenarios, the maps show areas of inundation, as well as associated flood plain changes. Potential economic impacts are extrapolated from this information and combined with other geological and socio-economic data to identify key areas of ecological, economic, and social vulnerability. Particular attention is paid to the economic risks and the effects on coastal communities, including tribes. Finally, an analysis of the legal and regulatory framework specific to coastal land use identifies potential areas of conflict and highlights constraints on adaptation. The end goal is to increase resilience to climate change by providing key information to decision-makers, identifying social/economic adaptation options, and increasing the adaptive capacity of coastal communities.



■ Marine Affairs Education in the 21st Century

Mark T. Imperial
 Department of Public and International Affairs
 University of North Carolina Wilmington
 601 S. College Rd.
 Wilmington, NC 28403-5607
 (910) 962-7928
 imperialm@uncw.edu

This panel explores the future of marine affairs education in the 21st Century. While many marine affairs graduate programs have been around for decades, there are several relatively new options for students wishing to pursue careers in coastal and ocean resource management. Thus, it is appropriate to take stock of where we have been and to examine the needs for Marine Affairs education in the 21st Century. The panel consists of academics and professionals with experience in marine affairs education at various institutions. Prior to the conference, each panelist will receive a short summary of the results of surveys being done by the panel organizer. One will survey the graduate directors of master degree programs that offer some sort of curriculum specializing in coastal or ocean resource management. The second surveys potential employers of marine affairs graduates and focuses on the training and educational needs. Panelists will also be supplied with excerpts from reports detailing estimated hiring needs related to environmental management. The panel session begins with a short overview of these survey data to facilitate audience participation. Panelists will then each have an opportunity to briefly comment on the findings. The goal of the discussion will be oriented around identifying future educational and training needs as Marine Affairs education enters the 21st Century. Substantial time will also be set aside for audience questions. Our goal is to have a very interactive and informative session and begin a dialog on future educational needs in marine affairs. Panelists: Timothy M. Hennessey, Department of Political Science and Department of Marine Affairs, The University of Rhode Island; Thomas Leschine, Director, School of Marine Affairs, University of Washington; Lauriston King, Director, Ph.D. Program in Coastal Resources Management, East Carolina University; Thomas Bigford, Chief, Habitat Protection Division, National Marine Fisheries Service, NOAA; Christine Patrick, TCS-NOAA intern & 2008 Knauss/Sea Grant Fellow.

■ Implementing Ecosystem-Based Management within the Ventura River Bioregion

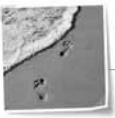
A. Paul Jenkin
 Surfrider Foundation
 PO Box 1028
 Ventura, CA 93002
 pjenkin@surfrider.org

The Ventura River bioregion is under severe stress from increasing urban pressures and fragmented management. This is manifested in conflicts over water supply, precipitous decline in anadromous fisheries, flood damages, loss of habitat, beach erosion, and degraded surface and coastal water quality. Progress in the past decade has led to the pending implementation of two precedent-setting projects: Matilija Dam removal and Surfers' Point beach restoration. Increased attention on the watershed and emerging planning processes may provide significant opportunities for integrated Ecosystem-based Management (EBM). However, to be effective, watershed-based planning needs to incorporate all levels of government and community. Making the linkages between land use, water supply, and water quality, and demonstrating the benefits of multi-purpose projects are timely and critical issues. Integrating watershed goals into local policy may best be realized through pilot projects that demonstrate the value of an integrated approach. This presentation outlines ongoing efforts to implement a vision for sustainable coastal management through a holistic set of precedent-setting projects including the Surfers' Point Managed Shoreline Retreat project, the Matilija Dam Ecosystem Restoration Project, Urban Watershed Management, and Integrated Watershed Management Planning.

■ Connecticut Coastal Hazards Data Portal and Visualization Tool

Joel Johnson
 NOAA Coastal Management Fellow
 Connecticut Department of Environmental Protection
 Office of Long Island Sound Programs
 79 Elm St.
 Hartford, CT 06106
 Joel.Johnson@po.state.ct.us

Damages to Connecticut's coast resulting from hazards such as severe storms and flooding are relatively large due to high levels of development and population in the coastal zone. In the future, the effects of global warming, including stronger storms and sea level rise, will likely increase the frequency and severity of flooding, erosion and resultant damages. However, Connecticut lacks a comprehensive hazards plan specific to the coast. The Connecticut Coastal Hazards Data Portal and Visualization Tool is a living website



that provides foundational infrastructure for a comprehensive coastal hazards management plan 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, mitigation, preparation, response and recovery, the impacts of population growth, development, and global warming, and links to relevant websites, government documents, and scientific reports, the website contains an interactive map and visualization tool that features user-generated inundation modeling. Two models incorporating high-resolution LIDAR elevation and bathymetry data are used to create different inundation scenarios on the interactive map. One model estimates the extent of inundation across various scenarios of sea level rise. Another model estimates the extent of inundation from storm surges associated with various hurricane scenarios. In addition to the output from the inundation models, the interactive map includes other spatial data such as orthophotography, land-use, historic shorelines, critical infrastructure, and FEMA flood zones.

■ Preventing Aquatic Invasive Species Transport by Boats Traveling the Coasts of California and Baja California

Leigh Taylor Johnson* and Jamie Anne Gonzalez
University of California Sea Grant Extension Program
County of San Diego MS O-18
5555 Overland Avenue, Suite 4101
San Diego, CA 92123
ltjohnson@ucdavis.edu

Small craft are implicated in transporting aquatic invasive species (AIS) from ports to smaller harbors along the coast. Recreational boating is characterized by races, fishing tournaments and coastal cruising that convene boats from many areas at locations far from home ports. This increases risks that boats will exchange and carry AIS to new locations. Approximately 80% of boats in Baja California marinas are from the United States, primarily California and Arizona. Mexico's streamlined customs clearance policy and planned expansion of Baja California marina capacity will increase binational boat traffic and AIS transport risks. New, California water quality programs may reduce antifouling paint use and increase reliance on strategies, such as in-water hull cleaning, slip liners and dry storage, to control fouling and reduce AIS transport risks. Boat owners need to learn the importance of hull cleaning before departure to and return from another area and especially to vulnerable, island ecosystems. The authors have created a bilingual outreach program for marina managers, boat owners and contractors on AIS risks and risk reduction measures. They are surveying boaters on attitudes and businesses on availability and costs of fouling control supplies and services along the coasts of California, United States, and Baja California and Baja California Sur, Mexico.

■ Financing Coastal Protection: Tools and Case Studies That Can Lead You to Success

Tim Jones* and Rakhi Kasat
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, and Watersheds
1200 Pennsylvania Avenue, NW (4504T)
Washington, D.C. 20460
Jones.tim@epa.gov

The success of any coastal management program depends on achieving environmental results. But these results require secure finances. Obtaining and using sustainable funding efficiently is critical. With unpredictable grants and an increased need for coastal watershed protection, a new strategy for financing watershed protection is critical. The National Estuary Programs (NEPs) have raised approximately \$16.5 for every \$1 dollar of base funding. Long-term finance plans, effective partnerships, innovative funding mechanisms, and community support have been the keys to their success. EPA's Sustainable Finance Team has built the capacity of watershed organization nationwide by offering training and tools to help groups think more strategically about long-term financing. This poster will feature free, web-based finance tools to help coastal organizations create a sustainable finance plan. These tools include a prioritization tool, a step-by-step finance planning module, and a website that serves as a portal for funding resources. This poster will also feature examples of successful finance mechanisms used by the NEPs. This poster is intended to complement the proposed funding panel entitled "Financing Coastal Protection: Tools and Ideas You Can Use to Fund Your Program." The panel focuses on NEP funding strategies while the poster focuses on take-home tools developed by the finance team.

■ Financing Coastal Protection: Tools and Ideas That Can Help Fund Your Programs

Tim Jones* and Rakhi Kasat
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, and Watersheds
1200 Pennsylvania Avenue, NW (4504T)
Washington, D.C. 20460
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innovative funding mechanisms, and community support have been the keys to their success. EPA's Sustainable Finance has built the capacity of watershed organization nationwide by offering training and tools to help groups think more strategically about long-term financing. This panel will feature two NEPs, who will discuss the finance strategies they have found most effective for their organizations, as well as important lessons they have learned along the way. This panel will also feature a member of EPA's Sustainable Finance Team who will present several free, web-based resources that can be accessed easily from EPA's watershed funding portal. A prioritization tool, step-by-step finance planning module, and funding data bases will be presented. The audience will learn practical financing strategies and concepts that they will be able to share with their own organizations to build their capacity.

■ Akkeshi: A Small Town's Challenge For Coastal Zone Management

Midori Kawabe
 Department of Marine Science
 Tokyo University of Marine Science & Technology
 Konan 4-5-7, Minato-ku
 Tokyo, JAPAN 108-8477
 kawabe@kaiyodai.ac.jp

This interview-based study examines what a local government can achieve with its environmental policy to protect the coastal zone environment. The town of Akkeshi is located on the Pacific rim of Hokkaido, the northern-most island of Japan. Because the town's major industries are dairy farming and coastal fisheries, the local government has an interest in protecting water quality to ensure a balance between both industries. The town's environmental policies have evolved over the decades, from water pollution control measures in the 1970s and 1980s, to indirect measures such as forest preservation in the 1990s, to the current precautionary approach. Although the local government is now interested in involving citizens, especially fishermen who want a return to the higher quality of the past watershed environment, a democratic process that involves a wide range of stakeholders in the planning and implementation stages is still lacking. Limitations to this process are that the town budget has been reduced by recent finance reform implemented by the national government and the town's jurisdiction is limited to the land portion of the coastal zone. In order to build the capacity that could develop a more participatory approach to addressing the coastal zone, the author suggests that the local government, in cooperation with citizens, construct an environmental database that provides information about the coastal environment and enables consensus building among the stakeholders.

■ Education for a Sustainable Tokyo Bay: Learning Through a University and Coastal Communities Partnership

Midori Kawabe
 Department of Marine Science
 Tokyo University of Marine Science & Technology
 Konan 4-5-7, Minato-ku
 Tokyo, JAPAN 108-8477
 kawabe@kaiyodai.ac.jp

Over the past 40 years, most of the tidal flats and shallow areas of Edomae, the innermost reaches of Tokyo Bay, have been lost to land reclamation projects. As a result of the accumulation of pollutants in bottom mud, organic contamination, and anoxia stemming from eutrophication, some native species have been lost. Nothing could be more vital to ensuring that Tokyo Bay continues to benefit both the people and the native species that share its ecosystem than the development of mechanisms for the sustainable use of the Bay's resources. Tokyo University of Marine Science and Technology is implementing a project titled "Education for the Sustainable Tokyo Bay" – or "Edomae ESD" – which involves working with museums, fishermen, educators, citizens' groups, and other concerned parties to spread awareness through the local community of the importance of sustainable development of the Bay by:

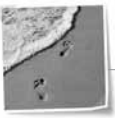
- Cultivating a multifaceted understanding of the innermost reaches of Tokyo Bay (sharing knowledge);
- Visiting the coast and holding interviews with people who make their livelihoods from the bay in order to learn from them (sharing experiences);
- Holding workshops for people from various backgrounds on resource use and the environment and developing a consensus based on an understanding of each other's perspectives and differences (sharing understanding).

The activities of an ongoing project involving collaboration between a museum, a university, a citizens' group, and primary schools are presented.

■ Uncertainty in Climate Change Process Limits Management Options: A Bangladesh Case Study

Mohammad Khorshed Alam Khastagir
 Marine Affairs Program, Dalhousie University
 and
 Ministry of Foreign Affairs
 Government of the People's Republic of Bangladesh
 Dhaka-1000, Bangladesh.
 +880-189-423267
 khastagir@yahoo.com

The overwhelming scientific consensus is that the global warming is a very real threat, that human activity is a major contributor, and that some degree of climate change is inevitable. The fourth



report of the Intergovernmental Panel of Climate Change (IPCC) clearly established that most of the warming observed over the last 50 years is attributable to human activities. Still, several myths shape the public perception and the policy process. The first myth is of uncertainty in climate change predictability, including consequences. This myth maintains that although the logic of climate change may be right, the implications of these changes on individual societies or economies are not clear yet. The second myth relates to the threat of economic implosion: that it is simply too expensive to limit warming to 2-3 degree centigrade, and doing this may jeopardize economic growth. The third myth is that climate objectives must be pursued apart from other national priorities, and therefore must compete for scarce fiscal resources. This paper seeks to analyze the impact of uncertainty inherent in management models. The study found that uncertainties tend to limit policy decisions for management planning, posing a challenge for decision-making in resource-constrained countries like Bangladesh. The recent High Level Dialogue on Climate Change in New York on 24 September 2007, during the ongoing UN General Assembly, discussed options for 'adaptation costs' and recommended the imperatives of equitable allocation of resources and protection of the would-be climate refugees. This high-level diplomatic effort would provide the fundamental platform for countries like Bangladesh to engage itself in taking interventions, in association with the international community, in the face of uncertainty that otherwise could restrict interventions relating to climate change.

■ **Climate Change and the Law, Economics and Policy of California Land Use Change: Coastal Management Risk and Vulnerabilities**

Judith Kildow*, Meg Caldwell, Karen Seto, and Michael Mastrandrea
 Monterey Bay Aquarium Research Institute
 7700 Sandholdt Road
 Moss Landing, CA 95039
 831-775-2075
 jtk@mbari.org

California will experience major impacts in its coastal and coastal adjacent communities as climate changes unfold. California's coastal counties accounted for 83% of the state economy, 79% of its jobs, and included 75% of the state's population in 2005, but covered only 25% of its land area. Although forecasts of coastal population growth in California are low relative to inland counties (17 to 45 percent, respectively), coastal urban development will continue to modify the landscape and influence and shape the creation of vulnerable areas and groups within the urban system, with cascading effects on the state's economy. By synthesizing data and projections for the state's ocean and coastal economy, direct impacts from climate change on coastal

areas (sea level rise, water and food supply perturbations, wildfires, air quality and precipitation changes), as well as coastal and coastal-adjacent demographic and development trends, we can provide a powerful tool for coastal planners, managers, and policy makers to anticipate and plan under different climate change scenarios. An assessment of the current legal and regulatory system relevant to coastal and coastal-adjacent areas combined with this synthesized information can reveal where California's governance structure may not be adequate to manage places under the pressures from climate change. This panel will introduce this research project and probe the challenges of developing an integrated decision-making tool that incorporates and merges legal, policy, economic, land use, demographic, and climate change information and reflects an integration of the researchers' respective analytical approaches.

■ **Strategies for Adaptation to Climate Change: The Nature Conservancy's Approach in New England**

Kate Killerlain Morrison
 The Nature Conservancy
 Massachusetts Chapter
 205 Portland Street
 Suite 400
 Boston, MA 02114
 kkmorrison@tnc.org

There are currently no widely accepted strategies to identify, plan, manage or monitor conservation areas on the basis of their vulnerability to the impacts of climate change, and this knowledge gap is even broader in the nearshore and marine environment. The Nature Conservancy's (TNC's) conservation approach and its unparalleled global array of action sites offer a platform on which to develop and test climate-adaptive conservation strategies. One of three goals of The Nature Conservancy's Climate Change Initiative is to "Help Natural Areas Adapt to the Impact of Climate Change." Under the auspices of TNC's Global Marine Initiative, marine program staff have been moving forward in Rhode Island, New York, and Massachusetts to plan and test coastal adaptation strategies. This presentation will present an overview of TNC's efforts in these three states, working toward better positioning conservation organizations and partners to anticipate and respond adaptively to the impacts of climate change. Panelists: Kate Killerlain Morrison, Massachusetts Chapter; Caroly Shumway, Rhode Island Chapter; Sarah Newkirk, Long Island Chapter.



■ Social Equity, Coastal Law and Policy: Framing the Dialogue

Kate Killerlain Morrison* and Kristi L. Bergemann
 The Nature Conservancy
 Massachusetts Chapter
 205 Portland Street
 Suite 400
 Boston, MA 02114
 kkmorrison@tnc.org

Salkin (2004) notes that the American Institute of Planners published a booklet in 1972, "Guidelines for the Social Responsibility of the Planner", that states, "the urgency of social needs and undesirable or inequitable human consequences resulting from public actions should be transmitted to those with power to influence those actions." Salkin goes on to question "whether there is enough guidance to lead participants . . . through an ethics analysis to balance goals of smart growth with sometimes competing demands of social equity." Despite the fact that these discussions were occurring in the early 70s, it is arguable that the suite of environmental laws codified during the same decade lack a similar social equity lens. Instead, many environmental laws make peripheral mention or weak statements about communities and socio-economic concerns that remain undefined for practitioners who are often balancing between conflicting uses and the environment. Understanding that most environmental laws were, by their nature, not intended to serve as social equity protections, what room is there in the current law to set the stage for a more comprehensive view that more directly considers social equity? What questions should be asked when initiating a dialogue to develop such a framework? Can you legislate social equity, or can these concepts only be maintained through moral obligation? This presentation will raise some key questions to initiate a more progressive dialogue around social equity in the coastal law and policy environment and provide some initial parameters on how laws may be assessed through this lens.

■ Lots of Base Hits and (Maybe) a Lucky Home Run: A Different Strategy for United States Marine Policy

Lauriston R. King
 PhD Program in Coastal Resources Management
 East Carolina University
 Greenville, North Carolina 27858
 kingl@ecu.edu

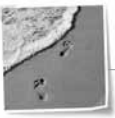
Reformers have complained continuously about the complex, fragmented nature of United States ocean policy. Their solution to this dispersed and diffused policy arena is legislation that defines a cohesive, comprehensive U.S. ocean policy, a seat at the White House policy table, and creation of an independent ocean agency.

Given that these diagnoses and prescriptions have been staples in the marine policy realm for nearly five decades, the interesting question becomes why so little has happened to put these in place. This discussion will seek to answer that question by drawing on the literature of policy change and political structure. Specifically, it will review the major reform proposals of the past four decades; place these in the context of more general policy changes during these years; and identify the political features of the policy process, referred to here as ordinary politics (public opinion, clientele and sub-government politics, competition for a place on the policy agenda, budgets, ideology) that have conspired to thwart the key elements of the reform agenda. Federalism, the separation of powers, congressional committee structures, the specialized nature of marine problems and the nature of competing centers of political power define the setting within which marine policy must operate. These features appear far more likely to perpetuate the complex, fragmented decision-making structures now in place than to evolve into the harmonious governance structure envisaged by reformers.

■ The Regulatory Regime for Wave Energy Development in Oregon: Making It Work for Everyone

Paul N. Klarin
 Oregon Coastal Management Program
 Department of Land Conservation and Development
 635 Capitol Street N.E. Suite 150
 Salem, Oregon 97301-2540
 paul.klarin@state.or.us

Oregon's existing regulatory framework is not well-equipped for approving ocean wave energy facilities. Although some existing regulations are designed to assess ocean uses such as wave energy, most applicable statutory authorities and regulations do not clearly address the unique issues related to ocean wave energy projects. The state's Territorial Sea Plan does not directly address wave energy development in a manner that clearly addresses the requirements of Statewide Planning Goal 19 Ocean Resources, with respect to the potential effects on the marine environment and other ocean users. The current state regulatory regime is characterized by multiple regulatory processes, with unique timelines, standards, and opportunities for appeal. State agencies lack adequate staff capacity to provide the necessary level of service and community outreach to address the complex issues related to the introduction of a new energy generation industry in a marine environment. Limited site-specific information exists about potential impacts and other ocean users have substantial concerns over effects on their economic well-being. Industry representatives, local governments, ports, and fishing and other interest groups are advocating that the state's management regime be changed to ameliorate potential conflicts between the new and traditional users through some form of ocean



zoning. Furthermore, developing an integrated regulatory process is a time and staff intensive effort that will require leadership and the focused participation and cooperation of multiple state agencies to succeed. This paper recommends actions that can be taken by the office of the governor, legislature, and various state agencies to make that happen.

■ A Google Earth Picture is Worth a Thousand Words: An Oregon Coastal Atlas Module

Andy S. Lanier*, Tanya Haddad, and Bob Bailey
NOAA Coastal Fellow
Oregon Coastal Management Program
Department of Land Conservation and Development
635 Capitol St. NE, Suite 150
Salem, OR 97301
Andy.Lanier@state.or.us

The seemingly separate disciplines of coastal science, policy, and management all have one thing in common; the scientific data, legal regulations and policy decisions can be mapped geospatially. The Oregon Coastal Atlas project has the ambitious goal of being a useful resource for the various audiences that make up the management constituency of the Oregon Coastal Zone. It serves as a depot for traditional and digital information which can be used to inform decision-making related to the Oregon Coastal Zone. The Atlas has traditionally provided background information for different coastal systems through access to online learning modules, interactive mapping, geospatial analysis tools, and direct download access to various planning and natural resource data sets. With the relatively recent development of geospatial visualization tools, like Google Earth, we now have a technology to display the intersection of science, policy, and management in a cohesive view. The Oregon Coastal Atlas is exploring the use of Google Earth as a means for disseminating data to the public in a holistic manner. Themes will be developed from the GIS database of the Atlas for incorporation into Google Earth's visualization engine. The data themes, which will include scientific data, regulation boundaries, and coastal policy decisions, will help visualize the intersection between the seemingly unrelated fields of science, policy, and management. Case study examples from Oregon's Territorial Sea will highlight examples of data intersection within the nearshore oceanic environment, especially as they pertain to the siting of marine reserves and ocean wave energy facilities.

■ Virginia Coastal Zone: Managing Land and Water Use Conflicts within a Multi-Jurisdictional Regulatory Framework

Lewie Lawrence
Middle Peninsula Planning District Commission
P.O.Box 286
Saluda, Va 23149
804-758-2311
LLawrence@MPPDC.COM

As the Middle Peninsula portion of the Virginia Coastal Zone transitions from less rural to more suburban, public policies that once served as management tools for terrestrial lands, public water bodies, and water use rights and privileges seem to have become inadequate. Conflicts between waterfront property owners, watermen, boaters, recreational fishermen, sportsmen, aquaculture industries, and others seeking use rights and use privileges to the Commonwealth's water resources have become increasingly common. The historical balance between working waterfronts and residential development is changing to predominantly residential waterfront. Balancing the rights and privileges of all Virginians to access common public trust areas with private property ownership rights and concerns creates a management conundrum for local and state governments. Within, but not limited to the Middle Peninsula coastal landscape, especially within the area commonly referred to as the riparian zone, multi-jurisdictional regulatory overlap exists. Overlapping jurisdiction causes confusion with elected officials, government staff and the general public, leading to confusing and sometimes inconsistent public policy. This presentation will explain and illustrate three-dimensionally, using Google Earth/Google SketchUp, the regulatory framework within the Virginia Coastal Zone and will discuss the York River Use Conflict Policy Recommendation Committee, and its work towards studying local and state public policies and statutes that manage and allocate uses of the shoreline and nearshore area. Additionally, the committee is attempting to determine the fairness and appropriateness of the current system, and making recommendations to improve the current use conflict management system.



■ Concentrated Animal Feed Operations (CAFOs): Implications for Coastal and Watershed Land Use Planning within the Great Lakes Coastal Zone of NW Ohio

Patrick L. Lawrence
 Department of Geography and Planning
 University of Toledo
 Toledo, OH 43606
patrick.lawrence@utoledo.edu

The emergence of large scale animal production facilities, also commonly known as “megafarms”, factory farms or Concentrated Animal Feed Operations (CAFOs), has raised serious concerns over the potential environmental impacts, especially in regards to animal waste handling and water contamination. A study team from Bowling Green State University and the University of Toledo has received funding support from USDA to examine the various issues associated with the human health and environmental impacts from the practice of the application of sewage sludge and other biosolids to farmland. The research is being undertaken within the Lake Erie coastal watershed of Wood and Lucas Counties, NW Ohio. This study was conducted to collect and review available studies and information regarding CAFOs and identify the key issues and future studies that would be needed to examine the impacts from CAFOs within NW Ohio. The research focused on evaluating the current literature, scientific studies and published reports regarding CAFOs with special focus on water quality impacts and the handling and disposal of the liquid manure waste from these facilities. All related current regulatory and policy for CAFOs with the State of Ohio were also collected and reviewed. The study results were compiled into a decision-making matrix in order to determine the necessary follow-up tasks required by the project team in regards to CAFOs and future studies needed to examine potential health issues within the region.

■ Scuba Diver Specialization and Norms: Integrating Human Dimensions in Coral Reef Management

David K. Loomis
 University of Massachusetts Amherst
 Amherst MA 01003-0641 USA
loomis@nrc.umass.edu

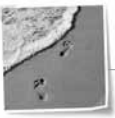
Proper management of coral reef ecosystems for quality recreation opportunities, while protecting the resource, can be challenging. While exogenous barriers to genuine integration of social science in coastal policy and management persist, the Florida Reef Resilience Program has endeavored to create an approach that integrates the human and biophysical dimensions of coral reef research. This study seeks to examine the ever-present issues of resource condition, behavior of users and perceived crowding by connecting two bodies of scientific knowledge—recreation specialization and social norms.

Recreation specialization is a way of segmenting recreationists into meaningful subgroups and ordering them along a continuum from low to high. Specialization theory predicts differences between different subgroups along a number of resource management dimensions. Norms are evaluations, held and sanctioned by social groups, of what “should be.” Scuba divers were intercepted in the Florida Keys between June 2006 and July 2007 and later sent a mail questionnaire that asked them about their norms for resource conditions, behaviors, and crowding. Scuba diver specialization level was determined using an index. Based on recreation specialization, it was hypothesized that highly specialized divers would have higher norm intensity for resource conditions, behaviors, and crowding. A total of 975 surveys were completed by scuba divers. Consistent with predictions, results revealed strong norm differences across different resource conditions, behaviors and crowding. However, differences between specialization levels was minimal. Integrating these concepts with more traditional management approaches is necessary if we are to successfully address the dual mandate of the National Marine Sanctuary Program.

■ Human Dimensions in Managing Coastal Quality

Susan Lovelace
 Hollings Marine Laboratory
 331 Fort Johnson Road
 Charleston, SC 29412
Susan.lovelace@noaa.gov

As the importance and complexity of human dimensions within coastal ecosystems becomes a central focus for understanding changes in coastal processes and resource health, it is necessary to consider a range of human activities. How people value and use resources for recreation, subsistence, protection from storms, aesthetics and commercial endeavors is important to management and community planning. Humans interact throughout environmental systems. We cause environmental stress, react to stress exposure and respond to stress in ways that feed back throughout the system. It is important to search for indicators of change that lead to our understanding of anthropogenic contributions to stress and responses that can lead to management actions. For example, Quality of Life (QoL) research has become more prominent as a social research topic as developed countries have come to realize that material wealth and technological progress does not necessarily correspond to improved QoL. One aspect of QoL is the Quality of Place (QoP) where we live. Defining how measures such as income, green space, eco-diversity, traffic, noise, water access, property value, physical health, population density, and life enjoyment may help define a QoP that can be related to measures of ecological health. Other examples may include a better understanding of land use planning processes, changes in coastal



populations, low impact designs for public boating areas, and motivations of seasonal visitors. This panel will include discussants from several academic and government institutions that are focused on the quality of environmental systems through understanding the diversity of human dimensions. Potential contributors to this session include: Susan Lovelace and David White, Hollings Marine Laboratory; Erica Seiden, National Oceanic and Atmospheric Administration; Bob Edwards, East Carolina University; Chris Ellis, National Oceanic and Atmospheric Administration; Angela Halfacre, College of Charleston; Jeff Allen, Clemson University; and Tom Safford, University of New Hampshire

■ **Understanding Knowledge, Attitudes and Access to Knowledge to Enhance Environmental Decision-Making**

Susan Lovelace
East Carolina University
Coastal Resources Management PhD Program &
Hollings Marine Laboratory
331 Ft. Johnson Road
Charleston, SC 29412
Susan.lovelace@noaa.gov

Over recent decades a crisis in coastal resource management brought about by parallel trends of rapid coastal development and policy devolution has placed local decision-makers on the front line of the exigencies. Those who make decisions about local resource management in coastal communities are ill-prepared for the increasing importance of their role to long-term environmental and public health. The primary purpose of this research is to recommend policy changes that improve the quality of decision-making by local community leaders and/or the processes they follow. Three communities in coastal North Carolina were surveyed to determine knowledge, beliefs, attitudes, and access to information for environmental decision making. Citizens, local decision-makers (e.g., county planners and city council members) and local environmental advocacy groups are examined to determine their knowledge, beliefs, and access to information. Results indicate that environmental groups represent the issues and concerns of citizens while decision-makers have different considerations. When routes of influence are determined, university scientists and extension agents are not “in the loop” while state and county professionals are influential. More than half of decision-makers said that they know all they need to know or they do not need to know information about the health of their environment and natural resources. This research provides profiles useful for making recommendations to improve environmental considerations in local decision-making. A structured collaborative process might be the most effective approach for improving the quality of decision making and processes.

■ **Starving the Pacific Coastal Beaches of California, Oregon, and Washington**

Orville T. Magoon
600 Chestnut St. #409
San Francisco, CA 94133
415-931-1842
omagoon@sbcglobal.net

The sustainability of Pacific Coast beaches is believed to depend on deliveries of sand and gravel from coastal rivers and streams. Activities that have reduced the supplies of sediments to the coasts are: debris basins that intercept sediments before they reach the coast; dams and flood control works that either intercept or reduce supply of sediment to the coast; and sand and gravel mining operations that remove sediments from the fluvial system. Within the last century, the increase in human activities has caused modifications to coastal areas that have impacted the coast. As the population in coastal areas is expected to increase in the future, human activities could well accelerate, exacerbating the loss of supply of sediments to the coast. Although the true cost of human activities is difficult to assess, the losses of sediment since 1950 to the west coast of the United States are estimated to be 1,500,000,000 cubic meters – an estimated replacement value of \$22,000,000,000. The majority of this loss is attributable to sand and gravel mining in coastal rivers and streams. Due to expected sea level rise, the need for sand and gravel fill in coastal areas may greatly increase, and coastal beaches which otherwise function to dissipate the erosive action of storm waves on areas landward of beaches may diminish.

■ **Natural Hazards, Physical Planning and Caribbean Coastal Tourism: A Case Study of Grand Anse, Grenada**

Roché Mahon
The Department of Surveying and Land Information
The University of the West Indies
St. Augustine, Trinidad
rochemahon@yahoo.com

This paper investigates the role of physical planning in the coastal tourism reconstruction process of one Caribbean Small Island Developing State where the physical development of the tourism sector is an integral part of the island’s economic development. The study, which was carried out over a four-week period in April and May of 2007 with various coastal tourism stakeholders, documents key aspects relating to the difficulties and successes of the tourism reconstruction process in the main coastal tourism belt of Grand Anse, Grenada. The results of this case study demonstrate the importance of establishing a development framework: a rational physical planning process that makes use of both command-and-control and market-based instruments. However, several



deficiencies in the content, administration and enforcement of the physical planning process threaten the achievement of successful outcomes. These shortcomings in present planning practice have serious implications for the vulnerability, resilience and sustainability of the natural and built tourism environment. The lessons derived from this study will be of interest to other territories that face similar challenges in using the physical development planning and control process to address the threat posed by natural hazards to the resilience of critical coastal physical development.

■ Implications of Development as Indicated by Permitting Trends on Coastal Erosion in Florida Coastal Areas

Ariana Marshall* and Larry Robinson
 Florida A & M University
 NOAA Environmental Cooperative Science Center,
 Frederick Humphries Science Research Building, Suite 305-D
 1515 Martin Luther King Boulevard
 Tallahassee, Florida 32307
 Ariana1.Marshall@famu.edu

In the United States, the importance of addressing chronic beach erosion was first firmly stated in 1981 by a group of concerned coastal geologists, who stated that humans have been directly responsible for the erosion problem by constructing buildings near the beach. Florida's coastal counties account for 53 % of the state's counties. With over 50% of the sandy beach shoreline eroding and the highest total number nationally of beach renourishment projects, the study of increasing trends of coastal erosion and its relationship to government mitigation in Florida is warranted. Furthermore, the overall increasing trends in coastal population growth and development in Florida provide an opportunity to investigate the relationship between coastal development and coastal degradation. This study hypothesizes that increasing development exacerbates the occurrence of coastal erosion. In this study, coastal development will be quantified using both state and local government new building construction permits and coastal degradation will be quantified in terms of miles of eroding shoreline/year. This study asserts that this correlation can serve as an indicator to assess the effectiveness of coastal permitting in preventing further coastal degradation. Research sites selected include the northwest Florida counties of Gulf, Franklin, Liberty and Wakulla and are adjacent to one of Florida's most productive estuaries, the Apalachicola National Estuarine Research Reserve. Data from the period 1992-2007 will be analyzed statistically and shown utilizing GIS.

■ Effectively Linking Land Use Research to Decision Making: A Case Study in Federal Funding Program Design

Kalle E. Matso*, Justine Stadler, and Dolores Leonard
 The Cooperative Institute for Coastal and Estuarine
 Environmental Technology
 University of New Hampshire
 35 Colovos Road
 Gregg Hall; Rm. 142
 Durham, NH 03824
 kalle.matso@unh.edu

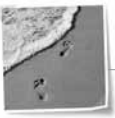
Federal programs like The Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) are striving to make more strategic investments with greater impacts. Doing so requires a hard look at the process of defining the problem and designing a program with maximum potential to deliver solutions. For a technology-focused program like CICEET, this meant broadening our problem examination to include social and economic influences, as we did with our recent land use planning tools enhancement funding opportunity. For this problem, CICEET implemented a national survey of land use planners, educators, researchers and tool developers. The feedback we obtained from the 271 respondents brought a broader perspective to our investigation and corroborated our initial findings: effective land use planning is less a technical issue than a complex mixture of non-technical barriers including lack of capacity at the planning level. The survey results became the basis of a funding solicitation which, in turn, led to a cumulative award of \$2.8 million, divided amongst 13 different applicants representing communities from across the United States. This paper uses this solicitation and cohort of projects (all of which began in October, 2007) as a single case study to explore the following questions:

- What is the relationship between technological innovation and effective land use planning?
- Can federal research funding agencies do more to link new knowledge and tools with decision making? If so, what mechanisms can agencies use?
- What is the relationship between these mechanisms and more effective evaluation of research investment impacts?

■ Beyond Politics of Place

Linda Maxson* and Miles Logsdon
 University of Washington
 23222 Eighth Place West
 Bothell, Washington 98021
 ljmaxson@gmail.com

From feminist theory to globalization of economics, place-based politics has been a premise of effective planning for a long time. Classic challenges of decision-making (e.g., not-in-my-backyard, identifying stakeholders' needs, what is effective public participation) are all un-resolvable because our system is rooted in



“place.” In an era of shrinking resources and environmental issues such as climate change and ocean health, place-based politics is a principle that is no longer sustainable. The interesting question is: Will open information virtual societies replace the existing politics of place? When school children in Ellensburg, Washington, have the same information access and virtual experience to the Puget Sound marine ecosystem as residents of the Seattle metropolitan area, will the Puget Sound become part of their political “landscape”? As a thought experiment, consider the issue of professional sports. How is it that fans for a team like the “DALLAS” cowboys will be spread over the whole of the U.S., transcending place? Clearly something that is identified with a place has an impact (image and market) well outside and removed from place. Information theory provides both a mean of explaining this, and offering insight into this new political reality. We will contrast the experience base of the incoming class of college freshmen and their perspective that what they have virtually experienced is as real to them (and shapes their political agenda) as the experiences of our current decision makers.

■ Land Cover Maps for Monitoring Changes in the Nation's Coastal Zone

John McCombs* and Susan Fox
NOAA Coastal Services Center
2234 South Hobson Avenue
Charleston, SC 29405
John.McCombs@NOAA.gov

The NOAA Coastal Services Center (CSC) has recently completed a national baseline of land cover and change information for the coastal zone of the U.S. as part of its Coastal-Change Analysis Program (C-CAP). C-CAP products inventory coastal intertidal areas, wetlands, and adjacent uplands and can be used for illustrating national and regional landscape changes over time, evaluating impacts on water quality, and for land use planning. These maps are created utilizing remotely sensed imagery. A multi-year effort to create a baseline of coastal land cover changes is complete for the lower 48 United States and Hawaii. C-CAP has played a role in producing land cover maps for at least two decades. This is the first time, however, that the entire coastal zone was mapped using consistent technology and standards. Standardizing data acquisition and reporting requirements makes it possible to compare maps from different regions and more easily compare maps of the same places using different time frames. This utility greatly increases the value of these maps to those people and organizations who work to protect coastal resources and the quality of life for coastal residents and visitors. The goal is to update the baseline every five years. The C-CAP effort is conducted in coordination with state coastal management agencies, the U.S. Geological Survey (USGS) and other federal programs in support of the National Land Cover Database (NLCD) effort. The data is online at www.csc.noaa.gov/landcover/.

■ Marine Debris Knowledge: Using the Best Science to Guide Our Efforts

Kristine McElwee
NOAA Marine Debris Program
I.M. Systems Group
737 Bishop Street, Suite 2250
Honolulu, HI 96813
kris.mcelwee@noaa.gov

Scientific knowledge is used to build awareness, guide policy development, identify research gaps, and support management decisions. Within the field of marine debris, a body of scientific literature exists from beach monitoring surveys, studies of marine debris impacts on several species, and regional surveys of debris threats. Partly as a result of this research, there has been a groundswell of interest in marine debris, evidenced by legislative activity and media and Internet coverage. Science is one of several factors that can influence policy and management. Because resources to address marine debris are limited, it is important that scientific findings be communicated clearly to decision-makers. Given marine debris's wide geographic range, our knowledge of its distribution and impacts—particularly in submerged, open-ocean, and remote areas—may not be sufficient to guide management actions. By relying on limited and narrowly focused data sets, we may expend critical resources on areas and debris types that turn out not to address the most severe impacts. The presentation will provide examples of scientific results that have been extrapolated beyond the original findings or used out of context. These examples will highlight the need for targeted and accurately communicated research to guide marine debris policy and management, as well as careful examination of advocacy arguments that may be presented as scientific findings. Audience members will be encouraged to share ideas on how to interpret and communicate scientific results to promote an accurately informed public, guide policy development, and target marine debris management efforts.

■ Coastal Structures in Massachusetts and Options for Future Management

Leslie-Ann S. McGee*, Julia Knisel and Wes Shaw
Massachusetts Office of Coastal Zone Management
251 Causeway Street, Suite 800
Boston, MA 02114
Leslie-Ann.McGee@state.ma.us

Many types of structures exist along the coast of Massachusetts to stabilize the shoreline and protect buildings and infrastructure constructed prior to coastal management policies and regulations. Today, maintenance of coastal structures built prior to 1978 to protect public and private development in dynamic coastal areas challenges the Commonwealth, municipalities, and individuals. Given current rates of sea-level rise and potential acceleration,



management of coastal structures will become even more critical in the future. One component of a recent state commission to address coastal hazards was an inventory of the coastal structures either owned or managed by the Commonwealth. Along the South Shore of Massachusetts, 312 publicly owned coastal structures were assessed. The structures included bulkheads, seawalls, revetments, groins, jetties, and breakwaters. Bulkheads and seawalls were the most abundant, with a combined total of 177 (57%). The condition of the structures ranged from excellent (A) to critical (F), but the majority of the structures were either in good (B) or fair (C) condition. Overall, 152 (49%) structures are stable and 160 (51%) need moderate to immediate repair. These findings, along with results of inventories of the other coastal regions, will assist with the development of a statewide plan for management of the Commonwealth's coastal structures.

■ Planning Working Waterfronts in Massachusetts

Leslie-Ann S. McGee* and Brad Washburn
 Massachusetts Office of Coastal Zone Management
 251 Causeway Street, Suite 800
 Boston, MA 02114
 Leslie-Ann.McGee@state.ma.us

The Port of Boston's working waterfront is a vital economic engine for the Commonwealth of Massachusetts. Considerable public investment in and around Boston Harbor has contributed to significant environmental improvements and has helped foster the emergence of a new maritime economy. The new maritime economy goes beyond traditional maritime uses such as cargo shipping, water transportation, fishing, and seafood processing by incorporating more diversified uses such as an expanded cruise ship industry, waterfront recreational opportunities and a surge in mixed-use waterfront development throughout the city. The new maritime economy serves as an economic catalyst for the Port of Boston, but needs to be carefully planned to avoid potential conflicts between the working waterfront and the new mix of uses. State agencies, such as the Massachusetts Office of Coastal Zone Management (CZM), are at the forefront of this issue. CZM serves as the lead waterfront planning agency for the Commonwealth of Massachusetts. Through its active participation in port and harbor planning, CZM works to protect and enhance traditional port activities and to assist municipalities with comprehensive planning efforts to accommodate a mix of uses along the waterfront.

■ Seafloor Mapping Science and Habitat Classification to Facilitate Integrated Multi-Use Ocean Management in Massachusetts

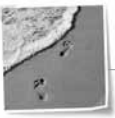
Leslie-Ann S. McGee* and Brad Washburn
 Massachusetts Office of Coastal Zone Management
 251 Causeway Street, Suite 800
 Boston, MA 02114
 Leslie-Ann.McGee@state.ma.us

Acoustic mapping technologies provide unparalleled views of the seafloor landscape, helping scientists understand the ocean environment and regulators manage coastal and ocean resources, and inspiring a greater appreciation of the diversity of marine habitat and life. The Massachusetts Office of Coastal Zone Management and United States Geological Survey (USGS) Woods Hole Science Center initiated the Seafloor Mapping Cooperative in 2003 to comprehensively map the bathymetry and surficial geology of the seafloor in Massachusetts. Acoustic – or sonar – systems, such as swath bathymetry, sub-bottom profiling, and sidescan sonar, are used to map the physical structure of the seafloor. The sonar data are groundtruthed using underwater photography and benthic grabs. The acoustic and groundtruth data are combined in GIS to facilitate data interpretation, map production, and data distribution. These maps are used to identify shipwrecks, guide scientific research and monitoring, track distribution of invasive species, mark navigation routes and potential hazards, site construction projects, and design dredging and dredged material disposal plans. The mapping data are also useful at investigating approaches to classify and delineate potential seafloor habitats through a systematic series of automated data processing techniques. The imagery of the seafloor, along with interpreted habitat classification, facilitates proactive planning for ocean uses and protection. The program is a success story in partnership, funded by a combination of state, federal (USGS and NOAA), and private sector contributions, while effectively leveraging expertise and technology within state and federal agencies.

■ Land Use Land Cover Change and County Land Use Planning: Are Land Use Plans, or Lack Thereof, One of the Agents of Observed Changes in Coastal North Carolina?

Gregory Meyer
 Coastal Resources Management Program
 East Carolina University
 Greenville, NC 27858
 meyer@ecu.edu

North Carolina coastal counties are required by the Coastal Area Management Act (CAMA), a state legislation derived from the 1972 Clean Water Act, to maintain land use plans so that fragile ecosystems can be protected from unplanned development. We have been investigating land use and land cover change in coastal watersheds and how they relate to fish recruitment in North



Carolina estuaries and coastal waters. In the past twenty years, Carteret and Onslow counties have had a great increase in human population (>20%) and a rapid land use change, with approximately 30 thousand hectares of forest and wetland area being transformed to agriculture or urban uses. This study is an attempt to explore the possible links between human population increase, land use planning history in the targeted counties and the observed changes.

■ Regulations Protecting Public Rights to Natural Resources

Timothy M. Mulvaney
New Jersey Attorney General's Office
R.J. Hughes Justice Complex
7th Floor West, P.O. Box 093
Trenton, NJ 08625-0093
Telephone (609) 633-0918
mulvatim@dol.lps.state.nj.us

This presentation will address the evolution and scope of the public trust doctrine, a common law principle that recognizes that the public has particular inalienable rights to certain natural resources. Public trust resources include but are not limited to tidal waterways, the underlying submerged lands and the shore seaward of the mean high water line, whether owned by a public, quasi-public or private entity. New Jersey's courts have acknowledged the deep roots of the Doctrine as one of the rights of free citizenship that the American people inherited after gaining independence from English rule. For the past thirty years, New Jersey has been at the forefront of protecting public rights of access to and use of ocean beaches, and recent caselaw in this arena could serve as a precursor to a nationwide movement. This presentation aims to encapsulate recent legal efforts to increase public access to and use of coastal waterways under the public trust doctrine, including overviews of ongoing litigation regarding public access rights to replenished beaches and proposed regulations in support of public trust rights.

■ Development of a Vertical Datum Transformation Tool and a Bathymetric/Topographic Digital Elevation Model for Southern California

Edward Myers*, Frank Aikman III and Jason Woolard
NOAA, National Ocean Service
Coast Survey Development Laboratory
SSMC3, N/CS13
1315 East-West Highway
Silver Spring, MD 20910
Edward.Myers@noaa.gov

As one component of NOAA's Coastal Storms Program, a vertical datum transformation tool (VDatum) and a bathymetric/topographic digital elevation model (DEM) are being developed

for the Southern California region. This pilot effort of the Coastal Storms Program (CSP) is a multidisciplinary effort to increase community resiliency to coastal storms by providing integrated sets of tools, data and modeling. In addition to development of VDatum and a DEM, other CSP efforts in this region include enhanced observing systems, ecological assessment of storm impacts, coastal storm decision-support tools, and a precipitation atlas. VDatum is a software tool developed by NOAA's National Ocean Service for the transformation of data between vertical datums (orthometric, ellipsoidal, and tidal). VDatum accurately translates geospatial data between 28 different vertical reference systems, allowing for the easy transformation of elevation data from one vertical datum to another. NOAA's Coast Survey Development Laboratory, National Geodetic Survey and Center for Operational Oceanographic Products and Services are coordinating the development of a VDatum application for the Southern California region. The National Geodetic Survey will then use VDatum to transform the best available bathymetric and topographic data to a common vertical datum and reformat these data onto a quality-controlled, gridded DEM for Southern California. The DEM will be available on a CD, and the VDatum transformation tool will be available as downloadable software from the web. These types of applications are increasingly useful to coastal planners, floodplain managers, emergency managers, wetland and coastal habitat specialists.

■ An Assessment of the Environmental, Economic and Social Issues Associated with Integrated Coastal Zone Management in India

K. Shadananan Nair*
Centre for Earth Research and Environment Management
Vallayil House, North Gate
Vaikom-686141
Kottayam Dt.
Kerala, India
nair59@yahoo.com

The 7500 km-long and thickly populated coastal zones of India face challenges from human interference and climate change. India is highly vulnerable to the impacts of climate change-related sea level rise and increasing frequency and intensity of tropical storms. Changes in coastal circulation and upwelling may affect fisheries and thus the lives of millions of poor who depend on marine resources. Population and industry growth degrades the coastal environment, and the resultant increase in shipping can further degrade the coastal environment through the introduction of invasive species and more. In addition, coastal aquaculture, excessive groundwater use, changing land use, shoreline hardening, river input of sediments and pollutants, and rapid urbanization make sustainable coastal management a challenging issue. Rules



and regulations for the protection and management of coastal zones can exist only on paper because of various social, political and financial reasons. The coastal zone act is widely violated, as the implementation mechanism is weak. Social issues such as poverty, migration, conflicts and competition over resources that now only occasionally affect normal life are likely to worsen with climate change, unless proper strategies are developed for the adaptation. This paper analyses the various environmental, economic and social issues in the coastal zones of India. An assessment of the existing acts, constitutional provisions, policies, management practices, and policy implementation mechanisms is presented. Suggestions for the integrated management and development, and adaptation strategies for the Indian coastal zones, aimed at poverty alleviation, conflict resolution and economic development are provided.

■ **The Socioeconomics and Management of Surfing Areas: International Case Studies from Mexico, Spain, California and Australia**

Chad Nelsen*, Neil Lazarow, Dean LaTourette and Paula Pijoan
Surfrider Foundation
PO Box 6010
San Clemente, CA 92674
cnelsen@surfrider.org

Surfing is a major recreational and economic activity involving intimate human interaction with diverse coastal environments. The rising popularity of surfing in many countries and significant growth in participation has increased the economic contribution of surfing to local communities. Despite the popularity of surfing, it is often challenging for the sport to be taken seriously in coastal management decisions. Surfing and surfers are very sensitive to environmental conditions and changes in these conditions can negatively impact surfing. At present there is little research on the value of recreational surfing even in traditional locations such as the east coast of Australia and California, where it is estimated that over three million people surf on a regular basis. To make informed decisions, coastal professionals require information about the users that will be affected by coastal policies and activities. In recent years, there has been an increase in research on the economics and management of surfing. This panel presents findings from detailed investigations using multidisciplinary techniques that include economic valuation techniques and social and historical research to understand the value of surfing in California, Mexico, Australia and Spain. The findings demonstrate the significant economic, social, environmental and cultural importance of surfing amenities to specific locales and support the need for consideration of negative impacts to surfing that may occur as a result of coastal development.

■ **The Coastal Act: What Difference Has It Made?**

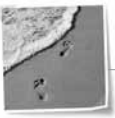
Jeffrey A. Onsted* and Gail Osherenko
Environmental Studies Department
Florida International University
11200 SW 8th Street
Miami, FL 33199
jonsted@fiu.edu

California's beautiful coastline, while admired throughout the world, is under constant assault from population pressures. As natural vegetation gives way to farms and ranches and these to houses, condos, and big box malls, the State government, with a strong push from its own citizens, decided controls should be put in place to more strongly regulate this development. Thus was born the 1976 California Coastal Act. The Act seeks to, "Assure orderly, balanced utilization and conservation of coastal zone resources taking into account the social and economic needs of the people of the state." Our research, therefore, sought to discover whether there has been an appreciable difference in development of agricultural lands since the implementation of the Act. We contrasted rates of conversion of agricultural land, both inside and outside the Coastal Zone, as well as before and after the inauguration of the Act. Results suggest that the Act can make a difference but only if the local jurisdiction in question had a pre-existing permissive environment for coastal development that would benefit from State oversight. Santa Barbara and Ventura are the two contiguous coastal counties used as samples. In addition to this quantitative examination, interviews and surveys were conducted with landowners, environmental activists, and members of the relevant policy making bodies. This combined approach offers a quantitative evaluation as well as a human decision making component.

■ **Tidal Energy in Washington State: Navigating the New Frontier**

Rebekah R. Padgett* and Olivia H. Romano
Washington State Department of Ecology
Shorelands and Environmental Assistance Program
3190 160th Avenue SE
Bellevue, WA 98008 USA
(425) 649-7129
rpad461@ecy.wa.gov

As the nation turns toward the ocean for energy from ocean waves, tides, and currents, as well as free-flowing rivers, new challenges in environmental regulation are arising. In December 2007, the Federal Energy Regulatory Commission (FERC) issued the first license for a hydrokinetic energy project, to be located off the coast of Washington State. The short-term license allows a proponent to generate energy while testing a technology. FERC has issued



a total of nine additional permits for tidal energy in Willapa Bay and Puget Sound, the second largest estuary in the United States. These preliminary permits reserve study sites and allow the applicant to apply for a license. Hydrokinetic technology is so new that identifying potential environmental impacts has only begun and solutions to address these impacts have yet to be developed. Tribes, federal, state, and local agencies are examining their own permitting processes to see how they fit into this process, and are coming together to discuss how to address regulatory constraints and information needed about both existing environmental conditions and potential environmental impacts from pilot and long-term projects. As FERC fine-tunes their licensing process, these agencies are struggling to determine how to fit experimental technology projects – and the research needed to identify potential impacts – into their regulatory permitting process, despite major gaps in environmental information. This paper presents an alternative way to address permitting in this new frontier.

■ **Integrated Ocean and Coastal Mapping: Providing Solutions to Coastal Challenges**

Captain Roger Parsons

NOAA Integrated Ocean and Coastal Mapping (Ret.)

Roger.L.Parsons@noaa.gov

The National Oceanic and Atmospheric Administration (NOAA) will host a roundtable discussion addressing the challenges facing coastal states, communities and others in need of ocean and coastal mapping data and products and ways to address these challenges. NOAA defines Integrated Ocean and Coastal Mapping (IOCM) as the practice of acquiring, integrating and disseminating ocean and coastal geospatial data in such a manner that permits these data and their derivative products to be easily accessed and used by and for the greatest range of users and purposes. IOCM requires intra- and inter-agency coordination and collaboration with a focus on streamlining operations, reducing redundancies, improving efficiencies, developing common standards, and stimulating innovation and technological development. The 2004 National Research Council assessment of national needs for coastal mapping and charting concluded that the users of ocean and coastal geospatial data had several common requirements that were not being met by Federal mapping agencies, including the need for a consistent spatial framework for coastal data that allows a seamless transition from onshore to offshore; increased collection and availability of data including land cover, shallow-water bathymetry, seafloor imagery, habitat distribution and classification standards; national standards and transformation protocols that allow easy data exchange; and easy access to up-to-date digital, geospatial data, imagery and mapping products. The U.S. Ocean Action Plan has since directed Federal mapping agencies to coordinate their ocean

and coastal mapping activities and leverage data collection and mapping resources across the Federal sector as well as with State, industry, academic and non-governmental mapping interests. A panel representing diverse mapping interests and perspectives will review the challenges they are facing and discuss the benefits to decision makers of implementing an IOCM approach to mapping our ocean and coastal zones. The panel will consist of: Sheila Semans, Manger, California Seafloor Mapping Program, California Coastal Conservancy; Dr. Gary Greene, Director, Tombola Habitat Institute; John Haines, Coastal and Marine Geology Program Coordinator, U.S. Geological Survey; Roger L. Parsons, Integrated Ocean and Coastal Mapping Coordinator, NOAA; Representative Deborah Boone, Chair, Committee on Emergency Preparedness and Ocean Policy, Oregon House of Representatives; Bruce Carlisle, Assistant Director, Massachusetts Office of Coastal Zone Management.

■ **Combined Economic and Environmental Indicators of Coastal and Ocean Health: Working Waterfronts**

Linwood Pendleton*, Allison Chan and Scott Norris

The Ocean Foundation

Coastal Ocean Values Center

PO Box 9

North Sandwich, NH 03259

linwoodp@coastalvalues.org

Since July of 2006, we have worked to develop historical data on marine-dependent economic activities and environmental conditions in three California estuaries: Morro Bay, Moss Landing/Elkhorn Slough, and Santa Monica Bay. Our focus is on business and economic activities that are in some way dependent upon the local marine environment with a focus on “the waterfront.” Using these historical data we show how environmental change, management and regulation affect the intensity and composition of economic activities on the waterfront and surrounding areas. We provide three examples, each of increasing sophistication of how economic indicator data can be linked to data on environmental indicators and data on regulation. We provide results from a historical narrative of the link between regulations and commercial rockfish harvests in Morro Bay, a correlation analysis of data that links commercial fish catch to hypoxia in Elkhorn Slough, and a fixed effects panel data analysis of the effects of wetlands restoration on beach attendance in Santa Monica Bay.



■ A Case Study: A Fishers' Cooperative in Lower Plaquemines Parish as an Avenue for Integrating Social Equity into Coastal Management

Rosina Philippe and Kristina Peterson*
 Lower Plaquemines Fishers Cooperative and
 Center for Hazards Assessment, Response and Technology
 University of New Orleans
 Business Administration Bldg Rm 356
 New Orleans, LA 70148
 krajekpeterson@msn.com

The old economic systems that supported the fishing extraction business exploited traditional small family fishers. Between the excessive costs of provisions and low pay-outs for catch at the docks it was difficult for the small fisher to make ends meet. Since Katrina and Rita there have been excessive delays with the federal government and their assistance to the fishers through loans, through the debris removal and cleaning of water ways and the hauling of vessels off the land to the water. In the midst of this struggle there has been considerable encroachment of rural gentrification through development of vacation villages and sports recreation centers. Small family fishers, as well as their traditional ecological knowledge and culture, are at risk of extinction. The fishers of Grand Bayou, like other traditional family fishers of lower Plaquemines Parish are at risk of loss of livelihood, loss of place and loss of environment/wetlands. Collectively, the small fishers of lower Plaquemines have pooled their efforts to form a fishers cooperative that will address: fair practices of docks for supplies and marketing of their catch, thus providing a fair livelihood; secure location in the region by having a livelihood to support their families; and coastal erosion, restoration issues, hypoxia, and land loss affecting estuaries. This paper will present a case study and possibly a model for other communities who want to resist displacement and retain their presence and their livelihood as fishers.

■ Knowledge Diffusion in Two Marine Protected Areas Networks in the Central Visayas Region, Philippines

Diana M. Pietri* and Patrick Christie
 School of Marine Affairs
 University of Washington
 3707 Brooklyn Ave NE
 Seattle, WA 98105
 dianap@u.washington.edu

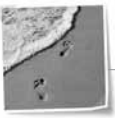
In the Philippines, community-based marine protected areas (MPAs) are a common form of coastal resource management. Despite a proliferation of community-based MPA initiatives, factors such as poor management, insufficient funding, and wavering community support have compromised the success of many MPAs. In order to strengthen both the biological and social

success of MPAs, some organizations have begun instituting MPA networks. In the Central Visayas region, Coastal Conservation and Education Foundation (a domestic NGO) and Fisheries for Improved Sustainable Harvest (a USAID-funded project) are implementing networking initiatives. Educational programs (MPA orientations, cross visits to other MPAs, community participation in monitoring, etc.) are integral components of these projects. This presentation will analyze the relationship between educational techniques and knowledge diffusion within and between communities in the networks. These concepts will also be compared to standard measures of MPA success, such as compliance with MPA rules and strength of enforcement. Surveys were conducted with individuals in 33 communities in the two MPA networks. Preliminary analysis shows that compliance correlates strongly with educational factors such as participation in cross visits ($r=0.434$, $p < 0.05$) and the presence of educational programs ($r=0.350$, $p < 0.01$). Enforcement evaluation also shows a positive correlation with involvement of MPA managers in trainings ($r=0.355$, $p < 0.05$) and the presence of educational programs ($r=0.639$, $p < 0.01$). The findings of this study will have implications for MPA practitioners and managers in planning and evaluating the educational components of MPA networking programs.

■ Waterfront Land Use Change and Marine Resource Regulation: The New Bedford Pilot Study

Michelle E. Portman
 Marine Policy Center
 Woods Hole Oceanographic Institution
 Crowell House
 Mail Stop #41
 Woods Hole, MA 02543
 mportman@whoi.edu

How fluctuations in marine resource stocks and the management of these fluctuations influence onshore land use changes has not been extensively studied, especially at the local level. This research identifies and characterizes land use changes in waterfront properties with the goal of relating them to marine resource regulation and corresponding market influences. The first stage of research focuses on the building of a database that tracks coastal properties over the last 25 years in the pilot area of New Bedford, Massachusetts. Waterfront land uses from 1986 to 2006 is analyzed using GIS with the unit of analysis being city lots and parcels along the intensely used port area. The main sources of data are licenses issued by the Massachusetts Waterways Regulation Program. This is a state-level regulatory program that has as its goals preservation of waterdependent uses of coastal properties and public use rights for "fishing, fouling and navigating". Other sources of land use information are master planning and harbor planning



documents, surveys, assessors data (e.g., ownership information), other state records (e.g., the registry of corporations) and local key informants. The potential uses of the database are many; however the first application will be to relate observed changes to fisheries management and regulation.

■ Sustainable Developments in Coastal Mississippi After Hurricane Katrina

Melissa Pringle*, Jeff Allen, Adam Dial, and Jay Estes
Eco-Systems, Inc.
6360 I-55 North, Suite 330
Jackson, Mississippi 39211
melissa.pringle@eco-systemsinc.com

In response to the housing shortage resulting from Hurricane Katrina's destruction of more than a third of the dwellings in coastal Mississippi coupled with the desire to retain the coast's character and protect coastal resources, developers are providing solutions in the form of sustainable, conservation-minded communities. Two sustainable developments are located in Harrison County. The Reserve at Carr Bridge is a 176-acre single-family residential development designed with a network of pedestrian and bicycle trails. A Tidelands Grant is being pursued to support an "Eco-Walk," and LEED certification is being considered. River Hills is an 800-acre mixed-use development containing 400 acres of wetlands. Of the 400 acres, 80 acres will be placed in mitigation with the remaining 320 acres being placed in conservation easements. A third development is Graystone at Saracennia. It is a 476-acre mixed-use development in Jackson County designed around known environmental constraints to impact less than 6 acres of the total 219 jurisdictional wetlands on site. The remaining 213 acres of wetlands will be placed in conservation easements. These three developments implement smart growth elements, conservation design principles and low impact concepts and were designed to fit into the natural setting by taking advantage of the natural site features such as topography, conservation areas, and natural waterbodies. These developments were engineered not only to meet the housing demands by yielding more than 2,800 residential units, but were designed to conserve the coastal resources of Mississippi. These unique developments represent the balance between economic development and environmental protection in coastal Mississippi.

■ Linking Science, Policy and Management: Case Studies and Lessons Learned

Marina Psaros
San Francisco Bay National Estuarine Research Reserve
415.338.3511
mpсарos@sfsu.edu

Every day, individuals in government agencies, private businesses, and non-profit organizations make decisions that affect the health of coastal resources. Despite their essential role in coastal management, these decision makers may not have convenient, timely access to the most current scientific information and tools to help inform their decisions. Moreover, these individuals are often not involved in the generation of scientific information and tools. To bridge these gaps between science, policy and management, NOAA's National Estuarine Research Reserve system has developed a nationwide education program called the Coastal Training Program. This program seeks to overcome disciplinary, institutional, and cultural barriers to foster more effective stewardship of coastal resources. This presentation will offer case studies from the Coastal Training Program and provide a discussion of best practices to link science, policy, and management activities.

■ Beach Water Quality: Balancing Competing Resource Uses within the Existing Regulatory Framework

Renee Purdy* and Ginachi Amah
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013
rpurdy@waterboards.ca.gov

Beaches are iconic, and coastal recreation contributes significantly to the economy. As a result, when regulating microbiological water quality of beaches, the focus is on protecting human health through the imposition of limits on fecal indicator bacteria. These bacteria, however, originate from wildlife as well as human sources. As wildlife is another resource to be protected, this complicates the application of these limits, particularly in coastal areas where biologically diverse and sometimes threatened habitats exist. This highlights one of the challenges posed in managing beach water as a result of competing resource uses. When such conflicts arise, a policy solution that balances protection for each important resource use should be developed within the confines of the existing regulatory framework. This paper presents an approach taken by the Los Angeles Regional Water Quality Control Board in addressing the high levels of fecal indicator bacteria at beaches. Water quality standards and total maximum daily loads were developed recognizing that it would not be environmentally prudent or reasonable to eliminate all fecal indicator bacteria conveyed to



beaches. This approach maintains the protection of human health and removes the undue burden of having the regulated community responsible for remediation of natural source bacteria loadings. In addition, it avoids potential damage or elimination of valuable aquatic and wildlife habitat, which could result from removing critical flows from coastal streams.

■ An Organizational Framework for Strengthened Links Between Science and Policy in Coastal Zone Management

Melissa Rada* and Braxton Davis

South Carolina Department of Health & Environmental Control
Office of Ocean and Coastal Resource Management
1362 McMillan Ave., Suite 400
Charleston, SC 29405
radams@dhec.sc.gov

South Carolina provides one example of how a state coastal agency attempts to integrate coastal science, policy-making and management through a newly created division within its own agency. SCDHEC-OCRM's Science and Policy Division has proven to be a valuable component of the state's Coastal Zone Management Program in fostering linkages between science and coastal management. The mission of this one-year old division is to ensure the utilization of the best available science for SCDHEC-OCRM in short-term decision-making and long-term policy development. This includes providing support to the Planning, Legal, and Regulatory Divisions of the agency. The Science and Policy Division advises SCDHEC-OCRM on permitting and enforcement actions, develops science priorities, develops State of Knowledge (SOK) Reports on various coastal issues, and evaluates policy alternatives. Division Staff also partner with outside researchers on grant proposals, coordinate workshops that bring together coastal scientists and managers, advise graduate students, present seminars, and attend scientific meetings. Examples of topics addressed include monitoring associated with marinas, dredging, wetland restoration and development impacts; dredging (coordinating with other state and federal agencies re: Sediment Analysis Plans); policy analysis (including review of other coastal state policies); data and information synthesis; review of research proposals; and evaluation of new technologies. The Science and Policy Division has developed formal procedures for coordination with the other agency divisions and has created a database to track information requests and monitor reports associated with permits, enforcement actions, certifications and/or consent orders.

■ Marine Stewardship Area Offers a Model for Integrating Science, Management, Stewardship and Ecosystem Thinking in the Conservation of Coastal Resources

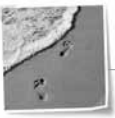
Kit Rawson*, Jody Kennedy and Jacques White
Tulalip Natural Resources Department
Tulalip Tribes
7515 Totem Beach Road
Tulalip, Washington 98271
krawson@tulaliptribes-nsn.gov

On July 17th, 2007, the San Juan County, Washington Council unanimously approved a Marine Stewardship Area Plan to protect and restore the natural marine system and the human uses that depend on it. The plan, which covers the entire archipelago of nearly 200 islands that comprise the County, is the culmination of a two-year effort driven by the local Marine Resources Committee (MRC), a citizen-based advisory group representing diverse interests within the County. In partnership with the Northwest Straits Commission and The Nature Conservancy, the MRC adapted a site-based conservation action planning approach to this unique and diverse marine ecosystem. A large cross-section of scientists, managers, citizens and stakeholders participated in the various stages of developing the plan. Over 200 members of the public reviewed the draft plan in workshops on the more populated islands and the MRC incorporated their input into the final plan. The outcome is a set of six scientifically-based strategic protection strategies supported by the local community and adopted by the local government. Now, tribes, state and federal agencies, the MRC, commercial interests, conservation groups, citizens, and local governmental departments are working together to implement these strategies by taking direct conservation and restoration actions and pursuing more effective policies for coastal resources. The San Juan County Marine Stewardship Area offers a model for identifying and building support for common solutions that integrate science, management, stewardship and ecosystem thinking in the conservation of natural resources.

■ The Subtidal Habitat Goals Project: Working Toward Ecosystem-Based Management in San Francisco Bay

Daniel W. Robinson
San Francisco Bay Conservation and Development Commission
50 California Street, Suite 2600
San Francisco, CA 94111
danr@bcdca.gov

San Francisco Bay is the largest estuary on the Pacific Coast and one of the world's great natural resources. The Bay provides food and shelter for a wide variety of finfish, shellfish and wildlife, contains numerous plants and varieties of submerged aquatic vegetation, and makes many contributions – economically, socially and ecologically



– to human welfare. As expressed by the Pew Oceans Commission and the U.S. Commission on Ocean Policy, successful management of marine resources requires consideration of the entire system while acknowledging the inherent complexity and connections within the system. The Subtidal Habitat Goals Project (SHGP), a collaborative interagency effort between the San Francisco Bay Conservation and Development Commission (BCDC), NOAA, the California Coastal Conservancy (CCC), and the San Francisco Estuary Program (SFEP), strives to bring these facets of Ecosystem-Based Management into the forefront of Bay management. The SHGP aims to establish a comprehensive, long-term vision for research, restoration, protection and management of the subtidal system in San Francisco Bay. To inform the process, GIS maps have been created to define the scope of the Bay's stressors on its various habitat types. In each map, stressor activities (e.g. wastewater treatment discharge sites, dredging, sand mining, marinas, etc.) have been overlaid on habitat types to spatially illustrate opportunities and constraints for subtidal habitat protection and restoration.

■ Coastal Agriculture of Bangladesh: How to Adapt to Sea Level Rise?

Golam Mahabub Sarwar
Committed to Earth Care (CEC)
Dost Building (4th floor)
Chittagong, Bangladesh
+88 01714 39 70 71
mgmsarwar@gmail.com

The coastal area of Bangladesh is highly vulnerable to sea level rise (SLR). A one metre SLR will inundate 17.5% of the total landmass of the country, contributing to increased coastal salinity. Twenty million people will be directly affected. The agricultural practice in the coastal zone of Bangladesh will be affected by the SLR induced inundation and salinity intrusion. The salinity increase caused by 0.3 metres of SLR will cause a net reduction of 0.5 million metric tons of rice production. Bangladesh will fail to achieve food security due to decreased rice production. Adaptation to SLR is an emerging need for the coastal agriculture of Bangladesh. Two potential adaption options are the development of salinity tolerant species and the practice of floating agriculture. Developing salinity tolerant species demands long-term biotechnological research. Practicing floating agriculture is partially developed using indigenous knowledge. The study analyzes the two adaptation options for the coastal agriculture of the country. Systems Analysis is used to see the big picture of the situation.

■ Collaborative Development of Science, Restoration and Protection Goals for San Francisco Bay

Korie Schaeffer*, Marcia Brockbank, Abe Doherty, Brenda Goeden, Christina Hoffman, Natalie Cosentino-Manning, Dan Robinson, Rebecca Smyth and Caitlin Sweeney
NOAA National Marine Fisheries Service
Habitat Conservation Division
777 Sonoma Avenue
Santa Rosa, CA 95404
Korie.schaeffer@noaa.gov

San Francisco Bay is the largest estuary on the West Coast of the United States, and supports a number of natural resources and commercial and recreational uses. Human uses such as fishing, shipping and ports, dredging, transportation projects, sand mining, recreational use, marinas, and industrial uses have direct impacts on the subtidal habitats of the Bay. These habitats are also threatened by non-native species, pollution, and systemic alterations such as climate change and water control in the Sacramento-San Joaquin Delta. Thus, there is a need to develop a plan to protect and restore subtidal resources within the Bay. The San Francisco Bay Subtidal Habitat Goals Project is a collaborative, inter-agency and stakeholder effort, lead by the National Oceanic and Atmospheric Administration, San Francisco Bay Conservation and Development Commission, State Coastal Conservancy and San Francisco Estuary Project, to establish comprehensive goals for protection, restoration, and protection of the subtidal habitats in San Francisco Bay. With multi-agency and stakeholder support, goals allow for increased efficiency of conservation and restoration efforts, better informed management decisions, and support for scientists to pursue funding for monitoring and research priorities. For goal development, working committees evaluated the distribution, function, and condition of subtidal habitats in San Francisco Bay, as well as key human stressors impacting those habitats. Working committees then identified habitat-based priorities, and developed specific science, restoration, and/or protection goals for each priority and strategies for achieving the goals. The expected release date for the Subtidal Goals Document is December 2008.



■ North Carolina: Tackling Emerging Ocean Policy Challenges

Lisa C. Schiavinato* and Joseph J. Kalo
 North Carolina Sea Grant
 1575 Varsity Drive
 Flex Building, Module 1
 North Carolina State University
 Raleigh, NC 27695
 lisa_schiavinato@ncsu.edu

2004 was an important year for ocean policy. In 2004, reports on ocean policy from the U.S. Commission on Ocean Policy and the Pew Commission were released, encouraging federal, state and local governments to take a fresh look at ocean issues. In response, states have taken the lead on either developing their own ocean policy strategies or updating existing policies. North Carolina is one state currently updating existing ocean policy. Encouraged by the challenges issued by national reports, North Carolina is updating its ocean policy by focusing on emerging issues. Although many of these issues are not at the forefront at the moment, the North Carolina Division of Coastal Management (DCM) is attempting to anticipate ocean and coastal challenges and preparing for the future by developing appropriate policies and strategies in advance. Examples of emerging issues for which the state will develop policies in advance are: ocean energy, water-based wind energy, offshore ocean aquaculture, increasing demands for beach nourishment and limited beach-quality offshore sand sites, public coastal access protection and enhancement, and the impact of climate change on coastal regulatory policies. Working with the North Carolina Coastal Resources Law, Planning and Policy Center, DCM and other state agencies will study these issues, make recommendations and then implement strategies and necessary regulatory changes to meet the challenges of tomorrow. This paper will explore North Carolina's planning efforts and its evolving strategies and solutions as part of the ongoing national dialogue on ocean management policy.

■ Creating an Integrated Ocean Monitoring System: California's Recent Initiatives to Provide Better Science for Resource Management

Sheila Semans* and Paul Siri
 State Coastal Conservancy/Ocean Protection Council
 1330 Broadway, Suite 1300
 Oakland, CA 96412
 ssemans@scc.ca.gov

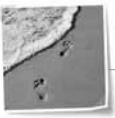
Recognizing the threats to ocean resources, the Ocean Protection Council (OPC) has made it a priority to fund projects that will provide useful information for those who use or manage the coastal ocean. The Coastal Ocean Currents Monitoring Program (COCMP)

is now being implemented with a goal to bring together the state's exceptional oceanographic expertise with its resource managers to provide real-time information on ocean currents. COCMP has been designed to provide ocean current monitoring infrastructure on a variety of space and time scales in a manner that is best suited for the broad range of regional and statewide needs. Additionally, the OPC has recently embarked on an ambitious program to complete seafloor mapping in all state waters along California's 1,100 miles of coastline, another data set critical to guide multiple ocean management decisions. The California Seafloor Mapping Program (CSMP) maps are now being used to design and monitor marine reserves, but the data collected will have far-reaching applications. The challenge ahead is to integrate these data and address management priorities, such as understanding sediment transport and sand delivery, ensuring shipping safety, describing tsunami potential, improving wastewater management, and recovering fish populations. This paper will provide recent examples as to how these data are being used to inform management decisions, how models are being created to improve our ability to predict ocean response to natural and human-induced change, and how resource managers and scientists are working together to assess potential applications.

■ Addressing Sustainable Public Access in the Virginia Coastal Zone

Jacqueline L. Shapo* and Lewis L. Lawrence
 NOAA Coastal Services Center Coastal Management Fellow
 Middle Peninsula Chesapeake Bay Public Access Authority
 P.O. Box 286
 Saluda, VA 23149
 Jshapo@mppdc.com

In the diverse Virginia coastal zone, only one percent of the shoreline is publicly owned. Providing residents and visitors with sufficient public access to natural resources is therefore challenging. It is important not only to offer access points through publicly owned land, but also to give the public meaningful coastal experiences incorporating Virginia's maritime heritage and natural wonder. The Middle Peninsula Chesapeake Bay Public Access Authority (MPCBPAA), a Virginia political subdivision, was established in 2003 to identify, acquire, and manage regional water access opportunities that can be used by the general public for passive and active activities. Since its inception, the MPCBPAA has leveraged more than \$2.5 million dollars in state and federal funds to address public access issues, incorporating such innovative solutions as utilizing inmates to construct and maintain public access projects; leveraging local disability services boards to enhance disabled features in MPCBPAA-managed areas; and producing educational brochures about MPCBPAA



projects. It frequently partners with the public, governmental agencies, non-governmental organizations, and private citizens to respond quickly to acquire land that can be used by the public in perpetuity; develop habitat management plans that support long-term public access, resource conservation, resource protection, and traditional uses; manage user conflicts within existing access sites; coordinate with regional localities to maximize conservation efforts in sensitive areas; and procure sustainable funding for MPCBPAA activities. This presentation will address the utility of an innovative government entity that functions to provide focused attention to public access issues and solve a multitude of local concerns.

■ The Massachusetts StormSmart Coasts Program

Wesley Shaw
NOAA Coastal Services Center Coastal Management Fellow
Massachusetts Office of Coastal Zone Management
251 Causeway Street/Suite 800
Boston, MA 02114
Wesley@NWcoastal.com

While experts at various federal and state agencies continually improve their understanding of how to best manage coastal floodplains, most land-use decisions are made by local boards with varying experience and expertise on floodplain management issues. *StormSmart Coasts* is a new program designed to help bridge the gap between the ever-growing sea of information on coastal hazards and the decision makers who need it to create safer, more resilient coastal communities. Developed by the Massachusetts Office of Coastal Zone Management with extensive input from local officials, the program works to help communities find existing tools and techniques for better floodplain management, and, when appropriate, offers guidance on creating new tools. A central feature of StormSmart Coasts is the program's website (mass.gov/czm/stormsmart), which houses a wide breadth of technical assistance on managing the coastal floodplain. Topics range from techniques for correctly reading FEMA Flood Insurance Rate Maps to guidance on how to create a multi-objective management plan. The tools are presented as a menu of options from which communities can pick and choose according to their resources, political climate, and level of expertise, and seeks to provide all communities with the opportunity to incrementally improve. The website also houses the program's fact sheets, case studies, model bylaws and regulations, potential funding sources, and various other outreach materials. It also provides an overview of the No Adverse Impact approach to floodplain management, and detailed legal information.

■ Improving Coastal Land Use Planning Through a Grant Competition

Stephanie Showalter
National Sea Grant Law Center
University of Mississippi
Kinard Hall, Wing E – Room 256
University, MS 38677
sshowalt@olemiss.edu

In February 2007, the National Sea Grant Law Center funded eleven research and outreach projects on law and policy issues related to coastal management. The Law Center proposes this panel session to facilitate the dissemination of the knowledge gained through this grant competition. Judith McDowell, Woods Hole Sea Grant, oversaw the development of a course to enhance understanding of wetlands protection laws and legal authority of Coastal Conservation Commissions in Massachusetts. By partnering with a nonprofit organization serving local environmental officials, a coastal version of an existing course, Fundamentals for Conservation Commissions, was designed and field-tested. James O'Connell, Woods Hole Sea Grant, worked with a project team to prepare a national model floodplain bylaw that was adapted from an existing model floodplain bylaw generated by the Cape Cod Commission in 1996. Workshops were held with local community planners and officials, as well as state and federal floodplain specialists, to address stakeholder concerns and educate potential users. Brian Ohm, University of Wisconsin, led an effort to develop a model coastal management ordinance for Great Lakes coastal communities. A model ordinance developed twenty-five years ago was updated to incorporate improved technological information and best practices. Colleen Masterson, Great Lakes Water Studies Institute, created a unique and innovative new legal outreach workshop for Michigan communities. The workshop was designed to provide government officials and citizens with the tools they need to better understand and protect Michigan's coastal environments through a combination of legal analysis sessions and field experiences related to coastal environments.



■ Improving Fisheries Management Through a Grant Competition

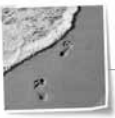
Stephanie Showalter
National Sea Grant Law Center
University of Mississippi
Kinard Hall, Wing E – Room 256
University, MS 38677
sshowalt@olemiss.edu

In February 2007, the National Sea Grant Law Center funded eleven research and outreach projects on law and policy issues related to coastal management. The Law Center proposes this panel session to facilitate the dissemination of the knowledge gained through this grant competition. Kristen Fletcher, Rhode Island Sea Grant Legal Program, developed a judicial outreach project entitled *Fisheries for the Bench* to provide educational seminars to judges regarding fisheries management and law and community-based approaches to marine resource management. The seminars held in Rhode Island and Oregon included presentations from fisheries lawyers, managers, and the industry, as well as field trips. Rita Heimes, University of Maine School of Law, convened a meeting of attorneys, economists, industry representatives, and members of the regulatory and environmental communities to discuss creation of binding and effective harvest cooperative agreements for New England fisheries. The meeting was timed to assist the design of harvest cooperatives that may be formed under provisions for self-selecting sectors included in the Fishery Management Plan for the Northeast multispecies fishery. Suzanne Iudicello, MRAG Americas, conducted research on community-based management opportunities in Oregon, focusing on Port Orford, Oregon. Port Orford is interested in creating a “stewardship area,” a specifically bounded section of the adjacent marine environment, where they could share management authority with current state and federal managers. Martley’s team reviewed the current near-shore marine management policies and laws of the state of Oregon and related federal policies and laws to determine whether the laws would permit the community to pursue its vision.

■ Exploring Coastal Management Legal Issues Through a Grant Competition

Stephanie Showalter
National Sea Grant Law Center
University of Mississippi
Kinard Hall, Wing E – Room 256
University, MS 38677
sshowalt@olemiss.edu

In February 2007, the National Sea Grant Law Center funded eleven research and outreach projects on law and policy issues related to coastal management. The Law Center proposes this panel session to facilitate the dissemination of the knowledge gained through this grant competition. Natalie Springuel, Maine Sea Grant, developed an outreach tool to provide useful, practical information about complex water access-related legal issues. The researchers examined cooperative agreement models for coastal access; legal tools for conservation and access; and regulatory and tax options. An interactive website was developed to disseminate research results. Matt Pecoy, University of South Carolina School of Law, examined the evolving public trust in South Carolina through a competitive Coastal Law Fellowship program funded by the Law Center. Pecoy researched the scope and implications of submerged lands leasing and private ownership of public trust lands in South Carolina. Richard McLaughlin, Harte Research Institute for Gulf of Mexico Studies, organized a consortium of marine law, policy, and management researchers and practitioners to develop an integrated and adaptive management strategy for the Gulf of Mexico. Emphasis was placed on identifying those institutions that lack the legal and regulatory structure to balance competing uses and objectives with the goals regional governance. Alison Rieser, University of Hawaii at Manoa, identified and assessed the legislative and regulatory options for ensuring the full protection of the Northwestern Hawaiian Islands Marine National Monument under U.S. law. Rieser also analyzed potential international law measures to reduce threats from navigation and fishing vessel operations.



■ Reef Check California: Applying Scientific Rigor to Community-Based Subtidal Monitoring

Craig S. Shuman*, Cyndi Dawson, Colleen Wisniewski, Claudette Dorsey, Chris Knight and Gregor Hodgson
Reef Check Foundation
PO Box 2057
Pacific Palisades, CA 90292
cshuman@reefcheck.org

Reef Check California educates, trains, and engages all ocean users in the collection of scientifically sound data describing California's nearshore rocky reefs to help inform management decisions and create an informed constituency supportive of science-based management. The survey protocol was designed to produce data that would be comparable throughout the state and could be used to answer questions about the health of the ecosystem, the status of specific organisms – especially those targeted by fishing – and provide critical baseline information to help locate and evaluate new MPAs as directed by the California Marine Life Protection Act. Originally focused on the central coast, Reef Check California has recently expanded into northern and southern California, creating a full statewide network. Since our initial training in April 2006, we have trained over 180 certified divers ranging from commercial fishermen to high school students, helping to monitor California's nearshore coastal resources at over 40 sites from Gerstle Cove State Marine Reserve in Sonoma County to Isla Natividad, Baja California. Rigorous training and testing procedures combined with our thorough Quality Assurance/Quality Control requirements help ensure the scientific integrity of all data collected. Data that have passed QA/QC requirements are publically available and regularly submitted to the California Department of Fish and Game to assist with the management of California's nearshore marine resources.

■ Newcastle's South Pacific Beach - Reinvented

Robert Sirasch BE MIE (Aust)
University of Newcastle
NSW AUSTRALIA
rsirasch@iinet.net.au

South Newcastle Beach has deteriorated from a first class 18th century city beach; a reinvention of the area is needed for an aspiring 21st century global city. Recent plans call for an eclectic combination of changes to a world-renowned natural sandy beach. Preparatory work included participation workshops, studies and community consultative processes, one of which was the City's Coastal Management Plan. All of the stakeholders have been engaged by this and extended activities. The site presents challenges including the location, height, slope, exposure, weathered material layering and strike/dip with permeable parkland above. The author has geologically mapped strata and jointing and examined the

physical properties of materials. A 3D laser survey has been used to create a virtual model, distinguishing strata well. Visualization for various scenarios is assisted by a 3-D survey of council's built works combined in the model. For sustainability, the new threats of sea level rise and tsunamis are examined, as are coastal ocean dynamics. Investigations greatly expanded the possibilities for a successful outcome. A community driven, managed and implemented solution is the most important conclusion. Every part of the community must have benefits from a not-for-profit development, which emphasizes natural and indigenous history, of this public land.

■ Developing a Beachfront Digital Inventory to Enforce South Carolina's 40-Year Retreat Policy

Matthew J. Slagel
NOAA Coastal Management Fellow
Earth Resources Technology, Inc.
South Carolina Dept. of Health and Environmental Control
Office of Ocean and Coastal Resource Management (SCDHEC-OCRM)
1362 McMillan Ave., Suite 400
Charleston, SC 29405
slagelmj@dhec.sc.gov

Jurisdictional "baselines" and "setback lines" were established by the Beachfront Management Act, which was passed in 1988 and appended to the South Carolina Coastal Zone Management Act of 1977. These lines help regulate the repair or reconstruction of buildings that have been damaged following a storm. Existing habitable structures must be rebuilt farther landward, if possible, when storm-related damage exceeds 66%. To enforce this policy of retreat from eroding shorelines, SCDHEC-OCRM conducts post-storm damage assessments based on the pre-storm condition of the structures. The agency has accumulated 35mm print photographs of many of the beachfront buildings within its jurisdiction, but most of the photographs are from the early 1990s, and significant new construction has occurred since this time. To complete a digital inventory of the beachfront buildings, all of the 35mm prints are being scanned and saved as JPEG files according to city and street address. Google Earth® is also being used to determine which buildings are missing from the inventory and where new or replacement construction has occurred. For the North Myrtle Beach and Atlantic Beach communities, which have 391 beachfront buildings combined, only 199 buildings, or 51%, are documented correctly in the existing print inventory. The remaining 49% of the buildings are either missing from the inventory or have been replaced by newer construction that has not yet been photographed. To fully enforce South Carolina's retreat policy, it is essential to maintain a digital inventory of ground-level images showing the pre-storm condition of each beachfront building.



■ An Assessment of Maritime Infrastructure and Water-Dependent Uses in the New York City Metropolitan Area

Tiffany C. Smythe*, Robert Freudenberg, and Robert Pirani
 Department of Marine Affairs
 University of Rhode Island
 310 Washburn Hall
 Kingston, RI 02881
 tcsmythe@mail.uri.edu

Anecdotal evidence suggests that recent waterfront development trends are resulting in the loss of maritime infrastructure and water-dependent uses in coastal areas nationwide. In the New York City metropolitan area, maritime and water-dependent facilities include a range of uses, from large-scale industrial infrastructure supporting the Port of New York, to small-scale fishing piers and marinas in the surrounding suburbs. In this paper, we describe research supporting the efforts of Regional Plan Association (RPA), a non-profit planning and advocacy organization, to assess the status of maritime infrastructure and water-dependent uses in waterfront areas of the 31-county tri-state region (encompassing New York, New Jersey, and Connecticut). First, we assess the current state of maritime and water-dependent uses in the region through primary research and through interviews with coastal managers, land use planners, industry representatives, and other key informants. The research catalogs the major threats to these industries and documents the trends that have led to its decline. This assessment is augmented by select case studies that provide insight into the range of maritime uses and issues characterizing this complex region. Next, we describe efforts by RPA to convene stakeholders for a meeting to explore these issues, share best management practices and develop policy perspectives. We then draw upon this research to determine how the private sector and local, state, and federal government can best facilitate stewardship of these waterfront uses. We conclude with discussion of how this research can inform other regions' efforts to protect maritime infrastructure and water-dependent uses.

■ The Reedsport Settlement Process: A Model for Wave Energy Planning?

Pete Stauffer
 Oregon Policy Coordinator
 Surfrider Foundation
 (503) 887-0514 work/cell
 pstauffer@surfrider.org

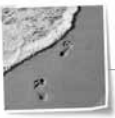
The Oregon Chapter of the Surfrider Foundation is engaged in the first comprehensive settlement process related to wave energy development for the proposed Reedsport Wave Energy Project. Surfrider, a non-profit environmental organization dedicated to the

protection and enjoyment of the world's oceans, waves and beaches, is a key stakeholder in this process because its members, primarily surfers and other recreational ocean users, will be directly affected by wave energy development. Surfrider recognizes that wave energy may offer important benefits as a renewable source of energy, as well as a cutting-edge industry for coastal communities. The organization also recognizes that many questions about wave energy remain, including potential impacts to nearshore ecology, ocean recreation, public safety, aesthetics, and fishing access. To ensure appropriate consideration of these issues, Surfrider has participated in a settlement process with federal and state agencies, stakeholder groups, conservation organizations, and Ocean Power Technologies (OPT) to agree on a precautionary approach to wave energy in Reedsport. Negotiations have developed a draft settlement agreement that includes an adaptive management approach. This includes several study plans that OPT has agreed to implement to identify any adverse effects from the first and second phases of the wave energy project. The company hopes to install one buoy and then ten buoys before a potential build-out to 200 buoys. Adaptive Management ensures that parties reassess implementation of the project at each phase to avoid or minimize degradation to aquatic resources.

■ Living Shorelines Projects on the Eastern Shore of Maryland

Bhaskaran Subramanian*, Audra Luscher, David Wilson, Lee Anne Janney, and Johann Martinez
 Riparian and Wetlands Restoration
 Department of Natural Resources
 580 Taylor Ave.
 Annapolis, MD 21401
 BSubramanian@dnr.state.md.us

Shoreline erosion has gained much-needed attention in recent times. Though extreme events such as hurricanes and rising sea-levels have a profound effect on the land and water dynamics, it is the "low-key" daily tidal and wave action, combined with boating activity, loss of submerged aquatic vegetations (SAVs) and oyster reefs, that have exacerbated the problem. Shoreline protection measures have been in place for a long time, traditionally as "hardened" structural methods, like bulkheads and riprap. Although natural shoreline erosion control techniques like "living shorelines" – marsh edging, sills and breakwaters – have been practiced in Maryland for many years, there has been some renewed interest due to the recent Living Shorelines Act passed by the State of Maryland. Living shorelines have provided immense benefits, which include creation, restoration and protection of wetlands, reduction in the movement of excess sediments into the Chesapeake Bay, and lower influx of nitrogen and phosphorus into the Bay. A monitoring and assessment study was conducted



for the projects managed by Maryland Eastern Shore Resource Conservation and Development Council. A GIS database was created to record these findings and also to help in future projects. As a part of this study, 200 living shorelines projects were analyzed. The study sheds light on key parameters used to evaluate the success of the projects, which included type of project, slope and condition of the banks, marsh erosion, structure condition, and the presence/absence of marsh grasses.

■ Preserving Seafood-Related Working Waterfronts Through Strategic Decision Making Processes

Gilbert Sylvia,* Heather Mann, Laurel Kellner, Jeff Feldner, Susan Hanna, Michael Dickerson, Adam Zimmerman, and Margret Kirby
Coastal Oregon Marine Experiment Station
Oregon State University
Hatfield Marine Science Center
2030 Marine Science Drive
Newport, OR 97365
Gil.Sylvia@oregonstate.edu

U.S. West coast ports and coastal communities are facing major challenges in maintaining seafood dependent working waterfronts. Harvest limitations, industry consolidation, depreciating infrastructure, and a changing economic and regulatory landscape are forcing coastal communities to evaluate challenges in maintaining and revitalizing working waterfronts. In response, the Community Seafood Initiative has undertaken a project to help West Coast communities with seafood-related working waterfronts to develop strategic decision-making that supports waterfront growth and adaptation while remaining a viable part of the community's economy. The project has four major objectives. The first is to inventory coastal ports with working waterfronts from Eureka, California to Westport, Washington with respect to key economic, social, and environmental criteria. Second is to select a diverse set of four ports that are planning to preserve and enhance their working waterfronts or may be candidates for strategic engagement. These communities will be the focus of comprehensive case studies detailing historic development and decision-making within the context of economic and regulatory change. Third, the project will develop a "21st century tool box" for protecting and enhancing working waterfront activities that takes into account economic, social, and regulatory changes and encompasses both new and traditional tools, including zoning, taxation, development rights, and designated access systems. Finally, the project plans to develop engagement strategies for working with these port communities and to identify opportunities for utilizing the tool box. The results of objectives 1-3 and preliminary engagement strategies will be presented and discussed within the larger context of challenges facing our working waterfronts.

■ Beach and Inlet Management in North Carolina: Assessing the Needs of Local Beach Communities

Lauren Theodore
North Carolina Division of Coastal Management
1638 Mail Service Center
Raleigh, NC 27699-1638
Lauren.Theodore@ncmail.net

Currently, no comprehensive overview of beach and inlet management and planning in the U.S. exists in the literature. Therefore, a literature review was conducted in order to identify which states have or are in the process of developing statewide or local beach and inlet management plan; better understand the content, structure, and effectiveness of these plans; and identify research needs related to beach and inlet management. Of the 95 documents reviewed, 23 were existing state or local management plans; 16 were proposed beach management strategies; 23 were articles that analyzed beach management strategies; six were legal policies or legislation related to beach management; two were beach or inlet ecosystem descriptions; and one was a commentary. These data suggest that only one state has a formal, statewide beach and inlet management plan (FL); however, several states have programs, plans or legislation similar to a statewide beach and inlet management plan (CA, SC, TX, and WA). At least three states are currently pursuing beach and inlet management plans (HI, NC, ME); and many states have beach and inlet management plans for localized areas or regions (AL, CA, DE, GA, HI, ME, MA, OR, TX, VA). Increasingly, regional beach and inlet management is incorporating process-based, systems-wide strategies in lieu of what historically has been a project-by-project, piecemeal approach. The paucity of literature on the effectiveness of this more holistic management approach may be indicative of its recent emergence or a lack of resources to support implementation, monitoring, analysis, and reporting.

■ The Fate of Working Waterfronts after Hurricane Katrina: The Mississippi and Alabama Experience

Jody A. Thompson*
Auburn University Marine Extension and Research Center
Mississippi-Alabama Sea Grant Consortium
4170 Commanders Drive
Mobile, AL 36615
jody.thompson@auburn.edu

A fragile area in coastal Mississippi and Alabama, the working waterfront is a boon to the economies of each state. Destruction from Hurricane Katrina in August 2005 heightened growing pressures for recreational and residential waterfront development. Water-dependent groups are struggling to maintain water access and their way of life. Efforts of the Mississippi-Alabama Sea Grant



Consortium (MASGC) have helped organize groups of water-dependent businesses and other stakeholders in both states. Stakeholders have included interests from commercial fishing and related industries, charter fishing, recreational fishing, tourism, environmental groups, and heavy industry. MASGC's efforts and progress towards the maintenance of the traditional local culture and working waterfront protection in several fishing villages will be discussed. This presentation will share case studies of activities related to preservation of working waterfronts along the Mississippi and Alabama Gulf coasts, concentrating on Alabama communities.

■ Should Government Control the Cost of Overnight Accommodations Along the Coast?

Robert Thompson
Department of Marine Affairs
University of Rhode Island
303 Washburn Hall
Kingston, RI 02881
rob@uri.edu

Overnight accommodations along our nation's coasts are becoming unaffordable for an ever increasing number of Americans. This paper argues that state, regional, or local governments need to take steps to ensure that, along our coasts, overnight accommodations are available to as many Americans as possible and not just to the more affluent. Protecting affordability is a necessary part of protecting access to the full array of experiential values that coastlines offer. This paper makes a three-part argument as to why the government should intervene in the market to protect or promote affordable overnight accommodations. The first part deals with the government's obligation to promote the general welfare and uses recent work on the biophilia hypothesis to show how twenty-four hour coastal access promotes the public good. The second part of this argument shows how the value of coastal property is actually attributable to positive externalities that emanate from a public resource, that is, the ocean. The third part argues that government should regulate coastal property in a manner that redirects the benefits of these positive externalities to the broader public. Even if one believes that the government should regulate property to preserve affordable overnight accommodations, one must determine whether attempts by the government to preserve affordability can withstand legal challenges. This paper looks at how the law concerning rent control, eviction controls, price controls, and takings would apply to state statutes or local ordinances that use these legal tools to attempt to protect or promote affordable coastal accommodations.

■ Social Equity, On-Street Parking, and Shoreline Access

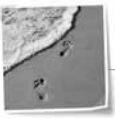
Robert Thompson
Department of Marine Affairs
University of Rhode Island
303 Washburn Hall
Kingston, RI 02881
rob@uri.edu

Although citizens of a state may have a right to shoreline access based upon their constitution, the Public Trust Doctrine, or custom, local government parking restrictions can still make access infeasible. Some authors argue that parking restrictions disproportionately affect lower income and minority populations even though they don't single them out. Even if one proves that a parking ordinance disproportionately and negatively impacts a disadvantaged group, this will not be enough to overturn the ordinance on constitutional grounds. This paper argues that beaches are "public forums" (*Leydon v. Town of Greenwich*, 777 A.2d 552, 565 (2001); *Florida State Conference of NAACP Branches v. Daytona Beach*, 54 F. Supp. 2d 1283, 1288 (M.D. Fla. 1999)), and parking ordinances that restrict access to these forums violate speech and assembly rights protected by the 1st Amendment of the U.S. Constitution. Even when municipalities have legitimate reasons for restricting parking, it's unlikely that these ordinances further compelling state interests or are narrowly enough tailored to survive a challenge. Although local governments can't use parking restrictions to block access, municipalities can implement reasonable management measures to control the environmental and social impacts of parking and charge fees to pay for management measures (see, *Warren v. Fairfax County*, 196 F.3d 186 (4th Cir. 1999)). In many respects, these conflicts over parking and access can be usefully analyzed as market failures that are common in coastal areas. This paper will examine some of the innovative—and constitutional—approaches that are being taken to address these failures.

■ Minimizing Ship Strikes on Whales: An Integration of Science, Technology and Management in the Stellwagen Bank National Marine Sanctuary

Paul C. Ticco
Northeast and Great Lakes Region
National Marine Sanctuary Program
National Oceanic and Atmospheric Administration
paul.ticco@noaa.gov

The Stellwagen Bank National Marine Sanctuary (SBNMS) is a region of considerable contrast – a crucial migratory seasonal feeding ground for right, fin and minke whales, a site of significant fishing pressures, and an area in which over 200 large commercial ships converge to enter the Port of Boston each month. Despite



long-term regulatory measures and restrictions on vessel speed and activity, marine gear entanglements and ship strikes remain the primary cause of death for the great whales (including the critically endangered northern right whale) that migrate to the sanctuary each spring from the Caribbean. Scientists, researchers and marine policy experts from SBNMS, in partnership with colleagues from other government agencies, research institutions, non-governmental organizations and academia, have developed new technologies and management schemes to greatly reduce the probability of whale mortality from ships both within and in close proximity to the sanctuary. These include the recently approved shifting of the ship traffic lane in and out of Boston Harbor (the first such alteration in U.S. history designed to protect wildlife), the placement of real-time acoustic detection buoys in the newly-realigned Boston Traffic Separation Scheme, and the continual transmittal of whale detection data from ships via the Automated Identification System. Years of research, data collection and collaborative efforts throughout Massachusetts Bay and the southern Gulf of Maine have led to these advances and the hope of far fewer whale mortalities in the near future.

■ Finding Common Ground: Approaches Used in Designing Program Evaluation Guidance for the National Estuary Program

Theresa Trainor*, James F. McManus, Richard Ribb, and Ginger Hinchcliff
Office of Water
Oceans and Coastal Protection Division
1200 Pennsylvania Avenue, NW (4504T)
Washington, D.C. 20460
Trainor.Theresa@epa.gov

The National Estuary Program (NEP) is the Environmental Protection Agency's (EPA) flagship watershed program and is a prime example of partnering between the federal government and locally-based coastal programs. Established in 1987 under Section 320 of the Clean Water Act (CWA), the twenty-eight estuaries comprising the NEPs are leaders in the development of innovative solutions to coastal challenges. While locally-driven priorities guided the development of each individual NEP's Comprehensive Conservation Management Plans (CCMP), the monitoring of progress, results, and efficient use of EPA funding has been a key responsibility for EPA headquarters and regional staff. Due to the nature of this partnership, program evaluation has always played an important role in the management of the Program and has an established history of demonstrating NEP progress. However, due to an increased need for federal program accountability, e.g., the Program Assessment Rating Tool (PART), in 2006, the NEP program evaluation underwent a thorough reassessment. The new state-of-the-art National Estuary Program

Evaluation Guidance was released in September 2007 and will greatly enhance EPA's ability to objectively and transparently assess programmatic and environmental achievements of each NEP as well as the overall effectiveness of the national Program. In this panel, EPA headquarters, EPA regional staff, an NEP Director, and a partnering federal agency (NOAA) will provide four unique perspectives on the program evaluation development process. This session will foster discussion on the challenges and successes of creating program evaluation methodology that meets the needs of scientists and policy-makers working together in partnership.

■ A Conservation Practitioner's Toolkit: Leasing and Ownership within Ocean and Coastal Waters

Jay Udelhoven
The Nature Conservancy - Global Marine Initiative
1917 First Avenue
Seattle, Washington 98101 U.S.A
judelhoven@tnc.org

Hidden within our bays, estuaries, and offshore waters lay forests of kelp meadows of seagrass, and gardens of coral. Home to an abundance and diversity of plants and animals, these productive ecosystems nourish marine communities and provide valuable economic benefits by hosting commercial fisheries, buffering shorelines, cleaning water, supporting tourism and offering recreational opportunities. Yet centuries of human activity have made these ocean and coastal areas some of the world's most threatened and degraded ecosystems. With increasing pressures on our oceans and coasts, new and innovative approaches are needed to sustain their immense biological wealth. To address these threats, The Nature Conservancy is taking successful strategies used on land—the acquisition and management of natural resources through ownership, easements, and leases—and applying them in the sea. To this end, The Nature Conservancy developed an on-line practitioner's toolkit for conservation leasing and ownership to help conservation organizations determine:

- What conservation leasing and ownership is.
- When leasing and ownership can help abate threats to ocean and coastal species, habitats, and ecosystems.
- How leasing and ownership processes work.
- How to plan and proceed with leasing and ownership projects.

The poster will explore the toolkit's information and application. The toolkit identifies the necessary steps and resources needed to assess, develop, and implement opportunities for leasing and ownership of lands and resources lying within ocean and coastal waters of the United States and abroad. The toolkit is available through the Internet, CD, and hardcopy manuals developed for specific workshops.



■ North Carolina's Initial Approach to Retaining and Enhancing Working Waterfronts and Public Access

Michael P. Voiland* and Kathleen E. Angione
 North Carolina Sea Grant Program
 North Carolina State University, Box 8605
 Flex Research Lab, 1575 Varsity Drive
 Raleigh, NC 27695-8505
 michael_voiland@ncsu.edu

In summer 2006, the North Carolina General Assembly established, by state statute, a Waterfront Access Study Committee (WASC) and charged it to "study the loss of diversity of uses along the coastal shoreline of North Carolina and how these losses impact access to the public trust waters of the state." In tasking the Committee, the legislature sought the panel's guidance on potential solutions, including "incentive-based techniques and management tools," that would sustain riparian land-use diversity and public access along the North Carolina shoreline. The deadline imposed by the legislature for recommendations necessitated immediate engagement and communication among the committee, media and the public. This presentation, by the chair of that Committee, overviews (1) public pronouncements, and activities that led to Committee formation; (2) the approach, studies, and resources utilized by the Committee in framing and conducting its work; (3) the Committee's final recommendations presented in April 2007; and (4) actions taken by the State of North Carolina in 2007 in response to those recommendations. Such actions included:

- Extending of present use value taxation assessment to commercial fisheries-related working waterfronts
- Creating and implementing of a \$20 million state waterfront access and marine industry fund;
- Boosting state agency boating infrastructural development funding via boat registration fee increases;
- Establishing a state waterfront access coordinating committee; and
- Directing the state transportation department to explore and coordinate public access opportunities with other state agencies.

■ The Portfields Initiative: Revitalizing Port and Harbor Communities

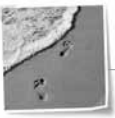
Kenneth Walker*, Brent Ache, Mary Baker, David Holst, and Robert Neely
 National Policy & Evaluation Division
 Office of Ocean & Coastal Resources Management
 1305 East West Hwy, Room 10166
 Silver Spring MD 20910
 kenneth.walker@noaa.gov

"Portfields" is a federal interagency effort focused on port community revitalization with an emphasis on development of environmentally sound port facilities, community revitalization, and environmental restoration. Led by the National Oceanic & Atmospheric Administration (NOAA) with partners, including the Environmental Protection Agency, the Economic Development Administration, the U.S. Army Corps of Engineers and the U.S. Maritime Administration, three Portfields Pilots were selected: New Bedford, Massachusetts, Bellingham, Washington, and Tampa, Florida. The goal of the pilots is to produce on-the-ground results by improving the delivery of partner agencies' financial and technical resources and by improving coordination among federal, state and local partners. Examples of Portfields activities implemented in the three pilots includes brownfields clean-up and reuse, navigational dredging and beneficial use, waterfront revitalization, stormwater management, habitat restoration and permit streamlining. Portfields is building on the success of brownfields cleanup and redevelopment efforts over the past decade. Port communities face a number of unique challenges that require strong partner ships at all levels of government and the private sector. By applying a collaborative, integrated approach, the Portfields Initiative is leveraging public and private resources, providing more efficient delivery of services, and developing creative solutions to support port revitalization. The experience in each of the pilots is providing opportunities to transfer innovative tools, best practices, and lessons learned to other port communities. This paper will focus on "lessons learned" and tools and techniques from the Portfields Pilots.

■ Evolution of Maritime Transportation in the Chang Shan Islands, China

Haizhuang Wang* and Luan Weixin
 School of Urban & Environment, Liaoning Normal University
 School of Economy & Management, Dalian Maritime University
 Dalian, China
 whaizhuang@gmail.com

Transportation by water is a primary means of travel, and an important means of communicating with isolated islands. Using the Changshan islands in northern China as a case study, and using data on spatio-temporal changes in traffic nodes (ports and docks), sea lanes and numbers of passengers, this paper analyzes factors behind changes in water



transportation, as well as recent problems. To optimize the distribution of water transportation in the Chang Shan islands and develop a more integrative island-land economy, this paper argues for a port investment policy of innovation, modern ship fleet construction, building a land-bank base for islands, and carrying out integrative shipping modes between sea and land are effective adjustment-control and planning countermeasures. We hope that this paper can give some suggestions to island traffic departments and land branches concerned with traffic on sea.

■ Mapping the Social Landscape of Land Use Decision Making in a New Hampshire Watershed

Erika L. Washburn
Ocean Process Analysis Laboratory
University of New Hampshire
Morse Hall Rm. 106
Durham, NH 03824
Erika.washburn@unh.edu

The New Hampshire seacoast is a mere 18 miles in length, but includes over 40 coastal watershed communities experiencing tremendous population growth and development pressure. Within this system is Great Bay, an estuary in the National Estuarine Research Reserve network and National Estuary Program. Pressures affecting the health of Great Bay are largely related to land use decisions by towns in the coastal watersheds. The Lamprey River watershed, one of the six major watersheds flowing into Great Bay, is the subject of my dissertation research. Key questions include: Do towns in this watershed communicate upstream and downstream when making land use decisions? Are cumulative effects on the watershed considered while debating development proposals? Long term research goals include defining the existing components which could be involved in building a watershed based land use decision making framework. This presentation will discuss the methods involved in mapping the social landscape of land use decision making within the towns of the Lamprey River watershed.

■ Development of Ohio's Lake Erie Shore Erosion Management Plan

Amanda A. Wenczel*, Deborah L. Beck, Brian D. George, Sandra Kosek-Sills, Sharon Lingle, Constance J. Livchak, and Eric Weimer
Ohio Department of Natural Resources
Office of Coastal Management
105 West Shoreline Drive
Sandusky, OH 44870
Amanda.Wenczel@dnr.state.oh.us

Erosion of Ohio's Lake Erie shore and nearshore has been a noted issue for decades, with piece-meal structural controls providing, at best, minimal mitigation. Although erosion management plans were developed in the 1940s and 1950s, none were implemented

due to a lack of available resources. With allocated funds, a greater understanding of shore erosion, and a need to protect increased coastal development, Ohio's Coastal Management Program initiated the Lake Erie Shore Erosion Management Plan (LESEMP) - a regional, voluntary, incentive-based plan for erosion mitigation. Presently, this interagency project is focusing on the creation of a model guidance document for one designated area of shoreline. The regional alternatives are based on site-specific scientific data as well as policy initiatives extracted from an analysis of erosion management plans in other states. With nearly 90% of the Ohio coast under private ownership, the LESEMP partners hired The Ohio State University Sea Grant Extension to conduct a Local Community Needs Assessment, consisting of focus groups and a questionnaire. The Needs Assessment showed that a lack public understanding is a major obstacle for the plan. Another prominent achievement was the formation of a diverse external workgroup consisting of state and federal agencies, universities, and non-profit organizations. This technical review board assists with gap analysis and data acquisition. The model guidance document is slated for release in late spring 2008. The final product will be a series of guidance documents tailored for each reach of shore along Ohio's 312-mile coast.

■ Challenging Issues, Challenging Future: Take the Challenge to Be a Leader in Coastal Management in 2028

Susan White* and Cory Riley
Hollings Marine Laboratory &
Center for Excellence in Oceans and Human Health
NOAA National Centers for Coastal Ocean Science
331 Fort Johnson Road
Charleston, SC 29412
Susan.White@noaa.gov

Coastal management is in a period of profound transition. The profession faces challenges and opportunities to build upon the past thirty years and to proactively face the future. Leaders in coastal management at local, state and national organizations will be retiring en masse within the next ten years as the Baby-Boomers (born ~ 1946-1964) are replaced with Generation-X' and Y-ers (born ~ 1964-1977 and ~ 1977-1997 respectively). The Coastal Zone Management Act that has been a major driver of coastal management in the past three decades is under revision and any changes will shape federal and state efforts in the future. The exodus of current leaders is concerning in terms of the collective "loss" of institutional history and intellectual capital; however the departure of leadership across multiple levels provides opportunities for young professionals with the interest and motivation to positively impact coastal resources. Building from the Coastal Zone 2007 discussion "Preparing for the Next Generation of Coastal Management"; the panel speakers will offer insight into their experiences, challenges and lessons learned during their



careers as coastal professionals. Speakers will discuss what future coastal management issues and managers might “look like” in the year 2028, just a short 20 years away. Motivating presentations will challenge participants to think creatively about the future role of individuals and organizations in positively impacting coastal management. A facilitated discussion will follow to identify steps to take to foster inspired, innovative, and flexible professionals prepared to steward the oceans and coasts of 2028. Potential speakers include: Virginia Burkett, Chief Scientist Global Change Research Program, USGS; Richard Lagnan, Co-Director of the Cooperative Institute for Coastal and Estuarine Environmental Technologies; Margaret Davidson, Director of NOAA’s Coastal Services Center; Kristen Fletcher, Executive Director of the Coastal States Organization; Jerry R. Schubel, President and CEO of the Aquarium of the Pacific.

■ Early Warning Systems for Coastal Ecosystems and Public Health Concerns

Susan White
Hollings Marine Laboratory &
Center for Excellence in Oceans and Human Health
NOAA National Centers for Coastal Ocean Science
331 Fort Johnson Road
Charleston, SC 29412
Susan.White@noaa.gov

The concept of developing early warning systems at a range of scales to reduce the likelihood of negatively impacting ecosystems (including humans) is not new. However, coastal ecosystems provide a particularly challenging environment in which to develop timely early warning systems that alert coastal decision makers of unsafe water quality conditions occur (e.g. beach closures or seafood harvesting bans) as well as the point at which habitats no longer offer environmental buffering capabilities and begin to show whole-system decline. These coastal and estuarine systems, located at the interface between oceanic and terrestrial systems, are integrators of multiple physical, chemical and biological stressors, making it difficult to select a single, penultimate indicator of environmental condition at any one place in time. The importance of developing timely early warning and rapid detection technology to reduce negative human and environmental impacts in coastal ecosystems also has clear economic importance, in terms of dollars lost in tourism, health care, and remediation efforts resulting from poorly designed coastal communities. Presenters in this panel session will provide research examples from an individual component of the coastal ecosystem to an entire habitat as a sentinel of environmental stress for the system. Technical tool development, implementation challenges, policy implications and coastal resource management applications will be highlighted for

discussion. Speakers: John Griffith; Jill Stewart; Guy DiDonato; Denise Sanger; Robert Chapman; and Stacey VanderPol.

■ Development and Evaluation of Management Measures for Erosion Response in 25 Coastal States

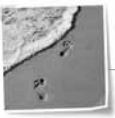
Rick Wilson*, Daniel Robinson and Chad Nelsen
Surfrider Foundation
P.O. Box 6010
San Clemente, CA 92674-6010
rwilson@surfrider.org

As sea level rise increases, many coastal communities are struggling to address chronic coastal erosion problems stemming from coastal development that has altered coastal processes and constrained the natural shoreward migration of the coast. In the interest of promoting the use of proactive measures to comprehensively address this issue, the Surfrider Foundation contacted key coastal managers and coastal scientists and surveyed state coastal management websites to develop a list of best management practices and policies. Solutions include incentives for coastal development that proactively avoids coastal hazards by recognizing the dynamic nature of coastlines and disincentives for inappropriate and hazard-prone development. The resultant list of management measures includes both pro-active policies designed to avoid or minimize coastal erosion issues and reactive responses to address existing coastal erosion problems. Using a list of “erosion response indicators”, 25 coastal states were surveyed and rated on a 10-point scale for each indicator, according to the degree each of the best practices were used in each state. A matrix showing the results of that survey was developed and state-level case studies highlight the implementation of erosion response practices.

■ The Possibility of Using Mangrove Forests as a Natural Fortress to Tsunami Impacts on Indonesian Coasts: A Preliminary Study

Achmad Yasir Baeda* and Yasushi Higo
Graduate School of IDEC, Hiroshima University
1-5-1 Kagamiyama, Higashi Hiroshima-shi
739-8529, Hiroshima, JAPAN
yasirbaeda@hiroshima-u.ac.jp

There are many prevention and warning systems for tsunami impacts that can be used along Indonesian coasts. One of them is a natural fortress – mangrove forests, which can absorb, diffract and dissipate energy of incidental big waves, such as those from tsunamis. This research is presented in two major parts: numerical simulation and physical experimentation. Models are based on KdV-based solitary wave theory, producing a moderate tsunami, (3m <math>\lt; \eta < 5\text{m}</math>), with typical Indonesian beach characteristics considered. Both schemes can provide information on the



dimensions and forms of mangrove forest which we believe will have the highest chance of reducing wave energy. After those two parts are completed, implementation should be carried out on beaches. However, the open ocean can be a challenge for mangroves. We can perhaps solve this through the use of temporary organic dams of bamboo. Hopefully, mangrove forests can give us a chance to ensure that this hazardous event causes fewer casualties than we have seen.

■ **California Water and Land Use Partnership: Lessons Learned from Early Stage of Stakeholder Collaboration**

Susan F. Zaleski
University of Southern California Sea Grant Program
3616 Trousdale Pkwy, AHF 209
Los Angeles, CA 90089-0373
szaleski@usc.edu

The California Water and Land Use Partnership (Ca WaLUP) is an informal partnership among state and federal agencies, non-governmental organizations, and universities that have goals related to improving water quality in the state of California. The partnership is an educational program for land use decision makers that addresses the relationship between land use and natural resource protection. Ca WaLUP provides practical tools and technical information that helps build the capacity of local governments, elected officials, and stakeholders to protect natural resources and encourage informed land use decisions. Advantages of the partnership approach include: an established network for sharing information and ideas; coordinated, multi-partner projects; and shared resources for local workshops. Current and emerging partner projects include the Local Government Commission workshops on water principles for local elected officials; the Center for Water and Land Use at the University of California at Davis; the Office of Environmental Health Hazard Assessment's Impervious Surface Analysis Tool with California specific co-efficients; and the University of Southern California Sea Grant and Los Angeles-San Gabriel Rivers Watershed Council needs assessment.

■ **Problems with Climatic and Related Data in Coastal Management Planning and Practices**

Gregory A. Zielinski* and Lisa C. Schiavinato
South Carolina and North Carolina Sea Grant Programs
Center for Marine and Wetland Studies
Coastal Carolina University
Conway SC 29526
gzielins@coastal.edu

Incorporating climatic information into planning and practices along coastal regions is of utmost importance under changing climatic conditions. Potentially critical environmental changes

include the effects of sea level rise and impact from the potential of a greater number of more intense storms, particularly tropical systems. Planning for these conditions requires evaluation of climatic information in several forms, including trends in existing data and models of future conditions. However, climatic information and data available to coastal managers is not as clear-cut and easy to interpret as what is printed in the media. For instance, local to regional changes in climate probably will differ from the broad global conditions often predicted by global circulation models, primarily given the spatial resolution employed by them. Similarly, local to regional rates of sea-level rise may vary greatly because of the relationship between global sea level and local land movement. Of additional significance are problems associated with instrumental climatic data. Stations are moved, urban areas encroach upon recording sites, inconsistencies among tidal gauge records are evident, length of records is variable, and stations are poorly located. Often, these problems are not taken into consideration when local or regional data trends are established. Although some climatic data sets take these problems into consideration, these records may not be ideal. This presentation provides solutions to strengthen the incorporation of climatic information into planning and practice in coastal regions of the U.S.