

The Coastal Society

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LIQUIFIED NATURAL GAS:

A Primer on Needs, Regulations, Environmental Implications and Trends

by David MacDuffee and Patricia Delgado

Liquefied natural gas (LNG) is natural gas that has been converted into a liquid. During the process of liquefaction, the natural gas (consisting primarily of methane) is cooled below its boiling point to approximately -259 °F (-160 °C), which removes most of its impurities (e.g., low concentrations of other hydrocarbons, water, carbon dioxide, nitrogen, oxygen, and some sulfur compounds). At this temperature, natural gas becomes a clear, colorless, odorless liquid that is neither corrosive nor toxic, that can be stored in specially designed tanks. LNG is about 1/600th the volume of natural gas, making it more cost-efficient for long-distance transportation and storage. In addition, LNG will float if spilled because it is lighter than water.

The infrastructure needed for LNG transportation consists of a liquefaction facility, where the gas is cooled and converted to liquid, a load-out terminal for loading the LNG onto ships, LNG ships for long-distance transportation, and a regasification terminal at the destination, where the LNG is reheated and reverted to a gas. Regasification terminals usually are connected to a pipeline distribution network.

LNG produces fewer emissions and pollutants than coal or oil and is considered a cleaner source of energy. The versatility of natural gas as a source for heating, cooling, cooking, electricity generation, and industrial uses has increased demand for it through-

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LIVING SHORELINES:

A Technique Used To Protect, Enhance, Restore, and Create Natural Habitat for Aquatic Species

by Kimberly Lellis

Shorelines are dynamic areas where the land and water intersect. Stable riverine, estuarine, and coastal shorelines are important to the health of aquatic ecosystems because they provide habitat for fish and wildlife, filter sediment and pollutants from the land, improve water quality, and protect developed coastal areas from storm surge and flooding hazards. To stabilize shorelines and prevent erosion, hardened structures such as seawalls, bulkheads, and stone revetments have sometimes been placed at the land-water interface. These structures, however, cause abrupt transitions in ecological zones, and diminish the natural value of a shoreline. Specifically, they increase loss of beach and intertidal habitats, decrease the diversity and quality of habitats on both sides of the structure and impede those natural processes that are necessary and beneficial for healthy aquatic ecosystems. They limit the natural ability of the shoreline to absorb energy and migrate in

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Barren Island Living Shorelines Project
Photo: Alison Ward-Maksym, NOAA Restoration Center

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**"We have it in our power to begin the world over again."**

-- Thomas Paine, "Common Sense"

Although others are far more knowledgeable and better versed (please see Mike Wascom's reflections on page three) I would be quite remiss if I did not offer a few words concerning the devastation wrought upon the citizens of the beautiful Gulf Coast by Hurricanes Katrina and Rita. Those of us living outside of the area could only watch helplessly as the horrifying spectacle began to unfold on our televisions. Scenes of massive destruction and death usually reserved for far-flung nations routinely battered by wind, rain and sea appeared once again, but this time it was not Bangladesh, India or Myanmar that captured our attention and sympathies but our own coastal cities and towns. The TCS members who live, work and play in the region were contacted via e-mail by Judy Tucker, our Executive Director. Thankfully, all are safe, but each had a story to tell --- one of trepidation, shock, anguish, and then, as so often happens to those in desperate situations, resolve.

Of course, the finger-pointing began while the waters of the Gulf were still rising. Who or what to blame: slow and inadequate government response on all levels, poor coastal land-use planning, the many citizens themselves who chose to live in homes often located below sea-level, a lack of leadership and vision, or a society that had turned its compassionate eyes away from many of its poorest and most helpless members. Perhaps a fatal aggregation of all.

The questions over what happened, why it happened, what could or should have been done, what to do now, etc., will continue to drive our national debate (and hopefully action) for years to come. People and organizations, many perhaps previously unconnected and unrelated in their missions, will have to join together in open dialogue to share their ideas, wisdom, and strengths to create conditions that minimize the prospects of a similar future catastrophe.

It is clear that coastal policies and attitudes must change. The stresses on Gulf resources and ecosystems must be reduced. As Mr. Paine stated over 200 years ago, we do have the power to begin again, at least in one part of the world. As an organization composed of individuals concerned with wise coastal management and the sustainable use of resources, TCS can play several roles in this rebirth. We can educate, perform research, promote coastal values, aid in the prudent redevelopment of the Gulf Coast, work to change regulations, etc. But perhaps more important than these professional pursuits should be our vow to make changes as individuals, becoming less dependent on non-renewable energy sources, conserving fresh water, limiting our use of household pollutants, increasing our recycling efforts, and speaking up to elected officials. The loss of life and property on such a grand scale, be it in New Orleans, Calcutta, Yangon or Dhaka, affects all of us. Now that the waters have receded let's use this opportunity as a clarion call for both collective and individual action. Those who died and those who mourn for them deserve nothing less.

Paul C. Ticco

TCS President

Photo of New Orleans courtesy of DigitalGlobe

The views expressed herein are those of the authors and do not necessarily represent TCS nor its Board.

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My thanks to Mike Wascom who responded expeditiously to my request to address the future of the Gulf Coast, in light of the twin hurricane disasters Katrina and Rita. As a coastal professional in Baton Rouge, Louisiana, Mike brings his professional experience and a personal perspective to this thoughtful commentary. I am happy to relinquish the Editor's Desk to him this quarter.

Ellen Gordon

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ESPERANACE POUR DE GOLFE DE MEXIQUE HOPE FOR THE GULF OF MEXICO

Since 1969, Hurricane Camille has been the modern benchmark against which Gulf of Mexico hurricanes are measured. A Category 5 hurricane, Camille hit the Mississippi Gulf coast and southeast Louisiana after barely missing New Orleans. Thirty-six years later, Katrina raised the bar, setting a new standard for hurricane havoc.

The one-two punch of Hurricanes Katrina and Rita destroyed large parts of the Louisiana and Mississippi coastal zone and heavily impacted coastal Alabama and Texas as a result of flooding and wind destruction. For example, 80% of America's most European city, New Orleans, flooded because of levee failure after Katrina passed. The now well-cited Lower Ninth Ward area of the city then re-flooded as a result of Rita. The Vieux Carre--French Quarter--built by Bienville in 1718 on the natural levee of the Mississippi River (the highest land in the vicinity) escaped flooding. However, other parts of the city, primarily those built in the 20th century on drained former marshlands were most adversely affected.

What will it take to restore the Gulf coast and New Orleans? Certainly, coastal zoning and building codes must be reviewed and revised (true for all U.S. coasts). In light of the utter destruction wrought by Katrina's storm surge, the questions of how near development should be to the Mississippi and

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CHARTING A NEW COURSE: Shaping Solutions for the Coasts

The Coastal Society's 20th International
Conference

May 14-18, 2006
St. Pete Beach, Florida

TCS 20, the Society's 20th International Conference will present a solution-based conference experience: learning and sharing information, success stories and challenges, and exploring the interface among scientists, policy-makers, coastal managers and the public.

TCS 20 will focus on thoughtful, innovative solutions or case studies that can serve as platforms for learning and discussion among conference participants. Special emphasis will be given to issues facing Florida's coastal areas. Specifically, TCS 20 will present papers, posters, and proposals that:

1. Provide scientific information relevant to solving contemporary coastal problems;
2. Integrate science, management, and policy towards changing behaviors; and,
3. Present questions or case studies that allow for dialogue, learning, and solution-sharing.

To complement the TCS 20 Theme of Innovative Solutions, the conference will be organized within the following tracks:

Solutions for Land Use Challenges

Solutions for Governing Ocean Use Conflicts

Solutions for the Effective Integration of
Science

Solutions for Changing Behaviors:
Professionals & the Public

Solutions for Mitigating Coastal Natural
Hazards

For more information or to serve on the TCS 20 Planning Committee, contact Judy Tucker at coastalsoc@aol.com.

Visit the TCS 20 Conference Website at:
<http://www.thecoastalsociety.org/conference/tcs>

*Liquefied Natural Gas continued*

out the United States. Domestic natural gas resources have not met the increasing demand, and suppliers are investigating foreign sources to meet the nation's needs.

The largest natural gas reserves are found in Russia, Iran, Qatar, Saudi Arabia and the United Arab Emirates.

Although natural gas from these countries is not accessible via pipelines, it can be transported as LNG. The ability to transport LNG in large quantities on tankers from distant locations, combined with the falling costs of LNG processing and transportation, have opened the door for LNG to become a more competitive commodity around the globe.

The Energy Information Administration forecasts that domestic demand for natural gas will grow approximately 40 percent by 2025. Since consumption of natural gas is expected to outpace domestic production, the shortfall likely will be made up with LNG imports. As a result, net LNG imports are expected to rise from 0.4 trillion cubic feet in 2003 to 6.4 trillion cubic feet in 2025.

Although approximately 60 percent of the increase in LNG imports could be handled by expanding the capacity of existing LNG terminals, additional terminals will likely be constructed. Market demand for LNG likely will dictate the final number and location of any new coastal and offshore facilities.

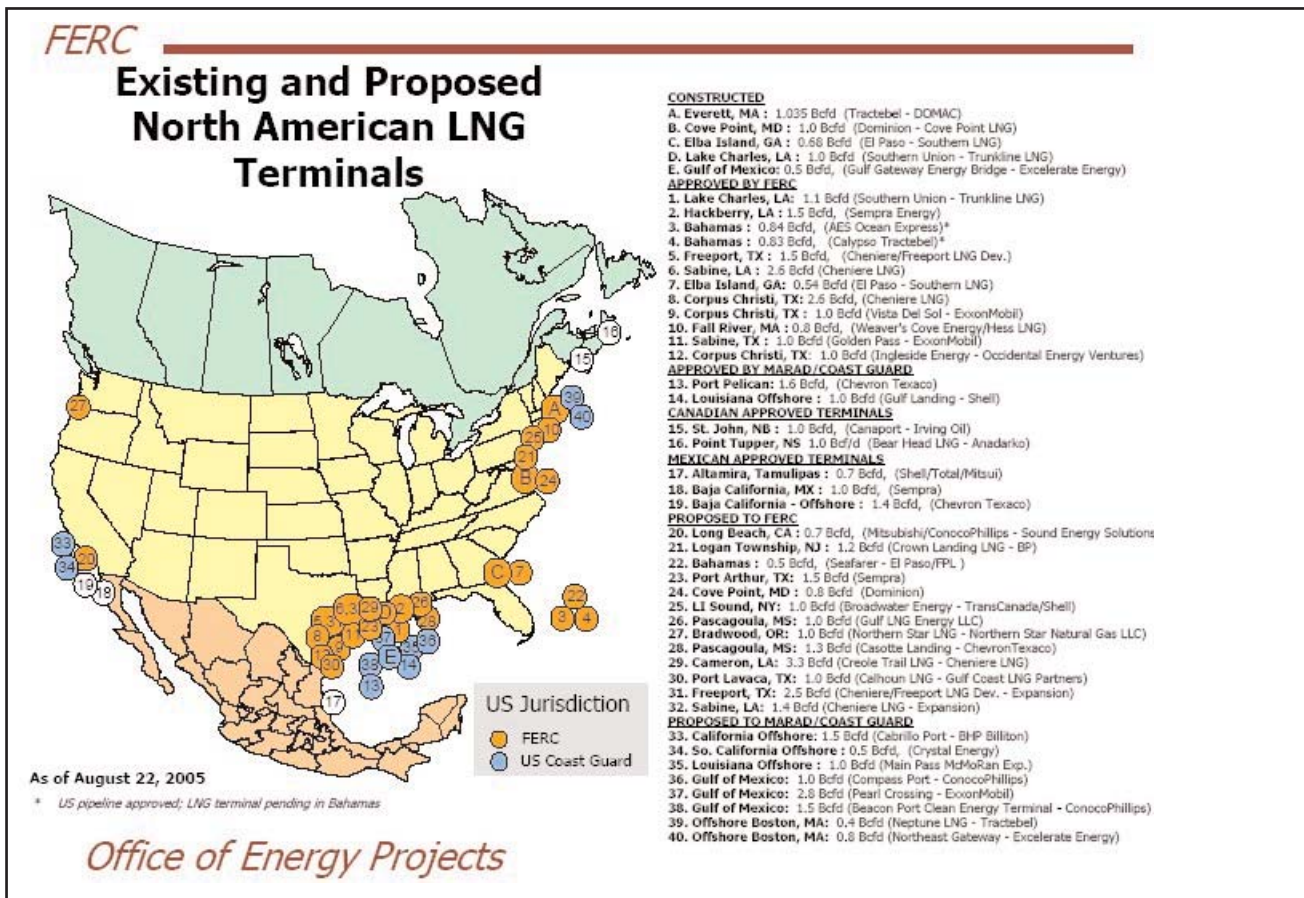
The legal authority for obtaining a federal license for an LNG terminal falls under two statutes: the Natural Gas Act (NGA) (16 U.S.C. §§ 717 et seq.) and the Deepwater Port Act (DPA) (33 U.S.C. §§ 1501 et seq.). The recently amended NGA provides the Federal Energy Regulatory Commission (FERC) exclusive authority to license facilities located onshore or in state waters. For terminals proposed in federal waters—the focus of this overview—the DPA authorizes the Secretary of Transportation to issue licenses if certain criteria are satisfied. One of these criteria requires the applicant to demonstrate that the deepwater port will be constructed and operated using the best available technology to prevent or minimize adverse impacts on the marine environment. The Maritime Administration, under authority of the Secretary of Transportation, issues the licenses and the U.S. Coast Guard conducts an environmental review of the proposed terminal to ensure compliance with the National Environmental Policy Act (NEPA) and other laws. While Congress recently amended the NGA and DPA licensing processes, changes to the DPA created a new regulatory

vehicle for expediting the licensing of offshore LNG import terminals.

Amendments to the DPA in 2002 brought the licensing of offshore LNG terminals under the strict timelines and expedited review procedures that apply to other deepwater ports. The DPA gives the Secretary of Transportation 21 days to determine whether an application for a deepwater port is complete, 240 days to consolidate and conduct all public hearings, and 90 days from the last public hearing to approve or deny the application. Because the Secretary of Transportation must approve or deny an application within 330 days after determining an application is complete, any NEPA documentation or analyses must be incorporated into the 330-day timeframe. The DPA further streamlines the licensing process by consolidating the licensing NEPA responsibilities of all federal agencies involved. Under section 1504(f) of the DPA, the Secretary of Transportation must cooperate with other federal agencies when complying with NEPA to ensure environmental impacts from all federal activities are evaluated. The resulting NEPA document is then used to fulfill the NEPA responsibilities of all federal agencies involved in the licensing of the terminal.

In addition to the Congressionally mandated procedures for expediting the review of energy-related license applications, the Executive branch of the government has also promoted increased efficiency in the licensing processes. In 2001 President Bush issued Executive Order 13212, directing executive departments and agencies to take appropriate actions, to the extent consistent with applicable law, to expedite projects that increase the production, transmission, or conservation of energy. The Executive Order also establishes an interagency task force to monitor and assist federal agencies in their efforts to implement the policy. The task force subsequently coordinated the development of a Memorandum of Understanding between multiple federal departments and agencies that establishes a process for upfront and timely processing of deepwater port applications, including applications for offshore LNG terminals.

The past three years have seen a steep increase in license applications for LNG terminals along the nation's coasts. The substantial increase in applications, along with the expedited review schedule, presents a challenge to federal and state agencies conducting environmental reviews of LNG proposals. Government agencies must not only estimate the potential impacts associated with individual LNG facilities but, because of the large number of license



For a larger image visit: www.ferc.gov/industries/lng/indus-act/esist-prop-lng.pdf

applications, they also must estimate the cumulative impacts of multiple terminals on coastal and marine resources. The level of uncertainty in estimating potential impacts to marine resources has been an obstacle to obtaining consensus between federal and state agencies on the extent and significance of these impacts. In the Energy Policy Act of 2005, Congress recognized this uncertainty, specifically as it affects offshore proposals in the Gulf of Mexico. Section 1338 of the Act requires the Department of Energy to conduct a study to determine the risks or benefits presented by cumulative impacts of multiple offshore facilities using or proposing to use open-rack vaporization (ORV) systems (described below) in the Gulf of Mexico.

Environmental implications of LNG import terminals and their associated pipelines primarily concern the siting, construction, and operational aspects of the infrastructure. With respect to the operation of the terminal, the system that is used to warm and regasify the LNG has prompted federal and state agencies to take a closer look at the potential impacts on marine and coastal resources.

Two techniques currently predominate in LNG regasification: open-loop or "once through" systems typically utilizing an ORV system, and closed-loop or recirculating systems. A third alternative, a hybrid system, uses both open and closed systems at the same location.

An ORV system uses heat from seawater to warm and regasify LNG. Functioning much like an automobile radiator, except that the water does not recirculate, the ORV requires a continuous supply of large volumes of seawater (ranging between 90 and 200 million gallons per day) to heat the LNG and discharges cooler water back into the environment. Consequently, ORV systems are considered mainly for offshore or coastal terminals that have access to relatively warm seawater. The main environmental concerns associated with ORV's are entrainment and impingement of ichthyoplankton and other marine organisms through water intake, the reduction of water temperature (which could be harmful to marine life, particularly around the facility), and the potential effects on marine life of hypochlorite and other chemicals that are mixed with the intake water to prevent biological incrus-

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Living Shorelines continued

response to shifting water and storm surges. They often exacerbate erosion on their seaward side and generally have a short life span.

Hardened vertical structures are not typically necessary for erosion control in low-energy environments. "Living shorelines" are an alternative that minimizes coastal erosion and maintains coastal processes while protecting, restoring, enhancing, and creating natural habitat for aquatic organisms. Living shorelines can be used in low-to medium-energy riverine, estuarine, and coastal environments. Recreating the functions of the shoreline ecosystem through the use of natural materials, techniques include marsh and riparian plantings, submerged aquatic vegetation (SAV), organic coir fiber logs, organic matting, clean sand fill, oyster reefs, and low-profile "living breakwaters" seeded with oyster spat. The result is a natural transition zone at the land-water interface that provides numerous ecological and economic benefits to aquatic and riparian ecosystems, property owners and society.

A primary ecological benefit of living shorelines includes the preservation or restoration of habitat for aquatic flora and fauna, especially critical feeding and nursery habitat for adult and juvenile fish. Living shorelines provide access to shoreline for amphibians, reptiles, and waterfowl for breeding, nursery, and feeding activities. Natural shoreline dynamics are maintained through coastal water flow patterns that allow sediment to accrete and erode naturally. These projects result in the creation of a natural buffer that is aesthetically pleasing, absorbs wave energy, reduces coastal erosion, and traps and retains nutrients and pollutants contained in land runoff. Sediment-stabilizing vegetation also can improve air quality and lessen the effects of climate change by trapping greenhouse gases within plant cells.



Truxton Park Living Shorelines Project
Photo: NOAA Restoration Center

Hence, living shorelines not only confer ecological benefits, but economic and health advantages as well. They are less costly to install and potentially more sustainable than hardened structures. Living shorelines may increase property value due to enhanced views and aesthetics, and can provide a sense of place and privacy to the property owner.

Several steps are involved to plan and implement the projects. These include obtaining appropriate permits, adhering to relevant regulations and statutes, performing a site analysis, site preparation and installation, and post-construction monitoring and maintenance activities. Federal, state and local permits, laws, and regulations impact all stages, including planning, construction, implementation, and monitoring phases. Relevant statutes and regulations may include those intended to protect water quality, endangered and threatened species, essential fish habitat for trust resources, marine mammals, the environment, and navigability.

A site analysis determines whether this technique is appropriate for use in a particular location and should include an evaluation of the bank erosion rate, bank elevation, bathymetry, fetch, vegetation presence, and soil type. After site analysis, restoration activities are planned and the site is prepared by removing debris and unstable trees. Steep banks are regraded and filled to provide an elevation gradient for wave dissipation. Runoff issues must be identified and then addressed prior to material installation. Riparian and marsh vegetation is planted; coir fiber logs and organic fiber mats are installed; and oyster reefs or "living breakwaters" are constructed. After material installation, the site may undergo periodic post-construction monitoring and maintenance activities. This would include debris removal, vegetation replanting, depositing spat-on-shell for oyster reef growth, installing goose exclusion fences (if necessary), adding additional sand fill, and ensuring that the organic and structural materials remain in place and continue to stabilize the shoreline.

In recent years, politicians, state, federal, and local natural resource agencies, educators, private citizens, communities, and environmental organizations have increased their support for living shorelines installation in lieu of hardened structures in states such as Maryland, Virginia, and North Carolina. Recognition that hardened structures placed on soft, shifting sediments may not remain intact drives efforts to find cost-effective solutions that provide benefits beyond erosion control. Living shorelines offer an innovative alternative.



Several living shorelines projects have been installed in the low- to medium-energy environments of the Chesapeake Bay. For example, in 2002, a living shorelines project was implemented on Kent Island in Maryland at



Horseheads Wetland Center Living Shorelines Project
Photo: NOAA Restoration Center

the Horseheads Wetland Center. Restoration activities included removing a failing concrete/asphalt bulkhead, regrading and stabilizing the shoreline with sand fill and dredge material, and installing coir fiber logs, wetland plants, SAV, fish habitat structures, and an offshore oyster reef breakwater. The Horseheads Wetland Center project resulted in reduced coastal erosion and a stabilized shoreline along with the creation of valuable fish habitat.

In 2004, the Amos Garrett Park Living Shorelines project was implemented along Spa Creek in Annapolis, Maryland. Prior to the project, coastal erosion had degraded water quality and habitat for living marine resources. Restoration activities included replacing organic material, planting marsh and riparian vegetation, and installing coir fiber logs. The Amos Garrett Park project created habitat for an array of fish, amphibian, reptile, and waterfowl species while decreasing runoff and coastal erosion.

These two projects were partially funded through the NOAA Restoration Center Community-Based Restoration Program (CRP). The NOAA Restoration Center is dedicated to the restoration of marine, estuarine, and riparian habitats to enhance NOAA trust resources in U.S. waters. Within the Restoration Center, the CRP provides technical assistance and funding to partners for on-the-ground projects to promote a conservation ethic and the stewardship of living marine resources.

In recognition of the extensive benefits living shorelines provide to the environment, property owners, and society,

the NOAA Restoration Center CRP developed and released a Living Shorelines Initiative Grant Program in 2004 in partnership with the National Fish and Wildlife Foundation, Chesapeake Bay Trust, and The Keith Campbell Foundation for the Environment. This new initiative promotes installation of living shorelines by providing funds to applicants to create them, as well as to educate landowners, contractors and public agencies about their benefits. Eight living shorelines projects were selected from the 2004 grant proposal solicitation. For more information on the Initiative and the 2005 grant proposal solicitation, see the following program announcement: http://www.nmfs.noaa.gov/habitat/restoration/projects_programs/crp/partners/documents/lsi_rfp_2005-2006.pdf Living shorelines offer an exciting opportunity to recreate the natural functions of shoreline ecosystems in low- to medium- energy riverine, estuarine, and coastal environments. Rather than placing conventional hardened structures along dynamic and shifting shorelines, the living



Amos Garrett Park Living Shorelines Project
Photo: Alison Ward-Maksym, NOAA Restoration Center

shorelines technique is a cost-effective alternative that stabilizes sediment, minimizes coastal erosion, and maintains coastal processes. Living shorelines create a natural transition zone that provides numerous ecological and economic benefits to aquatic and riparian ecosystems, the property owner, and to society, while protecting, restoring, enhancing, and creating natural habitat for our Nation's living marine resources.

Kimberly Lellis is a Marine Habitat Resource Specialist in NOAA's National Marine Fisheries Service, Office of Habitat Conservation. Kimberly.Lellis@noaa.gov



The Coastal Society was well represented at the 14th biennial Coastal Zone conference in New Orleans, Louisiana, July 17 to 21, 2005. The conference provided TCS members the opportunity to share ideas with other coastal resource managers, and gather new information and tools on issues ranging from alternative energy sources to invasive species to urban revitalization.

On Sunday evening TCS co-sponsored a reception with the International MPA Workshop at Mother's Restaurant. TCS members enjoyed their fill of jambalaya, bread pudding, and gumbo while enjoying music from a live jazz band.

About 35 TCS members, including five past presidents, gathered on Tuesday morning for the Annual Members Meeting and breakfast. Discussion topics included the TCS Internship, the Coastal Management Journal, and the upcoming TCS20 Conference. See the meeting minutes for more specifics.

the board voted to change the international members dues rate to match the US rate.

Bulletin: Paul reported that Ellen Gordon is the new Bulletin editor. Lindsay Fullenkamp reported that Ellen is always looking for articles and she could work with authors to edit their articles.

TCS20: Paul reported that the call for papers for TCS20 is out ahead of schedule, and was being advertised at the CZ'05 conference with flyers. Kristen Fletcher asked meeting attendees to take flyers with them to distribute. Paul also mentioned that the facilities chosen for the conference are great and located right on the beach.

Off-Conference Year Activities: TCS is holding several off-conference year activities, including a seminar series in DC and possibly other meetings in the chapters. Paul mentioned that TCS is looking into adding two more chapters - one in the Gulf coast area and one in the DC metro area.

Coastal Management Journal: Marc Hershman reported that the Coastal Management Journal still offers a discounted subscription rate of \$40 to TCS members, while the rate for other individuals is \$200. However, only nine people have subscribed as individuals, and he did not know how many of those were TCS members. He felt that TCS members were not all aware of this members benefit. It was suggested that \$40 could be added to TCS dues, and a subscription to the Journal could be a benefit for all members. It was also suggested that the Journal be made available on-line to all TCS members as a member benefit. A notice will be placed in the TCS Bulletin informing members of the reduced subscription rate available to them.

TCS Internship Program: Tom Bigford introduced Kim Lellis, the TCS intern in his office, and reported that he has hired a new TCS intern. He described the program, and asked others to join him in offering it in their offices, explaining that every office could choose from the same pool of applicants.

The meeting was adjourned at 9:00 AM CDT.

TCS Members Meeting Minutes

New Orleans, LA at Coastal Zone '05

July 19, 2005

7:30 AM CDT

Attendance: There were about 35 people in attendance. Paul Ticco welcomed everyone, and introduced the five past president's in attendance - Mike Orbach, Virginia Trippe, Lori King, Mo Lynch, and Marc Hershman; and the board members present - Kristen Fletcher, Mo Lynch, Lindsay Fullenkamp, Tom Bigford, Laurie Jodice, and Bob Goodwin.

Membership: Paul mentioned the membership drive. Current membership is about 309. Paul also reported that





TCS GATHERINGS

TCS Seminar Series

On August 4, 2005, Coastal Society members in the Washington, DC area gathered for the second area TCS seminar. Dr. Paul Ticco, Coastal States Organization (and TCS President) and Dr. Ariel Cuschnir, Louis Berger Group, Inc. (and TCS Board Member) spoke about marine protected areas and sustainable development. Dr. Cuschnir discussed some of his work in Honduras and the Philippines, including difficulties and successes in promoting marine protected areas. Dr. Ticco spoke about U.S. marine protected area efforts, including federal/state interactions. Both speakers emphasized the importance of inclusive, cooperative efforts, rather than regulatory implementation. For this lunchtime seminar, TCS thanks the Louis Berger Group for providing pizza for the attendees.

TCS at Delaware "Coast Day"

A beautiful, sunny day greeted thousands of coast and ocean lovers Sunday, October 2nd as they gathered at the University of Delaware's Lewes campus for Delaware Coast Day. For the past 29 years, the College of Marine Studies and the Delaware Sea Grant College Program have organized a day to celebrate Delaware's ocean and coastal resources and showcase the University's efforts in marine research and education. Activities ranging from marine archaeological exhibits, educational seminars, children's touch tanks, research demonstrations, ship tours, live music and a crab cake cook-off highlighted the festivities. Spearheaded by TCS member and volunteer Lilli Ferguson of NOAA's National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment, The Coastal Society was represented by Lilli and Paul Ticco, TCS President, at a large table in the Education Tent, together with several other non-profit, research and educational organizations. While handing out TCS material, both Lilli and Paul spoke with many members of the public who stopped by to learn more about TCS, and with several University professors and graduate students about the benefits of becoming an active member of The Coastal Society. Perhaps a Delaware chapter is in our future!

Coastal Partners Workshop, Virginia Beach

The Coastal Society was a sponsor of the Virginia Coastal Partners Workshop in Virginia Beach on October 5-7, 2005, receiving recognition on the workshop web site, in the program and during the workshop. Approximately 120 people attended from NOAA's Northeast Region. TCS members from Maine to Virginia were among the speakers addressing the conference theme tracks of coastal "smart growth" communities, building consensus among diverse stakeholders, coastal zone land conservation, and future energy needs and impacts on the coastal zone. TCS Past President and current Treasurer Mo Lynch, and TCS Executive Director Judy Tucker manned the TCS display table provided to workshop sponsors and networked among state and federal agencies, educational institutions and NGO's. During the evening reception at the Virginia Aquarium, Mo and Judy gave a few remarks and received thanks on TCS behalf for being a conference sponsor.

Chesapeake Bay Foundation

Sometime in the Spring of 2006, The Coastal Society will hold a free, day-long event at the Chesapeake Bay Foundation's (CBF) office in Annapolis, MD to bring TCS members and others together to explore the state of the Chesapeake Bay ecosystem. Co-sponsored by CBF and originally scheduled for October 11th, 2005, but now postponed, this gathering will provide information on science, management and policy issues associated with improving the health of the Chesapeake Bay. Once we have rescheduled, announcements of the new date will be forthcoming!

COASTAL MANAGEMENT

Keep abreast of research findings, analysis, tools and techniques as you set policy and manage our coastal resources--and save money at the same time. Your TCS membership entitles you to a substantial discount on a subscription to Coastal Management, the International Journal of Marine Environment, Resources, Law and Society. Normally \$142/year, an individual TCS member pays only \$40. To subscribe, visit TCS website, look under membership benefits, and follow the links. Be sure to state that you are a member of The Coastal Society to receive your subscription discount.



NEWSNOTES

Global Climate

The June-August summer season was the tenth warmest on record for the contiguous U.S., while precipitation was above average. Global temperatures were the second highest on record for the boreal summer, which runs from June 1 through August 31. Twelve named tropical systems formed in the Atlantic by the end of August, including Hurricane Katrina, which was among the strongest hurricanes ever to strike the U.S., according to scientists at the NOAA National Climatic Data Center in Asheville, N.C. Visit www.ncdc.noaa.gov/oa/ncdc.html for more information.

Beach Health

Three reports are available that detail the health of the nation's beaches. The Surfrider Foundation released its 2005 State of the Beach report, which provides information on beach ecology, access, erosion and water quality. The Natural Resources Defense Council (NRDC) released Testing the Waters, its 15th annual report on beach closures. Statistics in the NRDC report identified 21,061 beach closures and advisory days in 2004. This information is consistent with data released by the U.S. Environmental Protection Agency (EPA). Dangerously high bacteria levels, indicating the presence of human or animal waste, prompted 85 percent of the closing and advisory days. The main culprits are improperly treated sewage and bacteria-contaminated stormwater runoff. The jump in closures in 2004 can be partially attributed to expanded monitoring by EPA and the states under the federal Beaches Environmental Assessment, Closure, and Health Act (BEACH). Since the law was enacted in 2000, EPA has provided \$42 million for testing of coastal water quality at 3,500 beaches. In 1997, only 1,000 beaches were being monitored. The three reports can be found at:

Surfrider - <http://www.surfrider.org/stateofthebeach/home.asp>

NRDC - <http://www.nrdc.org/water/oceans/tw/titinx.asp>

EPA - <http://www.epa.gov/ost/beaches/2004fs.html>

Smart Growth

In mid-July, The National Endowment for the Arts announced the Governors' Institute on Community Design (GICD), a new initiative to support governors' leadership in good community design and innovative planning. Created in partnership with the U.S. Environmental Protection Agency, the Institute comprises a series of workshops that initially will be held up to four times a year, pairing governors and their cabinets with top planning experts and practitioners to identify strategies for well-designed planning that will have a positive effect on American life.

Former Governors Christine Todd Whitman of New Jersey and Parris N. Glendening of Maryland will spearhead the new Governors' Institute on Community Design. Former Governor Angus King of Maine, who is working closely with GrowSmart Maine, also has agreed to be part of the Institute's future workshops. All three former governors, who have worked on community design and planning during and since their terms, have agreed to work together to help other governors address these issues.

"Air and water quality, brownfields, water infrastructure and wetlands protection are all linked to how and where we grow," said Ben Grumbles, Assistant Administrator for Water, EPA. "Working in collaboration with states, we will enhance our understanding of the implications of growth. Thinking strategically, the participating governors will help their states dollars go farther while protecting and preserving their environment."

For information on the Governors' Institute, call 202- 207-3354, e-mail htregoning@govinstitute.org or jfrece@umd.edu, or visit www.govinstitute.org.

Regional/International Cooperation

At the 29th Annual Conference of New England Governors and Eastern Canadian Premiers held in St. John's, Newfoundland and Labrador on August 28-29, 2005, participants formed an Oceans Working Committee. Intended to foster international cooperation and collaboration on all aspects of marine and oceans related research and development, education, exploration, and oceans management and to facilitate the exchange of information, the Oceans Working Committee will make recommendations to the New England governors and the Eastern Canadian premiers on practical means to expand and enhance regional efforts on all oceans related issues. More information is available at www.scics.gc.ca/new_e.html.



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tation on heat-transfer equipment. The exact level of impact associated with open-loop systems is not known at this time; however, given the numerous license applications for these facilities in the Gulf of Mexico, the potential cumulative impacts from multiple terminals have been of concern to federal and state marine resource managers.

The closed-loop system does not require seawater withdrawal, but instead uses another heat source to continually heat a liquid "bath" that warms the LNG. Environmental analyses conducted to date do not suggest the closed-loop system is a significant source of pollution for the marine environment, although it may produce air emissions in the form of carbon, sulfur, and nitrogen oxides when natural gas is used as a heat source.

For either open or closed systems, additional impacts on coastal and marine resources could result from increased vessel traffic (e.g., increased turbidity through sediment resuspension and ship strikes on marine mammals), construction or removal of structures such as pipelines, and ship channel dredging.

The original four LNG import facilities were built between 1971 and 1980 in Everett, Massachusetts, Cove Point, Maryland, Elba Island, Georgia, and Lake Charles, Louisiana. An additional LNG terminal, Peñuelas, is located in Puerto Rico. Between 2002 and 2005, 13 new LNG terminals have been permitted (one has been constructed), 20 are in various phases of the application process, and several others are in the planning stages. More than half of the terminals are located in the Gulf of Mexico, but applications have also been filed in the Northeast, Southwest, and Northwest. Of the 13 LNG terminals approved to date, three will be sited offshore and will operate using an ORV system. The remaining ten terminals will be sited onshore and will operate under a closed-loop system.

Importing LNG into the United States has become a priority for meeting the nation's energy needs. The combination of legal and policy actions by the Legislative and Executive branches of the Federal government, advances in LNG technology, and strong market demand have resulted in an exponential increase in license applications for LNG import terminals. As a result, licensing agencies and marine resource managers are striving to balance the energy needs of the nation with environmental protec-

tion. Inherent in this balancing act is how uncertainties will be addressed, particularly as they relate to cumulative impacts of multiple terminals in the marine and coastal environment. Not all of the proposed terminals are likely to be constructed because of market saturation; however, some will become operational and resource managers will need to factor any potential impacts of those facilities into their decisions.

Footnotes:

¹ See Energy Information Administration, *The Global Liquefied Natural Gas Market: Status and Outlook* (2003) <<http://www.eia.doe.gov/oiaf/analysispaper/global/index.html>>.

² See *Id.*

³ See Energy Information Administration, *Annual Energy Outlook 2005 With Projections to 2025*, at 118 (2005) <<http://www.eia.doe.gov/oiaf/aeo/index.html>>.

⁴ *Id.* Includes LNG imports into Florida via the Bahamas.

⁵ See Energy Information Administration, *supra* note 2.

⁶ See 15 U.S.C. § 717b(e)(2).

⁷ See 33 U.S.C. § 1503(c).

⁸ See *id.* at § 1503(c)(5).

⁹ See Maritime Transportation Security Act of 2002, P.L. 107-295.

¹⁰ See 33 U.S.C. §§ 1504(c)(1), (g), and (i)(4).

¹¹ See Maritime Administration, *The Deepwater Port Act License Requirements* (visited Aug. 23, 2005) <http://www.marad.dot.gov/dwp/about_dpa/about_lic_req.html>.

¹² See 33 U.S.C. §1504(f).

¹³ See Exec. Order No. 13212, 66 Fed. Reg. 28,357 (May 22, 2001).

¹⁴ See Memorandum of Understanding Related to the Licensing of Deepwater Ports among the Departments of the Army, Commerce, Defense, Energy, Homeland Security, Interior, State, Transportation, Environmental Protection Agency, Federal Energy Regulatory Commission, and Council on Environmental Quality (2004) <http://www.uscg.mil/hq/gm/mso/docs/dwp_white_house_task_force_energystreamlining.pdf>.

¹⁵ Congress did not specify a timeline for completing the Section 1338 study or provide guidance on how the results of the study should be applied to licensed and proposed offshore LNG terminals using open-loop systems.

¹⁶ Federal Energy Regulatory Commission, *Existing and Proposed North American LNG Terminals* (last modified August 22, 2005) <<http://www.ferc.gov/industries/lng/indus-act/exist-prop-lng.pdf>>

¹⁷ In the Gulf of Mexico, all seven applications for offshore deepwater port licenses propose to use open-loop regasification systems, and all onshore facilities propose to use closed-loop systems.

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Hope for the Gulf continued from Page 3

Alabama beaches and what storm-resistant building standards should be implemented needs to be addressed. Would better building codes have prevented some of the devastation resulting from the storm surge? Florida's new building standards are a place to start.



Levee Break
Photo: Louisiana Department of Environmental Quality

We hope the nation now understands the importance of Louisiana's coastal wetlands as a storm buffer, valuable habitat and location of much of the nation's oil and gas infrastructure. The protection of our remaining coastal marshes should be a high national priority. Will people finally grasp that Louisiana's disappearing coastal wetlands are indeed "American's Wetlands?"

It will take years to restore New Orleans--with its thousands of historic structures--to the vibrant, ethnically diverse city that it was. Over 100,000 structures were damaged, primarily by flooding. Citizens are slowly returning to observe their mold-contaminated homes. The city can, without doubt, become the world's new "center" for the study of mold species.

Certainly, the multiple levees in the city require re-thinking, in terms of resistance to a Category 5 storm, prevention of structural failure, and the need for additional levees. The city's unique flood pumping system must be studied. How can the pumps be

protected from flooding; are additional pumps necessary?

Because of the flooding in the eastern part of the city and adjacent St. Bernard Parish, pressure will mount for the closure of the underused Mississippi River Gulf Outlet. Cutting St. Bernard in half, this navigation channel provides an open invitation for hurricane storm surge to reach eastern New Orleans.

Rebuilding New Orleans will require the implementation of deliberate, wise, and holistic land use. Government officials, citizens, impacted user groups, planners, engineers, natural and social scientists must be involved. It will require federal, state and local governments to plan together. An issue of special significance is the maintenance and restoration of historic areas.

Questions that need to be addressed before rebuilding begins include: How should re-development proceed? What land use tools and incentives are necessary to retain the city's multi-cultural and mixed-income society, so vital to New Orleans' culture? How rigorous must re-building restrictions/permitting requirements be, e.g., how high off the ground will dwellings have to be rebuilt? What innovative flood control/infrastructure improvements must be made?



Water Tower in Buras, LA
Photo: Louisiana Department of Environmental Quality

Should some or even the entire city be filled in to above sea level? Should parts of the city built in for-



mer swamps or marshland be allowed to return to nature? For example, the last part of New Orleans to be developed (New Orleans and Orleans Parish are coterminous) was built on such wetlands. It sits adjacent to the Bayou Sauvage National Wildlife Refuge, an extensive wetland area.

The human dimension of rebuilding New Orleans is the most gut wrenching aspect. Before Katrina, New Orleans was a city of about 465,000 (80% of whom were African-American) with an extensive population living below the federal poverty line. Who and how many will return? How long will it take the area to build back its pre-Katrina population? How would the population be impacted by new building requirements/standards?



Mississippi River Levee in Front of Plaquemines Parish Prison
Photo: Louisiana Department of Environmental Quality

As mentioned earlier, New Orleans was originally built on the highest land available, the natural levee of the Mississippi. It was a wise choice, since the Vieux Carre' and other areas built on the natural levee did not flood, including the lovely Uptown area and Port of New Orleans' wharves.

Of course, Katrina's effects go beyond the Gulf coast. Baton Rouge, 90 miles northeast of New Orleans, has initially absorbed over 200,000 New Orleanians; a 50% population increase in three weeks! The city had infrastructure/housing problems before; now, they are horrendous! What about the impacts of the num-



Venice High School, Boothville, LA
Photo: Louisiana Department of Environmental Quality

ber of evacuees in Houston, Dallas, and many other cities?

The nation's energy situation will continue to get more difficult. Ten offshore oil and gas rigs were destroyed in the storm and won't be rebuilt. Offshore oil and gas production in the Gulf gets "shut in" during a hurricane; it takes time after a storm to get it operating at 100% again. The hurricanes may also slow the building/licensing of liquefied natural gas (LNG) facilities in the Gulf, thus helping to keep natural gas prices high. For example, one onshore, newly licensed LNG facility in Louisiana is located adjacent to the Sabine River, in the area where Rita did its greatest damage. Another LNG facility has been proposed off the mouth of the Mississippi River. Plaquemines Parish is the last parish the Mississippi River passes to the Gulf, and its levees were destroyed. These are just two of the twenty or so facilities that companies have discussed building in the Gulf.

Nonetheless, with desire, with hope and with time, New Orleans and the Gulf Coast can again be a vibrant--though forever changed--place.

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THE FIRST INTERNATIONAL MARINE PROTECTED AREAS CONGRESS

October 23-27, 2005, Geelong, Australia
<http://www.impacongress.org/>

SUSTAINABLE BEACHES CONFERENCE

October 31-November 2, 2005, St. Petersburg, FL
The Clean Beaches Council will host the second annual Sustainable Beaches Conference on October 31-November 2 in St. Petersburg, Florida. The goal of the 2005 conference is to build and expand upon networks and to continue to inform citizens and professionals about the importance of keeping America's beaches safe, healthy, and sustainable.
<http://www.cleanbeaches.org/events/summit/2005/>.

2005 CANADIAN COASTAL CONFERENCE

November 6-9, 2005, Dartmouth, NS, Canada
<http://www.ccc2005-ccl2005.ca>

URBAN WATERFRONTS 23: GATHERING BY THE WATERS

November 11-12, Savannah, Georgia
23rd annual international conference of the Waterfront Center
<http://www.waterfrontcenter.org/conference/index.html>.

MARITIME HERITAGE EDUCATION CONFERENCE

November 18-20, 2005, Norfolk, VA - The conference brings educators together to promote the sharing of maritime heritage education partnerships, programs, and products. <http://www.sanctuaries.noaa.gov/education>

1ST INTERNATIONAL CONFERENCE ON COASTAL ZONE MANAGEMENT AND ENGINEERING IN THE MIDDLE EAST

November 27-29, 2005, Dubai, United Arab Emirates
<http://www.arabiancoastlcom/>

2006 OCEAN SCIENCES MEETING

February 20-24, 2006, Honolulu, Hawaii
The 13th Ocean Sciences Meeting, a joint meeting of ASLO, ERF, TOS and AGU. The Program Committee is developing a scientific program that will cover all topics in the area of Ocean Sciences.
www.agu.org/meetings/os06

COAST TO COAST

May 22-25, 2006, Melbourne Australia
Preparations have begun for Coast to Coast 2006, Australia's biennial national coastal conference. The need for sustainable coastal and marine use, planning and management is increasingly hard to ignore. Coast to Coast will focus debate across the full range of coastal and marine issues being considered at national, state, regional and local levels.
<http://www.iceaustralia.com/coasttocoast2006/index.html>

THE COASTAL ZONE CANADA '06 CONFERENCE AND YOUTH FORUM

August 12-18, 2006, Tuktoyaktuk, NWT, Canada
The proposed conference title for CZC '06 is "Arctic Change and Coastal Communities". The intent of the conference is to "raise awareness about the unique challenges faced by residents of the Arctic coastal zone in the face of rapid changes occurring in Arctic marine ecosystems. While the focus is on coastal and ocean issues in the north, we encourage contributions from coastal areas around the world, recognizing that many of the drivers of coastal change, and the adaptation of people to them, are common to many parts of the world."
<http://www.czc06.ca/>



CHAPTER NEWS

Duke University

The Duke University Chapter of The Coastal Society held its 5th annual Neuse River Sprint Triathlon on Saturday September 10th. The triathlon, held at the Duke Marine Lab on Pivers Island, began with a 300 meter swim, followed by a 14 kilometer bike, and ended with a 5 kilometer run. Contestants hailed from central and eastern North Carolina and included both students and state residents. The race was followed by a barbeque where awards were handed out for fastest male, female, team, and best costume (won by a contestant who completed the entire race dressed as Big Bird). Prizes were donated by local businesses and the event raised just under \$1,000 for the Neuse River Foundation.

We had planned a beach cleanup for September 17, on Shackleford Banks, a barrier island that is part of the Cape Lookout National Seashore. Unfortunately, Shackleford Banks was closed due to hurricane Ophelia, so students redirected their efforts to Carrot Island, a nearby barrier island that collected a substantial amount of trash during the hurricane. This cleanup was the Duke chapter's contribution to the "2005 North Carolina Big Sweep," the North Carolina component of the "International Coastal Cleanup."

The Duke Chapter will wrap up its September activities at the Morehead City Seafood Festival on the weekend of September 30th. At the two day festival, students will hand out sustainable seafood wallet cards, answer any questions seafood lovers may have, and sell channel-caught shrimp. Proceeds from the shrimp sales will be donated to victims of hurricane Katrina.

University of Washington

The UW Student Chapter of TCS is gearing up for the start of the school year on September 28. We will be presenting at the orientations of the School of Marine Affairs and the School of Aquatic and Fishery Sciences in an effort to recruit a diverse membership representing a variety of backgrounds and interests. In the month to come we will be encouraging both current and incoming students to submit abstracts for the upcoming TCS Conference in May, as well as pursuing funding sources to help send students to the conference. We continue to be active on the TCS planning committee and are teaming with the Duke student chapter to help support student interests in the conference."

University of Rhode Island

The URI Chapter Brown Bag Presentation Series is off to a great start this fall, with sessions that include a Coast Guard boarding simulation, an update of the National Estuary Program, and a look into the revitalization of Northern Narragansett Bay. We will be volunteering in a few coastal cleanup efforts as well.

Catching up With East Carolina University

Barefoot on the Mall, East Carolina University's outdoor spring semester event includes live music and free lunch for all ECU students. This event also provides student organizations the opportunity to recruit new members and raise funds. This year we purchased a small snow cone machine and sold snow cones, while informing interested students about the purview and the joys of TCS. We had also designed a new T-shirt to represent our local chapter, and gave these away as a bonus for purchasing a student membership in TCS, or for an equivalent donation to the chapter.

In May, we were able to provide financial assistance for two of our members to attend conferences. Melissa Madrigal attended the International Oil Spill Conference in Miami, FL, whose theme was "Prevention, Preparedness, Response and Restoration - Raising Global Standards." She was especially excited to attend the Issue Paper "Potentially Polluting Wrecks in Marine Waters," with keynote speaker Robert Ballard. Valerie Grussing attended the joint conference of the North American Society for Oceanic History and the National Maritime Historical Society in Savannah, GA. There she was unexpectedly presented with the opportunity to give a presentation on the Ocracoke Shipwreck Project, funded by NOAA's Office of Ocean Exploration and the NC Coastal Studies Institute, and directed by Dr. Timothy Runyan.

This fall we have big plans to inject new life into our little chapter. We are organizing a forum in November that will feature current research projects of students in the Coastal Resources Management Program. The event will open with a dinner for interested students and staff, and will feature presentations by students representing each of the CRM tracks (Maritime Studies, Coastal Ecology, Geosciences, and Social Sciences). We would like to translate this forum into an annual, or once-per-semester, event that will provide an opportunity for students to present their work in progress, while simultaneously raising awareness and interest in TCS.



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Last First Middle Initial

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Present Occupation: _____

Primary Interest: _____

Sponsored/Referred by: _____

Signature: _____ Today's Date: _____

Type of Membership:

Individual Regular: ___ \$35 U.S. 1-year ___ \$68 U.S. 2-year ___ \$99 U.S. 3-year

Student: ___ \$15 U.S.

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Corporate/Agency: ___ \$250 U.S.

Dues Payment:

Select membership category and number of years (discount for 2 or 3 years).

To pay by check: Make check payable to: The Coastal Society. Please mail check and application to: PO Box 25408, Alexandria, VA 22313-5408.

To pay by credit card: We cannot accept credit card information other than through the PayPal option. Please go to the TCS online membership form if you wish to pay by credit card (<http://www.thecoastalsociety.org/membersub.html>).

Thank you for your support.

The Coastal Society is an organization of private sector, academic, and government professionals and students dedicated to actively addressing emerging coastal issues by fostering dialogue, forging partnerships, and promoting communication and education.