

The Coastal Society

TCS Bulletin
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The World Can't Wait Global Climate Change

by Ellen Gordon

“So today, we dumped another 70 million tons of global-warming pollution into the thin shell of atmosphere surrounding our planet, as if it were an open sewer. And tomorrow, we will dump a slightly larger amount, with the cumulative concentrations now trapping more and more heat from the sun...In the last few months, it has been harder and harder to misinterpret the signs that our world is spinning out of kilter. Major cities in North and South America, Asia and Australia are nearly out of water due to massive droughts and melting glaciers. Desperate farmers are losing their livelihoods. Peoples in the frozen Arctic and on low-lying Pacific islands are planning evacuations of places they have long called home. Unprecedented wildfires have forced a half million people from their homes in one country and caused a national emergency that almost brought down the government in another. *Climate refugees* have migrated into areas already inhabited by people with different cultures, religions, and traditions, increasing the potential for conflict. Stronger storms in the Pacific and Atlantic have threatened whole cities. Millions have been displaced by massive flooding in South Asia, Mexico and 18 countries in Africa. As temperature extremes have increased, tens of thousands have lost their lives. We are recklessly burning and clearing our forests and driving more and more species into extinction. The very web of life on which we depend is being ripped and frayed...The future is knocking at our door right now. Make no mistake, the next generation will ask us one of two questions. Either they will ask: ‘What were you thinking; why didn’t you act?’ or they will ask instead; ‘How did you find the moral courage to rise and successfully resolve a crisis that so many said was impossible to solve?’”

That quote is excerpted from former vice-president Al Gore’s Nobel Peace Prize acceptance speech of Decem-

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Dear TCS Members,

Many of you know that I recently relocated and made a job change to Washington, DC, where federal policy decisions and implementation can affect our individual and collective ability to improve the state of our coasts and oceans. With a quickly approaching U.S. presidential election this fall, reauthorization of the nation's primary coastal management statute, the Coastal Zone Management Act, and climate change and energy discussions ringing through the halls of Congress, it's an exciting time and full of opportunities.

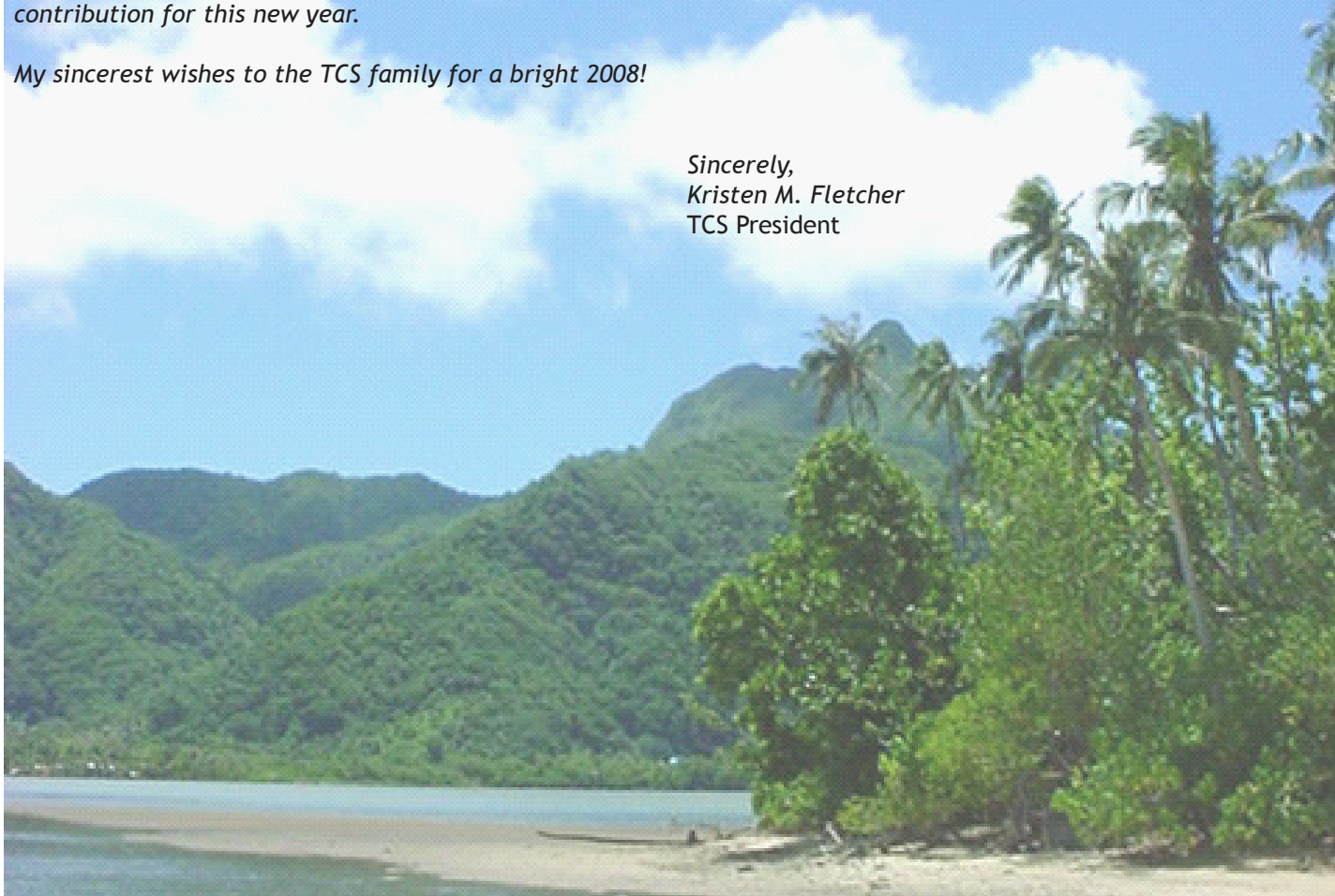
With a new year comes heightened expectations and hope for personal and professional successes in our lives. For an organization like TCS, a new year brings with it both common goals for the organization and its members and challenges for meeting the fire hose of demands for improved coastal management around the world.

TCS is in a unique position to create a bridge between the national policy discussions and the work done by state and local governments, regional bodies, private sector entities and environmental organizations, making the best use of our body of members that represents different disciplines, regions, organizations, and expertise.

With several new members to our Board of Directors, new policies and committees, and our biennial conference just six months away, TCS has a bright year ahead. For the Society to be most effective, I invite you to share with TCS your ideas for how we can best serve as this bridge and how we can enable you to realize your most effective contribution for this new year.

My sincerest wishes to the TCS family for a bright 2008!

Sincerely,
Kristen M. Fletcher
TCS President



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

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ber 10, 2007. "Climate refugees" is a rather chilling new addition to the lexicon. Gore emphatically lays out our imperative; to do everything we can, as individuals and associations, to ensure that it is the latter question we will be answering.

For the first two weeks of December, much of the world was represented at the United Nations Climate Change Conference in Bali. This gathering marked a global effort to establish a framework for negotiations on a new world agreement, to replace the soon-to-expire Kyoto Protocol for curbing global warming. An intransigent U.S., the single remaining industrial nation not signed on to the Kyoto Protocol, held out until nearly the end. In a dramatic flourish, only when the Conference had extended into a day of overtime did the U.S. join the historic deal being brokered on this Indonesian island. Significantly, the accord sets late 2009 as the target for a climate treaty—speeding up the original targeted date, but still timed for well after President George Bush leaves office.

Among difficulties that delayed agreement were protracted international negotiations that bore a striking resemblance to a cabal of argumentative, pouting children, finger pointing, ducking blame and responsibility, each refusing to be the first to agree to change; "I will if you will," and "you go first, then I'll try it," with the U.S. on one side of the debate and China, India and other developing countries on the other. Nearly 190 nations attended the conference, which opened with a standing ovation for Australia's new Prime Minister, Kevin Rudd, in recognition of his recent signing of the Kyoto Protocol. He remarked that, "The other nations must not allow the U.S. to derail, delay or water down the Bali mandate."

And indeed, on December 14, 2007, poor and rich nations agreed, for the first time, to each consider ways to reduce greenhouse gases. The action plan sets the stage for a new, binding treaty that may be humanity's best hope for preventing the worst predictions about global warming. Developing nations, including giants China, Indian and Brazil need only consider "measurable actions," while richer nations agreed to seek "quantified emissions cuts." In an interview with the "Christian Science Monitor," Hans Joachim Schellnhuber, Germany's top climate adviser expressed his belief that, "The role of the industrialized countries is to demonstrate that you can protect the climate and nevertheless prosper and increase your well-being as a society. Germany has now put together a package for a 40 percent reduction of emissions—very ambitious, but we did the calculations and in the end it

will save us money...In particular, we need to be on an emission-reduction path that doesn't allow global temperatures to rise more than 2 degrees C above pre-industrial levels. This is very ambitious. But we know if we get into the 3-5 degrees realm, we will be faced by major crises like a complete meltdown of the Greenland ice sheets, a collapse of the Amazon rain forests, a sea-level rise of 10-20 meters in the long run. So the goal has to be spelled out, and it has to be as simple as possible. Of course, achieving this kind of simplicity can be extremely complicated."

Will history look back and view the Bali conference as the beginning of a geopolitical shift? In the past, industrial countries set the terms and cut the deals and presented developing countries with the results. At the Bali conference, "developing countries were fuming that U.S. insistence was forcing the road map to confine scientific recommendations on necessary emission cuts by industrial countries to a footnote. Their ire was fed by a comment from a senior member of the U.S. delegation, James Connaughton, head of the Council on Environmental Quality who told reporters that, 'the U.S. will lead' on global climate change, 'but leadership requires that others fall in line and follow.'" Kevin Conrad, head of Papua-New Guinea's delegation responded, "We seek your leadership. But if for some reason you are not willing to lead, leave it to the rest of us. Please get out of the way."

Another unprecedented event announced during the Bali conference: over 200 climate scientists put away their traditional dispassionate stance and urged government leaders to take radical action to slow global warming because "there is no time to lose." Signers of the petition called for the world to cut greenhouse gas emissions in half by 2050. "The amount of carbon dioxide in our atmosphere now far exceeds the natural range of the past 650,000 years, and it is rising very quickly due to human activity," the scientists stated. "If this trend is not halted soon, many millions of people will be at risk from extreme events such as heat waves, drought, floods and storms, our coasts and cities will be threatened by rising sea levels, and many ecosystems, plants and animal species will be in serious danger of extinction."

On November 16, 2007, the Intergovernmental Panel on Climate Change (IPCC), co-recipients of the Nobel Peace Prize with Al Gore, published their "Synthesis Report of the IPCC Fourth Assessment Report." It stated that,

1. Warming of the climate system is unequivocal, as is now evident from observations of increases in global

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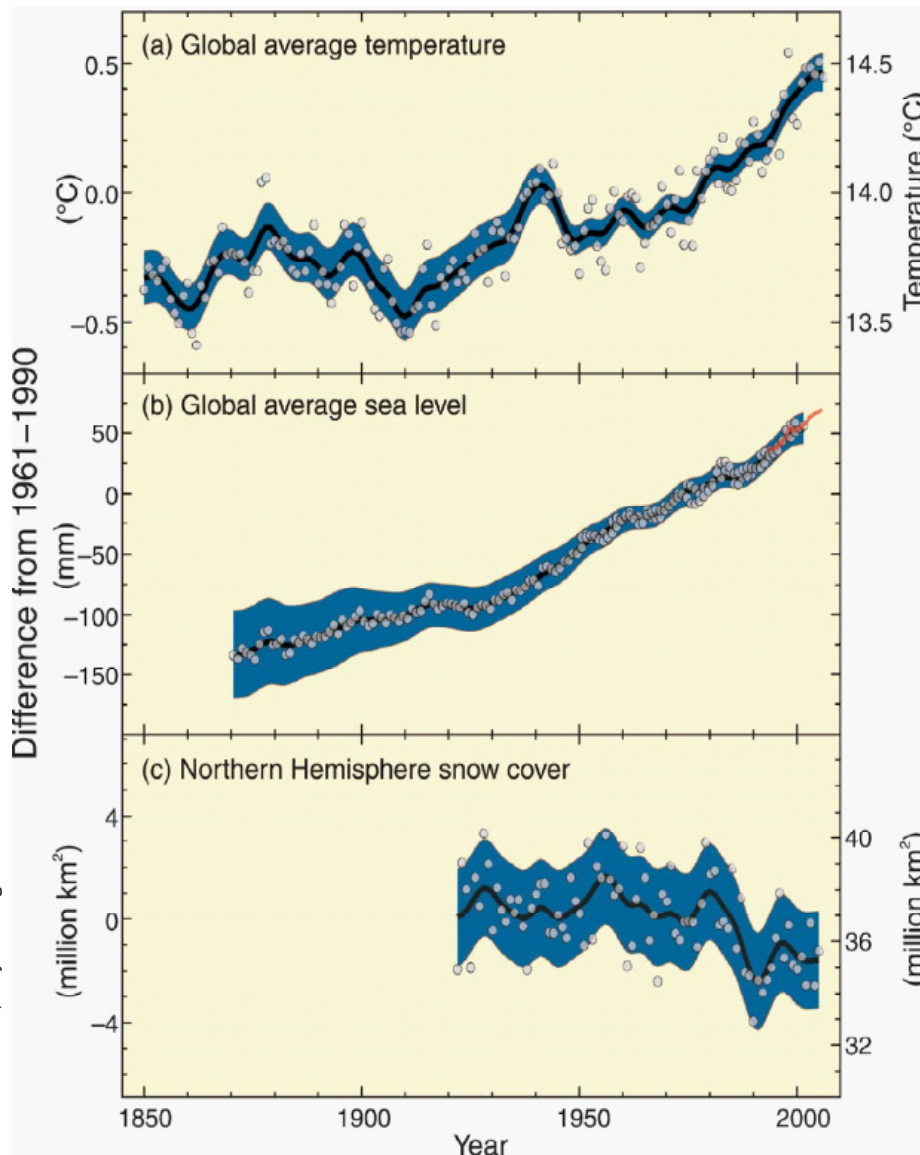
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- average air and ocean temperatures, widespread melting of snow and ice, and rising global sea level.
2. Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases.
3. There is medium confidence that other effects of regional climate change on natural and human environments are emerging, although many are difficult to discern due to adaptation and non-climatic drivers.

by climate change. Particular areas of concern include coastal ecosystems, especially mangroves and salt marshes, due to multiple stresses; coral reefs, also due to multiple stresses (including ocean acidification); and the sea ice biome, because of sensitivity to warming. Low lying coastal ecosystems will be seriously impacted by sea level rise and increased risk from extreme weather events. Small islands will also suffer disproportionately, due to high exposure of population and infrastructure to projected climate changes.

The Synthesis Report points out that certain systems, sectors and regions are likely to be especially hard hit

Sobering summative statements in this report include: Altered frequencies and intensities of extreme weather,



Warming of the climate system is unequivocal

- Increasing global air and ocean temperatures
- Rising global average sea level
- Reductions of snow and ice

Dr. R. K. Pachauri, Chairman, IPCC
4th Assessment, Key Findings

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Holly Frank

Route 133 in Ipswich, MA during May 2006 flooding. Yes, this is a road!



Holly Frank

Pedestrian Bridge downstream of the Ipswich Mills Dam in downtown Ipswich, MA during the May 2006 flooding. There is normally about 4 feet between the bridge and the water!

together with sea level rise are expected to have mostly adverse effects on natural and human systems.

Anthropogenic warming and sea level rise would continue for centuries due to the timescales associated with the climate processes and feedback, even if greenhouse gas concentrations were to be stabilized. Impacts may be abrupt or irreversible, depending upon the rate and magnitude of the climate change.

Nonetheless, the report offers hope; “Both bottom-up and top-down studies indicate that there is high agreement and much evidence of substantial economic potential for the mitigation of global greenhouse gas emissions over the coming decades that could offset the projected growth of global emissions or reduce emissions below current levels...A wide variety of policies and instruments are available to governments to create the incentives for

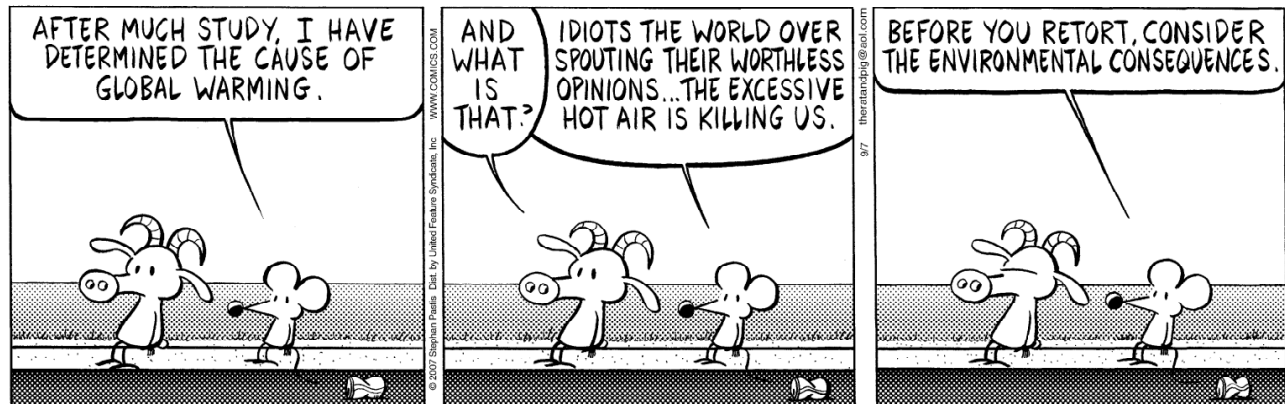
mitigation action. Their applicability depends on national circumstances...”

What will we tell the next generation?

The impacts of changing climate are already many and varied. Please be sure and take a look at this issue’s NewsNotes. In keeping with our thematic focus, all of the stories focus on coastal and ocean aspects of these changes.

Ellen Gordon, Bulletin Editor agrees with the Dalai Lama when he said, on November 15, 2005, “I believe that the twenty first century can become the most important century of human history. I think a new reality is emerging. Whether this view is realistic or not, there is no harm in making an effort.”

PEARLS BEFORE SWINE. © Stephan Pastis/Dist. by United Feature Syndicate Inc.





TCS Members Speak Out

Invited to offer their comments on the theme of this Bulletin issue, Global Climate Change, here are responses we received from members.

It would be easy for surfers to get lulled into thinking that global climate change might be good for surfing. Warmer water, increased frequency and strength of storms (that produce those waves we love) and hotter summer days all sound pretty good. That said, global warming will also kill coral reefs that make some of our best waves, increase coastal erosion leading to loss of access, beaches and coastal property, and increase sea level rise swamping some of our favorite breaks. That is only the beginning of the problems. You can learn more about the Surfrider Foundation's perspective on global climate change at: http://www.surfrider.org/srui.aspx?uiq=a-z/global_warming. - *Chad Nelsen*, Surfrider Foundation, PO Box 6010, San Clemente, CA 92674. phone: 949.492.8170x40, email: cnelsen@surfrider.org

Actually there is something I have been wanting to say to all the naysayers. Even if you don't believe that humans are contributing to climate change; individuals, industry and governments should take action for many reasons. We need to cut use of and dependence on fossil fuels to save money, prevent air and water pollution, reduce wastes, reduce conflicts and save lives (fighting over oil), and more. Some argue that costs are too high or too much land is needed for solar power. However, in Florida for example, there are many large developments with lots of rooftops. If these had photovoltaic panels, they could power not only the subdivisions, but also whole towns. - *Anonymous TCS Member*

One of the reasons that threats from climate change to coastal areas, including stronger and more frequent major storms and sea level rise, are so serious is that federal policy has helped put more Americans in harm's way. Federal flood insurance has subsidized rapid coastal development over the last few decades, and the result is massive losses from hurricanes, increasing costs of beach renourishment, and other costs of mitigation. Although we may be "stuck with" federal flood insurance as an ongoing commitment of sorts, there are new proposals to create federal subsidies for wind damage insurance as well. One rationale is that private insurers, who make their money by assessing risk, are increasingly reluctant to issue wind damage coverage in certain areas, are raising rates when they do issue coverage, and are calling for much stricter and more expensive building codes in wind-prone coastal

areas. Federal subsidies skew the market by masking real costs and penalizing non-consumers of these subsidized services. When climate change raises the risks of coastal wind damages, does it make sense for federal subsidies for coastal construction to put more people and structures at risk? - *Lawrence B. Cahoon*

Coverage of climate change and associated sea level rise needs improvement. Communicating about them is challenging because they are gradual, long-term phenomena, and other risks are more immediate. Legitimate scientific debate is ongoing. People know there is controversy, but the range of predictions and underlying assumptions often are not explained clearly. Communications should accurately portray scientific information, come from trusted sources, be impartial, and outline policy options. Messages should be crafted carefully, tailored, and clear. Following this approach would better inform individuals and communities and hopefully motivate them to consider and pursue ways to mitigate and adapt to future conditions. - *Rebecca L. Feldman*, Master of Environmental Management, 2007; Coastal Environmental Management & Geospatial Analysis; Nicholas School of the Environment and Earth Sciences

Whether the atmosphere cools or warms, the oceans are changing at unprecedented rates. We are faced with a combination of changes underway in our oceans that, for lack of a better phrase represent a "perfect storm." In our oceans, CO₂ is rising and pH is falling; oxygen is declining, sea temperatures are rising; unprecedented amounts of nitrogen are entering our oceans. All of these factors react with each other, exacerbating the direction of change leading to potential collapse of our marine ecosystems, uncertainties about availability of protein from the sea and ultimately to food shortages. These changes are the result of our way of life and require urgent societal change--from stopping CO₂ emissions to rethinking how we grow crops with fertilizers. We have no alternatives. Suggestions such as iron fertilization and other technical fixes represent reckless band-aids. And carbon sequestration make such a small dent in ridding our world of CO₂ and leaves such an unacceptable environmental footprint and impact, not to speak of waste of energy to capture the CO₂ that we are left with only one solution; not to emit these harmful substances.

Also, our oceans are by far the largest sink for CO₂ by magnitudes. Yet the rate of uptake has begun to decline as the capacity of other sinks is becoming saturated, leaving our atmosphere without sinks in the foreseeable

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Forty, Fifty, Sixty: A Fictional Trilogy
about Global Warming
*global warming made more palatable with
a good story*

Forty Signs of Rain, Fifty Degrees Below,
Sixty Days and Counting
By Kim Stanley Robinson

Reviewed by Beverly Jernberg

I'm a rather lazy student and enjoy learning from a good writer with a gift for storytelling who does all the research. When a friend told me about Kim Stanley Robinson's fictional series on global warming, I started to read and found them to be engaging, humorous--and terrifying.

The books are set in the near future (the Bush administration is not named, but almost perfectly described), primarily in Washington D.C. The main characters are scientists working for the National Science Foundation, a federal agency. The actual science fiction aspect is pretty minimal, with the exception of super-accelerated climate change, some fancier cell phones, surveillance equipment--and the concept that a minor government agency can convince indifferent, self-satisfied politicians to do something about global warming!

In Forty Signs of Rain, temperatures have risen 6° F, the coral reefs have died, and a huge, Katrina-like event happens to Washington, DC. Robinson contrasts the world events with wonderful domestic situations. Anna Quibler, one of the directors at NSF, is a warm, appealing working mom. She opens the first book with her workday morning; Robinson's writing is so good that he makes even that dull event an attention grabber. Her husband, Charlie Quibler, is a stay-at-home dad to their two boys and an environmental adviser to a pro-environment senator. His interactions with his 18 month old son are hilarious and heartwarming.

Frank Vanderwal, temporarily at NSF on leave from a University faculty position and an angry ex-girlfriend in California has the most adventures, both internal and external. Trying to remain the cool, cynical, detached scientist, he is completely undone by a monk's remark and a sexy encounter in a stuck elevator. A group of Buddhists from a fictional island in the Indian Ocean that's in imminent danger from rising sea level round out the cast and provide a wonderful counterpoint to the western-thinking scientists.

Robinson, an award winning sci-fi writer with a large

following, has much in common with his characters. He grew up in California, has lived in Switzerland and in Washington D.C. He is married to an environmental chemist, and has been a stay-at-home dad to their two boys while continuing his prolific writing. His PhD is in literature, but he is hugely interested in science and the outdoors.

He cuts our politicians very little slack. At one point, Charlie is called to an emergency meeting with the president's science advisor. Charlie thinks of the guy as a "pompous ex-academic of the worst kind, hauled out of the depths of a second-rate conservative think tank." The president is called "the happy man" with "such a huge amount of low cunning that it amounted to a kind of genius."

In the second book, Fifty Degrees Below, the Gulf Stream stops and it gets very, very cold. Frank finds himself homeless in the aftermath of the storm because his apartment lease has expired and new rentals are impossible to find (flooding during the Katrina-like event having destroyed parts of residential DC), at the same time that he's committed to a second year at NSF. Being an experienced outdoorsman with all the necessary gear, he builds a tree house in a closed section of Rock Creek Park, goes to a gym for his showers & keeps his clothes in his van. This was my favorite part of all three novels for the same reason that the author ascribes to Frank: a childhood experience at Disneyland's Swiss Family Robinson treehouse. When the extreme weather hits, he struggles to cope both on a global level at work and on a personal level, living outdoors in the deep cold.

In Sixty Days and Counting, the third in the series, sea level continues to rise dramatically and a president is finally elected who is devoted to stopping global warming. It's an interesting exercise to see what Robinson's ideal, committed leader does to address the huge environmental problems that have evolved.

Certainly there are flaws, but they are well worth overlooking, as the story is wonderfully told, making global warming a personal, very real prospect. Robinson weaves in the scientific explanations, his world view philosophy, Buddhism, and economics with a light hand, creating a thoroughly enjoyable read.

Bev Jernberg is an avid DC-area paddler and gardener who prefers winters without subzero temperatures.



Climate Change Hits Seabirds in Australia

Birds Australia has released a report that the impact of a recent coral-bleaching event in the southern Great Barrier Reef has propagated up the food web to tropical seabirds. The bleaching event has led to a decrease in food supply that ultimately caused the death of more than 2,000 adult shearwaters and breeding failures at several seabird colonies, with some island colonies experiencing a loss of all chicks. The group argues for dire consequences for northern Australia's seabirds if bleaching events become more common and more widespread as they are predicted to with climate change. This would come as a sharp blow to Australia's seabirds, as most colonies are already in decline from other causes, such as invasive species and habitat loss. Excerpted from APINFO. <http://www.birdsaustralia.com.au/soab/>

Scientists Warn Soft Corals Are Melting

In his recent study, Hudi Benayahu, Tel Aviv University Professor and head of TAU's Porter School of Environmental Studies made the stark discovery that soft corals are disappearing from their watery habitats around the world. Benayahu told Science Daily on Nov. 13, "Environmental stress is damaging the symbiotic relationship between soft corals and the microscopic symbiotic algae living in their tissues." He adds, "There is no doubt that global warming is to blame."

Like their reef-forming relatives, soft corals play an important role in marine ecosystems, by providing protection for numerous fishes and other marine life. In addition, some soft coral species contain important compounds used in pharmaceuticals. During the past two years, Benayahu has observed his study sites around the globe go from 50 to 60 percent soft coral cover to 5 percent, today. Excerpted from APINFO. <http://www.sciencedaily.com/releases/2007/11/071112105938.htm>

Without Its Insulating Ice Cap, Arctic Surface Waters Warm to as Much as 5 Degrees C above Average

Record-breaking amounts of ice-free water have deprived the Arctic of more of its natural "sunscreen" than ever in recent summers. The effect is so pronounced that sea surface temperatures rose to 5 degrees C above average in one place this year, a high never before observed, says the oceanographer who has compiled the first-ever look at average sea surface temperatures for the region. Such superwarming of surface waters can affect how thick ice grows back in the winter, as well as its ability to withstand melting the next summer, according to Michael Steele, an oceanographer with the University of Washing-

ton's Applied Physics Laboratory. Indeed, since September, the end of summer in the Arctic, winter freeze-up in some areas is two months later than usual. The extra ocean warming also might be contributing to some changes on land, such as previously unseen plant growth in the coastal Arctic tundra, if heat coming off the ocean during freeze-up is making its way over land, says Steele. Source: University of Washington, EurekAlert. <http://www.eurekalert.org/>

Urea Fertilization Experiment Alarms Environmental Groups

Environmental groups led by Greenpeace South-East Asia cautioned the Philippine government on Monday, November 12 to stop experimental urea dumping in the Sulu Sea, the body of water between the Philippines and Malaysia. The project by Ocean Nourishment Corp., an Australian biotech company, involves the release of urea granules into the ocean in order to act as a fertilizer to increase plankton growth. Plankton absorbs carbon dioxide from the atmosphere and the company is touting its project as a carbon offset initiative and a way to combat climate change.

However, environmentalists are concerned that increasing plankton levels could suffocate marine life and permanently change ecosystems, which could potentially affect the food supply and livelihoods of thousands of regional fishers. Beau Bacongis, Greenpeace South-East Asia campaigner, told Deutsche Presse-Agentur that ocean nourishment, which is being promoted as a solution to climate change is "really an unnecessary distraction" towards efforts to fight global warming. In October, the company released one ton of urea into the Sulu Sea without permission from the Philippine government and is now under investigation. The company has plans for a larger experiment in which they will release 1,000 tons of urea into the Sulu Sea. Excerpted from APINFO. http://afp.google.com/article/ALeqM5gMp6Gt_xbFLr1G-m8TjrTE_zcGFKQ
http://newsinfo.inquirer.net/breakingnews/nation/view_article.php?article_id=100151
<http://blog.wired.com/wiredscience/2007/11/australian-comp.html>

AMWA Releases Report on Threats to Water Systems from Global Warming

Global warming will raise the risk of water pollution and flood damage to urban water systems, the Association of Metropolitan Water Agencies (AMWA) said in a report yesterday. The association of publicly owned drinking-water

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systems predicts rising temperatures will increase evaporation and rainfall and decrease snow pack. Nationwide, increased precipitation and flooding could overwhelm wastewater treatment facilities, the report says. Citing U.S. EPA research, the report says most treatment plants and overflow-control programs were designed according to historic water flows and do not take into account sea level rise spurred by rising temperatures. "As a result, it is conceivable that water suppliers will face a continually increased influent challenge from sewage overflows, producing high concentrations of Giardia, Cryptosporidium and coliforms," the report says. The report urges planners to consider methods to reduce greenhouse gas emissions, including a re-examination of water transmission and distribution methods to reduce electricity use during peak periods, as well as integrating renewable energy sources like solar or wind-powered pumping. Excerpted from CSO Weekly. http://www.amwa.net/galleries/climate-change/AMWA_Climate_Change_Paper_12.13.07.pdf

Antarctica's Penguins Threatened by Global Warming

Antarctica's penguin population has slumped because of global warming as melting ice has destroyed nesting sites and reduced their sources of food, a WWF report said on Tuesday. The Antarctic peninsula is warming five times faster than the average in the rest of the world, affecting four penguin species; the Emperor penguin, the largest and the grandest in the world, the Gentoo, Chinstrap and Adelie, it said. Source: Reuters, PlanetArk. <http://www.planetark.com/>

Have Shrinking Ice Sheets Reached a Tipping Point?

The world's ice sheets may have reached a "tipping point" beyond which significant melting is irreversible, scientists said at the American Geophysical Union's December meeting in San Francisco. Recent satellite observations have revealed that Arctic sea ice shrunk to its smallest level since scientists began monitoring with satellites in 1979 and that the Greenland ice sheet thawed at a record pace this summer, outpacing the previous high set in 1998 by more than 60 percent. "The amount of ice lost by Greenland over the last year is the equivalent of two times all the ice in the Alps, or a layer of water more than one-half mile (800 meters) deep covering Washington DC," said Konrad Steffen of the University of Colorado at Boulder. At the South Pole, scientists have documented large-scale melting of the West Antarctic ice sheet. NASA climate scientist Jay Zwally states that new data shows that the Arctic Ocean could be nearly ice-free at the end of summer by 2012. Excerpted from CSO Weekly and Reuter's, PlanetArk. <http://www.nytimes.com/apon->

[line/us/AP-Arctic-Melt.html?_r=2&pagewanted=all&oref=slogin&oref=slogin](http://www.planetark.com) <http://www.planetark.com>

Tiny New UN Fund to Combat Droughts, Rising Seas

A new UN fund to help poor nations cope with climate change threats such as droughts or rising seas can start up in 2008 after a draft deal at UN talks in Bali, the United Nations said on Tuesday. The Adaptation Fund now comprises only about \$36 million (U.S.) but could rise to \$1-\$5 billion a year by 2030 if investment in green technology in developing nations surges, according to the highest UN projections. "The fund can become operational...at the beginning of 2008," Yvo de Boer, head of the UN Climate Secretariat, told a news conference of the preliminary deal. Source: Reuters, PlanetArk. <http://www.planetark.com/>

Bali's Fishermen Adapt to Climate Change

As countries from around the world met in Bali to thrash out a new framework on fighting global warming, the local fishing community is adapting to the looming impact of climate change. Many are turning away from fishing to a small but innovative scheme aimed at reviving the tropical island's coral reef, which is threatened by rising temperatures and over-exploitation. The scheme, run by environment group World Wildlife Fund, encourages people to give up damaging fishing practices and turn instead to the more sustainable and lucrative practice of seaweed farming. Source: ABC News, Australia. <http://www.abc.net.au/>

Carbon Emissions Threaten Coral Reefs

NOAA Coral Reef Watch coordinator Mark Eakin and 17 fellow coral scientists from around the globe say corals could begin to completely disappear in 50 to 75 years due to steadily warming temperatures and increasing ocean acidification caused by carbon dioxide emissions. Their findings were published today as the cover story in journal Science. "Our findings are simple. Increasing concentrations of atmospheric carbon dioxide are warming and acidifying the oceans," said Eakin "The impacts will be dramatic. Coral reef ecosystems will begin to disappear within the next 50 to 75 years. Warming and acidification will have devastating impacts on marine biodiversity and human livelihoods, especially in developing nations that depend on reefs for much of their economic well being. Even if atmospheric CO2 stabilized at 550 ppm, not increasing to the 880 ppm projected by 2100, no existing coral reef could survive, the researchers said.

Even emission curbs will not be enough without con-

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certed management of other threats to these ecosystems. Under guidance from the NOAA co-chaired US Coral Reef Task Force, some ecosystem managers at the local level have been devising "local action plans" to cope with coral bleaching impacts.

www.noaanews.noaa.gov/stories2007/20071213_carbon-coral.html

Additional Resources of Possible Interest

Rhode Island's draft climate change and sea level rise regulations will be supplemented and further modified in the coming months, and are the basis for the State's planning and regulatory changes. http://www.crmc.ri.gov/news/pdf/Redbook_145rev_Oct4proposed.pdf

The Institute of Development Studies In-Focus (Issue 2, November 2007) focuses on recent research on climate change adaptation and disaster risk reduction. <http://www.ids.ac.uk/go/publications/ids-series-publications/in-focus>

A report entitled **Regional Impacts of Climate Change: Four Case Studies in the United States** was prepared for the Pew Center on Global Climate Change. http://www.pewclimate.org/regional_impacts

The total economic cost of climate change in the United States will be major and nationwide in scope, but remains uncounted, unplanned for and largely hidden in public debate, says a new study from the University of Maryland. The report, **The U.S. Economic Impacts of Climate Change and the Costs of Inaction**, is the first to pull together and analyze the previous economic research on the subject, along with other relevant data, in order to develop a more complete estimate of costs.

www.cier.umd.edu/climateadaptation/index.html

The Synthesis Report of the Intergovernmental Panel on Climate Change provides an integrated view of climate change as the final part of the IPCC's 4th Assessment Report. All of the IPCC reports are available at: <http://www.ipcc.ch>.

The U.S. Drought Portal was officially launched on November 1, 2007. It was created to provide comprehensive information on emerging and ongoing droughts, and to enhance the nation's drought preparedness. www.drought.gov

For **real time coral reef data** on bleaching and temperatures, see: <http://coralreefwatch.noaa.gov/satellite/>

GLOBAL CLIMATE CHANGE WORD FIND

E	N	E	R	G	Y	A	L	C	E	R	O	N	B	A
X	S	E	A	L	E	V	E	L	R	I	S	E	S	N
T	H	U	R	R	I	C	A	N	E	S	R	L	L	T
I	T	I	D	A	L	E	J	Y	A	I	A	S	E	A
N	S	F	I	P	Q	R	C	O	N	R	W	O	U	R
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N	P	Z	I	A	N	U	T	E	I	A	B	N	R	S
R	O	L	R	O	T	G	I	D	V	B	N	Q	O	H
O	C	G	B	R	V	E	N	E	F	L	K	U	W	E
W	A	R	M	I	N	G	G	R	T	E	J	E	P	E
L	A	C	I	D	I	F	I	C	A	T	I	O	N	T
C	D	F	O	T	W	N	E	P	T	D	L	N	G	T

- ACIDIFICATION
- ANTARCTICSHEET
- BIOFUELS
- CARBONNEUTRAL
- CONSERVE
- CLIMATE
- ENERGY
- EXTINCTIONS
- GREEN
- HURRICANES
- MELTING
- RENEWABLE
- SEALEVELRISE
- SOLAR
- TIDAL
- WARMING
- WIND

Words may be horizontal, vertical (up or down) or diagonal.



continued from page 6

future, for the excess CO₂ we are pouring in every minute. And, this doesn't even address the sea level change problems that will affect our coastal cities and towns, economies and public infrastructures from melting ice and temperature rises.

Pretty gruesome future if we don't change our ways now. We have the opportunity to slow the ocean changes and

give marine life the chance to adapt if we give them more time than is predicted under current conditions. Their resiliency may be strengthened with time. Without holding back time through immediate curbs on emissions, we shall bear the consequences. In that case, we had better start preparing for those eventualities.

- Judy Kildow

University of Hawaii

TCS Hawaii has big plans for 2008! We plan to hold our first chapter meeting of the new year in January, followed by membership drive events in February and March. TCS Hawaii continues to administer the Hawaii Coastal Conservation Committee (HCCC) which has been meeting monthly to discuss coastal issues in Hawaii. HCCC will be lobbying the 2008 Hawaii State Legislature to update current coastal laws. In addition, HCCC plans to organize a coastal-themed conference in the late spring.

University of Rhode Island

This fall, the URI student chapter of TCS sponsored a variety of events. Our fall forum series offered a wide array of topics, from offshore wind energy in Massachusetts to local conservation efforts in Narragansett Bay. We also had several social events, including a welcome picnic at the beginning of our semester and a happy hour meeting at a local restaurant. New this year was our "international feast" for Thanksgiving. We have several international members, and this potluck was a way for students to share recipes and give thanks. We also held monthly beach cleanups at a right-of-way that our chapter adopted in Narragansett, RI.

Our chapter has worked on increasing membership by expanding recruiting efforts to our second campus, the "Bay Campus," as well as promoting forums and social events with undergraduate students. This spring we are planning a career panel of URI alumni, as well as a spring "brown bag" seminar series.

University of Washington

Fall quarter has been a busy one, filled with great TCS activities. We started off the year getting a whole new batch of TCS members, who have helped make this

quarter's events so successful. Our first event of the year was a Blue Drinks, which brought in ocean-minded graduate students, faculty, and alumni from the Departments of Fisheries, Oceanography, Civil Engineering, Education, and Marine Affairs. It was a very eclectic group. Over the quarter we have had four Brown Bag speakers: Catarina Santos (a visiting student from Portugal), Burt Hamner (Puget Sound Tidal Energy), Dr. John Delaney (UW professor and Director of Neptune Project), and Kathy Fletcher (People for Puget Sound). Thank you to all of our great speakers!!

TCSUW members also participated in Green Seattle Day by planting native trees at Seattle's Discovery Park. Finally, TCSUW has been busy planning the 2008 Fisheries and Marine Ecosystems (FAME) Graduate Student Conference, which will be held April 11-13 on the beautiful Olympic Peninsula. Check out our website at <http://depts.washington.edu/fame2008/Home.shtml> for more information and to register. We hope to see you all there!



Olympic Peninsula, Washington

Dave McShaffrey, Marietta College



The Coastal Society

Enhancing your membership benefits through....

- An online subscription to the Coastal Management Journal...
- A members-only accessible website...
- An Easier, faster way to join or renew your membership...

In response to TCS membership input from a 2006 survey regarding improving membership services and benefits, TCS has moved to address your needs for additional access to timely coastal zone management research and discussion.

TCS has partnered with the Coastal Management Journal to deliver an online subscription at a reduced rate for regular members. Student members responded that this journal is easily accessible through university libraries and thus this on-line access is not included in their dues. This online subscription helps TCS reduce its carbon footprint and support our long-standing tradition as an ecologically sound society. A members-only website will provide additional access for all members to web material that is relevant to the TCS membership and weekly emails will continue to deliver up-to-the-moment information on important issues and opportunities in the coastal management.

Membership dues have minimally increased to reflect the addition of the on-line access to the Coastal Management Journal and increased members services. The Society has also created an easier process to join or renew your membership to TCS. The transition to a regular calendar year membership period over the coming year will be aided by pro-rating existing memberships appropriately. In 2008, you will receive a renewal notice at your membership anniversary date.

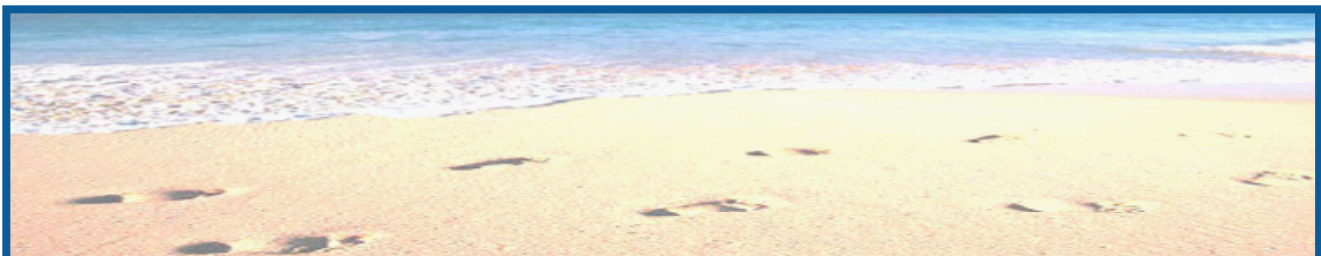
2008 TCS Annual membership dues:

Regular: \$60 (previously \$35)

Student: \$18 (previously \$15)

Library and Corporate/Agency Dues have not changed.

Questions? Email: coastalsoc@aol.com or go to <http://www.thecoastalsociety.org>



Please join us for The Coastal Society's 21st International Conference...

“Coastal Footprints: Minimizing Human Impacts, Maximizing Stewardship”

June 29 - July 2, 2008

Redondo Beach, Los Angeles, CA

For more information, visit:

www.thecoastalsociety.org/conference/tcs21/

**Climate Change: Science and Solutions**

January 16-18, 2008, Washington, DC
 Developing comprehensive strategies for protecting people and the planet against the threat of climate change.
<http://ncesonline.org/2008conference/>

Living with Climate Change: Are There Limits to Adaptation?

February 7-8, 2008, London, UK
<http://www.tyndall.ac.uk/research/programme3/adaptation2008/index.html>

Aquaculture America 2008, Conference and Exposition

February 9-12, 2008, Lake Buena Vista, Florida
<http://www.was.org>

Climate Change and Biodiversity in the Americas

Feb 25-29, 2008, Smithsonian Tropical Research Center, Panama
<http://www.climatechangeandbiodiversity.ca>

Ocean Sciences Meeting (Theme: From the Watershed to the Global Ocean)

March 2-7, 2008, Orlando, Florida
 Co-sponsored by the American Society of Limnology & Oceanography, the American Geophysical Union, The Oceanography Society, and Estuarine Research Fed.
<http://www.aslo.org/meetings/orlando2008/>

GIS and Water Resources IV, American Water Resources Association Spring Specialty Conference

March 17-19, 2008, San Mateo, CA
 GIS has become a necessary component in planning and managing water resources. This conference is the AWRA biennial survey of the state of knowledge in this field.
www.awra.org/meetings/San_Mateo2008/index.html

4th Global Conference on Oceans, Coasts and Islands

April 7-11, 2008, Hanoi, Vietnam
 Organized by the Global Forum on Oceans, Coasts, and Islands and hosted by the government of Vietnam
www.globaloceans.org/

Solutions to Coastal Disasters Conference 2008

April 13-16, 2008, Turtle Bay Resort, Oahu, Hawaii,
 Focus on science, management tools, challenges and options, and policy related to a range of coastal hazards.
<http://content.asce.org/conferences/cd2008/>

Ecological Monitoring and Assessment Network National Science Meeting

Apr 28-May 3, 2008, Gatineau, Quebec
<http://www.eman-rese.ca/eman/events>

15th Annual International Conference on the Great Lakes/St Lawrence River Ecosystem (Theme: Managing Ecosystems, Regulated Rivers & Watersheds)

May 5-8, 2008, Cornwall, ON
<http://www.riverinstitute.com/events/>

Coastal Environment 2008 (Seventh International Conference on Environmental Problems in Coastal Regions including Oil and Chemical Spill Studies)

May 19-21, 2008; The New Forest, UK
<http://www.wessex.ac.uk/conferences/2008/coast08/index.html>

2008 Annual Meeting of the Canadian Association of Geographers (Theme: 400 Years of Discovery)

May 20-24, 2008m Québec City
<http://www.cagquebec2008.org>

Coastal Zone Canada 2008 Conference

May 23-29, 2008, Vancouver, BC
<http://www.czca-azcc.org>

Summer Institute in Advanced Coastal Management

Jun 9-27, 2008, University of Rhode Island, Rhode Island
<http://www.crc.uri.edu/>

Coastal Footprints: Minimizing Human Impacts, Maximizing Stewardship

June 29-July 2, 2008, Redondo Beach, Los Angeles, CA
thecoastalsociety.org/conference/tcs21/index.html

11th International Coral Reef Symposium

July 7-11, 2008, Ft Lauderdale, Florida
<http://www.nova.edu/ncr/11icrs>

Greater Everglades Ecosystem Restoration Conference (GEER '08): Planning, Policy and Science

July 28-August 1, 2008, Naples, FL
 UF/IFAS Office of Conferences and Institutes (OCI)
 PO Box 110750 / Gainesville, FL 32611-0750
 PHONE: 1-352-392-5930 / FAX 1-352-392-9734
 EMAIL: bmt@ufl.edu

4th National Conference on Coastal and Estuarine Habitat Restoration

October 11-15, 2007, Providence, RI
<http://www.estuaries.org/?id=4>

4th International Symposium on Deep Sea Corals

December 1-5, 2008, Wellington, New Zealand
<http://coral2008.niwa.co.nz.index.php>



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(Please print out and complete all blanks.)

Name: _____
Last First Middle Initial

Organization: _____

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City/State/Zip: _____

Home Address (if preferred mailing address):

Day Phone: (____) _____ E-Mail: _____

Present Occupation: _____

Primary Interest: _____

Sponsored/Referred by: _____

Signature: _____ Today's Date: _____

Type of Membership:

Individual Regular: ___ \$60 U.S. 1-year

Student: ___ \$18 U.S.

U.S. Library: ___ \$50 U.S.

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 3590, Williamsburg, VA 23187-3590.

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.