



the 2016
Public Policy Forum

SCIENCE AND SOLUTIONS
FOR A RESILIENT OCEAN

Welcome to the
Consortium for Ocean Leadership's
Public Policy Forum



I would like to welcome you to Ocean Leadership's 2016 Public Policy Forum, *Science and Solutions for a Resilient Ocean*. We have once again organized an exciting meeting to facilitate robust discussions, as well as new opportunities for all of us to work together across academia, government, commercial, and non-profit sectors.

Resilience refers to the capability and capacity of an ocean system or region to recover from disturbance or withstand ongoing pressures. It is a measure of tolerance for disturbance – how a system or region rebounds from short term disturbances or tolerates longer term ones without significant changes caused and controlled by new parameters and processes. The Earth is in an era of change unprecedented in human history. We face continued and increasing disturbances in our oceans, and yet depend upon them for our livelihoods, our lifestyles, our food, our national security, and so much more. The past is no longer an accurate indicator of future trends or cycles, and it is only through sound science that we will be able to monitor, understand, and eventually forecast changing ocean conditions. How specific ocean ecosystems respond to these changes depends on their resiliency as well. Recalling that humans are part of oceanic ecosystems, we must understand and embrace our role in resilience. We all need sustainable prosperity in a dynamic ocean.

I am pleased to welcome you to my inaugural Public Policy Forum as President of Ocean Leadership, and I look forward to working with you on this and other issues where the ocean science community can serve as a critical link connecting science to policy and decision-making – providing information, expertise, and predictive capability to protect and support our nation and our oceanic planet. As in years past, we will post Forum presentations, video, and summary on our website: www.oceanleadership.org. Please be in touch if you have questions or just to introduce yourself. I'm looking forward to working with you all in the future, on resiliency and myriad other ocean science issues.

Sincerely,

A handwritten signature in black ink that reads "Jonathan W. White". The signature is fluid and cursive, with a large initial "J" and "W".

RADM Jonathan White, USN (Ret.)
President and CEO
Consortium for Ocean Leadership

Thanks to our sponsors!



MARCH 9, 2016
RESERVE OFFICERS ASSOCIATION BUILDING
#PPF2016

- 8:15a** **Registration and Breakfast**
- 9:00a** **COL President and CEO Introduction**
Dr. Rob Dunbar, *Chair of Ocean Leadership Board of Trustees*
- 9:10a** **Welcome Remarks**
Jon White, *President and CEO of Ocean Leadership*
- 9:30a** **Ray Toll, Old Dominion University**
- 10:00a** **Panel – Deep Sea**
Dr. Tony Koslow, *Moderator, Scripps Institution of Oceanography*
Dr. Tim Shank, *Woods Hole Oceanographic Institution*
Dr. Lisa Clough, *National Science Foundation*
Dr. Samantha Smith, *DeepGreen Resources*
Jeremy Weirich, *Senate Committee on Appropriations (invited)*
- 11:35a** **Congressman David Jolly (R-FL)**
- 11:45a** **Congressman Mike Honda (D-CA)**
- 12:00p** **Lunch**
- 1:00p** **Panel – Science Solutions for Resiliency**
Dr. Bob Corell, *Moderator, Global Environment Technology Foundation*
Dr. Andrea Dutton, *University of Florida*
Dr. Nancy Rabalais, *Louisiana Universities Marine Consortium*
Dr. David Cash, *University of Massachusetts, Boston*
Scott Rayder, *University Corporation for Atmospheric Research*
- 2:30p** **Senator Dan Sullivan (R-AK)**
- 2:45p** **Senator Ed Markey (D-MA)**
- 3:00p** **Break**
- 3:30p** **Panel – Resilient Fisheries**
Tom Bigford, *Moderator, American Fisheries Society*
Dr. Steve Murawski, *University of South Florida*
Dr. Richard Merrick, *National Oceanic and Atmospheric Administration*
DJ King, *King Lobsters*
Dr. Fern Gibbons, *Senate Commerce Committee*
- 5:00p** **Senator Sheldon Whitehouse (D-RI)**
- 5:30p** **Closing Remarks**
Jon White, *President and CEO of Ocean Leadership*
- 5:45p** **Release to Reception**
Dr. Rob Dunbar, *Chair of Ocean Leadership Board of Trustees*
- 6:00p** **Reception**

FEATURED SPEAKERS

CAPT Ray Toll, USN (Ret), <i>Old Dominion University</i>	5
Congressman David Jolly (R-FL)	6
Congressman Mike Honda (D-CA)	7
Senator Dan Sullivan (R-AK)	8
Senator Ed Markey (D-MA)	9
Senator Sheldon Whitehouse (D-RI)	10

PANEL: CLIMATE AND THE DEEP SEA

Tony Koslow, Ph.D., <i>Scripps Institution of Oceanography</i>	11
Timothy Shank, Ph.D., <i>Woods Hole Oceanographic Institution</i>	12
Lisa Clough, Ph.D., <i>National Science Foundation</i>	13
Samantha Smith, Ph.D., <i>DeepGreen Resources</i>	14
Jeremy Weirich, <i>Senate Committee on Appropriations;</i> <i>Commerce, Justice, Science, and Related Agencies Subcommittee</i>	15

PANEL: SCIENCE SOLUTIONS FOR RESILIENCY

Robert W. Corell, Ph.D., <i>Global Environment Technology Foundation</i>	16
Andrea Dutton, Ph.D., <i>University of Florida</i>	17
Nancy N. Rabalais, Ph.D., <i>Louisiana Universities Marine Consortium</i>	18
David Cash, Ph.D., <i>University of Massachusetts, Boston</i>	19
Scott Rayder, <i>University Corporation for Atmospheric Research</i>	20

PANEL: RESILIENT FISHERIES

Thomas Bigford, <i>American Fisheries Society</i>	21
Steven A. Murawski, Ph.D., <i>University of South Florida</i>	22
Richard Merrick, Ph.D., <i>National Oceanic and Atmospheric Administration</i>	23
DJ King, <i>King Lobsters</i>	24
Fern Gibbons, Ph.D., <i>Senate Commerce Committee;</i> <i>Oceans, Atmosphere, Fisheries, and Coast Guard Subcommittee</i>	25

FEATURED SPEAKERS

CAPT RAY TOLL, USN (RET.)

Old Dominion University



Mr. Ray Toll is the Director for Coastal Resilience Research at Old Dominion University in Norfolk, Virginia where he has been the primary facilitator in developing a government/community approach to regional planning to mitigate and adapt to sea level rise. This pilot project is one of several in the country dealing with climate change and resiliency. He recently served on Governor McAuliffe's Climate

Change and Resiliency Update Commission.

Toll is a retired Navy Captain who worked in Naval Oceanography for 26 years. Following Navy, he worked in the private sector, dealing mainly with Earth Science programs, models and data bases. He is currently the President of the Marine Technology Society and serves on a number of Boards including the Virginia Aquarium and Marine Science Center, the Middle Atlantic Coastal Ocean Observing System, and in October 2012 chaired OCEANS 2012 (www.oceans12mtsieehamptonroads.org). Toll has a Bachelor's of Science in Meteorology from the University of Utah, and a Master's of Science in Meteorology and Oceanography from the Naval Postgraduate School in Monterey, CA.

CONGRESSMAN DAVID JOLLY (R-FL)



David W. Jolly represents Florida's 13th Congressional District which covers most of Pinellas County. He was first elected to the U.S. House of Representatives in March of 2014. Jolly believes the first responsibility of Congress is to work, to govern. He believes Members of Congress should be thoughtful and deliberative in approaching the issues that are most critical to his community and to the nation, and should always

seek to work together on critical issues like veterans' healthcare, job growth, and reducing taxes and eliminating the national debt. To improve the effectiveness of the Congress, Jolly has formally called on Congress to be in session more days and introduced legislation to require that a work week in Washington is actually a full 40-hour work week. Jolly wants Congress to be in session from Monday morning through Friday evenings, the same work week of virtually every other American.

Fighting for local economy, Jolly has moved swiftly to address rising flood insurance rates by introducing legislation to broaden recent relief measures, but wants to see additional relief for businesses and homeowners by insisting on a reinsurance plan that diversifies both risks and costs across all regions of the country and across all natural disaster hazards. Jolly has championed beach renourishment projects that can reduce the costs of storm damage, provide vital pre-storm mitigation and habitat protection, and provide for our local economy that depends very much on hospitality and tourism. And Jolly has been a steadfast advocate on behalf of our recreational and commercial fishing industry, fighting for additional research to assess and ultimately improve fish stocks, addressing the lionfish epidemic, and fighting for increased funding to benefit water quality, oil spill recovery efforts, and the health of the Tampa Bay estuary.

As a member of the House Appropriations Committee, Jolly is able to scrutinize federal programs to eliminate waste, fraud, and abuse, while identifying areas of critical national investment from national security, to early childhood education, to the environment, to transportation and infrastructure.

Jolly received his Bachelor of Arts in History from Emory University and later received his law degree from George Mason University. Jolly and his wife, Laura, live in Indian Shores, Florida.

CONGRESSMAN MIKE HONDA (D-CA)



Mike Honda proudly represents California's 17th Congressional District in the U.S. House of Representatives. His district includes Silicon Valley, the birthplace of innovation and the national leader in high-tech development. Honda has dedicated his life to public service and is lauded for his focus on innovation and developing the jobs for the future, and his work on education, civil rights, immigration,

transportation, and the environment in particular. During his time in Congress as an Appropriator, he has also secured over a half-billion dollars for projects benefiting the region, including the BART expansion to San Jose and funding for a variety of local law enforcement, healthcare, education and public works initiatives.

In 2000, Honda was elected to the U.S. House of Representatives. He serves on the powerful House Appropriations Committee, as well as the Commerce, Justice, and Science subcommittee and the Labor, Health & Human Services, and Education subcommittee. As a Congressman for Silicon Valley, Honda is taking a leading role in bringing Democrats and Republicans together to better understand the issues of high-tech, working to bring more security to the nation's IT infrastructure and encouraging future innovation and growth.

Honda has two grown children. His wife, Jeanne, was a teacher at Baldwin Elementary School in San Jose before her passing in 2004. His son, Mark, is an aerospace engineer and his daughter, Michelle, is a public health educator.

SENATOR DAN SULLIVAN (R-AK)



Dan Sullivan was sworn in as Alaska's eighth United States Senator on January 6, 2015. Sullivan serves on four Senate committees vital to Alaska: the Commerce, Science and Transportation Committee; the Armed Services Committee; the Environment and Public Works Committee; and the Veterans' Affairs Committee.

Prior to his election to the U.S. Senate, Sullivan served as Alaska's Attorney General and Commissioner of the Alaska Department of Natural Resources. As Alaska's Attorney General, Sullivan's number one priority was protecting Alaskans, their physical safety, financial well-being, and individual rights – particularly Alaska's most vulnerable.

As Commissioner of the Alaska Department of Natural Resources, Sullivan managed one of the largest portfolios of oil, gas, minerals, renewable energy, timber, land, and water in the world. Working closely with Alaska's Governor and state legislature, Sullivan developed numerous strategies that spurred responsible resource development, energy security, and a dramatic increase in good-paying jobs across a number of critical sectors in the Alaska economy.

Sullivan has a distinguished record of military and national security service. He is currently an infantry officer and Lieutenant Colonel in the U.S. Marine Corps Reserves. Sullivan served in the Administration of President George W. Bush as the U.S. Assistant Secretary of State for Economic, Energy, and Business under Secretary of State Condoleezza Rice. He focused on fighting terrorist financing, and implementing policies relating to international energy, economic, trade, finance, transportation, telecommunications, and Arctic issues. Sullivan also served as a Director in the International Economics Directorate of the National Security Council staff at the White House.

Sullivan earned a B.A. in Economics from Harvard University in 1987 and a joint law and Masters of Science in Foreign Service from Georgetown University in 1993. Dan and his wife Julie Fate Sullivan were married over 20 years ago in Julie's hometown of Fairbanks, Alaska. They have three teenage daughters: Meghan, Isabella and Laurel.

SENATOR ED MARKEY (D-MA)



Ed Markey is a national leader on energy and the environment. He is a member of the Environment and Public Works Committee, the Commerce, Science and Transportation Committee and the Foreign Relations Committee. These key Committee positions, combined with his more than 38 years of experience make him a powerful influence on national and international energy policy.

Markey has amassed an unparalleled record of legislative achievements. He is the principal House author of the 2007 fuel economy law. That law will increase fuel economy standards to 54.5 miles per gallon by 2025. Because of Ed's law, America won't have to buy nearly 5 million barrels of oil per day from OPEC. That is a huge benefit for our national security and our economy. He is the author of the appliance efficiency act of 1987, which stopped the construction of hundreds of coal fired plants. He is the author of the revolutionary law that requires electricity regulators to open up wholesale electric power market for the first time.

In 2009, Markey partnered with Henry Waxman to write the landmark Waxman-Markey bill. This was the most important energy and climate bill ever to pass the House of Representatives and the only comprehensive climate legislation to ever pass a chamber of Congress. It gave hope to the world that the United States was serious about addressing climate change, and helped President Obama effectively negotiate with the international community. The bill slashed global warming emissions 17 percent by 2020, and 80 percent by 2050. Markey authored the renewable electricity standard in the bill that said by 2020, 20 percent of America's electricity should come from renewable sources.

Markey knows how to unleash a revolution. He was the author of the three major telecommunications bills in the 1990s that energy expert Daniel Yergin says in his bestseller *The Quest* "helped make the digital revolution possible by promoting competition in the cable and phone industries."

SENATOR SHELDON WHITEHOUSE (D-RI)



Sheldon Whitehouse, a member of the Senate Environment and Public Works Committee (EPW), plays a key role in crafting policies addressing environmental protection and climate change. In 2011, he joined with Democrats and Republicans to form the Senate Oceans Caucus to increase awareness of and find common ground on issues facing the oceans and coasts. The Caucus helped

gain Senate approval of four international fisheries treaties and passage of the IUU Fishing Enforcement Act that will prevent illegal, unreported, and unregulated fishing. Whitehouse has worked to boost federal support for fisheries science and cooperative fisheries research as well as efforts to improve transparency and efficiency in the commercial and recreational fisheries management process.

Senator Whitehouse has long advocated for a dedicated fund to support ocean and coastal research, restoration, and conservation. In 2015, the National Oceans and Coastal Security Fund was created to provide grants that support work for the oceans, coasts, and Great Lakes. He has also led efforts to fund and reauthorize the Environmental Protection Agency's National Estuaries Program to protect and study coastal habitats.

A graduate of Yale University and the University of Virginia School of Law, Whitehouse served as United States Attorney and Attorney General of Rhode Island before being elected to the Senate in 2006. In addition to EPW, he is a member of the Budget Committee; the Judiciary Committee; the Health, Education, Labor, and Pensions Committee; and the Special Committee on Aging.

He and his wife Sandra, a marine biologist and environmental advocate, live in Newport, Rhode Island. They have two children.

PANEL: CLIMATE AND THE DEEP SEA

MODERATOR

TONY KOSLOW, PH.D.

Scripps Institution of Oceanography



Dr. Tony Koslow is a Research Oceanographer (emeritus) at the Scripps Institution of Oceanography, University of California, San Diego. He received his Ph.D. in Biological Oceanography from Scripps in 1980 and returned there in 2007 as Director of the Scripps California Cooperative Oceanic Fisheries Investigations (CalCOFI) program, the world's foremost multidisciplinary ocean observation program,

a partnership between Scripps, NOAA, and California Department of Fish and Wildlife. Koslow stepped down from that position in 2013 to focus on his research on climate impacts on marine ecosystems and to work for an improved national and global network of ecological time series for the oceans.

Koslow's first undergraduate degree is in philosophy and literature from Harvard. Following two seasons fishing salmon in Bristol Bay, Alaska, he returned to university and obtained a degree in zoology from the University of Washington. His first position following his Ph.D. was as Assistant Professor of Fisheries Oceanography at Dalhousie University, Halifax, Canada. In 1989, he moved to Hobart, Australia to lead the deepwater fisheries and ecology group at the CSIRO, Australia's premier research organization. In this position he carried out the first acoustic and egg production surveys for deepwater fisheries, focusing on the orange roughy and blue grenadier. His group was also the first to examine the impacts of deepwater trawling on seamount cold-water coral habitats. In 2002, he moved to CSIRO's Perth laboratory to set up a pelagic ecology ocean observing program on Australia's west coast. Koslow has published more than 75 peer-reviewed scientific papers. In 2007, he published the award-winning *The Silent Deep: The Discovery, Ecology, and Conservation of the Deep Sea*.

TIMOTHY SHANK, PH.D.

Woods Hole Oceanographic Institution



Dr. Tim Shank was a 12-year-old shortstop in North Carolina in 1977 when scientists using the submersible Alvin made a startling discovery near the Galápagos Islands: Lush communities of animals were thriving on the sunless, volcano-strewn seafloor. Two years later, Shank still wasn't paying much attention to the news when scientists returned to the Galápagos Rift, looked out Alvin's tiny view ports, and

saw a garden of slender white tubes with blood-red, feathery tips. They had found tubeworms, mussels, clams, and other exotic creatures thriving on the chemicals venting from the ocean bottom.

"It wasn't until college that the animals and the geology of hydrothermal vents really caught my eye," said Shank. As he pursued degrees in marine biology, first at the University of North Carolina, then at Rutgers University, he began learning about the famous Rose Garden, where scientists first learned of the amazing vent animals that have adapted to life in the most alien of earthly environments.

Three decades later, Shank is now an assistant scientist in the Biology Department of the Woods Hole Oceanographic Institution, which he joined in 1999. He now specializes in the ecology and evolutionary genetics of those amazing creatures on the seafloor.

LISA CLOUGH, PH.D.

National Science Foundation



Dr. Lisa Clough is the Head for the Ocean Section at the National Science Foundation, comprised of the Biological and Physical Oceanography teams. Clough also served as the Program Director for the National Science Foundation's Antarctic Integrated System Science for four years.

A coastal oceanographer by training, Lisa spent ~20 years at East Carolina University, in North Carolina, achieving the rank of full professor of Biology, and serving as the Associate Vice Chancellor for Research for two years. Her outreach activities include serving as chair of the UNOLS Arctic Icebreaker Coordinating Committee, trustee for SURA (Southeastern Universities Research Association) and member of the Board for NCABR (North Carolina Association for Biomedical Research), and PTRF (the Pamlico-Tar River Foundation).

She is a recipient of both the Arctic and Antarctic Service Medals, and the Distinguished Public Service Award from the U.S. Coast Guard. Her Ph.D. is in Coastal Oceanography, received from the Marine Sciences Research Center at Stony Brook University in 1993. Clough did her undergraduate degree at Wesleyan University, majoring in Biology and Earth and Environmental Sciences.

SAMANTHA SMITH, PH.D.

DeepGreen Resources



Dr. Samantha Smith is the Director of the environmental and social performance consultancy Blue Globe Solutions. A key client is DeepGreen Resources, a company focused on providing the world with 'clean metal' from seafloor-based mineral deposits.

Prior to this, from 2006 to 2014, Smith headed Nautilus Minerals' environmental and community programs where she was responsible for managing impact assessments and permitting of Nautilus' operations. This work included managing the associated studies for seafloor mineral extraction. Following rigorous internal and independent external reviews, Smith's environmental impact assessment work resulted in Nautilus being granted an Environment Permit for the development of their Solwara 1 seafloor mineral development project from Papua New Guinea's Department of Environment and Conservation.

Prior to working with the seafloor minerals industry, Smith lectured at the University of Bristol and the University of Toronto and worked as a consultant to Placer Dome Gold. She has over 19 years experience in conducting environmental assessments with experience in Canada, Mexico, Papua New Guinea, UK and other jurisdictions. Smith is recognized as a world leader in deep-sea environmental management and practices and is a co-author of several peer-reviewed journal articles related to environmental management of seafloor resources. Smith was a steering committee member of the European Union / Secretariat of the Pacific Community Deep Sea Minerals Assessment Project and is the President of the International Marine Minerals Society, the peak body for seafloor minerals, which also runs the Underwater Mining Conference now in its 45th year.

Smith holds a BSc (Hons) from McMaster University in Canada, and a Ph.D. from England's University of Bristol.

JEREMY WEIRICH

Senate Committee on Appropriations; Commerce, Justice, Science, and Related Agencies Subcommittee



Mr. Jeremy Weirich serves as the majority Clerk for the Commerce, Justice, Science, and Related Agencies Subcommittee on the U.S. Senate's Committee on Appropriations under the leadership of Senator Richard Shelby (R-AL) and Senator Thad Cochran (R-MS). Jeremy has been with the subcommittee since 2008, previously working as the majority clerk for Senator Barbara Mikulski (D-MD),

and has directly managed many accounts including NASA, NOAA, NIST, NSF, the FBI, as well as various justice, trade, and economic agencies.

Before joining the U.S. Senate, Weirich served in the NOAA Commissioned Officer Corps, honorably discharged at the rank of lieutenant commander. He split his commissioned career between serving as a deck officer aboard ocean-going research and hydrographic vessels and working in policy positions for federal research and exploration programs.

Weirich graduated from Maine Maritime Academy with a B.S. in Ocean Studies, and received a M.S. in maritime archaeology from the University of Southampton, United Kingdom.

PANEL: SCIENCE SOLUTIONS FOR RESILIENCY

MODERATOR

ROBERT W. CORELL, PH.D.

Global Environment Technology Foundation



Dr. Robert Corell is actively engaged in research concerned with the sciences of climate and global change and the interface between science and public policy, particularly research activities that are focused on global and regional climate change, related environmental issues, and the science to facilitate taking knowledge and scientific understanding to evidence-based planning and hence to adaptation

and sustainable development. He is a recognized expert regarding climate and other global-scale changes. For many years, he served as chairman of the multiple federal climate and global change research program and has and continues to serve as a senior climate and global change advisor to the White House for both Republican and Democratic administrations starting with President Ronald Reagan. For example, he was responsible for well over a decade to the White House's Office of Science and Technology Policy for the multi-agency U.S. Climate and Global Research Program, as well as the Assistant Director of the National Science Foundation (NSF) responsible for all research and education programs in the sciences of the ocean, the atmosphere and meteorology sciences, geology and the earth sciences as well as the nation's research programs in the two polar regions.

He was recognized with the other scientists for the 2007 Nobel Peace Prize awarded to the Intergovernmental Panel on Climate Change (IPCC). Corell also served as Senior Research Fellow at Harvard University's Kennedy School of Government. Currently, he is a Principal at the Global Environment Technology Foundation and leads its Center for Energy and Climate Solutions, is a Senior Fellow at the Consortium for Ocean Leadership, as well as holding Professorial appointments in the U.S. and Norway.

ANDREA DUTTON, PH.D.

University of Florida



Dr. Andrea Dutton is a carbonate geochemist who studies Earth's past climate and sea level changes. Her main research focus is to establish the behavior of sea level and polar ice sheets during past warm periods to better inform us about future sea-level rise. Dutton is co-leader of PALSEA2, an international working group that focuses on using past sea-level changes to provide constraints on sea-level

projections. She was first author on a recent paper published in *Science* that concluded that sea-level has repeatedly risen by at least 6 meters (~20 feet) during past warm periods when global mean temperature was only 1-2 °C warmer than preindustrial.

Dutton is active in communicating her research to the public and has been extensively quoted in the media, including *The New York Times*, *The Washington Post*, *The Guardian*, and *The New York Times Magazine*. Her research has been featured in a news article in *Science* magazine and in an OpEd in the *Sunday Review* of *The New York Times*. She serves on multiple editorial boards, steering committees, and working groups related to past climate and sea level change. Dutton is currently an Assistant Professor at the University of Florida in the Department of Geological Sciences and Fellow of the Florida Climate Institute.

She has degrees from Amherst College (B.A.), University of Michigan (M.S., Ph.D.), and spent seven years at The Australian National University as a Postdoctoral Fellow and a Research Fellow.

NANCY N. RABALAIS, PH.D.

Louisiana Universities Marine Consortium



Dr. Nancy Rabalais is the Executive Director and a Professor at the Louisiana Universities Marine Consortium. Her research interests include the dynamics of hypoxic environments, interactions of large rivers with the coastal ocean, estuarine and coastal eutrophication, benthic ecology, fate and effects of contaminants, and science policy. She is an author of 3 books, 33 book chapters, and over 100 peer-reviewed publications. She earned her Ph.D. in Zoology from The University of Texas at Austin in 1983.

She is active in state and national working groups, panels, and advisory boards. She currently serves on the Louisiana Environmental Education Commission, representing the Louisiana Board of Regents, University-National Oceanographic Laboratories Fleet Improvement Committee, member nomination committee for the Consortium on Ocean Leadership, Board of Directors of the Gulf of Mexico Coastal Ocean Observing System, National Sea Grant Program Advisory Board, NOAA Fleet Improvement Review Committee, and Executive Committee of the National Association of Marine Laboratories. She has served on eight National Research Committees for the National Academies and is a past member and chair of the Ocean Studies Board.

Rabalais is an American Association for the Advancement of Science Fellow, an American Geophysical Union Fellow, an Aldo Leopold Leadership Program Fellow, and a National Associate of the National Academies of Science. She was awarded the Clarke Prize of the National Water Resources Institute, the Ruth Patrick Award of the American Society of Limnology and Oceanography, the B. K. Ketchum award from Woods Hole Oceanographic Institution, the Blasker Award for Environmental Science and Engineering, shared with R. E. Turner, a Rachel Carson Lectureship for the American Geophysical Union, the Benchley award, the Heinz award, and in 2012 was named a MacArthur Fellow.

DAVID CASH, PH.D.

University of Massachusetts, Boston



Dr. David Cash became dean of the John W. McCormack Graduate School of Policy and Global Studies at the University of Massachusetts Boston in July 2015. Prior to this, Cash spent ten years in Massachusetts state government as Assistant Secretary for Policy in the Executive Office of Energy and Environmental Affairs, Commissioner of the Department of Public Utilities, and Commissioner of

the Department of Environmental Protection. In these roles, Cash helped drive nation leading ocean management policy, fisheries management, and climate mitigation and adaptation policy. He also worked on a range of other environmental issues including transportation, water management, waste, environmental justice and forest conservation.

He has published numerous academic articles and book chapters on the intersection of science and policy, and reports, memos and white papers to help drive policy change.

SCOTT RAYDER

University Corporation for Atmospheric Research



Mr. Scott Rayder, an expert on building new opportunities and funding for scientific organizations, is the senior advisor for development and partnerships at the University Corporation for Atmospheric Research (UCAR). He has extensive experience in building relationships and opportunities with the private and public sector, including longstanding relationships with federal funders, such as the U.S.

Department of Energy, National Science Foundation, National Oceanic and Atmospheric Administration (NOAA), U.S. Geological Survey, and National Institute of Standards and Technology.

Before coming to UCAR, he was director of business development for civil sector programs at ITT Exelis. There Rayder worked with officials in the federal executive branch as well as Congress, focusing on Exelis programs supporting weather forecasting, climate monitoring, and environmental analysis.

Rayder was the first chief of staff of NOAA, from 2001 to 2008. He worked with NOAA's partner organizations and played a key role in communicating NOAA priorities to the Department of Commerce, White House Office of Management and Budget, and Congress.

Rayder served as lead on the Hurricane Forecast Improvement Program at NOAA and was instrumental in introducing new technologies and unique observational platforms, such as unmanned aerial vehicles (UAVs) and the Integrated Ocean Observing System, to support research and operations related to climate, oceans, and high-impact weather. His work there also supported the needs of operational and research organizations for critical assets and infrastructure.

Rayder earned a master's degree in public administration (with a concentration in science and technology policy) in 1992 from the Maxwell School of Citizenship and Public Affairs at Syracuse University. His undergraduate degree in government and geology is from Hamilton College, New York.

PANEL: RESILIENT FISHERIES

MODERATOR

THOMAS BIGFORD

American Fisheries Society



Mr. Tom Bigford is Policy Director at the American Fisheries Society (AFS) in Bethesda, Maryland. His primary role is to use the best scientific knowledge to inform management and related policies affecting freshwater and marine fish. Prior to joining AFS in early 2014, he worked with the NOAA/National Marine Fisheries Service (1984-2014), spending the entire time working on habitat conservation in

regional and headquarters offices. He also worked in NOAA headquarters (1980-1984), consulted with the Center for Natural Areas (1977-1980), and did marine research at the EPA laboratory in Narragansett, Rhode Island (1974-1977).

Bigford is also very involved with several non-profit groups. He's been a member of The Coastal Society since 1976, was elected to its board as Secretary and Director (twice), served as their first Executive Director, edited their quarterly Bulletin for 17 years, and now serves as immediate Past-President. Tom is also active with the Land Conservancy of Western Michigan and the Pere Marquette Watershed Council (both near where he grew up), the Friends of Sligo Creek (near where he lives), and the Coastal and Estuarine Research Federation.

Bigford has a B.S. (1974) from Michigan State University in Fisheries Biology, a M.S. (1976) from the University of Rhode Island in Zoology/Marine Ecology, and a M.M.A. (1977) from the University of Rhode Island in Marine Affairs.

STEVEN A. MURAWSKI, PH.D.

University of South Florida



Dr. Steven Murawski is Professor and the St. Petersburg Partnership – Peter Betzer Endowed Chair of Biological Oceanography at the University of South Florida, College of Marine Science in St. Petersburg, Florida.

Murawski is a fishery biologist with 40 years of professional experience. He worked at NOAA for 35 years before coming to the University, where he retired as the Director of Scientific Programs and Chief Science Advisor for the National Marine Fisheries Service. Since coming to the Gulf of Mexico region he has been actively involved in assessing the environmental impacts of the Deepwater Horizon oil spill, and its implications for fisheries in the Gulf of Mexico. Murawski serves as Principal Investigator for the Center for Integrated Modeling and Analysis of Gulf Ecosystems (C-IMAGE) funded through the Gulf of Mexico Research Initiative. In addition to research on oil spill impacts, he and his graduate students have an active program to assess the status of fishery stocks and map their habitats in the Gulf of Mexico, with particular emphasis on reef fish stocks. This includes a program to develop new technologies focusing on the use of towed video camera systems.

Murawski continues to be involved in international fisheries and marine science activities, recently serving a term as vice-president and current USA delegate to the International Council for the Exploration of the Seas (ICES). Additionally, he is a member of the National Academy of Science's Ocean Studies Board. He is an elected Fellow of the American Association for the Advancement of Science. He is the recipient of the Senior Executive Service Meritorious Service Award, conferred by President Obama, and the Department of Commerce Gold Medal, among other professional awards.

His Ph.D. in Wildlife and Fisheries Biology was conferred in 1984 from the University of Massachusetts-Amherst.

RICHARD MERRICK, PH.D.

National Oceanic and Atmospheric Administration



Dr. Richard Merrick began serving as Director, Scientific Programs and Chief Science Advisor in September 2011. In this capacity, he leads NOAA Fisheries' efforts to provide the science needed to support sustainable fisheries and ecosystems and to continue our country's progress in ending overfishing, rebuilding fish populations, saving critical species, and preserving vital habitats. As the head of NOAA

Fisheries' scientific operations, Merrick directs NOAA's six regional Fisheries Science Centers, including 30 NOAA Fisheries laboratories.

He joined NOAA Fisheries in 1985 as an oceanographer at the Alaska Fisheries Science Center conducting ecological field research from then through 1997 in the Aleutian Islands, Bering Sea and Arctic. In 1997, he transferred to the Northeast Fisheries Science Center (in Woods Hole, MA) where he initially served as Branch Chief for Protected Species, and then as Chief of the Resource Evaluation and Assessment Division where he directed this Center's assessment, ecological, and social-science research for fish and protected species. He has led various regional and national efforts to improve fishery and protected resources science, and has broad experience in dealing with a wide variety of controversial fishery and protected species. Presently, he is Co-Chair of the Subcommittee on Ocean Science and Technology, Co-Chair of the Joint Implementation Working Group of the National Fish, Wildlife and Plant Climate Adaptation Strategy, and the Advisory Committee on Climate Change and Natural Resource Science.

Merrick's education includes a Ph.D. in fisheries from the University of Washington; a master's of science degree in biological oceanography as well as a master's degree in marine resource management from Oregon State University.

DJ KING

King Lobsters



Mr. Donald J. King (DJ) is a life-long resident of Branford, Connecticut. A lobster fisherman and oyster farmer, King is the Captain of the *Kory Alexander* commercial fishing vessel and owns King Lobsters. King has spent 15 years as a licensed Captain (100 Ton), 45 years as a commercial lobstermen, 20 years as a commercial shell fisherman, 7 years as commercial shellfish farmer, and 4 years commercial

seaweed grower. He serves as the President of the Connecticut Commercial Lobstermen's Association, serves on the Executive Board of the Connecticut Seafood Council, and is a consultant to UCONN's Sea Grant Program.

King is also an avid athlete (football, basketball, and track), and has served for the past 16 years as a volunteer coach and team sponsor with the Branford Youth Soccer Program, Branford Little League Program, Branford Rec and Travel basketball program, and coaches the Branford High School basketball and baseball teams.

King received his Bachelor's in Economics and his Master's in Geography from Clark University. With his wife of 25 years, Sue, the Kings are raising three children.

FERN GIBBONS, PH.D.

Senate Commerce Committee; Oceans, Atmosphere, Fisheries, and Coast Guard Subcommittee



Dr. Fern Gibbons joined Senator Thune's staff for the U.S. Senate Commerce Committee in 2014. She is Professional Staff for the Oceans, Atmosphere, Fisheries, and Coast Guard Subcommittee and was recently appointed as the Senator's Policy Director for Surface Transportation and Merchant Marine Infrastructure, Safety and Security.

Prior to joining the Commerce Committee, Gibbons worked for the Nature Conservancy, where she advocated for science-based environmental policy in the federal government.

Gibbons was a 2012 Sea Grant Legislative Fellow for the Commerce Committee.

She received her Ph.D. from the MIT/Woods Hole Oceanographic Institution Joint Program in Oceanography. Her thesis focused on climate variability on long time scales. Her B.S. is from the University of Chicago where she studied the Geophysical Sciences and Biology.

MEMBERS OF THE CONSORTIUM FOR OCEAN LEADERSHIP

Ocean Leadership is a Washington, DC-based nonprofit organization that represents the leading public and private ocean research institutes, aquaria, and industry with the mission to advance research, education, and sound ocean policy. The organization also manages, coordinates, and facilitates ocean research and education programs in areas of scientific ocean drilling, ocean observing, ocean exploration, and ocean partnerships.

Alabama

Dauphin Island Sea Lab

Alaska

Alaska Ocean Observing System
Arctic Research Consortium
of the United States (ARCUS)
North Pacific Research Board
University of Alaska Fairbanks

California

Aquarium of the Pacific
Bodega Marine Laboratory
Esri
Hubbs SeaWorld Research Institute
L-3 MariPro, Inc.
Liquid Robotics, Inc.
Monterey Bay Aquarium Research
Institute (MBARI)
Moss Landing Marine Laboratories
(MLML)
Romberg Tiburon Research Laboratory
Stanford University
Teledyne RD Instruments
U.S. Naval Postgraduate School (NPS)
University of California, San Diego
(Scripps)
University of California, Santa Barbara
University of California, Santa Cruz
University of Southern California

Colorado

Cooperative Institute for Research in
Environmental Sciences (CIRES)

Connecticut

University of Connecticut

Delaware

MARACOOS
University of Delaware

Florida

Earth2Ocean
Florida Institute of Oceanography (FIO)
FAU Harbor Branch Oceanographic
Institute
Mote Marine Laboratory
Nova Southeastern University
University of Florida
University of Miami
University of South Florida

Georgia

Savannah State University
Skidaway Institute of Oceanography of
the University of Georgia

Hawaii

University of Hawaii

Illinois

John G. Shedd Aquarium

Louisiana

Louisiana State University
Louisiana Universities Marine
Consortium (LUMCON)

Maine

Bigelow Laboratory for Ocean Sciences
IOOS Association
University of Maine

Maryland

Johns Hopkins University Applied
Physics Lab
National Aquarium
University of Maryland Center for
Environmental Science

Massachusetts

Massachusetts Institute of Technology
University of Massachusetts, Dartmouth
University of Massachusetts, Lowell
Woods Hole Oceanographic Institution

Michigan

University of Michigan

Mississippi

University of Mississippi
University of Southern Mississippi

New Hampshire

University of New Hampshire

New Jersey

Monmouth University Urban Coast
Institute (UCI)
Rutgers University

New York

Columbia University (LDEO)
Stony Brook University

North Carolina

Duke University
East Carolina University
North Carolina State University
University of North Carolina at Chapel
Hill
University of North Carolina at
Wilmington

Oregon

Oregon State University

Pennsylvania

Pennsylvania State University

Rhode Island

University of Rhode Island

South Carolina

South Carolina Sea Grant Consortium
University of South Carolina

Texas

Fugro
Harte Research Institute
Sonardyne, Inc.
Texas A&M University
University of Texas at Austin

Virginia

CARIS, USA
CNA
College of William & Mary (VIMS)
Institute for Global Environmental
Strategies (IGES)
Old Dominion University
U.S. Arctic Research Commission

Washington

Sea-Bird Scientific
University of Washington

Washington, DC

Marine Technology Society (MTS)
National Ocean Industries Association
(NOIA)
Southeastern Universities Research
Association (SURA)

Wisconsin

University of Wisconsin, Milwaukee
School of Freshwater Sciences

Australia

Institute for Marine and Antarctic Studies
(IMAS)

Bermuda

Bermuda Institute of Ocean Sciences

Canada

Dalhousie University
University of Victoria



1201 New York Avenue, NW, 4th Floor, Washington, DC 20005

P. 202.232.3900 • F. 202.332.8887

www.OceanLeadership.org

#PPF2016