UNITED STATES COAST GUARD
AND
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

COOPERATIVE MARITIME STRATEGY

February 2013 Washington, D.C.

NOAA
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Contents

Introduction 3

Executive Summary 5

Legacy of Collaboration 7

Today's Realities 11

Our Vision and Strategy for the Future 17

Promote a Safe, and Sustainable Marine Environment 19

Enhance Regional Collaboration 25

Foster Innovation in Science,Technology and Youth Education 31

Ensure Long-Term Success 35

Conclusion 39

End Notes 41

On the Cover: *Coast Guard Fireman De'Jon Williams and Jeff Gearhart, a research biologist with the National Oceanic and Atmospheric Association, prepare to release endangered sea turtles into warmer offshore water after approximately 1,500 turtles became displaced due to extreme cold weather throughout Florida.*

U.S. Coast Guard photo by Petty Officer 3rd Class Jaclyn Young

Introduction

Washington, D.C.
25 February 2013

We are pleased to promulgate our Nation's first-ever Cooperative Maritime Strategy between the United States Coast Guard and the National Oceanic and Atmospheric Administration. For over 200 years, our Services have stood in partnership on maritime resilience, environmental sustainability, and scientific research. Indeed, America is a maritime nation, and the oceans, coasts, rivers and Great Lakes are the lifeblood of our economy. The maritime commons promote economic growth, advance technology, and challenge the human spirit. Our Services share a legacy and are committed to a future that honors our responsibilities as stewards of the oceans.

The Father of the Revenue Marine, Secretary Alexander Hamilton once said, "There is a certain enthusiasm in liberty, that makes human nature rise above itself, in acts of bravery and heroism." Not only is our shared legacy marked in a vision for maritime excellence, but also in front-line acts of courage and inspiration. From rescuing survivors in unforgiving regions like the Arctic since the mid-1800s, to flying through hurricanes today to collect data, our men and women have served America with distinction for over two centuries.

This strategy builds on our legacy and establishes an integrated and coherent course for the future. Moving forward, we will continue partnering to promote a safe and sustainable marine environment, enhance collaboration in the Arctic and Gulf Coast regions, and foster innovation in science and technology. Perhaps most strategic, our Services will build on existing programs to inspire our Nation's youth academically in the areas of science, technology, mathematics, and marine environmental protection. We will implement this strategy pragmatically and mindful of the fiscal challenges we currently face. It provides a solid vision and is the North Star for our future.

Robert J. Papp, Jr.
Admiral, U.S. Coast Guard
Commandant of the Coast Guard

Dr. Jane Lubchenco
Under Secretary of Commerce for Oceans and Atmosphere, and NOAA Administrator

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Executive Summary

The United States depends upon the oceans, coasts, rivers and Great Lakes for economic prosperity, recreation, and advances in technology. The maritime commons foster globalization while serving as a gateway for diplomacy, trade, and scientific research. The United States Coast Guard and National Oceanic and Atmospheric Administration (NOAA) are America's front-line services for maritime commerce, science, safety, security, and environmental resilience. As stewards of the oceans, the Coast Guard and NOAA are committed to safeguarding maritime interests while preparing for the future in a coordinated and efficient manner.

The marine environment has evolved in dramatic ways since America's founding. World population growth, intensified globalization, changing patterns of world trade, advances in technology, and a growing competition for scarce resources require our Nation to remain vigilant, proactive, and adaptive in the protection of maritime interests, and adaptive to stay ahead. Increasingly, states have joined the search for energy and other resources into deeper and more challenging ocean waters. Their efforts require ever-more sophisticated domestic and international regimes that balance the needs and rights of individual states with the maritime commons as a whole.

With these trends as a backdrop, this strategy charts priorities for the future of the Coast Guard-NOAA partnership. As demand for government services rises in tandem with economic growth, so too will a need for innovation and governance, especially among Federal agencies with a common maritime heritage. Moreover, changing environmental and economic conditions compound challenges of ocean stewardship and sustainability. These trends will test our ability to meet responsibilities both independently and as partners. We must move forward in a cooperative manner. Implemented properly, strategic partnerships foster unity of effort, goal congruence, harmonization, and economies of scale over the long-term.

This strategy outlines joint objectives in the maritime domain over the next 10 years. It is consistent with the President's National Ocean Policy, and considers the long legacy of cooperation between the Coast Guard and NOAA as a foundation for the future. Structurally, it outlines three strategic priorities to guide the formal partnership:

1. **Promote a safe, and sustainable marine environment;**
2. **Enhance regional collaboration; and**
3. **Foster innovation in science, technology, and youth education.**

Beyond these three strategic priorities, there are numerous additional factors that will help to ensure long-term success. They include: implementation of the National Ocean Policy, joining the Convention on the Law of the Sea, establishing effective partnerships, leveraging administrative and training efficiencies, and planning for adaptation to the effects of climate change. This strategy will ensure safe, secure, and environmentally responsible activity by investing in the future collaboratively, and with long-term success in mind.

A Legacy of Collaboration

The Coast Guard and NOAA share a strong bond premised upon safety, security, stewardship, and study of the oceans, coasts, rivers, and Great Lakes. Our goals and maritime missions are exemplified through a long legacy of protecting U.S. interests. The modern era of collaboration, from the establishment of NOAA in 1970, highlights strong and symbiotic ties. These include the recent responses to the BP *Deepwater Horizon* oil spill and Hurricane Sandy. However, modern cooperation and common ties are anchored deeper in a 200-year legacy of collaboration.

Ancestry

The predecessor to today's Coast Guard was created on August 4, 1790, when the 1st Congress of the United States empowered President George Washington to "cause to be built and equipped, so many boats or cutters, not exceeding ten, as may be necessary to be employed for the protection of the revenue." Without an established name for the cutters or their mission, they became known as the Revenue Marine and officially named the Revenue Cutter Service in 1863. The modern-day Coast Guard was formed in 1915 when the Revenue Cutter Service and the U.S. Life Saving Service merged. The U.S. Lighthouse Service, and the Bureau of Navigation and Steamboat Inspection Service, were later annexed into the Coast Guard in 1939 and 1942.

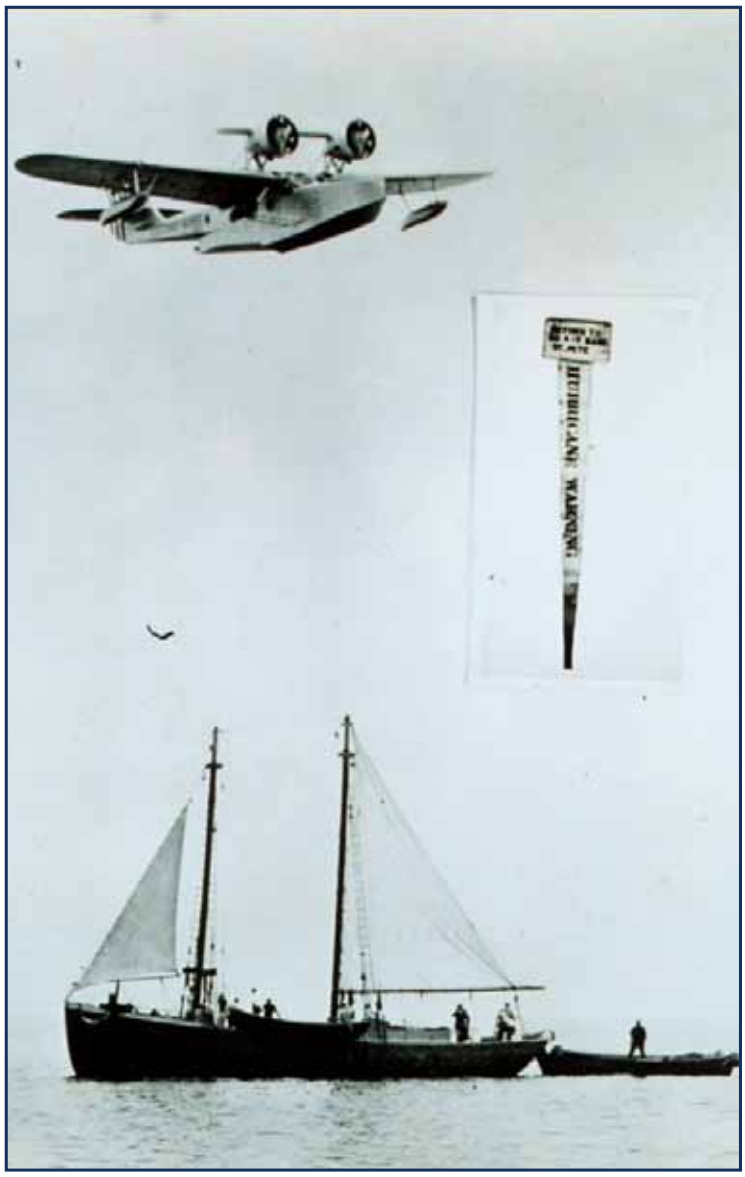
The primary task of the Revenue Marine was to suppress smuggling and ensure tariffs were paid on goods imported in to the United States. On June 4, 1791 Secretary of Treasury Alexander Hamilton gave detailed letters of instruction to the Commanding Officers of the Revenue Marine. He recognized the value of the cutters in gaining knowledge about the coastal waters of the new United States. In these letters he directed each Commanding Officer to:

> *"…be rendered an instrument of useful information, concerning the coast, inlets, bays and rivers of the United States, and it will be particularly acceptable if the officers improve the opportunities they have…in the interests of navigation, reporting the result, from time to time to the Treasury."*

The Revenue Marine marked obstructions, sounded channels, and surveyed coastal topography to aid navigation from 1790 into the late 19th century. These activities advanced interests of commerce and revenue generation. Congress later passed a resolution to conduct a survey of the entire U.S. coast and produce accurate nautical

charts. NOAA's oldest recognized ancestor agency was created on February 10, 1807[1], when President Thomas Jefferson approved the Congressional resolution to survey the coast.

The Survey of the Coast was created to promote "lives of our seamen, the interest of our merchants and the benefits to revenue."[2] The Survey of the Coast applied scientific rigor and new technologies to the task of producing accurate charts, marking a radical advance in navigation safety, and making the Survey of the Coast the Nation's first scientific agency. After a slow start, caused by difficulties in obtaining scientific instruments and the War of 1812, the Survey of the Coast grew to become the U.S. Coast Survey and eventually the U.S. Coast and Geodetic Survey by 1878. The U.S. Coast and Geodetic Survey was combined with the Weather Bureau and the Central Radio Propagation Laboratory of the National Bureau of Standards in 1965 to create the Environmental Science Services Administration (ESSA).[3] NOAA was established in 1970 through the merger of ESSA with numerous earth science-related activities including the Bureau of Commercial Fisheries, the Office of Sea Grant programs, the U.S. Lake Survey, and the National Data Buoy Project.



A Coast Guard Albatross (CG-PBY) alerts a commercial fishing vessel off St. Petersburg, FL of an approaching hurricane by delivering a Hurricane Warning streamer, circa 1928.

180 Years of Aligned Interests 1790-1970

Enhancing navigation safety is the oldest and deepest common bond between the Coast Guard and NOAA. The U.S. Coast Survey developed the standard color-coding of navigational buoys, which gave rise to the sailor's adage "red, right, returning." Conceived and proposed to the Secretary of the Treasury by a lieutenant serving in the U.S. Coast Survey, the U.S. Coast Survey Schooner WAVE set the first buoys marked in accordance with the new standard in Long Island Sound.

The placement and design of lighthouses represent another area of aligned interest in navigation safety. The U.S. Coast Survey was responsible for the placement of Lighthouses in the United States from 1851 until President Roosevelt transferred the Lighthouse Service to the Coast Guard in 1939. The first Commissioner of the Lighthouse Service under the authority of the Coast Guard was George Putnam, an inspirational figure from U.S. Coast Survey history.

Numerous examples of agency collaboration are woven throughout Alaska's history. In 1867, George Davison of the U.S. Coast Survey, sailed to Alaska aboard the U.S. Revenue Cutter LINCOLN. While aboard, he generated a report that influenced Congress to purchase the Alaska Territory. Beginning in

1892, the U.S. Revenue Cutter BEAR and the U.S. Fish Commission Steamer ALBATROSS participated in Bering Sea patrols to deter poaching of fur seals by foreign fleets.

During World War II, civilian Weather Bureau personnel commonly served aboard Coast Guard Cutters engaged in ocean weather station duties, and U.S. Coast and Geodetic Survey (USC&GS) personnel flew photogrammetry missions aboard Coast Guard aircraft. Some perished alongside their Coast Guard shipmates and air crews. Four Weather Bureau personnel were officially reported killed in action on September 10, 1942 along with 117 of their military shipmates. Their ship, the Coast Guard Cutter MUSKEGET, was likely sunk by the German U-boat 755.[4] On July 18, 1943, two USC&GS officers and a joint six-person Coast Guard and Navy aircrew perished when their Coast Guard PBY aircraft crashed in to Mount Moffat on the Aleutian Island of Adak while on a photogrammetry mission.[5] Our history is rich in cooperation, aligned interests, courage, and even personal sacrifice in service to the Nation.

Oceanography in the Coast Guard

The Survey of the Coast and the U.S. Commission of Fish and Fisheries conducted the Nation's first oceanographic studies. The Coast Guard's oceanographic accomplishments are not nearly as widely known. Since Alexander Hamilton's letters of instruction in 1791, the Coast Guard has had an active role in supporting and conducting oceanographic research. The first true oceanographic investigations by the Coast Guard were carried out in 1881 when the U.S. Revenue Cutter CORWIN was ordered to make "regular connected series" of ocean current observations in the Bering Strait. The Coast Guard's interest in oceanography became institutionalized when the International Ice Patrol was created in the wake of the Titanic disaster.

Following the Titanic disaster, Captain Commandant Bertholf ordered the Revenue Cutter Service to support the activities of the International Ice Patrol. He directed that the service "make a study" of the oceanographic, meteorological, and biological conditions that may assist navigators in iceberg laden regions of the North Atlantic. The oceanographic study of icebergs and sea ice led the Coast Guard to hire their first oceanographer in 1916 and to create an oceanographic unit at Harvard University in 1923. The Coast Guard's first official oceanographic cruise was conducted in July 1928 aboard the United States Coast Guard Cutter MARION. Numerous other cutters[6] were tasked with oceanographic studies throughout the years, most recently the Coast Guard icebreakers POLAR STAR, POLAR SEA, and HEALY have carried out our marine scientific research in the polar regions.

The oceanographic duties of the Coast Guard continued to expand and reached their zenith in 1961 when Congress passed Public Law 87-396, authorizing the Coast Guard to engage in oceanographic research. In 1969, the Coast Guard received congressional authorization to design and build the "most advanced oceanographic vessel of modern times." The ship was to be named JOSEPH HENRY. The selection of that name as the ship's namesake is a notable link to NOAA. Joseph Henry was the first Secretary of the Smithsonian Institution and was influential in the founding of the U.S. Weather Bureau. The Coast Guard engagement in scientific study of the oceans waned after the creation of NOAA in 1970 and plans to build the JOSEPH HENRY succumbed to higher priority budgetary pressures.

The 1969 Stratton Commission Report recognized the Coast Guard's role in ocean science and recommended inclusion of the Coast Guard as part of a new ocean and atmosphere agency (NOAA). Although never implemented, this recommendation validates our mutual interests and legacy in oceanography.

Rear Adm. Sandra Stosz, Superintendent of the U.S. Coast Guard Academy discusses education and interagency training with USCG and NOAA Officer Candidates aboard CGC EAGLE.

U.S. Coast Guard photo by Petty Officer 3rd Class Diana Honings.

Modern Era and Beyond

Over 200 years ago, an ancillary instruction to promote safe navigation gave rise to a long legacy of collaboration. The mutual dependence and support of missions are as important today as they were at the founding of our Nation. Today, our cooperation can be seen on a daily basis. We rely on each other's capabilities and expertise to affect the rescue of distressed persons at sea. We work cooperatively to protect marine sanctuaries and protected species. We establish and enforce fisheries treaties and regulations to support maritime resource stewardship, resilience and sustainability. We also enable the safety and resilience of the marine transportation system and coastal infrastructure in the face of disasters and increased demands for goods.

As we look to the future, our organizations will face challenges from increasing demands for food, energy, transportation, and recreation on the ocean, Great Lakes, coasts and waterways. Extreme weather and shifts in other demographics may test our agencies' abilities to execute current missions while addressing challenges yet to be identified. Through this cooperative strategy, we will focus efforts to maximize efficacy and efficiency for the Nation.

Today's Realities

The ocean, coasts, rivers, and Great Lakes are vital national resources that enable economic prosperity, recreation, and scientific research. They drive commerce, create jobs, and are critical to our environmental sustainability, and economic and national security. As stewards of the marine environment, the Coast Guard and NOAA are committed to ensuring these resources continue to provide economic, social, and cultural benefits to the Nation. Indeed, our Nation has finite natural resources. A continuing rise in population requires innovation and resourcefulness. Changing environmental and economic conditions compound the challenges of ocean stewardship and sustainability. "Today's Realities" describes current drivers that influence our intersecting interests and mission requirements.

National Ocean Policy

The Coast Guard and NOAA played critical leadership roles in the development of the President's National Ocean Policy. Today, we are the only two sub-cabinet agencies with independent seats on the National Ocean Council. The Coast Guard and NOAA continue to be important partners in the effort to advance each of the nine priority objectives as described in the Final Recommendations of the Interagency Ocean Policy Task Force. Both agencies are critical to the effective implementation of the National Ocean Policy.

Coast Guard and NOAA Maritime Fleets

The Coast Guard and NOAA require ships, boats and aircraft to conduct their missions. These resources are vital to our ability to study the oceans and promote maritime safety, security, and stewardship. Operation, maintenance, and recapitalization of respective maritime fleets are primary resource drivers for the Coast Guard and NOAA. Advances in autonomous and remotely piloted systems are beginning to complement our maritime fleets. These systems are constantly being evaluated to improve efficiency, reduce operational costs, and to perform functions that are hazardous for traditionally crewed platforms. Use of autonomous and remotely piloted systems will continue to expand, but ships and aircraft remain critical and a primary source for mission accomplishment.

Economic Sustainability

Maritime economic activities including shipping and transportation, offshore energy development, commercial fishing, aquaculture, recreational fishing and boating, and tourism contribute $3.4 trillion in annual wages to our Nation's economy and

supports 66 million jobs.[7] There are challenges to maintain and enhance these economic factors that rely on healthy and productive oceans, rivers and lakes. Restoration and conservation of our ocean, coastal, waterways, and Great Lakes ecosystems are crucial to sustain products and services on which our Nation's economy depends.

Environmental Stewardship

The complexity of our ecosystems is evident by the fluid nature of our environmental processes which are multi-national in construct. Today, climate change, coastal resilience, stewardship of living marine resources, and environmental disasters are issues that are addressed through strong partnerships amongst Coast Guard, NOAA, and other stakeholders.

Climate Change, Severe Storms, and Unified Efforts to Adapt. Sea level rise, extreme weather, natural disasters, sea ice changes, and ocean acidification require increased coordination and preparedness. Drought, wildfires, hurricanes and severe storms, have significant economic costs. As a benchmark of a severe storm, costs reaching upwards of $50 billion[8] can be attributed to damages caused by Hurricane Sandy. Adaptation to climate change and extreme weather requires awareness and deliberate planning.

Lt. j.g. Joseph Carrier, a National Oceanic Atmospheric Admistration officer assigned to the Hawaiian Islands Humpback Whale National Marine Sanctuary, speaks to crewmembers at Coast Guard Station Maui on the use of humpback whale tracking and disentanglement equipment. Classroom instruction preceded underway practice in preparation for the approaching humpback whale season.

U.S. Coast Guard photo by Petty Officer 2nd Class Eric J. Chandler.

Stewardship of Living Marine Resources. NOAA is responsible for the stewardship of living marine resources in the world's largest Exclusive Economic Zone (EEZ), comprising more than 3.4 million square miles[9] and over 500 species sought for commercial or recreational purposes.[10] Under NOAA's leadership and collaborative enforcement actions with the Coast Guard, these resources are some of the best sustainably-managed fisheries in the world. The fishing industry contributes approximately 1.3 million jobs and about $143 billion per year to the U.S. economy.[11] The importance of the ocean as a global source of protein cannot be overstated. Effective fisheries management ensures sustainable food production and related economic and social benefits, enhances recreational and tourism opportunities, and protects ecosystem health and sustainability. NOAA, in partnership with the eight Regional Fishery Management Councils and their members have turned the corner to end overfishing. The Coast Guard provides representatives to Fishery Management Councils and Sanctuary Advisory Councils to develop fair and enforceable regulations and to promote the safety of human life at sea. The Coast Guard is the principal partner to support NOAA with regulatory compliance critical to sustain the health of marine ecosystems and the coastal communities that depend on them.

In addition to the direct management of commercial and recreational fisheries, today's living marine resources face a variety of global issues. These range from understanding the effects of climate change on ecosystems and communities to monitoring and evaluating the impacts of energy exploration and development on habitats. Particular areas of focus include: bycatch reduction; impacts of energy exploration and habitat loss on all species; rising levels of noise in the world's oceans; and long-term impacts of pollution on living marine resources.

Coastal Resilience. The partnership between the Coast Guard and NOAA is critical to maintain and strengthen the resilience of our coasts. In 2010, 163.8 million people, or 52% of the Nation's population, lived in coastal watershed communities,[12] generating 58% of our Nation's gross domestic product.[13] Multiple stressors acting on vital coastal areas decrease their ability to rebound from catastrophic and chronic threats, ultimately threatening human health and safety. The Coast Guard and NOAA have a longstanding relationship to help maintain resilient and sustainable coastal communities and economies, which includes compliance with laws affecting the health of marine ecosystems and response to oil and pollution hazards.

Environmental Response. The Coast Guard and NOAA actively work together as part of the National Response System. The Coast Guard serves as the Federal On-Scene Coordinator for oil spills and hazardous substance releases in the coastal zone while NOAA serves as the scientific support coordinator and as one of the Federal trustees for coastal and marine resources. Whether the response is a Spill of National Significance such as the BP Deepwater Horizon oil spill, or a sheen from an old sunken vessel, the Nation relies on us and our Federal, State, local and tribal partners to ensure appropriate management of the response and recovery efforts.

The Marine Transportation System and Maritime Security

The Committee on the Marine Transportation System (CMTS)[14] is an interagency partnership developed to address marine transportation policies, including: safety, security, environmental quality, infrastructure protection, free flow of trade, and the efficient movement of freight and people upon our Nation's waterways, coasts, and associated port facilities. On December 20, 2012, President Obama signed the Coast Guard and Maritime Transportation Act of 2012. With this action the CMTS became authorized

Coast Guard Cutter GEORGE COBB, working with technicians from the National Data Buoy Center/NOAA have repaired several key weather-data buoys and are now on station transmitting weather and sea-state data. The local fishing fleet, freighter and tankers, military vessels and even surfers rely heavily on the data provided by these and many other buoys in order to make informed decisions on where and when to travel at sea. The data buoys are used to measure and transmit air and sea temperatures, wind speed and direction, wave height, direction and period, as well as barometric pressure changes.

U.S. Coast Guard photograph by Lt. Collin Bronson

by law and assigned new authority, responsibilities, and opportunities. Currently chaired by the Secretary of Transportation, the Coast Guard and NOAA contribute to the CMTS by providing key leadership to the Coordinating Board (along with the U.S. Army Corps of Engineers and the Maritime Administration), and through participation in various working groups and teams. Among the many Federal agencies that touch upon the Marine Transportation System (MTS), the Coast Guard and NOAA serve vital roles in the day-to-day operation of thousands of miles of rivers, canals and shipping lanes interconnecting hundreds of ports and over 3,700 marine terminals[15] throughout the United States and its territories.

NOAA produces and maintains the Nation's suite of nautical charts; the essential and long-standing tool to support safe and efficient marine navigation and a host of other coastal management products. The Coast Guard's system of visual and electronic aids to navigation, air and sea patrols, and Vessel Traffic Services (VTS) manage the safe movement of vessels and security on our waterways. The Coast Guard's and NOAA's actions are strongly linked to foster the safe, secure, and efficient utilization of our MTS.

Partnerships. Both the Coast Guard and NOAA value the continuation of meaningful partnerships with Federal, State, local, tribal, international, and private sector stakeholders to gain knowledge and advance U.S. interests which includes both economic prosperity and environmental stewardship.

Maritime Domain Awareness. The safe and efficient flow of commerce is enhanced by a shared understanding of the maritime domain. Maritime Domain Awareness (MDA) is the effective

understanding of those elements associated with the global maritime domain that could impact the safety, security, economy, or environment of the United States. MDA increases the transparency of the marine environment and maritime activities, and functionally includes combining intelligence products and other domain knowledge. MDA informs not only government decision-makers, but also supports and informs the Nation's maritime safety, security, and stewardship interests, extending to a wide range of stakeholders.

International Engagement

Diplomacy, international engagement and maritime governance continue to grow in importance to the Coast Guard and NOAA. Joint participation and leadership in the International maritime arena is necessary to protect the Nation's economic, homeland, environmental, and food security interests. There are many international organizations to which the Coast Guard and NOAA provide leadership. Below are a few that this strategy highlights as priorities.

Arctic Council and U. S. Government Chairmanship. NOAA and the Coast Guard provide expert advice on marine issues through participating on, or leading, the United States delegations to various working groups and task forces of the Arctic Council. These working groups and task forces cover a variety of international cooperation such as protecting the marine environment, implementing the 2009 Arctic Marine Shipping Assessment recommendations, and involving the Arctic indigenous people in decisions that affect their way of life. As the United States approaches chairmanship of the Arctic Council in 2015, the Coast Guard and NOAA are working with the Department of State, other Federal agencies, and stakeholders to help shape key national themes and objectives.

International Maritime Organization (IMO). NOAA supports the Coast Guard in its role as leader of the U.S. Delegation to the IMO. The IMO is a specialized agency of the United Nations with responsibility for the safety and security of shipping, and the prevention of pollution by ships. The Coast Guard and NOAA work together on a wide range of issues including electronic navigation standards, designation of Particularly Sensitive Sea Areas, environmental risk concerns, such as the prevention and control of pollution from ships and the transport of non-indigenous aquatic nuisance species, and comprehensive regulations for ships operating in Polar waters.

International Hydrographic Organization (IHO). NOAA's National Hydrographer is the United States representative to the IHO; an intergovernmental consultative and technical organization that supports safe and environmentally sound navigation worldwide. The Coast Guard directly supports NOAA in this role by helping to ensure accuracy of U.S. nautical charts and other products. Coordination with IHO is critical to meeting international standards and guidelines which are applied to navigation products and services to enable safety of navigation.

Regional Fisheries Management Organizations. An irreplaceable strategic partnership between NOAA and the Coast Guard occurs in the context of Regional Fisheries Management Organizations (RFMOs). RFMOs seek to end international overfishing and to achieve and maintain sustainable fisheries worldwide. The Coast Guard's and NOAA's expertise, advice, and enforcement support the United States' proposals for international conservation and management measures.

NOAA

Our Vision and Strategy for the Future

The Coast Guard and NOAA have developed a vision for the future to collaboratively support our Nation's economy and ocean stewardship. The vision will be achieved by harmonizing activities and resources; enhancing operational cooperation; and influencing research and technical development to advance national interests. The Coast Guard and NOAA are committed to supporting economic growth and sustainability of the environment. Both agencies are also committed to promote safe commerce through support of efficient and environmentally sound marine transportation, sustainable fisheries, and resilient coastal communities.

Our strategy is to:

1. **Promote a Safe, and Sustainable Marine Environment**
2. **Enhance Regional Collaboration**
3. **Foster Innovation in Science, Technology, and Youth Education**

Both our agencies recognize that this strategy may be adapted over time to remain flexible to changing needs and emerging new research.

Promote a Safe, and Sustainable Marine Environment

New uses of the ocean are emerging. Demand for sources of renewable energy have brought about the development of offshore wind farms, hydrokinetics, and installations for ocean thermal energy conversion. Industrial aquaculture will be necessary to feed a growing world population. The Coast Guard and NOAA will have increased roles in adjudicating the demands of competing ocean interests and assessing and limiting associated threats to the marine environment. Increased maritime activity can stress marine environments and increase the risk of maritime accidents. Improving the reliability and resilience of Marine Transportation System (MTS) will promote the economy and minimize risks to the environment. The Coast Guard and NOAA will promote stewardship of the sea in the future when addressing these trends.

Foster a Safe, Secure, Efficient and Environmentally Sound Marine Transportation System

The United States is a maritime Nation. We rely upon a safe, secure, efficient, and environmentally sound MTS to support commerce, recreation, and national security. The MTS moves nearly 80 percent of the United States' overseas trade by weight and approximately 50 percent by value.[16] U.S. seaports handle more than 2 billion tons of domestic, import and export cargo annually. In 2011, international goods shipped in and out of U.S. ports in foreign trade was valued at $1.73 trillion.[17] Through strong partnerships and enhanced collaboration, the Coast Guard and NOAA stand as sentinels to support the dynamic and expanding MTS.

New uses of the ocean are expected to increase in the next decade. This increase will create a demand for routing measures to preserve and protect critical existing sea routes, and allow for growth of offshore terminals and infrastructure to handle larger ships. Collaboration on the development of vessel routing measures and aids-to-navigation (ATON) can promote future capacity and environmental resilience of the MTS. Port Access Route Studies (PARS) and marine spatial planning will be employed to support these efforts and new activities. To reduce congestion, enhance environmental stewardship, and promote MTS safety and efficiency, the Coast Guard has undertaken the largest PARS in its history. The Atlantic Coast Port Access Routing Study encompasses the entire Atlantic seaboard and will be used as a foundation for future marine highway planning and renewable energy sites. Using geospatial

information, the Coast Guard and NOAA will continue to collaborate on the development of routing measures to meet the full suite of mandates for navigation safety, environmental protection, and marine resource preservation. The Coast Guard and NOAA work to facilitate the safe and efficient transit of commerce throughout our Nation's waterways and to mitigate the inherent risks associated with transporting hazardous materials and dangerous cargoes. NOAA will continue to produce nautical charts and provide routine and severe marine weather forecasts that cover coastal waters of the United States and its territories. The Coast Guard will continue to support the maritime short range ATON system. The Coast Guard and NOAA aim to enhance maritime safety through expansion of the Physical Oceanographic Real-Time System (PORTS®) and optimization of the ATON constellation through integration of electronic ATON systems and marine information. We will strive to improve protection of coastal ecosystems, protected resources, and benthic habitat by integrating science and risk-reduction methodology in the design and deployment of ATON systems and navigation tools.

National Oceanic and Atmospheric Administration Veterinarian Michelle Barbieri travels from the Big Island to Oahu aboard an HC-130 Hercules airplane from Coast Guard Air Station Barbers Point with a Hawaiian monk seal.

U.S. Coast Guard photo by Petty Officer 2nd Class Eric J. Chandler.

New products will be integrated with Common Operational Picture systems to provide seamless means of accessing information for planning, preparedness, and response activities. Research and development partnerships between agencies will enhance navigation safety. Automatic Identification System (AIS) capabilities will be used to transmit real-time environmental data to vessels for inclusion in onboard navigation systems.

Promote Sustainability and Stewardship of Living Marine Resources

Our Nation benefits from healthy and diverse marine ecosystems. As ocean stewards, the Coast Guard and NOAA conserve, protect, and manage living marine resources.

Collaborative Enforcement. NOAA's science-based regulatory programs for living marine resources are complemented by programs that focus on the conservation and restoration of coastal habitat along the 93,000 miles of U.S. coastline. Effective compliance and enforcement conducted in partnership are critical elements of management success whether for protection of sanctuaries, sea turtles or commercial fisheries. The Coast Guard will work with NOAA in the development and enforcement of regulations necessary to help maintain and recover marine protected species and their ecosystems. Management measures and laws created to eliminate

illegal fishing and protect resources are ineffective without appropriate protocols for enforcement. The Coast Guard and NOAA commit extensive resources to achieve compliance with fisheries regulations and laws. The Coast Guard supports these efforts through active enforcement and surveillance by air and surface assets. These activities promote the ability to attain allowable harvest goals, the adoption and use of sustainable fishing methods, and the safety of life at sea for our Nation's most hazardous occupation, which is commercial fishing.

The Coast Guard and NOAA are the primary U.S. Government agencies for combating illegal fishing and other threats to living marine resources. The Nation's valuable living marine resources are under considerable pressure from domestic and international threats, which can only be addressed through coordinated enforcement efforts. Enforcement of the Nation's marine resource conservation and management laws and regulations is advanced through strengthened prioritization of shared objectives, training, information-sharing and coordinated deployment of assets and personnel.

Illegal, unreported or unregulated (IUU) fishing on the high seas creates an unfair market advantage for foreign fleets, compromises food safety, threatens the sustainability of shared and straddling stocks, and increases pressure on relatively healthy U.S. resources. The Coast Guard and NOAA must work collaboratively to ensure that enforcement considerations are reflected in the development of U.S. foreign policy objectives related to the regulation of international fishing.

Mitigating Human Impacts. The future will continue to bring change to the marine environment, partially due to impacts of human use. The Coast Guard and NOAA work together to manage and protect maritime cultural heritage assets, protected species, and protected areas. The Coast Guard works closely with NOAA on implementation of protected species recovery and management plans, and will continue to assist in the establishment, management, and enforcement of protected resource regulations.

Given the expected increase in marine transportation through the next decade, vessel discharges must continue to be addressed. The Coast Guard and EPA are the primary regulators for non-indigenous aquatic nuisance species in ballast water discharges. These two agencies work closely with NOAA to develop effective ballast water management strategies. The Coast Guard and NOAA will work together to identify and support future research and regulatory needs to minimize adverse environmental impacts from vessel discharges.

Marine Debris. Marine debris presents risks to the marine environment and coastal resiliency in the form of invasive aquatic nuisance species, navigation hazards, threats to marine life, and degraded aesthetics of the coastal environment. The ability to control and reduce marine debris is fundamental to mitigating associated impacts on the sea. NOAA's Marine Debris Program supports national and international efforts to research, prevent, and reduce adverse impacts. The Coast Guard and NOAA provide leadership to the Interagency Marine Debris Coordinating Committee and will continue to foster collaboration and innovation to address the Nation's marine debris challenges. We have joined forces to address risks associated with marine debris generated by the 2011 Japan Tsunami and other sources. The Coast Guard provides crucial information on debris location, composition, and density while patrolling the maritime domain. This information directly supports NOAA's Marine Debris Program

efforts. Through coordinated communication strategies, we will advance public awareness of debris impacts, inform communities about removal programs, and emphasize prevention techniques. We will continue to share requirements and leverage capabilities to advance our knowledge and effectiveness.

Collaborate on Disaster and Emergency Preparedness, Response, and Recovery

The quantity, severity, and human impact of natural disasters will likely increase in coming years due to climate change and population growth. The Nation's vulnerability to extreme weather events is increasing. Increased ocean use will raise the probability of hazardous material and oil spills affecting a wide range of marine resources and communities. The BP Deepwater Horizon oil spill emphasized the importance of collaboration between Federal agencies that work together in preparedness, response, and recovery.

Preparedness. The Coast Guard and NOAA support a "whole of government" approach to build a strong national response capacity through active leadership and engagement in domestic and international regimes that focus on preparedness. Partnerships such as the National Response Team and Regional Response Teams enhance national readiness to respond to oil spills and hazardous substance releases. These partnerships focus on the entire preparedness cycle to plan, exercise, respond, and evaluate. The cycle is key to comprehensively minimizing consequences of natural and human made disasters.

NOAA's Weather-Ready Nation initiative touches on the core responsibilities of both agencies; to protect life, property, and enhance the Nation's economy. Severe thunderstorms, coastal storms, tsunamis, fog, tornados, tropical cyclones, and space weather events threaten navigation and maritime safety. As part of a Weather-Ready Nation, the Coast Guard and NOAA will collaborate on preparedness activities.

Proactive external communication with maritime users and coastal communities saves lives, protects the environment, increases resiliency, and supports the MTS. The Coast Guard and NOAA play a vital role to ensure mariners are notified of actual and potential hazards on a daily basis. Communication is important leading up to, during, and following a disaster or emergency response, yet it is also frequently identified as an area needing improvement during development of lessons-learned. The Coast Guard and NOAA will continue to provide timely and accurate information to the public and work together with our stakeholders. We will share information, as appropriate, and ensure mechanisms are in place to promote active external communication.

Response. The Coast Guard and NOAA will further collaborate to identify, assimilate, and use cross-agency unclassified geospatial data and other information. NOAA's Environmental Response Management Application (ERMA®) provides critical observational data and forecast products to disaster and emergency responses. NOAA's satellites, as part of the COSPAS-SARSAT Program, deliver distress signals to Rescue Coordination Centers who coordinate and execute the search and rescue mission. NOAA will continue to provide specialized environmental products to support Coast Guard Incident Commanders and Search and Rescue Coordinators to enhance the efficiency and safety of response activities. We will continue to promote development of improved models and tools. A shared cyber-infrastructure that allows for the real-time ingestion of diverse geospatial data is crucial.

Members from the U.S. Coast Guard, National Oceanic Atmospheric Administration, New England Fishery Management Council and commercial fishermen meet at the Northeast Regional Fisheries Training Center in Cape Cod, Mass., to test solutions for displaying stowed gear aboard a trawling vessel while underway.

U.S. Coast Guard photo by Petty Officer 2nd Class Rob Simpson.

Research and development for oil spill response continues to be important as new drilling technologies and new areas for offshore drilling and maritime transit introduce different and more complex oil and chemical spill threats. The Coast Guard and NOAA will work closely to advance oil pollution research and new technology solutions through our roles within the Interagency Coordinating Committee on Oil Pollution Research and the National Response Team's Science and Technology Committee. We will collaborate and respond within the established processes of the National Response System to minimize impacts on life, the environment, and government and private property.

Short-Term Recovery. The United States' economy depends on the resiliency of our coastal and inland maritime ports and natural resources. In the wake of a disaster or other emergency response, the Coast Guard and NOAA are committed to support stabilization of the MTS, the resumption of maritime commerce, and to conduct accurate damage assessments. Our agencies minimize disruptions to the MTS through a network of hydrographic assets such as NOAA's Navigation Response Teams and survey ships. This unique response capability lessens exposure to significant economic losses and adverse effects on national security caused by prolonged disruption. The Coast Guard and NOAA will share data, as appropriate, relating to the status of ports, waterways, aids to navigation, waterfront facilities, and other critical infrastructure information to facilitate system stabilization and restoration of basic functionality of the MTS.

Enhance Regional Collaboration

Regional stakeholder collaboration and functional expertise are crucial to the continued safety, security, health, and prosperity of our Nation. Over the next 10 years, the Coast Guard and NOAA will place an increased emphasis on coordination efforts in the Arctic and Gulf Coast regions. These regions currently face unique challenges involving development and restoration requiring emphasis by both agencies. However, our efforts to coordinate and execute our complementary missions occur in every U.S. region and each presents its own set of emerging challenges.

The Gulf Coast Region

The Gulf Coast region is a vital contributor to the U.S. economy. It is home to abundant living marine resources, considerable oil and gas deposits, and a high-volume of recreational and commercial maritime traffic.[18] The Gulf of Mexico and the resources of the Gulf Coast provide jobs, food, energy, recreation, and tourism opportunities.

Gulf Coast communities rely on healthy marine ecosystems for commercial and recreational fishing, and tourism. Tourism and recreation is estimated to contribute nearly 650,000 jobs and over $10 billion per year in annual wages to Gulf Coast economies.[19] In 2011, recreational fishermen caught nearly 147 million fish in the Gulf, accounting for 34% of the Nation's recreational fishing activity.[20] The economic impact of commercial fishing is also significant. In 2011, commercial fishermen harvested nearly 2 billion pounds of finfish and shellfish from the Gulf of Mexico, valued at more than $795 million.[21]

The Federal waters of the Gulf of Mexico is home to significant oil and gas resources accounting for 23 percent of domestic crude oil production and 7 percent of domestic offshore natural gas production. Over 40 percent of the U.S. petroleum refining capacity and 30 percent of the U.S. natural gas processing plant capacity is located along the Gulf Coast.[22] The U.S. Energy Information Administration projects domestic crude oil production to increase in the Gulf of Mexico in the years to come. New platforms will be built to continue exploration for natural resources in locations that are further offshore and at greater depths, thereby increasing the surface and subsurface movement of oil and gas.

The Gulf of Mexico is also vital for international and domestic trade. The Gulf Coast is home to six of the top ten largest U.S. seaports (by tonnage) with a port in Louisiana and Texas ranked first and second, respectively.[23] In 2009, 50% of all U.S. international trade tonnage passed through Gulf Coast ports. From critical Mississippi River ports exporting agricultural and other resources from our Nation's heartland, to the petro-chemical ports along the coasts, the Gulf of Mexico is a major global thoroughfare and vital to the national economy and the world's supply chain.

Despite the overwhelming importance of this region, recent disasters have taught us that seemingly abundant resources and infrastructure can be critically impaired overnight. Such disasters can inflict severe human, economic, and ecosystem hardships on the Nation, as observed during the aftermath of Hurricane Katrina and the Deepwater Horizon oil spill. Of the 96 major hurricanes (Category III or higher) to make landfall since 1851, more than two-thirds have done so on the Gulf Coast.[24] In 2005, Hurricane Katrina killed over 1,300 people, displaced approximately 770,000 people, and spilled 7.4 million gallons of oil.[25] While the 2010 BP Deepwater Horizon oil spill in the Gulf of Mexico spilled an estimated 4.9 million barrels[26] of oil. These events devastated communities, damaged key ecosystems, and disrupted local, regional, and national supply chain economies.

The vulnerability and importance of this region make it imperative for the Coast Guard and NOAA to promote maritime transportation and resilience of coastal communities and ecosystems. To achieve this we will:

Foster Maritime Domain Awareness and Technology Sharing. As marine experts, the Coast Guard and NOAA have responsibilities for awareness of the maritime domain and technologies available to maximize operational knowledge. Fostering a cross-exchange of information, we will capitalize on expertise, and align information and technology sharing where possible. Both agencies have a persistent presence and extensive professional knowledge of the regions, which we will rely upon to share critical maritime domain awareness information, as appropriate.

Capitalize on Shared Resources and Expertise as a Force Multiplier. We will share information regarding operational capability and mission functions for Coast Guard and NOAA platforms operating in the region. Each agency will work to identify opportunities where the collaborative use of agency assets could improve maritime safety and security missions. We will utilize our air and surface assets as "force multipliers" and "cross deck" Coast Guard and NOAA personnel to meet mission needs and facilitate the exchange of professional expertise and data. This sharing of resources will leverage available assets to achieve greater overall benefit.

Cultivate a Strategic Planning Partnership. The Coast Guard and NOAA are active in joint and external domestic, bilateral, and multi-lateral planning efforts with stakeholders to effectively manage region-specific concerns. Our agencies participate in the Gulf of Mexico Citizen Advisory Committee, Gulf of Mexico Fishery Management Council, Gulf States Marine Fisheries Commission, and similar regional organizations to improve relations and coordination with our regional partners and constituents. NOAA, the Gulf of Mexico Sea Grant Programs, and other regional partners have developed a Gulf of Mexico Climate Outreach Community of Practice. Including the Coast Guard in this effort can improve long-term planning and immediate resilience against direct impacts such as storm surge. We are committed to strengthening our relationships within the Gulf Coast to build resilient coastal communities that are ready to face future challenges.

The Arctic Region

The United States is an Arctic[27] Nation. The Arctic holds both profound opportunity and consequence for the United States in terms of national security, economic prosperity, and environmental well-being. However, the vast U.S. Arctic poses significant challenges for operations. Tremendous distances, extreme weather, and scarcity of physical infrastructure present daunting logistical challenges. It is more than 1,100 nautical miles from the closest deepwater port in Dutch Harbor to Barrow by sea, and over 800 nautical miles from Coast Guard Air Station Kodiak to Barrow by air. The vast distances from major support hubs limit human presence in the Arctic. Despite these challenges, the U.S. Arctic is viewed as an attractive investment opportunity that could contribute to the overall vibrancy of the U.S. economy in the years ahead.

International maritime activity will continue to increase in the region as loss of sea ice creates a more accessible Arctic. Diminished sea ice has opened waters that provide opportunity for shorter sea routes for maritime commerce, thus expanding the significance of the Arctic to both the U.S. and world economies. As the Arctic opens, maritime activity will increase. The Coast Guard and NOAA will need to balance the safety, security, and economic needs of our Nation, with the protection of the fragile Arctic environment.

The safety, security, and environmental stewardship of the Arctic require strong partnerships, institutions, and regimes of governance. The consideration of knowledge and experience held by Alaska Natives is indispensable to shape our way forward and guide safe, secure, and responsible operations. Together, we must be prepared to inform, support, and execute safe, secure and environmentally responsible operations.

Promote Safe and Commercially Viable Maritime Transportation in the Arctic. Maritime transportation infrastructure is limited in the Arctic region. Moreover, the geographic spread of ports makes Arctic operations challenging. The Bering Strait is a chokepoint for all ships transiting through the Arctic via the Northwest Passage (Canada) or the Northern Sea Route (Russia). The Coast Guard and NOAA will work with other federal agencies, and international, State, local, Tribal, and industry stakeholders to assess the need for and as appropriate develop, implement, and maintain an adequate Bering Strait vessel traffic management scheme.

Planning for the predicted expansion of maritime traffic in the Arctic is crucially important to the Nation. Much of the remote region's waterways remain uncharted, hydrographic surveys are out of date and physical aids to navigation are difficult to maintain in this environment. Navigation risk increases due

to the lack of knowledge of water depths and seabed features and limited ability to properly mark safe routes. Sparse observational data make accurate forecasts of weather and sea ice conditions challenging. National icebreaking capability is limited. The Coast Guard and NOAA will collaborate to improve national capabilities and meet these challenges by modernizing charting, improving marine weather and sea ice products, enhancing navigation and communication infrastructure, and endeavoring to increase ice-breaking capabilities.

Strengthen Arctic Emergency Response Capabilities. The potential for marine casualties, mishaps, and other hazardous outcomes, in a region where help is currently hours, if not days, away will increase as Arctic vessel traffic and other activity continue to increase. Communications infrastructure and response equipment staging areas are extremely limited north of the Bering Strait, which adds challenges to search and rescue and other emergency response operations. The Coast Guard's and NOAA's blend of authorities, capabilities, and expertise will provide the groundwork for leadership across a range of missions and contingencies. Our chief pursuits to strengthen emergency response capabilities over the short-term will focus on collaborative preparedness. Over the longer-term, our focus will be on streamlined information-sharing, improved maritime domain awareness and communications, and advancing emergency preparedness and response technology.

Collaborate to Better Understand and Promote a Healthy Arctic Ecosystem. More information is needed to understand and predict the changes in the Arctic ecosystem and the impacts from increased human activity. A coordinated approach is required to sustain natural, cultural, and economic resources. Based on a recommendation from the North Pacific Fisheries Management Council, NOAA imposed a moratorium on fishing within the U.S. EEZ north of the Bering Strait until an assessment of the practicality of sustained commercial fishing is completed. Regardless of the outcome of this assessment, the Coast Guard will continue to execute its mission to enforce and protect living marine resources in the high latitudes to include support for appropriate regulatory regimes.

It is important to share technology and personnel resources, as well as coordinate future investments in facilities and infrastructure in order to maximize mission effectiveness, conserve resources, and promote ecological responsibility. Using a synchronized approach, we can balance multiple ecosystem uses equitably, limit stakeholder conflict, and meet critical ecological, economic, and social needs in the region. The Coast Guard and NOAA will work together to understand, predict, and manage ecosystem changes. We will partner to mitigate risks through increased efforts to collect environmental observations, environmental planning and identification of environmentally sensitive areas, and collaboration with the Interagency Arctic Research Policy Committee.

Other Emerging Regional Priorities

The coastlines and broader maritime domain of the United States are subject to numerous natural and human-induced threats. Hurricane Sandy is a prime example of an event with significant personal, environmental, social, and economic impacts. Though we cannot predict what the next major event will be, or where it may occur, we need to be prepared. Our agencies need to tailor their responses to the geographic, economic, and cultural traits of specific regions during responses. This will require firsthand knowledge of the requirements and dynamics of each region. This will also require awareness of each agency's mission and capabilities. It will further require organizational flexibility to tailor capabilities and services to meet distinctive regional needs. Additionally, strong partnerships with other stakeholders are necessary to diminish the impact of an event. As regional and local conditions change, both the Coast Guard and NOAA will need to utilize these established relationships to quickly assess changes in user and stakeholder priorities, and develop collaborative solutions to draw on the full range of available capabilities.

The Coast Guard and NOAA will apply lessons learned from past disasters and fold them into common training initiatives, helping to advance links between the agencies' preparation, response, and recovery protocols. This will help to ensure that qualified and experienced personnel are assigned to the right task, at the right time, in order to make the greatest impact. Informed collaboration will prove essential before, during, and after major events in the future. Working together, we will advance prediction of, and preparation for natural and human-induced disasters.

Lt. Cmdr. Paul Morris and Petty Officer 2nd Class Melanie Quintana take a closer look at shells and debris washing ashore in Pass Christian, with NOAA representative, Toni DeBosier.

U.S. Coast Guard photo by Petty Officer 2nd Class Elizabeth H. Bordelon.

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Foster Innovation in Science, Technology, and Youth Education

Innovation in science, technology, and youth education is critical to mission execution and fundamental to future economic growth and national security. By supporting the growth of innovative solutions, from development and deployment of sensors aboard unmanned systems to advancing research in advanced computer modeling, the outcomes will enhance our ability to address challenges of tomorrow.

Fostering innovation requires the ability to encourage and cultivate enthusiastic interest in a future state. Innovation depends on diversity of experience and knowledge, coupled with proficiency, curiosity, and intellect to creatively apply the discoveries of basic research to vexing challenges facing the Nation. Sustaining innovation in science and technology requires the Coast Guard and NOAA to harmonize research and development while deliberately engaging with other Federal agencies, industry and academia. Promotion of science, technology, engineering, and math (STEM) in youth education today is essential to enable a robust supply of scientists and engineers for tomorrow. Implementation of this priority will benefit the entire Nation as the United States seeks to maintain global leadership in science and technology.

Proficiency and Collaboration in Emerging Technology

Proficiency is being highly competent. It is not an end state, but a continuous pursuit toward mastering a specialty. It begins with the individual and expands to the organization. Proficiency relies on training, education, certification, and experience. It requires a sustained drive to achieve higher levels of excellence; and the continuous pursuit of mastery of craft. Proficiency provides a strong foundation for a resilient and responsive organization. We will continue to pursue advances in science and technology, ultimately using those advances to improve operations. Proof-of-concept projects such as the dissemination of NOAA's Physical Oceanographic Real-Time System (PORTS®) data over the Coast Guard's nationwide AIS network to enhance the safety and efficiency of our Nation's marine transportation system highlights the profound benefits of technology and collaboration.

Coordinate Activities and Resources

The maritime domain is a shared, vast, and finite operational area. Occasionally, it presents unique opportunities where agency platforms can intersect or overlap in space and time. The trend of miniaturization in electronic observation systems used to collect ocean information, the reduction in power consumption by these systems, and advances in communication technologies makes interagency deployment of systems possible. We will leverage this trend of technological advancements to create virtual increases in capacity by sharing observational requirements and operational plans.

Certain observational systems may be well suited to deploy on interagency platforms based on the degree of automation, reliability, and extended maintenance and calibration intervals. Some examples of attainable increases in virtual capacity include an initiative to deploy automated meteorological and oceanographic sensor packages aboard Coast Guard Cutters to improve marine weather forecasting, and feeding AIS data from NOAA platforms and non-Federal partners of U.S. Integrated Ocean Observing System (U.S. IOOS) to the nationwide AIS database. We will endeavor to deploy our sensors on each other's platforms to increase observational capacity. We will exploit observing assets, technologies, and data through active and continued engagement in the U.S. IOOS's Interagency Ocean Observation Committee.

Promote Information Sharing

Sound decision-making depends on access to useful information delivered in a timely fashion. The common operating domain of the ocean has resulted in data and information systems that serve as force multipliers when shared. Current information sharing between the Coast Guard and NOAA ranges from the use of established programs, such as NOAA's Environmental Response Management Application (ERMA®) during Coast Guard led response operations, to Coast Guard data on domestic ports used in a prototype NOAA study on port resilience to natural disasters.

Geographic Information Systems (GIS) are essential information systems common to both agencies. GIS data are used extensively for a wide range of activities. An example of GIS application to spatial planning is the Atlantic Coast Port Access Route Study where Coast Guard is using NOAA data and data analysis.[28] The integration and sharing of GIS data, systems, and products between agencies represents an area of collaboration with a proven record of mutual benefit. Future endeavors to encourage GIS system interoperability and access will enhance availability and improve the utility of powerful spatial information tools.

The Coast Guard and NOAA collect and store information every day as we execute our missions. These data, and the products derived from their analysis, have positive impact on the activities of the other agency. For example, unclassified data and products from the Coast Guard's Maritime Intelligence Fusion Centers can assist NOAA in determining human-use frequency and impacts on existing or proposed marine protected areas. Conversely NOAA's weather and oceanographic data are rapidly ingested by the Coast Guard's Search and Rescue Optimal Planning System when a distress alert is received, improving the probability of success in search and rescue operations. The Coast Guard and NOAA will continue to improve, and streamline information sharing in accordance with privacy, security, and legal requirements.

Science, Technology, Engineering, and Math (STEM) in Youth Education

An ocean literate society with a scientifically proficient workforce is essential for meeting future demands on the oceans for food, energy, transportation, and recreation. The challenges presented by the sea, and upon the sea, will only yield to knowledge and experience. Through scientific rigor, cutting-edge research, and integrated STEM education we are committed to developing and attracting the next generation of scientists who will drive scientific and technological innovation in the future.

The Coast Guard's and NOAA's education and outreach activities are far-reaching, covering diverse topics and promoting ocean literacy through a myriad of existing programs. Educational activities are as diverse as they are closely aligned in their goals and impact. The development of joint curricula infused with NOAA's significant scientific expertise, combined with the Coast Guard's broad reach, can greatly advance STEM education and ocean literacy in K-12.

Promoting STEM disciplines and careers will prepare students with the critical thinking skills they need to address demands on the sea, threats delivered by the sea, and the environmental stewardship of the sea. We will continue our efforts to develop, attract, and engage talented scientists of all ages, scientists that are needed to advance our Nation's innovation economy and develop the next transformational scientific breakthroughs for maritime gain.

High school students learn about the Forward Looking Infrared heat detection camera at the Science, Technology, Engineering and Mathematics (STEM) Exposition held at Base Support Unit, Honolulu. The STEM Exposition is a collaborative initiative to promote core technological fields and develop future innovators.

U.S. Coast Guard photo by Petty Officer 3rd Class Angela Henderson.

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Ensuring Long-Term Success

There are several additional concepts and imperatives that are necessary for the Coast Guard and NOAA to ensure long-term success. This section outlines these factors, which are independent of, but directly influence successful implementation of our strategic priorities.

Join the Convention on the Law of the Sea

The 1982 United Nations Convention on the Law of the Sea sets forth a comprehensive and international legal framework for the sea, the seabed, and its subsoil as well as the protection of the marine environment and its living and non-living resources. The Convention advances a broad range of U.S. interests, including freedom of navigation and sovereignty over offshore resources located on the Extended Continental Shelf (ECS) beyond the 200-nautical mile Exclusive Economic Zone (EEZ).

U.S. national security and global maritime commerce depend on the internationally recognized freedoms of navigation and overflight on and over the world's oceans and seas. The U.S. Government exercises lawful claims of sovereignty, sovereign rights, and jurisdiction within its EEZ and on its ECS. These sovereign rights give rise to duties related to freedom and safety of navigation and over-flight. Joining the Convention would enhance internationally recognized legal basis for U.S. activities to protect freedoms of navigation and overflight, environmental protection, marine scientific research, laying and maintaining of submarine cables and pipelines, and other important interests.

The Coast Guard and NOAA have worked together on the Extended Continental Shelf Interagency Task Force to lay the international legal foundation to assert claims over resources located on the U.S. ECS beyond 200-nautical miles. Joining the Convention would establish the strongest possible basis to exercise U.S. sovereign rights over these natural resources, including oil, natural gas, methane hydrates, minerals, and sedentary marine species located on or under the continental shelf beyond the 200-mile EEZ. Defining the area of the ECS seabed and subsoil is critical to our national interests in energy security, resource management, environmental protection, global mobility, and international leadership. Joining the Convention and protecting U.S. maritime interests are complementary actions.

Implementation of the National Ocean Policy

As the Federal Government moves forward with finalizing the Implementation Plan for the National Ocean Policy, the Coast Guard and NOAA will work together to ensure that our agencies promote the nine priority objectives and the five themes of the Implementation Plan: the Ocean Economy, National Security, Ocean Resilience, Local Choices, and Science and Information.

Effective Partnerships

The safety, security, environmental, and economic well-being of our Nation's waters relies on the development of a common governance structure and operational framework built upon domestic and international cooperation. The Nation benefits from strong maritime partnerships globally. The Coast Guard and NOAA must foster international and domestic partnerships to increase coordination, enhance efficiency and reduce risk. Mutually beneficial relationships with our international, interagency, State, local, Tribal, and other stakeholders are essential for mission success. The Coast Guard and NOAA will continue to seek and grow international partnerships and agreements that encourage joint planning, exercises, research and operations. The Coast Guard and NOAA must also continue to actively provide leadership and expertise in international organizations, such as the Arctic Council and the International Maritime Organization.

Domestically, the Coast Guard and NOAA must champion whole-of-government solutions that find and eliminate redundancies, encourage efficient operations, and build greater capacity across our organizations. By integrating operational capabilities, reducing redundancies, and leveraging authorities across all levels of governance, unity of command and effort will be improved, resulting in greater mission success. A

CGC Aspen, a 225-foot buoy tender out of San Francisco, tows the first of eight National Oceanic Atmospheric Administration (NOAA) weather information buoys into the San Francisco Bay from San Pedro, Calif., during the first leg of a 3,900 mile journey to the Bering Sea as part of the Alaska Expansion Project.

U.S. Coast Guard photo by Petty Officer 3rd Class Sabrina L. Arrayan

strategic approach to leveraging our strengths and those of other Federal agencies with ocean responsibilities and missions is essential for the United States to take advantage of emerging opportunities and address future challenges.

The Coast Guard and NOAA have long histories of working with other maritime services and organizations. Our agencies will continue to seek out areas of mutual interest to build strategic partnerships with the U.S. Navy, U.S. Army Corps of Engineers, and foreign maritime services whose respective mission areas often include similar functions to the Coast Guard and NOAA. Actively seeking and engaging with these partners in projects to address emerging challenges via conferences, symposia and projects will foster innovative, affordable solutions and ease individual resource constraints.

Gary Shigenaka, a biologist with the National Oceanic and Atmospheric Administration, and Coast Guard Petty Officer 2nd Class Cliff Fisher, a flight mechanic with Aviation Training Center Mobile, Ala., evaluate coastline conditions in the wake of the Deepwater Horizon explosion and subsequent oil discharge.

U.S. Coast Guard photo by Petty Officer 3rd Class Stephen Lehmann.

Leveraging Capabilities to Build Capacity

The Coast Guard and NOAA will seek areas of mutual interest to build strategic initiatives that promote innovative, affordable, and value added solutions to enhance mission support and program execution. Such efforts leverage each other's strengths and serve as a force-multiplier. The Coast Guard is leveraging NOAA's expertise and assets in small remotely piloted aerial systems to build observational capacity in the Coast Guard's polar icebreaking program. Additionally NOAA's Commissioned Officer Corps co-located their Basic Officer Training Center with the Coast Guard's Officer Candidate School. This co-location has proven successful beyond just the obvious efficiencies; it fosters the bonds and relationships between future NOAA and Coast Guard leaders. We must continue to find operational and administrative endeavors that leverage each other's capabilities to build capacity.

Climate Change Adaptation

The risks posed by extreme weather, such as tropical cyclones, droughts, and severe storms are exacerbated by climate change and extend beyond national borders. The impacts of climate change will affect the Coast Guard and NOAA in new and uncertain ways. We will prepare and mitigate vulnerabilities across mission areas by planning for and taking active steps to adapt to long-term climate change impacts.

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Conclusion

Nearly half of our country's population lives in coastal communities, and millions of visitors enjoy our Nation's seashores each year. Despite the critical importance of these areas to our health and well-being, the ocean and coasts face a wide range of threats from human activities. Overfishing, pollution, coastal development, and the impacts of climate change and severe storms are altering ecosystems, reducing biological diversity, and placing more stress on wildlife and natural resources, as well as on people and coastal communities. Human use of the ocean and coasts is expanding at a rate that challenges and compounds these threats. Demands for energy development, shipping, aquaculture, emerging security requirements, and other new and existing uses are expected to grow. Our agencies must work cooperatively to sustain and preserve the abundant marine resources and healthy ecosystems that are critical to our Nation's prosperity and resiliency. Moreover, we are committed to promoting sound science in support of economic growth, optimal decision-making, and resilient and healthy marine ecosystems that will continue to support the Nation's economy.

The reality of the 21st century is that most countries and regions of our Earth are now interconnected through numerous physical and virtual links. As we work together to accommodate these multiple uses and links, our agencies will focus on sustaining and preserving the abundant marine resources and healthy ecosystems that are critical to our Nation's resiliency, prosperity, and quality of life.

The Coast Guard and NOAA have complementary missions and work collaboratively across many facets of marine safety, security, and stewardship. As our Nation faces emerging challenges, it is imperative to leverage existing partnerships to achieve harmonization and alignment. This strategy provides a focused partnership between the Coast Guard and NOAA to strengthen ties as both agencies move forward in managing and protecting our ocean, coastal communities, and ensuring the long-term security of our Nation. We will partner to safeguard the marine environment, enhance regional collaboration, and foster innovation in science, technology, and youth education over the coming decade.

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End Notes

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27 "The term Arctic means all United States and foreign territory north of the Arctic Circle and United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain." Public Law 101-609: Arctic Research and Policy Act of 1984, as amended. National Science Foundation.Office of Polar Programs (OPP). http://www.nsf.gov/od/opp/arctic/iarpc/arc_res_pol_act.jsp, (accessed 14 February 2013).

28 Department of Energy's Pacific Northwest National Laboratory is the lead agency for spatial data modeling and analysis for the ACPARS.

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