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National Coastal Ocean Mapping

Advancing National Defense and Ocean Conservation

POLICY BRIEF



By Monica Medina, Joel Smith and Linda Sturgis

The United States is a maritime nation with an expansive coastal ocean that is integral to economic, environmental and national security.¹ The coastal ocean hosts a wide range of users, including the U.S. military, coastal shipping companies, offshore energy producers, commercial and sport fishermen, recreational users and conservation groups. As a primary user of the coastal ocean, the U.S. military needs dedicated and charted offshore areas in which to train and conduct exercises to prepare for war, thwart terrorist activities and prevent other threats against the United States. For the Navy, Coast Guard and Marine Corps, operating in the coastal ocean is critical to maintaining operational readiness.² Although the ocean may seem vast, a unified effort is necessary to balance increased offshore activity with the need to maintain U.S. military proficiency and national security and ensure the safety and sustainability of this vital resource.

White House Executive Order 13547 adopted the final recommendations of the Interagency Ocean Policy Task Force and established the National Ocean Council to implement an ocean policy to safeguard the country's ocean interests. The executive order requires the council to work with stakeholders across the country to develop coastal and marine spatial planning.³ To improve transparency and coordination, nine "regional planning bodies" were created to manage the neighboring coastal ocean and produce plans by 2015 for incorporation into the national ocean plan.⁴ Although significant progress has been made on national ocean planning over the past four years, efforts across the nation to improve information sharing and coordination among ocean users are inconsistent. Meanwhile, increased offshore activity and competition for space in the coastal ocean have created tension among national security, commercial industry and ocean conservation communities.⁵

As a steward of the ocean, the military expends significant time and resources to comply with federal environmental requirements. However, military users are often challenged by the environmental conservation community because of the potentially harmful effects on ocean life as a result of certain military activities.⁶ The development of a national coastal ocean mapping system that integrates geospatial data from all coastal ocean users (federal

agencies, the military, local and state regulators and law enforcement, industry and private individuals) would be an integral step toward balancing the offshore training needs of the military with the needs of ocean conservation groups and private-sector communities. Such a mapping system would also help integrate federal, military and regional planning efforts to manage these areas more effectively. Ultimately, it would increase transparency and awareness of the burgeoning activity along America's coasts. The military, in particular, would benefit from a mapping system, which would inform operational planning efforts and help it comply with applicable environmental laws and statutes.

The Growing Importance of the Coastal Ocean

As the diversity and volume of activity in the coastal ocean increases and numerous users vie for improved access, the potential for conflict rises. In 2010, the Interagency Ocean Policy Task Force recognized that “[d]emands for energy development, shipping, aquaculture, emerging security requirements and other new and existing uses are expected to grow. Overlapping uses and differing views about which activities should occur where can generate conflicts and misunderstandings.”⁷

MILITARY ACTIVITIES

The ocean functions as a geographic barrier for the United States, as well as a highway for U.S. military forces to deploy around the world. In order to be prepared for national defense, the Navy, Coast Guard and Marine Corps require large areas of the coastal ocean for training and long-range weapons testing. To maximize situational awareness and ensure safety and operational effectiveness, the military places significant value on the collection and analysis of data.⁸

To operate in the coastal ocean, federal agencies – including the military – must undergo an

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expansive permitting process to comply with the National Environmental Protection Act. The law requires federal agencies to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health of its programs, policies, and activities.”⁹ Military users must also comply with a host of other marine-based environmental protection laws, such as the Endangered Species Act, the Marine Mammal Protection Act, the Coastal Zone Management Act and the Clean Water Act, as well as state environmental protection laws.

To plan and chart operation areas for defense exercises in the coastal ocean, the military is required to craft detailed environmental impact statements indicating compliance with existing federal regulatory statutes. The process to obtain the necessary permits is arduous and requires significant time and resources. For example, the Navy has spent nearly five years attempting to obtain the necessary permits for a training exercise that begins in January 2014. Because the permits expire after five years, the Navy will need to start the permitting process over again once the exercise is over to secure mission-critical offshore training space.¹⁰

COASTAL TRADE AND TRAFFIC

The U.S. economy is dependent on the uninterrupted flow of waterborne commerce. A 2009 analysis by the National Oceanic and Atmospheric Administration (NOAA) – the most recent data available – concluded that the oceans and the Great Lakes support 2.6 million jobs and contribute \$223 billion to the U.S. gross domestic product (GDP).¹¹ The U.S. population is also largely concentrated within 50 miles of the coastline, and coastal communities are home to 44 million jobs that generate 41 percent of GDP.¹²

Transporting goods by ship is very efficient, and the demand for waterborne transport of goods continues to increase. The American Association of Port Authorities reports that more than 65,000 vessels arrive at U.S. ports annually to move more than 2 billion tons of cargo, and the American Waterways Operators reports that over 27,000 tugs with barges move more than 800 million tons of domestic cargo annually.¹³ According to the Bureau of Transportation Statistics, the total value of marine freight is estimated to increase by 43 percent domestically and 67 percent internationally between 2010 and 2020.¹⁴ Traffic from cruise ships, small passenger vessels, excursion vessels and recreational boats is also anticipated to increase, further congesting the coastal ocean.

OFFSHORE ENERGY

The offshore energy industry is a vital contributor to the nation's energy needs. Operations in the Gulf of Mexico alone account for 23 percent of total U.S. crude oil production and 7 percent of total U.S. dry natural gas production.¹⁵ The migration of sophisticated technology to offshore reserves has accounted for major increases in subsea production and may enable the extraction of additional untapped reserves.

Renewable energy has also emerged as a growing offshore industry. 2013 was the first year in which

the U.S. government auctioned offshore area leases for wind energy projects.¹⁶ Meanwhile, wave energy projects have raised concerns in the maritime community, with offshore development coming into conflict with coastal fisheries management in the Pacific Northwest.¹⁷ Other coastal ocean users have expressed concern that new energy projects often require the rerouting of established shipping routes. This type of activity can interfere with efficient transportation of goods, disrupt commercial and recreational fishing grounds and disturb defense readiness through the induction of electromagnetic fields near offshore military training areas.¹⁸

LIVING MARINE RESOURCES

Expanded use of the ocean also has an adverse impact on fisheries and marine mammals, and some populations are already at risk. For instance, North Atlantic right whales are highly endangered, with a population of fewer than 450.¹⁹ They migrate the length of the east coast twice a year, feeding in heavily fished areas off New England in summer and calving off the ports of Savannah and Charleston in winter. Measures have already been implemented to reduce the likelihood of vessels colliding with the whales, including the establishment of areas to avoid, traffic separation schemes, recommended routes, mandatory ship reporting areas, seasonal management areas and dynamic management areas.²⁰ Still, NOAA and others highlight the potential risk for extinction if shipping lanes are rerouted, underwater fixed structures are constructed and the Navy continues to use sonar in or along the whales' migration route.²¹

Fish stocks and other living marine resources move freely though the coastal ocean and high seas and are managed through scientific study, prescriptive fisheries regulations and fisheries management councils. In addition to federal regulations for commercial fisheries management, certain species can only be recreationally fished during specific

time frames. Incorporating publically available data layers into a national coastal ocean map would promote sustainable fisheries, annotate marine protected areas for all coastal ocean users and aid in ocean conservation to protect living marine resources.

CONFLICTS OF INTEREST

Recent disputes between the military and other users over the use of the coastal ocean have highlighted competing economic, security and environmental interests in this increasingly crowded space.

A transparent communication and operational planning tool based on “hard data” ocean maps would be a useful aid in avoiding similar disputes in the future and would help to better align military offshore training needs for national defense readiness with private-sector users and ocean conservation groups.

Off the coast of Virginia earlier this year, the Departments of Defense and Homeland Security raised an issue regarding the location of a planned offshore wind farm, contending that the introduction of fixed infrastructure in “off limits” military training areas could create an unsafe situation, endanger lives or impede military operations.²² Private operators in the area have also voiced concerns that the proposed wind farm would shift the pre-established routes of commercial vessels navigating the area and “create delays or unsafe operating situations for towing vessels during

hazardous weather and restrict north to south coastal navigation.”²³ Additionally, this area is situated within the migratory path of several marine species, including the previously mentioned North Atlantic right whale.

In March, the California state government ruled to limit the Navy’s sonar and explosives activity during exercises off its coast, citing potential harmful effects on highly concentrated numbers of endangered marine mammals.²⁴ It is unclear what effect this ruling will have; similar injunctions in the past by the California state government and other governmental and nongovernmental organizations have led to exemptions by the federal government for the Navy. A recent court ruling in which a consortium of conservation organizations lost a decision regarding Navy plans to build an under-sea training range further highlights the potential for conflict between conservation and military interests.²⁵

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Ocean Governance, Regional Coordination and the Importance of Data

Management of the coastal ocean is fundamentally an issue of governance. However, the diverse group of agencies with statutory obligations to manage ocean resources or undertake activities in these areas creates challenges for effective governance in the coastal ocean. For instance, the Department of the Interior’s Bureau of Ocean Energy Management leases rights to drill for oil and natural gas and build wind farms in the coastal ocean, while the Commerce Department’s National Marine Fisheries Service manages the number, type and location of

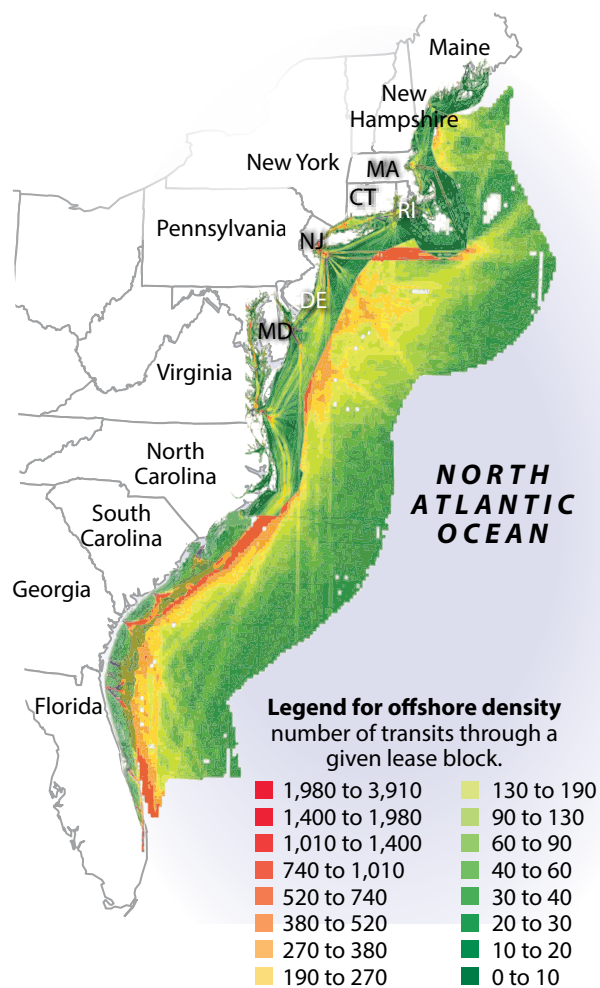
fish that can be caught and oversees the permitting process for the Navy to use sonar in training areas. In total, more than 140 federal laws govern the coastal ocean areas.²⁶

The creation and empowerment of regional planning bodies has been a central pillar of the national ocean policy. The military, particularly the Coast Guard and Navy, play a key role in regional planning efforts along with public and private stakeholders. Some regional planning bodies have made significant progress to advance ocean planning. Because of a lack of funding and centralized oversight, efforts throughout the nation have been inconsistent.

The Northeast Regional Ocean Council and the Mid-Atlantic Regional Council on the Ocean (MARCO) are widely recognized as leaders in regional planning. MARCO has led the way in transparency, cooperation and data sharing through the MARCO portal. If this level of effort could be replicated across the nation and integrated into an ocean plan, ocean users would clearly benefit.

Even for these relatively successful regional groups, challenges persist. Participants in a MARCO workshop in April noted that “the fragmentation of federal management was so strong that it would be difficult for the Mid-Atlantic Regional Planning Body to overcome in any meaningful way” and that “the lack of dedicated funding in support of regional ocean planning was considered a substantial challenge.”²⁷ For effective coastal and marine spatial planning, the National Ocean Council must empower regional planning bodies to address the competing uses in each region and resolve conflicts. Furthermore, there must be a national-level coordination mechanism to ensure consistency across adjacent areas and nationally unified ocean governance. Without sustained funding for their efforts, regional planning bodies will face challenges in

HEAT DENSITY MAP BY NUMBER OF TRANSITS



Source: U.S. Coast Guard, *Atlantic Coast Port Access Route Study Interim Report*, USCG-2011-0351 (July 13, 2012), http://www.uscg.mil/lantarea/acpars/docs/ACPARS_Interim_Report-Final_09AUG.pdf, Appendix III, 7.

creating uniform plans by 2015, and conflicts among users are likely to persist.

Numerous information technology programs map ocean use, but no single program comprehensively captures all major coastal ocean activities. Perhaps the most notable effort, the ocean.data.gov website, is designed to serve as the National Ocean Council’s gateway for ocean use data. This website

has many positive qualities and has the potential to become a comprehensive resource for coastal ocean mapping. However, it is based on limited data – almost exclusively from federal sources – and therefore captures only a subset of coastal ocean activity. Other publicly available geospatial applications, such as the “Marine Cadastre” program, a joint venture between the NOAA and the Bureau of Ocean Energy Management, are useful in certain applications, but are also limited by funding and scope of data.

Informed decisions require good data. To exemplify the importance of transparency and data sharing, the Coast Guard initiated the Atlantic Coast Port Access Route Study to evaluate vessel routing from Florida to Maine and assist the Bureau of Ocean Energy Management’s efforts to identify priority areas for offshore wind energy development. Data from automatic identification systems to track vessel movements were used to create a comprehensive view of current shipping routes, allowing analysts to depict the concentration of vessel movements and approaches to ports along the eastern seaboard. The data provide a useful starting point for discussions about port access and vessel routing and efforts to preserve navigational safety in conjunction with offshore energy development proposals.²⁸

This is an era of “big data” and ever-increasing amounts of publicly available information. Ocean users should strive to foster information sharing, improved cooperation and conflict avoidance. As the environmental compliance administrator, the Council on Environmental Quality should encourage government agencies to use coastal ocean mapping to ease the administrative burden of complying with federal statutes and regulations. A comprehensive coastal ocean mapping system – based either on an existing platform, such as ocean.data.gov or on entirely new software – should compile, integrate and analyze the available data. Those data need to be collected in a holistic manner for all

major activities in the coastal ocean, and they should include overlays describing such characteristics as water depth, bottom type, currents, shipping routes, marine protected areas, commercial and recreational fishing grounds, projected oil and gas lease sales, and military training areas. Using the standardized data collection methods, this system would produce region-specific maps based on the unique characteristics of each area. A publicly accessible and user-friendly mapping system could provide users and regional planning bodies with essential tools for national ocean planning.

Given the U.S. military’s history of researching and acquiring technology to advance coastal ocean awareness, we recommend that it lead the mapping effort, with input from public and private stakeholders. The military should invest in the development of a national coastal ocean mapping system that would provide regional planning bodies with a unified tool for ocean planning.

Conclusion

The development of a national coastal ocean mapping system would benefit all coastal ocean users and is an integral step toward more effective and thorough ocean planning. Through comprehensive awareness of major offshore activity, the United States would simultaneously advance national security, economic development and ocean conservation.

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ENDNOTES

1. For the purposes of this policy brief, the term “coastal ocean” is used to holistically describe the offshore area inward of the exclusive economic zone. In 1983, Presidential Proclamation 5030 defined the U.S. exclusive economic zone as the region “contiguous to the territorial sea . . . [that] extends to a distance [of] 200 nautical miles from the baseline from which the breadth of the territorial sea is measured.” The White House, “Presidential Proclamation 5030,” *Federal Register*, 48 no. 50 (March 14, 1983), 10605.
2. In *A Cooperative Strategy for the 21st Century Seapower*, the Navy, Coast Guard and Marine Corps established a unified strategy to integrate sea power to prevent and win the nation’s wars, ensure the free flow of commerce and protect the homeland, http://www.navy.mil/maritime/maritime_strategy.pdf.
3. Coastal and Marine Spatial Planning (CMSP) is “a comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas. Coastal and marine spatial planning identifies areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives. In practical terms, coastal and marine spatial planning provides a public policy process for society to better determine how the ocean, our coasts, and Great Lakes are sustainably used and protected—now and for future generations.”
4. White House Council on Environmental Quality, *Final Recommendations of the Interagency Ocean Policy Task Force* (July 19, 2010), 8, http://www.whitehouse.gov/files/documents/OPTF_FinalRecs.pdf.
5. For evidence on expanding and increasing ocean uses, see White House Council on Environmental Quality, *Final Recommendations of the Interagency Ocean Policy Task Force*, 13, 39; Office of Naval Intelligence and Coast Guard Intelligence Coordination Center, *Threats and Challenges to Maritime Security 2020* (March 1, 1999); Department of Transportation, *North American Cruise Statistical Snapshot, 2011* (March 2012), 1; and Department of Transportation, *America’s Container Ports: Freight Hubs That Connect Our Nation to Global Markets* (June 2009), Fig. 11.
6. One military activity that is commonly criticized by conservation groups is the use of sonar, which may have damaging effects on marine mammals. See Laura Zuckerman, “Environmentalists Win U.S. Court Fight to Protect Whales from Navy Sonar,” *Reuters*, September 26, 2013; and Warren Richey, “Supreme Court Lifts Limits on Navy Sonar near Whales,” *The Christian Science Monitor*, November 12, 2008.
7. White House Council on Environmental Quality, *Final Recommendations of the Interagency Ocean Policy Task Force*.
8. Over the past five decades, the Department of Defense has invested in science and technology to enable precise navigation. For instance, the U.S. military invented the technology for the Global Positioning System that is now commercially available to the public. Commercial mariners and private citizens benefit through improved navigation safety systems. Scott Pace et al., *The Global Positioning System: Assessing National Policies* (Santa Monica, CA: RAND Corporation, 1995).
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10. Department of the Navy, Fleet Forces Command, “Atlantic Fleet Training and Testing, Environmental Impact Statement/Overseas Environmental Impact Statement: Background,” Aftteis.com, accessed November 15, 2013, http://aftteis.com/Portals/4/aftteis/FEIS/Section/00_AFTT_FEIS_Exec_Summary.pdf.
11. NOAA Coastal Services Center, *NOAA Report on the Ocean and Great Lakes Economy of the United States* (prepared by Booz Allen Hamilton, April 6, 2012), <http://www.csc.noaa.gov/digitalcoast/sites/default/files/files/1366381798/econreport.pdf>.
12. The White House, *National Ocean Policy Implementation Plan* (April 2013), 5.
13. American Association of Port Authorities, “U.S. Public Port Facts,” Aapa-ports.org, accessed November 15, 2013, <http://www.aapa-ports.org/Industry/content.cfm?ItemNumber=1032>; American Waterways Operators, “Domestic Maritime Industry: An ‘Economic Engine and Foundational to America’s Security,’” Americanwaterways.com, September 18, 2013, <http://www.americanwaterways.com/media/press/2013/domestic-maritime-industry-%E2%80%9Ceconomic-engine-and-foundational-america%E2%80%99s-security%E2%80%9D>; and Department of Transportation Maritime Administration, *Vessel Calls Snapshot 2011* (March 2013), 1.
14. Department of Transportation Maritime Administration, “Marine Transportation System (MTS),” Dot.gov, accessed November 15, 2013, http://www.marad.dot.gov/ports_landing_page/marine_transportation_system/MTS.htm.
15. Energy Information Administration, “Gulf of Mexico Fact Sheet,” Eia.gov, accessed November 15, 2013, http://www.eia.gov/special/gulf_of_mexico/; and Energy Information Administration, “Federal Offshore-Gulf of Mexico Field Production of Crude Oil,” Eia.gov, accessed November 15, 2013, <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pets&mcrfp3fm1&f=a>.
16. These leases solidified the placement of offshore wind-energy areas, with two blocks off the coast of Massachusetts and Rhode Island covering 164,750 acres and one block off the shores of Virginia covering approximately 112,799 acres. Mark Drajem and Andrew Herndon, “Deepwater Wins First Auction for U.S. Offshore Wind Lease,” *Bloomberg*, July 31, 2013, <http://www.bloomberg.com/news/2013-07-31/deepwater-wind-wins-auction-for-first-offshore-wind-lease.html>; and Bureau of Ocean Energy Management, “Commercial Lease for Wind Energy Offshore Virginia,” Boem.gov, accessed November 15, 2013, <http://www.boem.gov/Renewable-Energy-Program/State-Activities/VA/Commercial-Lease-for-Wind-Energy-Offshore-Virginia.aspx>.
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20. Steve M. Tucker, "A Slippery Fish: Effective, Integrated Marine Resources Management," *Proceedings of the Marine Safety and Security Council*, 70 no. 3 (Fall 2013), 33.

21. A report by the NOAA Fisheries Office of Protected Resources on North Atlantic right whales indicates the potential threats to marine animal species in overlapping areas of activity with humans. NOAA Fisheries Office of Protected Resources, "North Atlantic Right Whales"; White House Council on Environmental Quality, *Final Recommendations of the Interagency Ocean Policy Task Force*, 45; and State of Massachusetts, Executive Office of Energy and Environmental Affairs, "High Risk Area for Right Whales in Western Cape Cod Bay," April 14, 2013.

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May 31, 2013, <http://www.americanwaterways.com/sites/default/files/legacy/index/AWONCWindCommentsMay2013.pdf>.

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A pod of dolphins surfaces as Arleigh Burke-class guided-missile destroyer *USS Halsey* (DDG 97) maneuvers behind Nimitz-class aircraft carrier *USS Carl Vinson* (CVN 70) during a replenishment-at-sea.

(COMMUNICATION SPECIALIST 2ND CLASS
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