

THE NAVY'S ENERGY & ENVIRONMENTAL MAGAZINE

# CURRENTS

winter 2015-16

Navy Collaborates, Monitors to Better Understand

## SEA TURTLE *movements* in San Diego Bay

Satellite Tagging May Provide  
Clearer Picture of Threatened Species

Spotlight on Departing DASN (E) Donald R. Schregardus  
Navy Closing in on One Gigawatt of Renewable Energy  
SECNAV Announces 2015 Energy & Water Management  
Award Winners

San Clemente Island  
**Life on  
the Edge**  
Poster Inside!



# THE NAVY'S ENERGY & ENVIRONMENTAL MAGAZINE **Currents**

**Chief of Naval Operations  
Energy and Environmental Readiness Division**

**DIRECTOR**

Rear Admiral Douglas G. Morton

**DEPUTY DIRECTOR**

Mr. Karnig H. Ohannessian

**DIRECTOR, COMMUNICATION AND OUTREACH**

Kenneth Hess

kenneth.hess@navy.mil

703-695-5077

**Currents Staff**

**MANAGING EDITOR**

Bruce McCaffrey

Bruce McCaffrey Consulting, Inc.

brucemccaffrey@sbcglobal.net

773-376-6200

**CONTRIBUTING WRITER**

Kathy Kelley

**ART DIRECTOR**

Victoria Bermel

**GRAPHIC ARTIST**

Amy Jungers

**DISTRIBUTION MANAGER**

Lorraine Wass

ljwass@outlook.com

207-384-5249



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## cover

Since the closure of a power plant in the southern part of San Diego Bay, a collaborative monitoring effort has been underway among the Navy, the National Marine Fisheries Service and others to better understand changes in the movement and behavior of the green sea turtle so that the Navy and this turtle can continue to share the resources in the bay.



### **Navy Collaborates, Monitors to Better Understand Sea Turtle Movements in San Diego Bay**

Satellite Tagging May Provide Clearer Picture of Threatened Species

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# features

- 14 **Cherry Point Environmental Scientists Bring Stream Back to Life**  
Restoration Project Flows Smoothly Past Initial Stage
- 18 **ESTEP Project Studies Data Center Smart Metering Technology**  
Effort Targets Large Energy Users for Greatest Efficiency Returns
- 24 **SECNAV Announces 2015 Energy & Water Management Award Winners**  
Program Recognizes Notable Progress Toward Energy Reduction Goals
- 52 **NSETTI Program's Energy Innovation Demonstration Projects Showing Promise**  
Efforts Include Hybrid Electric Vehicle Validation & Use of Seawater for Air Conditioning
- 60 **SSC Pacific Launches Software to Guarantee Compliance With Range Operating Permit**  
Sonar Permit Administration & Management Software Simplifies Sonar Use Recordkeeping
- 64 **NAS Sigonella Named Energy Biggest Loser in Navy Region EURAFSWA Competition**  
Second Annual Competition Pits Bases in Energy Reduction Battle
- 68 **Navy Closing in on One Gigawatt of Renewable Energy**  
An Important Step Toward Achieving the DON's Consumption Goal from Alternative Energy Sources



# departments

- 4 **N45 Outlook**
- 22 **Did You Know?**
- 29 **Best Shot**
- 30 **Trends of the Environment**
- 38 **Spotlight on the Departing DASN for the Environment**  
Donald R. Schregardus



## Changes & Challenges on the Horizon

**WELCOME TO THE** winter 2015-16 issue of *Currents*. Thank you for taking the time to read this magazine and for staying engaged on the vital issues it covers. As director of OPNAV N45, I am privileged to have the opportunity to work with such consummate professionals in the energy, environmental and compatibility portfolios here in the Pentagon and throughout the Fleets and systems commands. There is an incredible amount of important work going on in these areas that ultimately helps accomplish the mission, and it's largely due to the efforts of you and your colleagues that the Navy has such good stories to share.

Admiral John Richardson took over as the Chief of Naval Operations (CNO) in August 2015. In early January he released "A Design for Maintaining Maritime Superiority," a strategy document that describes the geopolitical, technological, and information challenges the Navy faces and outlines his vision for meeting them. Therein he identifies four core attributes—integrity, accountability, initiative and toughness, which will prepare us to operate successfully in the current and future environment.

as stewards of the natural environment when planning our activities, and as stewards of the taxpayer dollar when refining our EIS/EA document development processes to be more efficient. I'm hopeful that each Navy technical expert with a stake in this recognizes his or her accountability and takes the time to offer thoughtful input.



Meanwhile, Navy training and testing—and the environmental planning that supports it—continues. Public review for three final EISs (Naval Weapons Systems Training Facility Boardman, Naval Air Weapons Station China Lake, and Fallon Range Training Complex) is now complete. Scoping for the Phase III Atlantic Fleet Training and Testing and Hawaii-Southern California Training and Testing areas

I'm hopeful that each Navy technical expert with a stake in this recognizes his or her accountability and takes the time to offer thoughtful input.

I believe each of those core attributes is easily applicable and relevant to our specific work, and will offer an example for core attribute #2, accountability. Back in July of 2015, we launched a six-month field trial of tools for standardizing Navy environmental assessments (EA) and environmental impact statements (EIS). Working closely with Deputy Assistant Secretary of the Navy (Environment) staff, a steering group of echelon I and II technical experts developed a document preparation guide, a series of templates, and "drop-in" text for explaining our analysis of impacts on air, water, and land resources. We have asked for feedback from the teams who will ultimately use these tools, with the goal of producing these documents at lower cost while reducing the time burden and increasing consistency across the Navy. We need to be accountable

began with the publication of our notices of intent in the Federal Register in November 2015 and ran through mid-January of this year.

Now I'd like to draw your attention to some of the stories we've included in this issue of the magazine.

Our cover story "Navy Collaborates, Monitors to Better Understand Sea Turtle Movements in San Diego Bay" profiles an effort among the Navy, the National Marine Fisheries Service and others to better understand changes in the movement and behavior of the green sea turtle to enable the Navy and this turtle to co-exist effectively in San Diego Bay.

In one of our feature stories, "Navy Closing in on One Gigawatt of Renewable Energy," we provide an overview

of the Renewable Energy Program Office’s role in leading the Navy’s efforts to produce or procure one gigawatt of renewable energy generation capacity—a significant step toward our energy independence.

Two articles in this issue highlight the innovative work being sponsored by Navy’s energy-focused research and development (R&D) programs. In our article “ESTEP Project Studies Data Center Smart Metering Technology,” we educate readers about an effort funded by the Energy Systems Technology and Evaluation Program to evaluate the effectiveness of smart metering technologies that help minimize the energy consumption of some the Navy shore community’s biggest single energy users—data centers. The second article comes from our colleagues at the newly-formed Navy Shore Energy Technology Transition and Integration (NSETTI) program.

Our article, “NSETTI Program’s Energy Innovation Demonstration Projects Already Showing Promise,” describes a number of the program’s efforts including validating a hybrid electric utility vehicle and exploring the use of seawater for island base air conditioning.

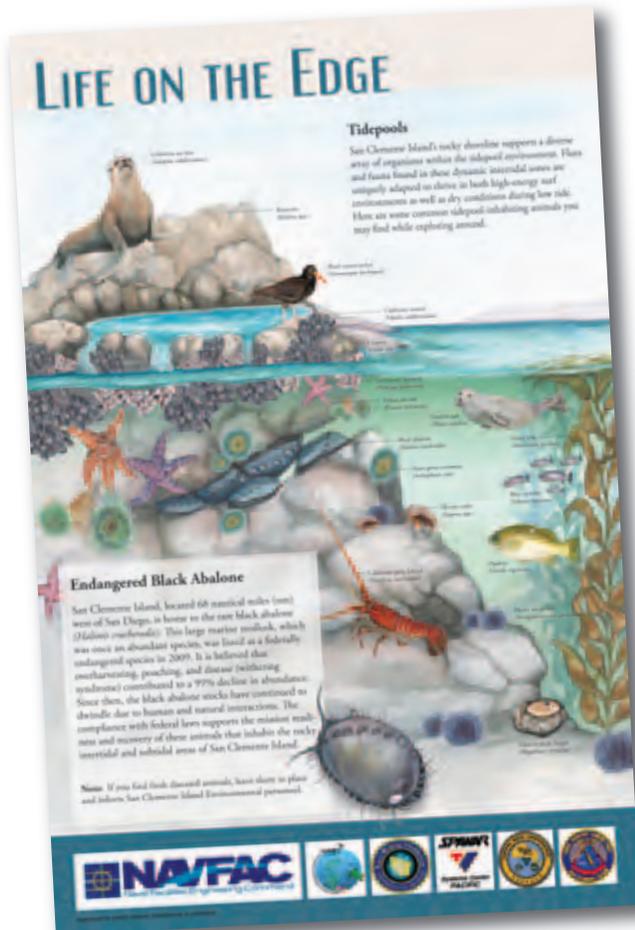
Both of these R&D programs are helping us to rethink our approach to energy use and reshape the Navy’s energy culture.

In this issue, we also pay tribute to the winners of the Secretary of the Navy’s 2015 Energy and Water Management awards and the “losers” in the second annual Energy Biggest Loser competition hosted by Navy Region Europe, Africa, Southwest Asia. Congratulations to all the winners (and losers).



Our most junior teammate may have the best idea; we must be open to capturing (it).

—Admiral John Richardson



Finally, our center spread contains a copy of the “Life on the Edge” poster which you can detach and hang on the wall in your cubicle or office. This poster comes to us from our colleagues at the Naval Facilities Engineering Command Southwest and the Space and Naval Warfare Systems Center Pacific, and explains the valuable ecological role of tidepools around San Clemente Island as well as threats posed to the black abalone from overharvesting and disease.

Thanks again for your attention, and for all you do to support the warfighter. If you or your command need help from my office, and/or have ideas for changes you think would benefit the Navy in these areas, don’t hesitate to contact us. As the CNO states in his design document under the “initiative” core value, ‘our most junior teammate may have the best idea; we must be open to capturing (it).’ We value ideas from the entire Navy workforce. For ideas specific to energy, drop us a line at [energywarrior@navy.mil](mailto:energywarrior@navy.mil).

Rear Admiral Doug Morton  
 Director, Chief of Naval Operation Energy and Environmental Readiness Division

Navy Collaborates, Monitors to Better Understand

# SEA TURTLE *movements* in San Diego Bay

## Satellite Tagging May Provide Clearer Picture of Threatened Species

**S**ince the closure of a power plant in the southern part of San Diego Bay, a collaborative monitoring effort among the Navy, the National Marine Fisheries Service (NMFS) and others has been underway to better understand changes in the movement and behavior of the green sea turtle so that the Navy and this turtle can continue to share the resources in the bay.

San Diego Bay is home to one of the largest U.S. Navy complexes in the world and California's second largest incorporated city. Today, more than 25 percent of the U.S. Navy fleet is homeported in San Diego. Maintaining readiness in this ecosystem without causing harm to the natural resources is an ongoing challenge. There are a variety of threatened and endangered

species that rely on the San Diego Bay ecosystem at different stages of their lives. One of these is the East Pacific green sea turtle.

The East Pacific green sea turtle is a federally threatened species in San Diego Bay. While the majority of the population has traditionally lived in the quieter south part of the bay, the turtles may be venturing into areas more frequently used for U.S. Navy, recreational, and commercial activities. An increased presence of turtles outside of the southern portion of the bay may have potential implications for management of this species, as there is a higher likelihood of boat strikes and other potentially adverse human interactions.



# Green sea turtles have inhabited San Diego Bay since at least the mid-1800s.

Green sea turtles have inhabited San Diego Bay since at least the mid-1800s. They have most frequently been observed in the southern section of the bay, known as the South Bay, most of which is designated as the San Diego Bay National Wildlife Refuge. The South Bay is well suited to support this turtle population because it is shallower than the central and northern parts of the bay, has a smaller shipping channel, and extensive eelgrass beds. Another attraction for the turtles until recently was the warm waters heated by the effluent from the fossil fuel-based South Bay Power Plant (SBPP) in Chula Vista.

## *A Habitat Within a Habitat*

The SBPP, in operation from 1960 to 2010, discharged warm water into the South Bay. The outfall area released water used to cool plant generators, producing water temperatures consistently in the green turtle's comfort range (59 degrees Fahrenheit) during operation of the plant. Automated monitoring conducted by underwater hydrophones found that when the SBPP was in operation, turtles consistently and frequently used the warm water outfall area. Additionally, as a result of the warm waters from the power plant, a study published in 2012 indicated the turtles in the South Bay grow faster than green sea turtle populations elsewhere in similar temperate zones.

Since the plant's closure, the waters are returning to their natural ambient temperature. Given that turtles demonstrate strong site fidelity to habitats, it may be that turtles are presently adjusting to the "new normal" of their environment in the South Bay. However, preliminary research has shown that some turtles are moving beyond the South Bay into other areas of the bay. These areas are much more heavily used by U.S. Navy, commercial, industrial, and recreational boaters. This is problematic because vessel collisions are

a known source of turtle mortality in other parts of the world, as is entanglement in fishing gear.

To a lesser extent, construction activities have been known to have some effect on turtle behavior and such activities are more prevalent in the central and northern sections of the bay. Naval operations in San Diego Bay frequently necessitate pile driving for routine in-water infrastructure construction and maintenance. Current in-water naval projects include the replacement of a fuel pier, the installa-



A green sea turtle on the jetty near the site of the former power plant in the South Bay.

NMFS permit #16803

tion of at least three boat lifts at Naval Base Point Loma, and the demolition and replacement of a pier at Naval Base San Diego. These in-water construction projects in San Diego Bay require consultation under the Endangered Species Act (ESA) with the National Marine Fisheries Service (NMFS) to determine whether such activities “may affect, but are not likely to adversely affect” green sea turtles. These consultations often require conditions to help minimize or avoid construction-related interactions with sea turtles. For example, when these or any in-water pile construction activities are performed at Navy facilities, spotters are assigned to visually sweep a 120 to 130 meter area for green sea turtles. If turtles are seen, prior to or during pile activity, work will not continue until the animal is known to leave the area or at least 15 minutes have passed since the last sighting.

Although these are the current NMFS-approved management practices, it is unknown how turtle behavior may be altered with water temperature changes, and what adjustments may need to be made to these and other human uses of the bay. It continues to be in the best interest of the Navy to remain a strong team partner with NMFS to better understand changes in turtle behavior or movements to preserve the Navy mission.

Given the conservation concerns regarding the federally threatened East Pacific green turtle, reducing threats to these turtles in their foraging areas is imperative. Management strategies must be able to accommodate shifts in movement and habitat use of this foraging population of turtles. For example, if automated monitoring reveals that the turtles are active at night, construction activities could continue to take place outside of these known foraging hours. Such strategies



Claire Fackler,  
CINMS, NOS, NOAA



cannot be formulated however, without sufficient knowledge of these behavioral patterns.

### Past & Current Monitoring Efforts

Green turtles have been monitored in San Diego Bay since the 1970s beginning with researchers at San Diego State University (SDSU). The monitoring program evolved into a collaborative effort headed by the NMFS Marine Turtle Ecology and Assessment Program based at the Southwest Fisheries Science Center (SWFSC) in La Jolla, California. Recent monitoring efforts have included NMFS collabora-

## The Basics About the GREEN SEA TURTLE

WEIGHING UP TO 600 pounds, the green sea turtle (*Chelonia mydas*) is one of the largest sea turtles in the world. It inhabits tropical and subtropical coastal waters around the world. Unlike most sea turtles, it occasionally clambers onto land to sunbathe. Another fairly unique characteristic of the green sea turtle is its diet—adults are largely herbivorous, feeding on sea grasses and algae. Juvenile green turtles will also eat invertebrates like crabs, jellyfish, and sponges.

The green sea turtle is named for the color of its fat, not its shell, which is typically brown or olive. Green turtles vary in size and shape around the world, but the East Pacific green turtle is particularly different. These turtles are darker in color with a different shaped shell and display a myriad of behaviors, many of which are not seen in green turtles elsewhere.

Green turtles, like other sea turtles, migrate from feeding sites to nesting grounds approximately once every three years, where they lay their eggs on sandy beaches. The green sea turtles that inhabit San Diego Bay are known to travel to Mexico to nest.

The green sea turtle is harvested for eggs and food in many parts of the world. Other green sea turtle parts are used for leather, and small turtles are sometimes stuffed and sold as souvenirs. Incidental catch in commercial shrimp trawling is an increasing source of mortality.

## *Some turtles* were found to regularly inhabit the waters off of Naval Base Coronado.

tions with SDSU, Space and Naval Warfare Systems Center Pacific, Naval Facilities Engineering Command Southwest, and the Unified Port of San Diego.

Before the SBPP closed, passive sonic telemetry technology was utilized to track turtle movements in the bay. Beginning in 2006, researchers deployed stationary hydrophone receiver stations in various locations throughout the South Bay. From four years of passive acoustic monitoring efforts conducted pre-power plant closure, researchers discovered regular turtle movement habits. Generally, the power plant outfall and eelgrass beds in the South Bay were the mostly commonly used areas and were frequented during dawn and dusk. During the day, turtles were often present in the Sweetwater Marine Terminal and designated boating lanes in the South Bay. There were also a few turtle detections in the central part

of the bay near Naval Amphibious Base Coronado in 2007 and 2008.

In addition to the passive acoustic monitoring efforts, seven satellite tags were attached to turtles in San Diego Bay from 2007 to 2009. Those data are now being analyzed.

The first attempt to study turtle movement patterns post-power plant closure included a combination of continued passive sonic telemetry as well as active tracking of turtles.

Out of an estimated 60 to 80 turtles who lived in the bay, a total of 21 were successfully tracked over the course of one year (2011–2012). Turtles were actively tracked via boat surveys on a bi-monthly basis. The data gathered through these surveys allowed the researchers to estimate and map the home range for four of the most commonly tracked turtles. As in the past, data were also gathered passively via underwater

receivers. Those receivers were placed in the South Bay in locations similar to the 2006–2010 monitoring efforts. Additional receivers were deployed in the northern and central portions of the bay as well as on either side of the mouth of the bay to track animals who headed for open waters.

The results of the one year effort concluded that green sea turtle populations were still most heavily concentrated in the south part of the bay, and that habitat use had not yet changed since the closing of the power plant. However, some turtles were found to regularly inhabit the waters off of Naval Base Coronado, the site of a large bed of eelgrass. In the past, turtles had only been documented in this area on a few occasions. Turtles were still regularly detected around the Sweetwater Marine Terminal and the South Bay boating channels, with one sighting in open water north of the Coronado



A green sea turtle enters San Diego Bay in 2012 wearing an acoustic monitoring tag. NMFS permit #16803



Researchers prepare to weigh a green sea turtle.  
 NMFS permit #16803



A researcher from SWFSC reads a flipper tag. The white cloth is placed on the turtle's head to help keep it calm.  
 NMFS permit #16803

Bridge—all areas in which high recreational, industrial, and naval boat traffic occur.

The research team also noted disparities between data gathered via active and passive monitoring methods. This is most likely due to limitations in the performance capabilities of passive receivers in deep or fast-moving water. For a clearer picture, the team recommended satellite tagging for continuing efforts.

### **Post-Power Plant Closure Satellite Tagging Begins**

A satellite tagging effort, funded by Commander, Navy Installations Command (CNIC), Commander, U.S. Pacific Fleet, and the Port of San Diego, began in 2013 and is currently underway.

In conjunction with SWFSC, turtles were captured in accordance with NMFS permit specifications and National Oceanic and Atmospheric Administration Institutional Animal Use and Care protocols. Turtles were measured and weighed, and a Global Positioning

System (GPS)-enabled satellite transmitter was attached to the animal's shell. The tags transmit the animal's position via either GPS or Argos satellite when it surfaces.

Tag transmitter data provide information on how turtles utilize their local habitat, with particular emphasis on their proximity to high Navy-use areas and previously identified areas adjacent to the former power plant. Movements are also correlated with eelgrass coverage data and time of day/night in order to get a better picture of what the turtles are doing and when they are doing it. These types of data will better inform users of the bay to minimize impacts to this species.

Between 2013 and 2014, ten turtles were tagged in the initial effort. Preliminary results appeared to indicate a behavioral difference between an adult turtle who had

## **The Basics About the SOUTH BAY POWER PLANT**

OPENED IN 1960, the SBPP provided electricity to the growing San Diego region for the better part of four decades. At its peak capacity, it generated 700 megawatts of electricity. However, in 1999 San Diego Gas & Electric sold the plant to the Port of San Diego. The Port's eventual goal was demolition, as soon as state regulators determined that the plant was no longer needed for the regional power grid.

By 2005, the plant was operating at reduced capacity, mainly at peak times of the year. In December 2010, regulators determined that the plant was no longer needed and it was immediately decommissioned. The complex was demolished by implosion in 2013. The site is now part of the Chula Vista Bayfront, a planned 500-acre mixed use development.

# Tag transmitter data provide information on how turtles utilize their local habitat.



A researcher applies epoxy to a sea turtle's back in preparation for affixing a satellite tag. NMFS permit #16803



After epoxy is applied, a satellite tag is attached. NMFS permit #16803

likely lived in the bay since the power plant was in operation, and a juvenile who may have entered the bay post-plant closure. The adult stayed closer to the South Bay range, while the juvenile traveled throughout the bay and north to the Los Angeles area—the northernmost point of the range for green sea turtles. Although these satellite data are still being analyzed, there has been a general shift in turtle distribution as compared to the 2007–2009 satellite tag data. The post-closure population has shifted to an adjacent South Bay location.

As the water temperature regimes in the bay continue to return to normal, and turtles adjust to these changes, continued use of satellite tagging is imperative to determine whether the preliminary movements are indicative of the population as a whole.

## Why Monitoring is Necessary

The monitoring of the green sea turtle in San Diego Bay directly supports Sections 7(a)(1) and 4 of the ESA which directs federal agencies to implement a conservation program for federally listed species. The act also requires that federal agencies must consult with NMFS and/or U.S. Fish and Wildlife Service (USFWS) to ensure that their actions do not jeopardize the continued existence of the protected species.

Information collected under the satellite tagging project will support these consultations and will be incorporated into National Environmental Policy Act documentation, including environmental impact statements.

The current tagging project also supports the NMFS recovery plan for the U.S. Pacific populations of the green turtle. In this plan, an action was identified to determine population size and status through regular monitoring and census-taking. Adherence to this recovery plan is a component

## The Basics About SATELLITE TAGGING

SATELLITE TAGS HAVE been used on various marine mammals to help determine migratory routes and provide information on foraging patterns. Satellite-linked tags transmit a signal to a satellite, and position data is then relayed to the researcher.

Previously, all satellite tags were compatible only with polar orbiting Argos satellites. These satellites pass over a given area approximately once every 90 minutes, limiting the potential for picking up an animal's signal to these brief periods. New technology has provided an interface with GPS satellites, greatly improving tracking ability.

In addition to location, the satellite tags used by the current research team deliver such information as water temperature, which helps paint a picture of sea turtle habits and preferences.



With the satellite tag in place, a green sea turtle returns to the bay. NMFS permit #16803.

of San Diego Bay's Integrated Natural Resources Management Plan (INRMP).

The San Diego Bay INRMP is unique in that it's the only Department of Defense INRMP that manages a body of water. The implementation success of the INRMP is due to the successful partnership between the Navy and the Port of San Diego, a non-Federal signatory on the plan. This project addresses several specific concerns detailed in the INRMP regarding the management of naval activities that may affect the threatened green sea turtle. Two of these include:

1. Providing information about the turtle's home range and foraging patterns in order to delineate and protect the range of habitat.
2. Addressing the impacts of potential reduction or fragmentation of turtle forage habitat.

Additionally, the SWFSC will continue to conduct other types of research on the San Diego Bay green sea turtle



NMFS permit #16803

population, such as genetics and population structure, demography, growth, diet and foraging ecology, long-distance migrations, health, and mortality, which will all contribute to the in-depth understanding of the population and will aid in management of the species.

Proper management of U.S. Navy activities in the vicinity of the green sea turtle will help the bay continue to avoid critical habitat designation under Section 4 of the ESA. Critical habitat is defined as “a specific

geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.”

If critical habitat were designated in San Diego Bay, it could result in modifications to training schedules, the temporary closing of specific areas, or restrictions on activities in areas where turtles may occur.

Continued investigation of the current home range shift of green sea turtles is necessary to manage this threatened species and to avoid critical habitat designation. Data from these projects will inform future consultations for facilities projects and will also contribute to the Navy's training range sustainment program known as the Tactical Theatre Training, Assessment and Planning (TAP) Program. [↕](#)

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Jessica Bredvik  
Naval Facilities Engineering Command  
Southwest  
619-532-4182  
DSN: 522-4182  
[jessica.bredvik@navy.mil](mailto:jessica.bredvik@navy.mil)

## The Basics Behind LISTING

THE ESA DEFINES an endangered species as “one that is in danger of extinction throughout all or a significant portion of its range.” A threatened species is “one that is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.” NMFS determines which protections are required for most marine species and USFWS determines which protections are required for land and freshwater organisms, as well as sea otters, polar bears, and manatees. In the case of sea turtles, NMFS regulates activities which may affect sea turtles in the water and the USFWS regulates activities which may affect sea turtles while on land, particularly when nesting.

To better address management of green turtles, NMFS and the USFWS are considering separating the species into 11 distinct population segments (DPS). These designations are based on species biology and genetics, and are intended to offer different levels of protection to various geographical groups. This action removes the current range-wide listing and, in its place, lists eight DPSs as threatened and three as endangered.

# Cherry Point Environmental Scientists Bring Stream Back to Life

## Restoration Project Flows Smoothly Past Initial Stage

**PERSONNEL FROM THE** Environmental Affairs Department (EAD) at the Marine Corps Air Station (MCAS) Cherry Point, North Carolina have just recently completed the construction phase of a stream restoration project to replace an old, dysfunctional culvert system.

### The Setting

From a distance, it looks like just about any other tiny stream winding its way through a small hollow to the broad, murky river at its end. The water, only a trickle now in the early autumn heat, is crossed here and there with

long early-morning shadows from the surrounding sweetgum and longleaf pine and the occasional oak that line the top edges of the shallow, grassy valley.

But what makes this tiny sliver of water in a back corner of Cherry Point's Grant's Landing housing area different, is what you don't see.

Only a few months ago, if you had found yourself crossing this idyllic patch of ground, the dominating feature was an ugly, unnaturally angular concrete culvert. Its purpose was to provide stormwater runoff from nearby residential streets to the Neuse River below. But it didn't

work. It often filled with debris that backed water into filthy mosquito-breeding pools, or was lined with litter.

In nature, it seems, streams pretty much just make themselves. They rely on geology and gravity and weather and, especially, time. They are so good at it that their most basic aim has become a human philosophical idiom—"to take the path of least resistance." So, the smart human stream builder will simply ask, what would nature do?



That's where people like Jessica Guilianelli, a natural resources specialist, and others from EAD come in. Partially driven by a long-standing federal policy to ensure "no net loss" of wetlands due to economic development, it also happens to be the kind of project they live for; to take a piece of ugly human engineering and return it to a natural and logical state.

This particular project began when housing residents complained of the poor drainage and its related consequences, which led the EAD team to investigate the site and to seek possible solutions. It may sound like a reasonably simple task—just remove the culvert, introduce plants to help check the resulting erosion and voilà—you've got a natural creek. But it just isn't that simple.

### The Complexity of Stream Restoration

Geologists have been wrestling with the science of stream restoration for decades and have learned it is an extremely complex process. A stream, they have discovered, is not just a sliver of water cutting through the landscape, but a complex ecosystem that includes the plants and sometimes even animals that surround it and live in it. The stream's riparian zone—or the interface between the land and the stream—is a symbiotic partner that supports, and is supported by, the stream itself.

Guilianelli and her team waded through a river of past research. One of their key influences was renowned hydrologist David L. Rosgen, a pioneer in the science and art of stream restoration. Rosgen developed processes to help determine the necessary characteristics of various kinds of streams, which he classified based on the wide range of those characteristics.

- Would the streambed need to be steep or nearly level, deep or shallow, built on bedrock or gravel or silt or sand?
- Would it need to be straight or sinuous?
- What kind of plants should grow in its vicinity?
- What would be its source?

These and many other questions must be answered during the planning for a new stream. In the end, it would have to be something that had a chance to work under local conditions.

There were other goals too. "This project gave us the opportunity to be good neighbors by improving water quality in the Neuse River," said Guilianelli. The idea is that this new



Jessica Guilianelli examines water samples two weeks after the initial construction stage of a stream restoration project at MCAS Cherry Point. Guilianelli, a Cherry Point natural resources specialist, is primarily seeking early signs of biological progress in the new stream's ecosystem, evidence that the stream restoration project is moving in the right direction.

*Mike Barton*

stream, unlike its solid, manmade predecessor, will allow for the appropriate filtration and distribution of upstream nutrients as they travel along its meandering course. Much of the material that finds its way into this creek from the streets above will be better deposited in the surrounding earth rather than flowing directly into the river below.

"We finally narrowed it down to a set of characteristics that are common to this region and this specific ecosystem," said Guilianelli, who worked with McAdams Company, the Durham, North Carolina, engineering design firm that created the new stream's design; and River Works Inc., a subcontracted river restoration construction company based in Raleigh. "Obviously, the more it works like other natural streams here, the more successful we feel the project will be."

### The Construction Process

According to Phillip Todd, River Works vice president, stream restoration is very complex. "If you don't have a good understanding of the critical design principles, your project can easily go awry," he said.

With 1,300 feet of channel work, the Cherry Point project was small compared to some that the company has tackled, but not without its challenges. "The site was very wet, mucky," said Tony Carmillo, the River Works Cherry Point project manager. "We also had to deal with the river's wind-driven tide that backed water and sand into the site, sometimes damming the outflow into the river."

Further complexity was added as River Works crews worked in the shadow of the residential neighborhood that wrapped around three sides of the construction site. “It was a high-profile project,” said Todd. “It was congested with lots of people watching. Being a good neighbor was a priority—like parking and stockpiling supplies and equipment on the site instead of blocking streets, restricting our work hours, and working within the tight access to remove soil and debris.”



Members of a construction crew make final adjustments near the end of the initial construction stage of a stream restoration project at MCAS Cherry Point. Only weeks before, this piece of ground was the site of a dysfunctional concrete culvert that did a very poor job of routing stormwater runoff from an air station housing area to the Neuse River.

*Jessica Guilianelli*

During the main construction phase, the crew disposed of tons of old concrete and removed 1,500 cubic yards of earth to subtly reform the little valley. Clay was trucked in to help plug the weak areas in the valley floor left by the former culvert as the new stream began to take on its new curvy path. Balanced against the heavy lifting (typical of any sizable construction project) was the fine-tuning required to meet the contract’s very specific design goals. These included building special instream features ranging from hard structures such as logs, to strategically shaped and measured curves, to a very critical angle of grading—less than one percent down—to help control the stream water’s flow.

In September 2015, River Works crews returned to the site to plant more than 9,000 herbaceous plugs (non-woody grasses) within the stream’s riparian zone.

## Lessons Learned

Todd’s advice to future stream restorers is to engage as early as possible in the planning process with your contractor to take advantage of any expertise they may have. “Stream restoration is so different from other horizontal or vertical construction projects,” said Todd. “You must ensure you are working with a company that has the appropriate training and certifications for this kind of work.”

He encouraged planners to share ways of doing things more efficiently and offered the following additional advice:

- Conduct a constructability review with the builder to identify construction practices that might improve the design or be more cost effective.
- Consult with a botanist familiar with regional plant species. Factors such as how wet the site is, and global sourcing of materials like select species of plants or special types and sizes of boulders can all affect the construction timetable and associated costs.
- Plan for the seasonal factors that can influence anything from the human element created by nearby work or living space, to the construction element that is affected by wet and dry climate periods. Build “down days” into your schedule to offset delays caused by weather and other hiccups.

To avoid changes in work orders and price changes, River Works planned for the additional challenges of working on a military installation, most specifically, base access for construction personnel. For this particular project, the company used a local contractor whose personnel were already vetted and cleared to haul dirt from the installation, which kept the project moving smoothly.

## What’s Ahead

If the duration of the project is measured from the time the old culvert was first removed to the shaping, filling of the land and planting of the first thin grasses lining its muddy banks, it lasted only a couple of months. If the time it took to plan, finance, schedule and complete the work was factored in, the period would be closer to three years.

Standing at the place where the young stream meets the quietly flowing river, you can look upstream and begin to see the reward for all of this effort. But the project is far from complete.

By the end of November 2015, larger trees and shrubs were introduced to the 50-foot riparian buffer to provide fauna-friendly shade to the stream, and enhance the natural transition toward civilization. “Nature itself,” says Guilianelli, “will fill in the remaining space between the stream zone and the housing area above.”

Ultimately, the EAD team’s goal is to have a broad range of plant species growing along this serpentine watercourse much like you would find in a completely natural setting. They want this to be a place where neighborhood families can explore or just relax on a pretty day—a little pocket of nature near their own backyards.

“We’re definitely not done here,” says Guilianelli, standing atop the short bluff near the head of the newly designed stream. “We will have to monitor its condition and continue to introduce other plant species as the stream matures.”

Guilianelli has been involved in nearly 20 stream restoration projects prior to this, but this is her first at Cherry Point, and it brought with it some unique challenges, such as the unpredictable effects of the Neuse River’s natural and wind-driven tides. “I look forward to learning how the backflow of river water will affect the stream, how the influx of tidal water will change its appearance over time,” she said.

Guilianelli takes in the full view of the waterway as it snakes its way to the river below—its canvas still has plenty of room for the paints she plans to apply over the coming months and years. “It’s a dynamic system, it’s always changing, and we’ll need to make sure we are allowing it to do its thing, allowing it to stabilize and still maintain that connection to the Neuse,” she continued.



Members of a construction crew lay stabilizing mesh along the serpentine sides of a newly dug streambed during the initial construction stage of a stream restoration project at MCAS Cherry Point. The mesh will help control erosion of the stream’s banks until appropriate plant life is introduced to the stream’s riparian zone in later stages of the project.

*Jessica Guilianelli*



Stormwater runoff finds its way into the Neuse River after traveling through a brand new streambed, the result of a stream restoration project at MCAS Cherry Point. The project, with only its first construction stage now complete, was initiated by EAD personnel to clean up a previously inefficient drainage system and to improve water quality in the Neuse.

*Mike Barton*

That is, of course, the biggest question of all. Will it hold up to the test of time? For now, the improvement is staggering. Even to Guilianelli, who watched as it slowly transformed from a nearly useless concrete-clad scar on the natural environment to its present, infinitely more pleasing state, it’s more than just an “E5” (a highly

sinuous stream with a sand bottom on the Rosgen scale)—it is a beautiful attempt to admit nature had it right the first time. 📍

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Jessica Guilianelli  
Marine Corps Air Station Cherry Point  
252-466-4826  
DSN: 582-4826  
jessica.guilianelli@usmc.mil

# ESTEP Project Studies Data Center Smart Metering Technology

## Effort Targets Large Energy Users for Greatest Efficiency Returns

**WITH FUNDING PROVIDED** by the Office of Naval Research's (ONR) Energy Systems Technology and Evaluation Program (ESTEP), researchers from the Space and Naval Warfare Systems Center, Pacific (SSC Pacific) are evaluating the effectiveness of a number of energy-saving measures, including smart metering technologies, to minimize the energy consumption of some the Navy's biggest single energy users—data centers.

### Data Center Energy Usage

Data centers, or facilities that house computer systems and associated electronics, use a disproportionate amount of energy to run and cool the equipment. Today's commodity servers can handle staggering loads using the same power that a run-of-the-mill desktop computer would have used ten years ago. But a side effect of this increasing efficiency in computation is increasing power density—a server today generates substantially more heat per unit volume than a typical server from ten years ago. In fact, data centers often use 100 times more power than typical office buildings.

Of the roughly 1,000 buildings at Naval Base Coronado, three buildings (a data center and two industrial buildings), account for more than 20 percent of the entire base's total power. This means that data centers are particularly good targets for energy efficiency technologies, because making a small improvement in one or two locations can have a significant effect on a base's overall energy bill.

### Evaluation of Smart Metering Technology

To tackle this issue, the SSC Pacific project team tested and evaluated a type of data center smart metering technology. Currently, data centers in the Navy have minimal metering of their consumption, individual component usage, and growth trends. In terms of cooling, little information is readily available regarding the effectiveness and efficiency of the cooling systems currently in use. A smart metering system would automatically monitor these variables.

The SSC Pacific project team, initially led by Dr. Daniel Grady and now led by Christine In, evaluated a type of

smart metering called Data Center Infrastructure Management (DCIM). This technology tracks and monitors all of the physical assets in a data center, including the power consumption of servers, the room temperature—even the locations of network cables are recorded and logged in DCIM software. This software allows operators to get detailed measurements of how well the data center is performing and make changes to improve that performance. One of the most important functions of DCIM is to gather real-time measurements and asset data into consolidated metrics that provides a high-level picture of how the data center is doing energy-wise.

A 2013 survey by Uptime Institute reported that 83 percent of surveyed commercial data centers had already adopted DCIM. Prior to the SSC Pacific team's evaluation of DCIM, there were no Department of the Navy data centers using this technology. The project team's investigation turned up two primary reasons for this:

1. Navy data center operators and managers don't have visibility of

individual contributions into centralized energy bills and so they don't have a strong incentive to reduce energy consumption.

2. DCIM technology introduces several new security risks. These security risks were evaluated by the SSC Pacific team during the two-year project.

## Date Center Infrastructure

To understand how DCIM works, it is first necessary to understand data center infrastructure and systems. The data center consists of three primary systems:

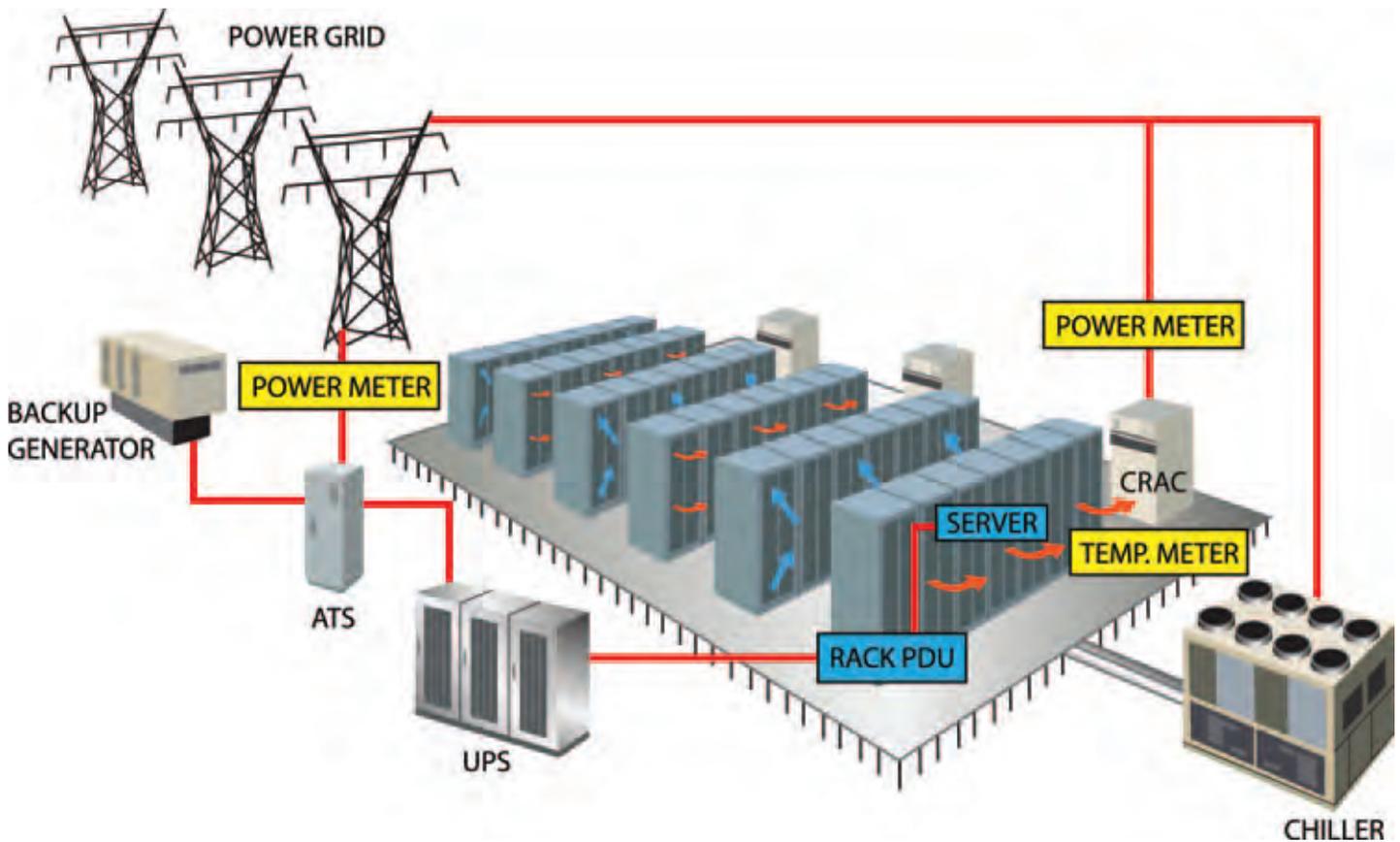
1. Information Technology (IT) systems
2. Cooling systems
3. Power distribution systems

IT hardware consists of servers, Storage Area Networks (SAN) that store data, and network equipment that

communicates between the systems and the internet or intranet. Because systems are moving toward cloud computing, an individual data center often does not have complete control over the software applications they support (such as the ability to put equipment in sleep mode).

Data center cooling systems are traditionally based on distributing cool air to the computing equipment so that hot air circulates away from the server. The power distribution system provides power to both IT equipment and cooling systems.

DCIM technology includes hardware sensors to monitor performance data, and software to collect this data, track physical assets, compile performance reports, and help plan capacity expansions. The SSC Pacific team evaluated different hardware meters and energy management software in a laboratory environment and demonstrated different options and configurations to stakeholders at the San Diego Data Center. The San Diego Data Center



Data center configuration with DCIM monitoring points. The Automatic Transfer Switch (ATS) is for transferring the system to battery power, the Uninterruptible Power Supply (UPS) ensures continuous power during switchover, and the Power Distribution Unit (PDU) distributes power from the building to system components.

provides web-based business and operational application services to the Navy and Department of Defense.

One major issue is that energy management software often assumes that it will be able to use temperature and power meters that are built into most modern servers, meaning that the energy management software has to reside on the same network as the server. In an operational military data center, this is a major security risk. Another concern was that modern servers and the power distribution units that they plug into usually provide a means to cut server power via software commands sent over the network—another big risk. After

these and other similar issues were identified in laboratory testing, the team developed a mitigation strategy to ensure that the DCIM software would be isolated to a non-operational network (meaning that it would not directly access power and temperature meters built into servers), and the new power distribution units would not be capable of switching off power.

The project team chose a vendor to install new, metered power distribution units for a portion of the San Diego Data Center. The DCIM software solution (developed by Data-center Clarity) resides on SSC Pacific's research and development network. This has allowed the project

team to work with the vendor to identify and patch information assurance issues and take the first steps towards achieving a full accreditation, which involves several additional months of rigorous security screenings and adjustments.

The San Diego Data Center now has, for the first time at a Navy data center, an operational DCIM pilot program that is logging performance data from server racks, room temperature and humidity sensors, air conditioning equipment, and the power distribution infrastructure. This allowed the SSC Pacific team to measure the data center's Power Utilization Effectiveness (PUE) in real time. PUE is a measurement of what

## The Basics About the Energy Systems Technology and Evaluation Program

**ESTEP FOCUSES ON** energy technologies that reduce costs, increase energy security, and ultimately increase the reach and persistence of the warfighter. ESTEP seeks to identify viable emerging energy technologies, obtained for the most part from open-market sources and in-house government demonstrations. Technologies identified as promising by ESTEP will be demonstrated, and data will be collected to evaluate the performance and reliability of selected technologies under various environmental and operating conditions. The entire program encompasses the following investment areas:

- Cyber and Energy Management for Information Systems
- Power and Energy Components
- Power and Energy Production/Efficiency

Established in fiscal year 2013, ESTEP casts a wide net across the Department of the Navy, academia, and private industry to investigate and test emerging energy technologies at Navy and Marine Corps installations. At present, ESTEP conducts nearly two dozen in-house government energy projects, ranging from energy

management to alternative energy and storage technologies. Additionally, an ESTEP Broad Agency Announcement has awarded several contracts to industry in those same energy areas.

In addition to testing and evaluating performance and reliability of energy technologies, the ESTEP program provides mentoring (via on-the-job training and education of interns) and other workforce development opportunities by partnering with the Troops-to-Engineers program for veterans at San Diego

State University and other universities. Workforce and professional development are key components of ESTEP and integral to the success of executing and transitioning energy technology projects at naval facilities.

ONR provides funding and oversight for ESTEP, and program management is being handled by SSC Pacific. The Naval Facilities Engineering and Expeditionary Warfare Center and the Naval Postgraduate School are executing selected research projects, and every project plans to involve at least one veteran intern utilizing an ESTEP grant to academic institutions.

For more information about ESTEP, contact Stacey Curtis at 619-553-5255 and [stacey.curtis@navy.mil](mailto:stacey.curtis@navy.mil).



## This software allows operators to get detailed measurements of how well the data center is performing and make changes to improve that performance.

percentage of a data center's power consumption is being used to run the servers—lower numbers equate to higher energy efficiency. The DCIM program revealed that the San Diego Data Center has an above average PUE of 1.5. Federally managed data centers can have ratios ranging from 1.2 to 5.

The goal of this ESTEP project was to evaluate the software's efficacy as an energy management and decision-making tool. Although Clarity records energy data and reports some instantaneous aggregate measurements (such as PUE), these are not sufficient to enable a manager or engineer to assess what features of a data center could be made more energy efficient. This would require statistical tools to help determine whether apparent changes are actually explained by random variation or other factors in the environment.

A concurrent sister project, funded by the Navy Shore Energy Technology Transition and Integration program, is evaluating methods of improving data center cooling efficiency through such techniques as cold-aisle containment and improving the airflow throughout the IT room. This project team made two significant changes to the data center's cooling systems during this project, and the ESTEP team sought to determine if either of these changes resulted in a statistically significant difference in the daily energy use of the chiller plant that

could not be accounted for by variations in the outside temperature.

### The Cooling Factor

At the San Diego Data Center, an outside chilled water plant provides cold water in a closed loop that's circulated to an array of Computer Room Air Conditioners (CRAC). Each CRAC is effectively a large box with a fan that blows air over the cold water pipes. The CRACs in the San Diego Data Center are all fixed speed units, meaning that the fan is always on, and thus each CRAC is effectively a constant power load no matter what the temperature in the IT room may be. However, each CRAC has a feedback sensor that measures the incoming air temperature and an automatically controlled water diverter valve, so as the intake air temperature measured by the CRAC goes down, it will lower or shut off the flow of cold water. The chiller plant, in turn, measures the return water temperature and flow rate, and its power load varies significantly based on these measurements.

The first change enacted by the team was the installation of an under-floor cold air containment system to reduce the total volume of air that the CRACs would need to cool, and, approximately five weeks later, to raise the set point of two CRACs in the center. Both of these measures reduced the energy and chilled water usage. These actions resulted in an approximately 150 kilowatt hours per day drop in chiller plant energy consumption.

This confirms the results seen by other individual data centers that have made significant improvements by adopting cold-aisle containment and various types of liquid cooling technology.

### Conclusions

The goal of this project was to evaluate whether the adoption of DCIM can improve energy efficiency at Navy facilities. While the project team was able to remove the first roadblock to its adoption—security issues—the costs of installation and accreditation of a DCIM program outweigh the potential energy savings, at least in the short run.

In the long run, DCIM can save labor by providing reliable and timely information, without imposing the burden of additional data calls on data center managers and technicians. These benefits are potentially the most important impact of DCIM technology and the strongest argument for its adoption. However, estimating the monetary impact of these changes is difficult. More work needs to be done with vendors to reduce implementation costs.

For more information about data center smart metering and cooling efficiency, contact Christine In at the information provided below. [📍](#)

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Christine In  
Space and Naval Warfare Systems Center  
Pacific  
619-553-2637  
DSN: 553-2637  
[christine.in@navy.mil](mailto:christine.in@navy.mil)

# DID YOU KNOW?

According to the U.S. Energy Information Administration, power plants emitted more than two billion metric tons of carbon dioxide in 2013. If we could convert this into diesel fuel with an efficiency of just five percent, we could produce tens of billions of gallons of diesel fuel annually just from this single source.

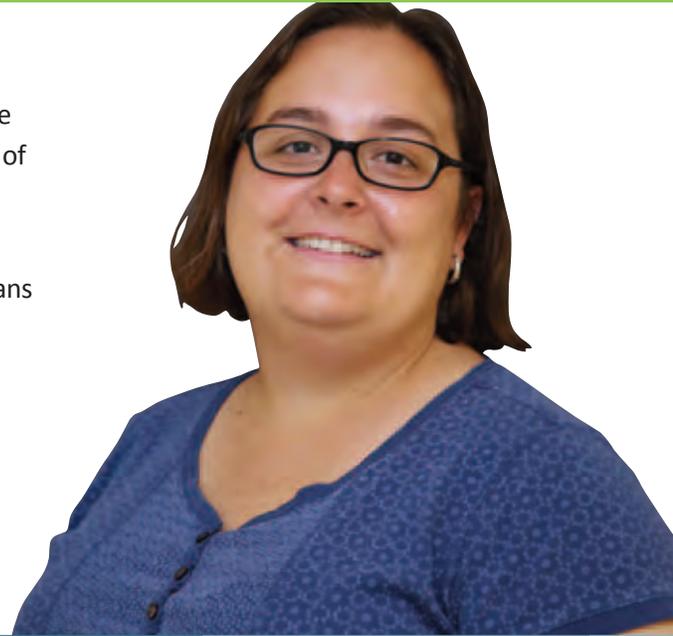
—Dr. Heather Meylemans

**Name:** Dr. Heather Meylemans

**Job:** Research Chemist

**Command:** Naval Air Warfare Center Weapons Division, China Lake

**Hometown:** Boulder, Colorado



## What is an Energy Warrior?

An Energy Warrior is a person who is trying to make our world more energy independent by being more energy efficient in all aspect of their lives. Download the Energy Warrior app at <http://greenfleet.dodlive.mil/energy/energywarrior> for more insights.



**ENERGY SECURITY ENHANCES COMBAT CAPABILITY**

# Did you know that according to the U.S. Energy Information Administration, power plants emitted more than two billion metric tons of carbon dioxide in 2013?

## What is solar fuel?

Solar fuel is the idea of converting sunlight into a liquid fuel. My research focuses on taking the sun's energy and the carbon dioxide found in our air and converting it into a liquid fuel feedstock such as methanol.

## What is our biggest energy challenge?

Carbon dioxide is a big problem for our environment. So we are looking for a way to not only mitigate its impacts but find a useful purpose for it. The challenge we face is efficiently turning carbon dioxide into something useful. Plants do this relatively well—at one to two percent efficiency, since that's all they need to live. But the fact is that they are able to transform carbon dioxide from the air into sugar. As a result, we know that there has to be a way for us to mimic and improve upon that process. We have to be able to change and improve the

process plants have developed over time. Ideally, our goal is to develop a process that's 10 to 20 percent more efficient.

## What role could solar fuel play in securing our nation's energy future?

Solar fuel is immensely important to helping our country achieve energy independence. Everyone has access to the sun and carbon dioxide—the two main ingredients for the technology I am researching. Developing solar fuels could reduce some of the conflicts over limited energy resources. And if we're able to develop a device that is reasonably-sized, our warfighters will be able to easily transport the technology to remote areas around the world. They won't need to have the fuel processed in a huge power plant. Theoretically they could be making their own fuel on location rather than having to haul it with them or refuel at sea. That's our ultimate goal—to develop a product that supports our warfighters around the world.

If successfully developed, solar fuels could help our country reduce its dependency on fossil fuels and change the world. That's why I do this. And the fact that there's an entire group of chemists working on this right now, trying to solve this very problem, is very motivating.



# SECNAV Announces FY15 Energy & Water Management Award Winners

## Program Recognizes Notable Progress Toward Energy Reduction Goals

**SECRETARY OF THE** Navy (SECNAV) Ray Mabus announced the winners of the 2015 SECNAV Energy and Water Management awards with a high concentration of those winners from the Hampton Roads area.

When announcing the awards, Secretary Mabus said, “Improving how we manage energy and water is critical to accomplishing our mission and your success provides a model that the rest of the Department of the Navy (DON) should emulate. I encourage all commanders to look to the accomplishments of our award winners and identify ways that your commands can improve how we manage these critical resources.”

### Background & Purpose of the Awards

The DON’s Energy and Water Management awards program is

designed to promote and reward excellence in the areas of energy efficiency, energy management, new technology, renewable energy, energy training innovation, and energy awareness. Each year, these awards are presented to those Navy and Marine Corps operational units, installations, and activities that have made notable progress toward the DON’s goals to reduce energy and water consumption, increase use of renewable energy sources, and construct sustainable facilities. The DON energy program evaluates and classifies the overall energy and water management performance of each installation, ranking them according to a system of SECNAV winner, platinum, gold or blue level of achievement. The 2015 awards recognize achievements in fiscal year (FY) 2014.

For the FY15 competition period, Secretary Mabus announced energy

conservation awards for outstanding overall energy performance in each of the following 12 categories:

1. Navy Large Shore Activity (equal to or greater than 300,000 million British Thermal Units (BTU) of energy consumption during the fiscal year)
2. Navy Small Shore Activity (less than 300,000 million BTU of energy consumption during the fiscal year)
3. Marine Corps Large Shore Activity (equal to or greater than 500,000 million BTU of energy consumption during the fiscal year)
4. Marine Corps Small Shore Activity (less than 500,000 million BTU of energy consumption during the fiscal year)
5. Other Shore Activity (Navy and Marine Corps tenant commands)

Improving how we manage energy and water is critical to accomplishing our mission and your success provides a model that the rest of the Department of the Navy should emulate.

—Secretary of the Navy Ray Mabus

6. Large Ship (crew of 400 or more)
7. Medium Ship (crew of 250 to 399)
8. Small Ship (crew of less than 250)
9. Commander, Naval Air Force Atlantic Aviation Squadron
10. Commander, Naval Air Force, U.S. Pacific Fleet Aviation Squadron
11. Marine Corps Expeditionary Unit
12. Military Sealift Command Ship

SECNAV award winners are authorized to display the SECNAV energy conservation award flag for a period of one year from the date of the award announcement and they will be recognized at a series of award ceremonies to be held over the course of the year.

Award winners and units or activities reaching platinum levels of achievement are authorized to receive cash awards and certificates of achievement. The annual amount and distribution of cash awards will be determined by Navy and Marine Corps energy management. Cash awards may be used at the discretion of the Commanding Officer to improve quality of life, encourage further energy improvements, or for other purposes subject to limitations on the use of operation and maintenance funds.

Navy, Marine Corps, and Military Sealift Command energy management staffs

submitted their recommendations based on FY14 accomplishments to the Office of the Deputy Assistant Secretary of the Navy for Energy in accordance with their respective awards criteria. A panel of experts reviewed the submissions and recommending award winners for SECNAV's review and endorsement. The panel evaluated all submissions to determine eligibility for a SECNAV, platinum, gold, or blue level of achievement.

## 2015 Award Winners

The 2015 winners for outstanding overall energy performance achievement in each of the above categories are as follows.

### SECNAV Award Winners

The following commands won a 2015 SECNAV Energy and Water Management award.

#### Navy Large Shore Activity

NAS Pensacola, FL \$45,000

#### Navy Small Shore Activity

NCBC Gulfport, MS \$30,000

USS Simpson (FFG 56).  
MCS Coleman Thompson



USS Bonhomme Richard (LHD 6).  
Photographer's Mate 2nd Class Jennifer Swader



USS Carney (DDG 64).

USS Bonhomme Richard (LHD 6), USS Carney (DDG 64), and USS Simpson (FFG 56) captured the three ship category awards in the 2015 SECNAV Energy and Water Management awards competition.

**Marine Corps Large Shore Activity**  
MCB Camp Pendleton, CA \$45,000

**Marine Corps Small Shore Activity**  
MCAS Camp Pendleton, CA \$30,000

**Other Shore Activity**  
NUWC, Division Keyport \$35,000

**Large Ship**  
USS Bonhomme Richard (LHD 6) \$30,000

**Medium Ship**  
USS Carney (DDG 64) \$25,000

**Small Ship**  
USS Simpson (FFG 56) \$20,000

**Commander, Naval Air Force Atlantic Aviation Squadron**  
VFA-131 \$30,000

**Commander, Naval Air Force, U.S. Pacific Fleet Aviation Squadron**  
VFA-14 \$30,000

**Marine Corps Expeditionary Unit**  
MAGTFTC Exercise Support Division \$30,000

**Military Sealift Command Ship**  
T-AKE 9 USNS Matthew Perry

### Platinum Award Winners

A platinum level of achievement indicates an outstanding energy or water program and an exceptional year for energy project execution. The following commands demonstrated platinum level of achievement:

**NAVSTA Newport, RI** \$5,000

**NAS Whidbey Island, WA** \$5,000

**NSA Bethesda, MD** \$5,000

**NAVSTA Rota, Spain** \$5,000

**NAVMAG Indian Island, WA** \$5,000

**NAS Lemoore, CA** \$5,000

**USS Mesa Verde (LPD 19)** \$5,000

**USS Lake Erie (CG 70)** \$5,000

**T-AO 187 USNS Henry J. Kaiser**

### Gold & Blue Award Winners

A gold level of achievement indicates a very good to outstanding energy or water program. The 67 commands that demonstrated a gold level of achievement will receive certificates of achievement. Thirty-one commands demonstrated blue level of achievement which indicates a well-rounded energy or water program. These commands will also receive certificates of achievement.

The efforts of the leadership and personnel at the winning commands included developing energy awareness campaigns, deploying energy efficiency technologies, and adopting new operational procedures that resulted in a consistent reduction in energy or water consumption.

### Six CNRMA Commands Earn SECNAV Energy Awards

Deputy Assistant Secretary of the Navy (Energy) (DASN (E)) Joe Bryan visited the Hampton Roads area in October 2015 to present the following commands and squadrons with their 2015 SECNAV Energy and Water Management awards:

- Naval Air Station Oceana
- Strike Fighter Squadron 131 (VFA-131)
- Carrier Airborne Early Warning Squadron 124 (VAW-124)



DASN (E) Joe Bryan presented a SECNAV Energy and Water Management award to Strike Fighter Squadron 131 (VFA-131) Commanding Officer Cmdr. Brad Freeman, Executive Officer Lt. Cmdr. Jeff Farmer and Command Master Chief Russell Sites. While in Hampton Roads, DASN (E) Bryan also presented energy awards to Carrier Airborne Early Warning Squadron 124 (VAW-124); Fleet Logistics Support Squadron 40 (VRC-40); Naval Station Norfolk; USS Mesa Verde (LPD 19); and Naval Air Station Oceana.

*MC1 Erik Wehnes*



DASN (E) Joe Bryan visited USS Mesa Verde (LPD 19) to present its 2015 SECNAV Energy and Water Management award.

*Ensign Jason Rowles*

- Fleet Logistics Support Squadron 40 (VRC-40)
- Naval Station Norfolk
- USS Mesa Verde (LPD 19)

During his visit, Mr. Bryan emphasized that energy efficiency within the Navy is about increasing combat effectiveness. “People talk a lot about the more energy you can save, the more money you can save, and that is a good thing,” he said. “People also talk about being good stewards of the environment, and we want to make sure we are always doing that. But the primary mission of our energy program isn’t focused on those benefits ...it’s really about getting the most mission capability out of every kilowatt hour of electricity or every gallon of fuel.”

“We want to be able to go further on a tank of gas, we want to be able to stay there longer and we want to be able to deliver more firepower while we’re on station. On the shore side, we want to be more efficient and more resilient and reliable with our

power systems so that we can support the mission, because our shore installations are what enable our forward operations,” Mr. Bryan continued.

Capt. Lou Schager, NAS Oceana Commanding Officer, indicated his command is committed to meeting the Navy’s energy efficiency goals. “We’re always looking for opportunities to be more energy efficient,” he said. “Whether it’s as simple as having Sailors turn off their lights and computers before they go home at night, or large-scale renewable energy projects such as solar, or ground source heat pump opportunities, or using the effluent from the Hampton Roads Sanitation Department as a heat sink like we do at Dam Neck

Annex. From big to small, we know everything matters.”

Capt. Nicholas Dienna, Commanding Officer of USS Mesa Verde, indicated his entire crew is committed to energy efficiency. “Mesa Verde is proud to have received this recognition,” he said. “Energy management and conservation is not only environmentally responsible and fiscally sensible, but is also a warfighting imperative. And, it’s an all hands effort. Secretary Bryan’s visit brought those ideas home very visibly for the entire crew.”

“Since the transition from sail, the U.S. Navy has been on the cutting edge of developing and implementing new technologies to ensure global access and operational flexibility,” he continued. “Recognition as a SECNAV Energy and Water Management award winner highlights the value of those concepts to every man and woman on board Mesa Verde. And, at the end of the day, responsible energy use is really just the right thing to do. We’re all extremely proud to be a part of that heritage.”

“Naval Station Norfolk’s selection for this honor reflects the hard work,



DASN (E) Joe Bryan (center) presents Capt. Doug Beaver, Naval Station Norfolk Commanding Officer (left) and Lt. Brian Gates, Assistant Public Works Officer (Air Side) (right) with the SECNAV Energy and Water Management gold level award.

## NAVFAC Southeast Public Affairs Team Recognized for Innovative Energy Awareness Video

ON 17 NOVEMBER 2015, DASN (E) Bryan stopped by the Naval Facilities Engineering Command (NAVFAC) Southeast offices aboard Naval Air Station Jacksonville, Florida to recognize the command's public affairs office (PAO) for their nationally recognized energy awareness video. (You can view the video at [www.youtube.com/watch?v=doZUxajMkDM&feature=youtu.be](http://www.youtube.com/watch?v=doZUxajMkDM&feature=youtu.be).)

Mr. Bryan presented SECNAV coins to Susan Brink, NAVFAC Southeast public affairs officer; John Parker, NAVFAC Southeast deputy public affairs officer; Jeff Hamlin, NAVFAC Southeast editorial assistant and multi-media specialist; and Nelson Smith, former deputy for small business, for their creativity and resourcefulness in the creation of the video.

"We have a great PAO team," said NAVFAC Southeast Executive Officer Capt. Drew Hascall. "I'm consistently amazed by their creativity and talent. Being recognized by the Secretary of the Navy is a huge honor and this kind of recognition

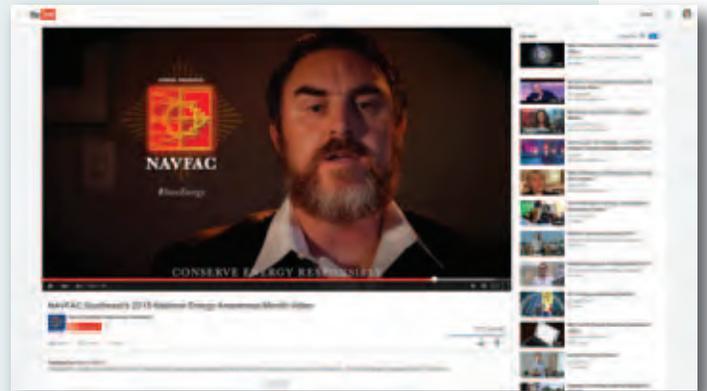
will only motivate them even more. I can't wait to see what's next."

In the video, the PAO team created a character, "The Most Energy Conservative Man in the World," to talk about energy conservation and to share the Navy's energy message in a new way.

"We wanted to find an interesting way to get the Navy's message out," said Parker, the main character in the video. "We wanted more than a talking head. We wanted to share the message in a way that everyone would find interesting."

Mr. Bryan said, "I loved the creativeness that went into the video." Mr. Bryan also commented that he and Secretary Mabus liked the way the team put a new and interesting spin on the Navy's energy message.

The assistant secretary went on to talk about how he showed the video to students at the Naval Academy during a recent speaking engagement.



The NAVFAC Southeast team originally created the video for their own command. But the video took on a life of its own and was soon being played all over the region. It eventually made its way to the halls of the Pentagon and elsewhere throughout the Navy.

commitment and dedication of all commands and personnel on the base to energy conservation," said Capt. Doug Beaver, Naval Station Norfolk Commanding Officer. "Additionally, our Public Works energy team is devoted to executing an aggressive energy conservation program. They did a tremendous job leading the way with innovative solutions and a passionate focus on the efficient management of our resources to support the warfighter. I could not be prouder of the entire Naval Station Norfolk team."

Mr. Bryan was impressed by the showing by commands in the Hampton

Roads region in this year's awards program—an indication that the energy and water message is resonating with Hampton Roads Sailors.

"It's really amazing," he said. "You have a concentration of award winners here in the Hampton Roads area that may be unmatched across the Navy. It shows that you have leaders who are making it a point to say that energy is important to our mission and that message is getting across to the deckplate Sailors, who are trying to come up with innovative ways to improve energy use and get more mission out of every ounce of energy that they use.

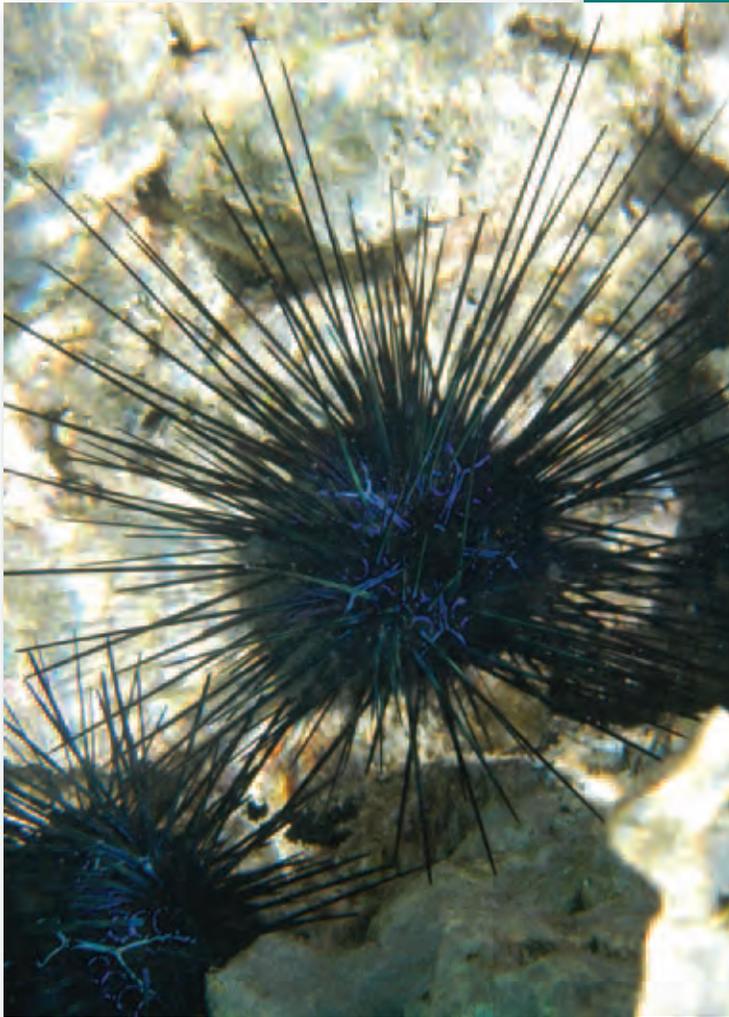
"This commitment is helping the Hampton Roads region be among the most successful in the country, and that commitment is reflected in this year's awards," Mr. Bryan finished. [📌](#)

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Chris Tindal  
Office of the Deputy Assistant Secretary of  
the Navy (Energy)  
571-256-7872  
DSN: 260-7872  
[chris.tindal@navy.mil](mailto:chris.tindal@navy.mil)

Ted Brown  
U.S. Fleet Forces Command  
757-836-4427  
DSN: 836-4427  
[theodore.brown@navy.mil](mailto:theodore.brown@navy.mil)

# SOME OF MY Best Shots



I captured these images of a long-spined sea urchin (*Diadema antillarum*) off of the western shoreline of Guam during field work for Naval Facilities Engineering Command Marianas. Our research team collected these organisms, induced spawning and conducted larval toxicity tests to better understand the impacts of nickel concentrations in the marine environment to the genus *Diadema*.

Results were published in the Bulletin of Environmental Contamination and Toxicology (DOI 10.1007/s00128-015-1457-0).

The photo was taken with a Nikon COOLPIX AW100 at an F-stop 3.9 and shutter speed of 1/250 seconds.

Pat Earley ● Scientist ● Space and Naval Warfare Systems Center Pacific ● [patrick.earley@navy.mil](mailto:patrick.earley@navy.mil)

Submit your own Best Shot to Bruce McCaffrey ● *Currents'* Managing Editor ● [brucemccaffrey@sbcglobal.net](mailto:brucemccaffrey@sbcglobal.net)

## Employing Shroud to Capture Particulate Emissions During Ship Touch-up

Do-it-yourself Solution is Easy & Cost Effective

**PERSONNEL FROM THE** Space and Naval Warfare Systems Center Pacific (SSC Pacific) have come up with an easy solution to help ship maintenance facilities prevent paint chips and other maintenance debris from falling into the surrounding waters—an innovative device called the Hull Maintenance Shroud.

According to a 2006 Department of Defense report, the U.S. Navy spends \$2.4 billion annually on ship corrosion-related costs. Various types of heavy-duty coatings are the main corrosion control technology used on all ships and submarines. These coatings perform well, but are often in need of repair or touch-up, through processes such as paint removal, surface preparation, and coating application. These activities can generate hazardous waste streams that must be controlled in accordance with stormwater regulations, National Pollution Discharge Elimination System limits, and human health regulations regarding Hazardous Air Pollutants.

Capturing waste from overwater (in-port) surface preparation is a high priority for naval facilities and is receiving increased attention from states and local regulatory authorities. Failure to meet clean water standards could lead to fines and/or work stoppages.

Current practices to prevent paint, paint

chips and abrasive grit from entering the adjacent waterbody include the use of a “paint float” platform that incorporates scaffolding and tarps close to the waterline to capture debris. However, these measures are subject to environmental factors (including wind) and operator error.

The NESDI program collected a need for a maintenance shroud that is inexpensive, portable, easy to use, and does not require special training.

The Navy Environmental Sustainability Development to Integration (NESDI) program collected a need from the Naval Facilities Engineering Command Southeast for a maintenance shroud that is inexpensive, portable, easy



Shroud in use during demonstration on USS San Diego.

to use, and does not require special training. A survey of nearly 200 Navy operations officers and environmental compliance personnel identified a high need for such a product.

Originally, Principal Investigator Pat Earley of SSC Pacific investigated the feasibility of partnering with a commercial off-the-shelf manufacturer to produce a shroud that would meet Navy requirements. However, it was determined that this option is not economically viable. The project efforts then turned to building a shroud with commonly available materials and making the instructions available to the user community.

The goal was to produce a shrouding system that would provide a small containment area around a tool and its working surface with enough space for personnel to reach in and operate the equipment. It was designed to accommodate existing vacuum-assisted, handheld rotary and reciprocating power tools.

An initial prototype was tested on the USS New Orleans (LPD 18) in 2011. After discussions with the user community, a second prototype was developed and was successfully tested at Naval Stations San Diego (California) and Mayport (Florida).

The final prototype shroud may be constructed at a retail cost of under \$138.00, using materials commonly available at any home improvement store. The shroud is so easy to build, a project intern was able to assemble one in just two hours.

A user's guide has been produced including complete directions and a materials list required for constructing a 3½-foot and an 8-foot shroud (P. J. Earley and R. Reardon (2015). Hull Maintenance Shroud Construction Manual. SPAWAR Technical Report 2074, Space and Naval Warfare Systems Center, Pacific Division 7175. January, 2015). The guide is available in PDF form on the NESDI web site (at [www.nesdi.navy.mil](http://www.nesdi.navy.mil) and search for project 456), and a tear-proof, water-resistant hard copy is also available from the Principal Investigator.

This new hull maintenance shroud captures 80 to 90 percent of maintenance-related debris. It offers Navy facili-

## NESDI Project Fact Sheets On-Line

**DID YOU KNOW** that fact sheets are available on-line for all NESDI-sponsored projects?

The NESDI program is the Navy's environmental shoreside research, development, testing and evaluation program. The program's goals are to demonstrate, validate and integrate innovative technologies in response to Fleet needs.

There are approximately 300 NESDI-sponsored projects in various stages of development. Fact sheets summarizing each of these projects and detailing their goals and accomplishments are available to the public on the NESDI program's web site. Go to [www.nesdi.navy.mil](http://www.nesdi.navy.mil), select "Projects" then select the "Fact Sheet" link for the project you're interested in.



ties a simple solution for better controlling a high priority hazardous waste stream. In addition, this build-it-yourself solution bypasses the supply chain and can be put into use immediately. 📌

Pat Earley  
Space and Naval Warfare Systems Center Pacific  
619-553-2768  
DSN: 553-2768  
[patrick.earley@navy.mil](mailto:patrick.earley@navy.mil)

## SERDP and ESTCP Announce 2015 Projects of the Year

### Awards Showcase Program Successes

**CONGRATULATIONS TO THE** Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP) 2015 Projects of the Year, recognized for research and technology developments with significant benefits to the Department of Defense (DoD). These outstanding efforts are helping DoD enhance its mission capabilities, improve its environmental and energy performance, and reduce costs. Recipients of this prestigious honor are as follows.

### SERDP Projects of the Year

#### Environmental Restoration (ER)

Lead and Antimony Speciation in Shooting Range Soils: Molecular Scale Analysis, Temporal Trends, and Mobility (ER-1770)

*Dr. Thomas Trainor*

*University of Alaska Fairbanks*

These outstanding efforts are helping DoD enhance its mission capabilities, improve its environmental and energy performance, and reduce costs.

#### Munitions Response (MR)

Continuous Monitoring of Mobility, Burial and Re-Exposure of Underwater Munitions in Energetic Near-Shore Environments (MR-2319)

*Dr. Peter Traykovski*

*Woods Hole Oceanographic Institution*

Long Time Series Measurements of Munitions Mobility in the Wave-Current Boundary Layer (MR-2320)

*Dr. Joseph Calantoni*

*Naval Research Laboratory*

Resource Conservation and Climate Change (RC)

Hydroecology of Intermittent and Ephemeral Streams: Will Landscape Connectivity Sustain Aquatic Organisms in a Changing Climate? (RC-1724)

*Dr. Julian Olden*

*University of Washington*

*Dr. David Lytle*

*Oregon State University*

#### Weapons Systems and Platforms (WP)

Novel Coatings Systems for Use as High Performance Chemical Agent Resistant Powder Topcoats (WP-2207)

*Mr. Mark Wytiaz*

*The Sherwin-Williams Company*

### ESTCP Projects of the Year

#### Energy and Water (EW)

Dynamic Exterior Lighting for Energy and Cost Savings in DoD Installations (EW-201141)

*Dr. Satyen Mukherjee*

*Philips Research North America*

#### Environmental Restoration

Development and Validation of a Quantitative Framework and Management Expectation Tool for the Selection of Bioremediation Approaches at Chlorinated Solvent Sites (ER-201129)

*Ms. Carmen Lebrón*

*Naval Facilities Engineering and Expeditionary Warfare Center*

#### Resource Conservation and Climate Change

Aerial Application of Acetaminophen-Treated Baits for Control of Brown Treesnakes (RC-200925)

*Dr. Brian Dorr*

*U.S. Department of Agriculture*

*Wildlife Services' National Wildlife Research Center*

#### Weapons Systems and Platforms

Demonstration/Validation of Zinc-Nickel as Replacement for Cadmium/Cyanide Plating Process for Air Force Landing Gears (WP-201107)

*Mr. David Frederick*

*417th SCMS USAF Landing Gear Team*





Visit the SERDP and ESTCP blog at <https://serdp-estcp.org/News-and-Events/Blog> to read articles about each of these award-winning projects. More details are also available on the SERDP and ESTCP website at <https://serdp-estcp.org/News-and-Events/News-Announcements/Program-News/SERDP-and-ESTCP-announce-2015-Projects-of-the-Year>.

For more information about SERDP and ESTCP, please visit [www.serdp-estcp.org](http://www.serdp-estcp.org).

SERDP is DoD's environmental science and technology program, planned and executed in partnership with the Department of Energy and the U.S. Environmental Protection Agency, with participation by numerous other Federal and non-Federal organizations. The Program focuses on cross-service requirements and pursues solutions to the Department's environmental challenges while enhancing and sustaining military readiness.

ESTCP is DoD's environmental technology demonstration and validation program. Projects conduct formal demonstrations at DoD facilities and sites in operational settings to document and validate improved performance and cost savings. Demonstration results are subject to rigorous technical reviews to ensure that the conclusions are accurate and well supported by data.

For more information about SERDP and ESTCP, please visit [www.serdp-estcp.org](http://www.serdp-estcp.org).

Lucia Valentino  
SERDP and ESTCP Support Office  
703-736-4549  
[valentino@hgl.com](mailto:valentino@hgl.com)

## DLA Aviation & NRL Partner to Create More Sustainable Products

### Recent Efforts Include Test of an Oil Removal System to Replace Power Washing

**THE DEFENSE LOGISTICS** Agency (DLA) Aviation's Hazardous Minimization and Green Products Branch joined efforts two years ago with the Naval Research Laboratory (NRL) to offer more sustainable products to its Navy customers.

This relationship was established when the Hazardous Minimization and Green Products Branch sponsored a project for bilge cleaning to assist with the demands and needs of the Naval Sea System Command. Bilge cleaning is ranked as the second highest corrosion-related cost for Navy ships.

DLA Aviation is testing a more sustainable system for oil removal in lieu of power washing which substantially reduces hazardous oily waste water and radioactive spill cleanup. By reducing clean time, manpower hours and extending the service life of the equipment, DLA Aviation estimates a 50 percent labor cost savings using the new system. This effort targets and is being tested for bilge cleaning, but could potentially be used in other military applications.



Moraima Lugo-Millán tests a delivery system for a decontamination gel at NRL's Center for Corrosion Science and Engineering.

Robert Brown

So far, NRL has successfully tested and qualified a decontamination gel product for bilge cleaning (National Stock Number: 6850-01-648-3792) which is available via military standard requisitioning systems.

DLA Aviation is also partnering with NRL's Center for Corrosion Science and Engineering to:

1. Conduct research on a greener thermal spray sealer.
2. Test amorphous powders for lapping tools to reduce nuclear/non-nuclear waste.
3. Evaluate chemical sealers with high efficiency for missile tube ring applications.
4. Test cleaners for radioactive decontamination on aircrafts.

The NRL Center for Corrosion Science and Engineering in Key West, Florida is strategically located to investigate the mechanisms of failure and degradation resulting from exposure to marine environments. This center provides technology to the fleet to predict, prevent, and control materials and corrosion degradation.

NRL performs research, development, test and evaluation in direct support of current and future fleet concerns and provides long-term engineering solutions and evaluation of materials for improved performance, increased cost savings, and lifecycle management.

Over the last several years, DLA Aviation's Hazardous Minimization and Green Products Branch has partnered with all military services and other federal agencies to increase the availability of sustainable products through research and development. These partnerships spur the innovation and research necessary to power new technologies, new capabilities and new capacities across the Department of Defense while complying with federal laws and regulations, decreasing operating costs, and improving customer service. 🌱

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Moraima Lugo-Millán  
Defense Logistics Agency  
804-279-2651  
DSN: 695-2651  
moraima.lugo@dla.mil

James Martin  
Naval Research Laboratory  
202-404-4132  
james.martin@nrl.navy.mil

## What's Behind the "Life on the Edge" Poster

**PERSONNEL FROM THE** Navy Facilities Engineering Command (NAVFAC) Southwest and the Space and Naval Warfare Systems Center Pacific (SSC Pacific) commissioned the "Life on the Edge" poster on the following pages to highlight the valuable ecological role of tidepools around San Clemente Island as well the threats posed to the black abalone from overharvesting and disease.

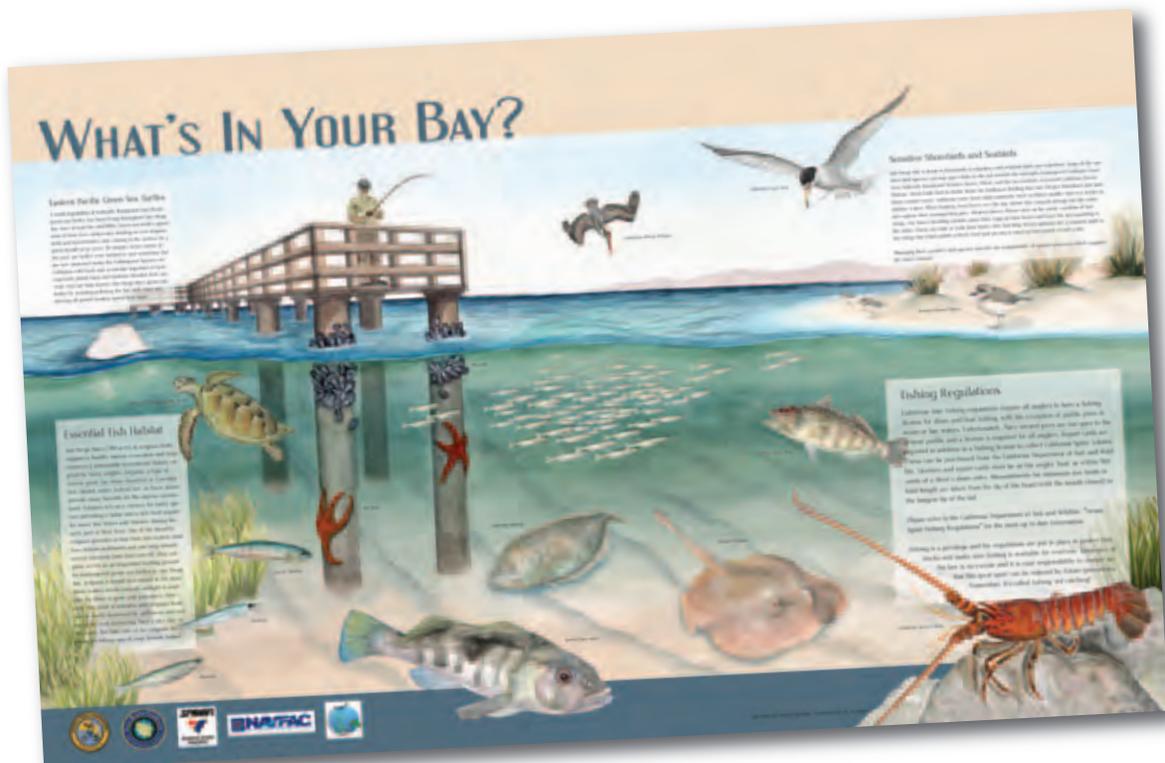
This beautifully illustrated poster highlights the valuable ecological role of tidepools around San Clemente Island as well the threats posed to the black abalone from overharvesting and disease.

Among the tidepool-inhabiting animals that thrive in high-energy surf environments around San Clemente Island are the harbor seal, ochre sea star and California spiny lobster. The black abalone was once very abundant in the rocky

intertidal habitat but overharvesting and disease have contributed to its great decline and federally endangered status. Multiple efforts are ongoing to support the recovery of the black abalone on San Clemente Island. With the Navy's management of this species and its home in the tidepools, critical habitat was not designated on San Clemente Island. Through proactive management efforts, the Navy can maintain both sustainable military and fleet readiness and conserve its sensitive marine resources with no net loss to the mission.

Illustrations in the poster were created by Calene Luczo of Luczo Illustration & Design. Calene takes a multi-step process when designing renditions of biological species. She conducts research and collects hundreds of reference images to ensure that anatomy and physical characteristics are appropriate. Calene then hand-paints each species using watercolor paint and gouache (an opaque watercolor paint). She then scans all of the hand-painted images at high resolution and uses both Adobe Photoshop and Adobe Illustrator to complete her design and incorporate final copy and logos.

Another poster from our NAVFAC Southwest and SSC Pacific colleagues—What's in Your Bay?—was published in the summer 2015 issue of *Currents*. For an electronic copy of either or both of these posters, contact Jessica Bredvik at [jessica.bredvik@navy.mil](mailto:jessica.bredvik@navy.mil) or 619-532-4182. [📎](#)



# LIFE ON THE EDGE

## Tidepools

California sea lion  
(*Zalophus californianus*)

San Clemente Island's rocky shoreline supports a diverse array of organisms within the tidepool environment. Flora and fauna found in these dynamic intertidal zones are uniquely adapted to thrive in both high-energy surf environments as well as dry conditions during low tide. Here are some common tidepool-inhabiting animals you may find while exploring around.

Barnacles  
(*Balanus* spp.)

Black oystercatcher  
(*Haematopus bachmani*)

California mussel  
(*Mytilus californianus*)

Limpets  
(*Lottia* spp.)

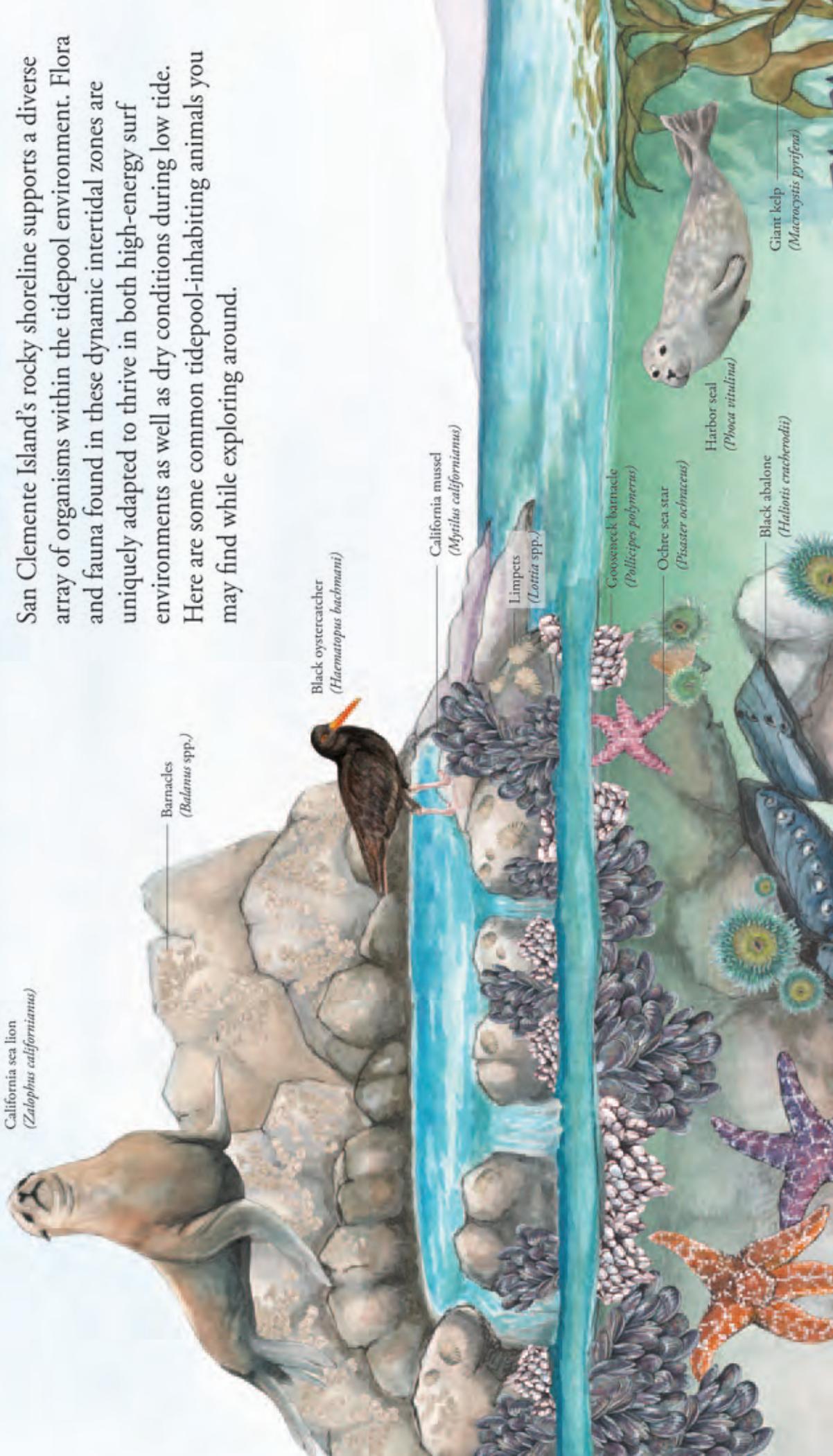
Gooseneck barnacle  
(*Pollicipes polymerus*)

Ochre sea star  
(*Pisaster ochraceus*)

Harbor seal  
(*Phoca vitulina*)

Black abalone  
(*Haliotis cracherodii*)

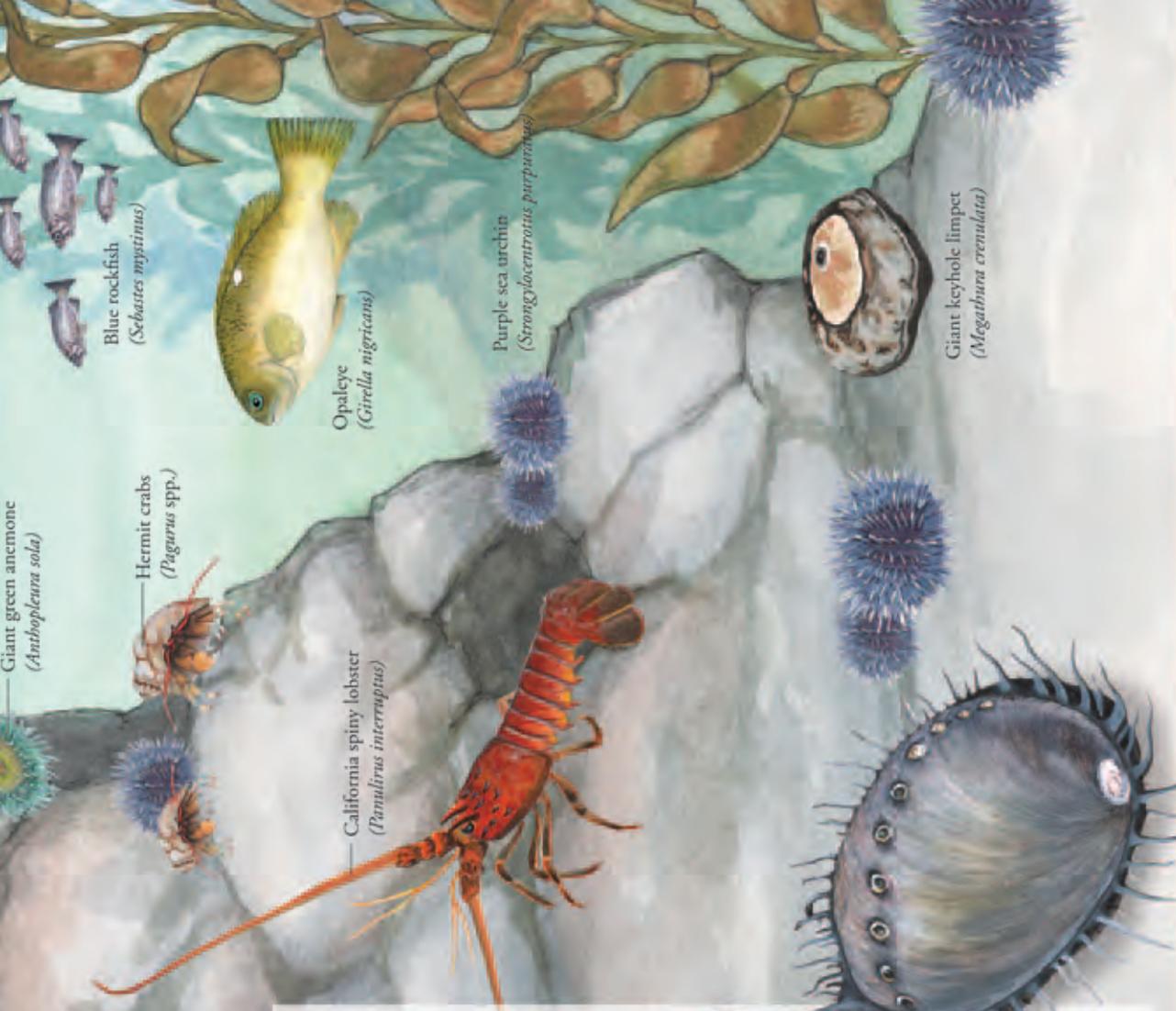
Giant kelp  
(*Macrocystis pyrifera*)



## Endangered Black Abalone

San Clemente Island, located 68 nautical miles (nm) west of San Diego, is home to the rare black abalone (*Haliotis cracherodii*). This large marine mollusk, which was once an abundant species, was listed as a federally endangered species in 2009. It is believed that overharvesting, poaching, and disease (withering syndrome) contributed to a 99% decline in abundance. Since then, the black abalone stocks have continued to dwindle due to human and natural interactions. The compliance with federal laws supports the mission readiness and recovery of these animals that inhabit the rocky intertidal and subtidal areas of San Clemente Island.

**Note:** If you find fresh diseased animals, leave them in place and inform San Clemente Island Environmental personnel.



Giant green anemone  
(*Anthopleura sola*)

Blue rockfish  
(*Sebastes myitinus*)

Opaleye  
(*Girella nigricans*)

Purple sea urchin  
(*Strongylocentrotus purpuraceus*)

Giant keyhole limpet  
(*Megathura crenulata*)

California spiny lobster  
(*Pinnulirus interruptus*)

Hermit crabs  
(*Pagurus* spp.)





## Donald Schregardus Shares His Thoughts on Four Decades in the Environmental Arena

**I****N THE SPOTLIGHT** for this issue of *Currents* is Mr. Donald R. Schregardus, Deputy Assistant Secretary of the Navy (DASN) for Environment. On Monday, August 10, 2015 Kenneth Hess, director of communication and outreach for the Chief of Naval Operations Energy and Environmental Readiness Division (OPNAV N45) and Bruce McCaffrey, managing editor of *Currents* magazine, sat down with Mr. Schregardus in his Pentagon office to get his perspectives on the environmental challenges facing the services today and any advice he may have for his successor.

**CURRENTS:** For readers who may not be familiar with your background, please provide some insights into the positions you've held.

**MR. SCHREGARDUS:** I graduated with a bachelor's degree in physics and master's in environmental science from Miami University in Ohio. I first worked at Argonne National Laboratory, outside of Cleveland. There I got to see the environmental challenges that the nation faced in the 1970s and the transition to the environmental standards that we have today. After 11 years, I went on to the U.S. Environmental Protection Agency (EPA) and managed the drinking water and wastewater compliance programs for the Midwest region.

We need to ask ourselves, how should the Department of Navy's mission be recognized as new areas are developed—everywhere from energy to climate change to coastline protection to community involvement.

We had the authority to issue orders and initiate legal action against people who were not complying with the law, and we did a lot of that. A lot of these were newly delegated programs, and an important part of enforcement was getting the states to take responsibility. In the political climate of the time,





Mr. Schregardus speaks with Gunner's Mate 3rd Class Jaime Mcleod, left, Cmdr. Christine O'Connell, commanding officer of the guided-missile destroyer USS Winston Churchill (DDG 81) and Capt. Fred Pyle, commodore of Destroyer Squadron (DESRON) 2, aboard Winston Churchill in August 2014. Mr. Schregardus was visiting Hampton Roads for meetings with leadership and staff at U.S. Fleet Forces Command and to present environmental awards to NAS Oceana and Joint Expeditionary Base Little Creek-Fort Story.

*MCS2 Jonathan E. Donnelly*

it was difficult for state regulators to bring action against major corporations or municipalities. In fact, the City of Chicago had more attorneys than EPA did at the time. We were forcing very powerful corporations to spend millions of dollars to come into compliance with their environmental regulations.

After working at EPA, I returned to Ohio to become deputy director for water programs at Ohio EPA. After two years, I was selected by the governor to be director of the Ohio EPA. That was my first foray into the public aspect of environmental policy making. I showed up on the first day when there were 30 reporters in the room firing questions at me. So very quickly, I began to appreciate the power of the press and the need to develop relationships with them. You learn how to explain what's going on in the environmental regulatory world to the public through the press.

I stayed in that position until the change of administrations in January of 1999. Then I worked for an environmental consulting firm for two years before the opportunity came to join the Department of Navy. So in 2001, I came to Washington D.C., and I've been here ever

since. It's been an honor and a pleasure to work for the Department. We have a great mission, a lot of great people, and do a lot of wonderful things. It's really been exciting to see the transition of environmental programs over my 40 years in the business.

**CURRENTS:** Talk a little bit about the transition from being an environmental regulator to working for the Navy. What were some of the things that were different in that regard?

**MR. SCHREGARDUS:** A lot of it was easy, because I'd seen all kinds of environmental issues while at Ohio EPA. But there were some new issues for me—things like the freedom of navigation and how that plays into joint uses of the ocean, issues that we as a Department, and as a nation, are still grappling with.

I was new to the National Environmental Policy Act (NEPA) process. As a federal agency, every one of our actions, every training, every new facility comes with this analysis. It is particularly challenging—especially for an organization like the Department of Navy—to be able to complete our NEPA obligations within very strict timeframes. Not only is

it important for us to comply, but the public process established by NEPA is the principal way the public has to provide input to the Department. Most of what we do is unfamiliar to the general public, so interaction through the NEPA process is valuable. We have to take that process seriously and make sure we have good communications with our communities and non-governmental organizations (NGO) and others that have a strong interest in some of our activities or impacts.

We have a great mission,  
a lot of great people,  
and do a lot of wonderful things.

The other challenge—and this remains a challenge 15 years later—is the Navy organization. It's very large with many different leaders. I think of the Navy as multiple navies—all with individual commanders that change every couple of years. I've had three or four major changes in my entire career. Somebody who's been in the Navy for 30 years has been in 20 different commands over the course of their career. While they may have a broad perspective, they often don't have a deep understanding of environmental compliance, including the purpose of NEPA and how you educate the public. How many N45 directors have we gone through since 2001? I bet the number is at least eight if not ten. Some I never met—they came and they left before I was able to meet them. Then there's the sheer number of leaders. It was probably a couple of years before I got around and met all the echelons.

**CURRENTS:** Briefly explain the functions of the DASN (Environment) office. What are you charged with accomplishing for the Navy?

**MR. SCHREGARDUS:** I'm principal advisor to the Assistant Secretary and the Secretary of the Navy on environmental matters, including what we refer to in our budget context as environmental protection, compliance, environmental restoration cleanup, environmental technology, and management of our natural and cultural resources and historic places.

I provide advice to the Secretaries on where we are, what our budgets should be, how we can improve, and how we



Mr. Schregardus posing with an endangered Guam rail (*Gallirallus owstoni*).

can incorporate the goals of the administration and other federal agencies while we meet our national security testing and training mission. We also provide policy direction and oversight. We're also the basic coordination spot with other federal agencies and the White House on major environmental policy issues for the administration. I'm pleased and excited about that role and I think it's been substantially enhanced over the last decade.

We need to ask ourselves, how should the Department of Navy's mission be recognized as new areas are developed—everywhere from energy to climate change to coastline protection to community involvement. I also sit on many boards and commissions and meet with my federal counterparts regularly on a variety of issues that most of the Navy doesn't hear about. We're able to share our concerns and have had some success in getting those other federal agencies to reflect our priorities into their own plans, regulations and programs.

**CURRENTS:** Can you give us a few examples?

**MR. SCHREGARDUS:** One example that comes to mind is the Coral Reef Task Force, which includes federal agencies as well as states and territories that have coral reef management responsibilities. I'm the longest serving member of that committee. There's also the Chesapeake Bay Executive Council, which consists of the states and EPA as well as the Department of Agriculture, ourselves, and the Army Corps of Engineers. We have periodic meetings to set goals and track progress on cleaning up the bay.

One of the newest committees that I serve on is the National Ocean Council, established under executive order by President Obama. This council seeks to establish a national policy on the protection of the oceans and coordination among federal agencies, as well as a commitment to public involvement in the protection and management of our coastal waters. It has established a regular dialogue across federal agencies. I think the oceans are a new frontier. They've been the Navy's home for a couple hundred years, but it's only now that some of these other agencies are thinking, "How do we manage our oceans?"

"What about tapping the oceans for various sources of energy? What does joint use of the oceans mean?" We're quite concerned that joint use may, for some, mean "Navy, you can't train here. You may not be able to travel here. You certainly can't discharge here." It can affect—does affect—our operations and planning. So we have to be part of that dialogue.



Mr. Schregardus and Tom Egeland planting a tree at Patuxent River, MD.

**CURRENTS:** Could you touch on marine spatial planning?

**MR. SCHREGARDUS:** Marine planning is carried out by the states, working with the federal agencies. The Coastal Zone Management Act gives states the right to determine whether an activity on the shoreline or off their coast is compatible with their planning. Some states have big plans, some have no plans. And that can affect us because we need to operate in the oceans. Off the coast of Virginia is a prime example. The State of Virginia wants to look at oil and gas development. Virginia doesn't own much water space, and what they have is at the heart of the largest naval fleet in the world. What does that mean to us? We've identified concerns to the Bureau of Ocean Energy Management (BOEM) who manages the leasing of those waters. We've talked to the state about it. The public is going to weigh in. We'll have to come to an understanding that is acceptable to the other players, including the general public. In the end, we get our support from the people. Our appreciation of the communities in which we live, being a good neighbor, means a lot to our future.

**CURRENTS:** What were some of the key issues facing you when you came into the job?

**MR. SCHREGARDUS:** One of the three biggest issues facing me on day one was marine mammals washing up on the shore of Grand Bahamas Islands in 2000. I came in 2001—the stranding report came out two weeks after I showed up. I had to brief it to the Bahamian leadership, explain why we were in their waters. That was just the beginning of a controversial issue that continues to this day.

We were also in a large national debate over Vieques and how to manage that island. When I arrived, we were just in the process of signing over that island—I believe it was turned over to the Department of Interior in 2003. I negotiated with the Department on what that transfer would look like, what we would do, what were the future uses—reflecting a decade of international interest and concern over the bombing range that we had on the island.

Another big issue is encroachment. With increased scrutiny over envi-

ronmental laws, we are getting more and more limited on what we can do and where we can do it. From our neighbors on our ranges, to our overseas areas, to combat training activities we carry out in the Gulf of Mexico, we've been seeing real pressure on what the future will look like for testing and training. On this issue, we were successful in communicating our concerns to Congress. As a result, we were able to get some changes made to the Sikes Act that allow us to partner and conserve land outside our bases to protect compatible activities. Those changes shifted the playing field for our activities.

It's only now that some of these other agencies are thinking, "How do we manage our oceans?"

It's called the Readiness and Environmental Protection Integration (REPI) program. Until then, federal agencies could only invest in property within our fence-line. The problem was, people were building houses right across our fence-lines and then we could no longer fly our planes or shoot our guns, because it's too noisy for the people across the street. We built our bases and our ranges out in the middle of nowhere, but it's not the middle of nowhere anymore. What's the line in the movie, "Build it and they will come?" We built it and they came and then they said, "You're making noise. You're disrupting my sleep and restricting the types of activity I can do in my yard. And you, the Department of Defense (DoD), need to stop that." This piece of legislation has changed the paradigm. It's not "you or them" it's "What can we do?" The land outside our fence-lines could be turned into a park. Or cropland if it's in an agricultural community. Or we could designate this land for conservation purposes.

The states of Florida, Virginia, California and others have important conservation initiatives, and they can help. So

can the Sierra Club and The Nature Conservancy, who were often looked at as our enemies. We're now saying, "Let's see what we can do together." Within the REPI program there are several thousand acres that have been purchased, protected or conserved in a compatible fashion that not only has met our needs, but also has some great natural resource benefits. It's opened up a dialogue.



**Mr. Schregardus and Capt. Charles Stuppard, commander of Joint Expeditionary Base Little Creek-Fort Story, plant grass on the beaches at the base in 2010.**  
Mr. Schregardus toured Little Creek-Fort Story to promote environmental and historical protection throughout the Hampton Roads area.

For a number of these organizations, it was, "You're the bad guys." Now it's more like, "We still don't agree with everything you do, but we might be able to use you to help us conserve and protect natural resources."

We can all agree on one thing—investments in protecting our bases and protecting our landscapes make sense, and that's only part of the puzzle. You then get matching dollars from the states, cities, counties, and/or NGOs. They'll say, "You're really trying to save a corridor, and we can make this happen." So it's been a valuable tool that we've used successfully. When a Marine Corps General from Camp Pendleton is given an award by the Sierra Club, we've changed the paradigm.

Mr. Schregardus inspects an ecologically friendly alternative tank target positioned on the Pinecastle Impact Range during a visit to Naval Air Station Jacksonville in October 2010. The concrete and steel tank targets, developed with resources provided by the Navy Environmental Sustainability Development to Integration (NESDI) program, are replacing the dwindling supply of surplus Army tanks.

*Clark Pierce*



That's not to say that encroachment is under control, but we are in a much better place today than we used to be. We have better communication with our neighbors, have some tools to use, and have recognition by other federal agencies of some of the challenges we face. We're better situated to address these issues moving forward than we were a decade ago.

**CURRENTS:** How have the Navy and our environmental programs evolved since you joined the Department?

**MR. SCHREGARDUS:** Let's talk about the Marine Mammal Protection Act. Some said the law didn't apply to us. The law talks about "taking" a marine mammal—we weren't "taking" any of them. Every now and then there may be an accident or something but we certainly weren't "taking" them intentionally.

I think the idea that our sound might cause some marine mammals to beach themselves was not appreciated. We felt there wasn't sufficient information to prove a correlation between our use of sonar and the beaching of some marine mammal species. But that particular incident in the Bahamas was a game changer. It wasn't the first one—there had been other instances of beachings, but for those, the connection wasn't as clear.

That incident really changed the facts. The Navy and National Oceanic and Atmospheric Administration (NOAA) studied the issue and determined that there was no other plausible cause for those beached whales coming ashore on the Grand Bahamas other than that the whales were there, we were training in the area, and the whales didn't have an exit route, so they beached themselves.

Prior to this stranding, we were developing the Surveillance Towed Array Sensor System Low Frequency Active Sonar (SURTASS LFA) program to be able to track submarines at long distances. Questions had been raised about the potential impacts of that system, so we began an environmental study to evaluate that particular system. I signed some Record of Decisions on SURTASS LFA so I became eminently familiar with the decisions in the study. For the hull-mounted mid-frequency sonars we use on our cruisers and destroyers, we couldn't shut down our operations while we obtained authorization to use the system. So we worked with NOAA on a proposal for authorization to use the system on all of our major ranges and operating areas in a risk-based fashion. A decade later we have done that. All of our major installations and operating areas are authorized for testing and training. This was a complex and long process because there are a number of sound

sources in use in a number of different ways—all critical for national security purposes.

Throughout this entire process, the Navy recognized that our operations may have an impact on some species of marine mammals and therefore we will operate our systems in recognition of those potential impacts. Since 2001, we've invested close to half a billion dollars on a combination of research, equipment, studies for NEPA, and permit authorization processes. We developed a whole new set of tools and methods that are now used by scientists to better understand the behavior of marine mammals and how they may react to man-made sound sources.

We recognize that some marine mammals react to our sonar. It may interrupt their diving behavior. But how important is that? What does that mean in their lifecycle? Does prolonged exposure to sound affect their reproduction or how much food they consume? There's a lot of science yet to understand. It's 15 years later with over 200 million dollars invested in the area and we still don't completely understand what these behaviors mean. But we know a lot more.

We've learned a lot about beaked whales, for instance. We thought there were very few of them because you hardly ever see them. Well, in fact, they spend 55 minutes of every hour at depth—that can mean 1,000 or 1,500 meters. They come to the surface only briefly to breathe. And we found out that there are a lot of them. What helped us to determine that? We've got hydrophones at our instrumented ranges for military purposes. Somebody had the idea of using these hydrophones to listen for other sounds. It was then that we discovered an entire world of sound down there. In our instrumented range in the Bahamas, we found that the animals were there and were, in fact, regular inhabitants of the area.

**CURRENTS:** What do you see as a top priority today?

**MR. SCHREGARDUS:** I'd be remiss if I didn't say "energy." It's a priority of Secretary Mabus to look at better energy use and alternative energy production across our full range of activities. And energy is so tied to environmental issues. It's probably the number one contributor to air pollution worldwide due to the burning of fossil fuels. So any discussion, improvement, shift, or change generally means fewer emissions, less carbon, and less sulfur.

We've made a lot of exciting progress in the energy realm in just a few years. When you see an F/A-18, one of the most powerful, capable jet fighters in the world, running on a biofuel blend, it's really quite impressive. When the Department puts its mind to something, there's almost nothing it can't accomplish. We have great minds, we have dedicated people, we have substantial resources, and we can accomplish virtually anything. We can change how fuel is produced and used in this country. We certainly are changing how it's used on land. It's pretty dramatic what's changed in the last few years and the future is really exciting.

## For More Information

**FOR MORE INSIGHTS** into the F/A-18's success with a biofuel blend, read our story "From Seed to Supersonic: How Camelina Powered the Navy's Premier Fighter Jet" in the winter 2011 issue of *Currents* at <http://greenfleet.dodlive.mil/currents-magazine/currents-magazine-winter-2011>.





Senior Airman Joy Cooper shows Mr. Schregardus a preserved Coconut Rhinoceros Beetle (CRB) larva and panel trap during his visit to Joint Base Pearl Harbor-Hickam (JBPHH).

The CRB is a high profile invasive species and is a pest of coconut palms and other palm species. During his visit, Mr. Schregardus toured multiple CRB mitigation sites on JBPHH, as well as environmentally significant areas at Pacific Missile Range Facility, to include Nohili Dunes, Turtle Cove and the Shearwater seabird nests and sanctuary.

*MCS3 Johans Chavarro*

And number two, climate change is something that the DoD and Department of the Navy have taken seriously. It may be the core de-stabilizing issue in the coming decade when you consider the potential impacts that it may have on the production of crops, supply of water, and the political redistribution of land across the globe.

Where are people going to go? What are they going to eat? Climate change is going to affect the security of nations, islands and peoples around the world. While some still want to deny it, clearly it's our job to protect this nation. We ought to be thinking ahead. What do we need to do to be prepared? You need to look no further than the U.S. Naval Academy. Four or five years ago, a hurricane came up into the Chesapeake Bay. It wasn't even a direct hit, but the Naval Academy's engineering building was underwater, and its computers were in the basement. And millions of dollars later, we said, "We ought to plan for that." We need to figure out how we can adapt our national security assets to the changing frequency and impact of storms. In Norfolk, we have the largest naval installation in the world in an area that's going to have more water in the next 50 years or so. The water's coming up and the land's going down. It will take the entire community to address this challenge. Part of that effort will be thinking and planning about the future of our infrastructure.

Climate change is also going to affect our activities in the Arctic. It's an area where we have very little activity, but we're going to have to plan for the Arctic melting sooner and faster than some expected. What are we going to do to protect our assets and prepare for an emergency? The nation needs to think about these things, and we, as an organization, are at the forefront of this thinking.

Let me talk about another priority that's on our agenda. We need to have a

stronger permanent presence in the Pacific. The president said it, we've signed international agreements that support it, and it's the Navy's job to make it happen. Now that's particularly challenging because the land mass is small, the need is large, and all the activities that would need to occur are at a great distance from the U.S. mainland. You need to bring virtually all of the equipment and systems out there. These islands have limited capability and infrastructure. But they also have natural resources and historical and cultural assets that, by our own laws, require protection and conservation. So it's been a particularly complex task. How do you bring a new Marine Corps base to Guam or new training capabilities to the Commonwealth of the Northern Mariana Islands? Bringing 5,000 more Marines to Pendleton? No big deal. We'll build a few more buildings. Bringing 5,000 more Marines to Guam? Now that's a challenge to work through all the regulatory and environmental issues—including the fact that there are very few federal employees on those islands. There's a lot to evaluate, but I think we're coming close to completing our plans for Guam.

## The Basics About Palau

**PALAU IS AN** archipelago of more than 500 islands, part of the Micronesia region in the western Pacific Ocean. In World War II, the battle of Peleliu took place on the Islands. After ferocious Japanese resistance and heavy U.S. casualties, the Allies took the island.

After the war, the United States assumed administration of Palau under United Nation auspices as part of the Trust Territory of the Pacific Islands. In 1982, Palau signed a Compact of Free Association with the United States. In 1994, Palau gained its independence and established diplomatic relations with the United States. Today it is a presidential republic in free association with the United States, which provides defense, funding, and access to social services.

Palau has a population of approximately 22,000 people, most of whom live in the northerly island of Koror. The Palau economy is based on tourism and other services such as trade, subsistence agriculture, and fishing.

Mr. Schregardus working on a shoreline restoration project in the Chesapeake Bay in 2006.



**CURRENTS:** Is there anything more you'd like to say about the Navy's interaction and relationships with other government agencies?

**MR. SCHREGARDUS:** As you know, the president has a national ocean policy. I probably attend at least one meeting a week dealing with some aspect of ocean policy. I think it's critical that the Department is leaning forward on this matter because it allows us to be a voice in an area that we know a lot about, and we have to understand the challenges we face in working with others regarding the use and management of ocean space.

As an example, some folks from the Office of Naval Research were trying to help the small island nation of Palau understand which fishing vessels are in their territorial waters. Palau has thousands of people and thousands of miles of territorial waters around them. But they have very limited availability to patrol those waters. They only have one craft and enough fuel to go on two trips a year to find out who's in those waters and whether they're fishing legally or not. So they talked to some of the folks at the U.S. Pacific Fleet in one of their "know your neighbor" efforts and asked for help from the U.S. government to better understanding who's in their waters. We've looked at developing commercially available, unclassified equipment for a small nation to be able to monitor their waters and ascertain whether there is illegal activity going on out there. This is a great example

of leaning forward, as exemplified by the Navy and the equipment that we're developing in this case.

**CURRENTS:** What have been some enduring priorities for you and your office?

**MR. SCHREGARDUS:** One thing that's a priority to me is I like to have facts. Good decisions will be made if decision makers have access to the facts. The Navy has some world-renowned scientists in our midst. I've tried to make sure that the best science is a priority throughout our Department so everyone has access to the facts. I've tried to open up avenues among our oceanographers, ONR, the operational Navy, and our installations. If there's a broader understanding of the information we have, you get better decisions and more options for meeting future challenges.

We also combine that with a strong desire and recognition of the need to partner with others. When I was with EPA, we were regulators. But we can't be everywhere with a traffic ticket forcing folks to do things. You need to educate, you need to advise, you need to help. You need to provide incentives to make an environmental regulation a reality on the ground. It isn't just saying, "You must do this." Whether the issue is encroachment, marine mammals, or marine planning, what works is communication and the sharing of ideas across federal, state and

local entities. When our bases partner with local communities, we end up with a lower cost, highly effective solution that conserves plants and animals and protects our bases. By working together, we've created oyster beds that provide security protection as well as support the rejuvenation of oysters in the Chesapeake Bay.

We often look to partner with our friends and battle with our enemies—those who don't happen to support our particular mission at a particular time. But some of our most important partnerships are with environmental interest groups that don't always agree with our priorities. When we work together to support the red cockaded woodpecker at Marine Corps Base Camp Lejeune, for example, we understand each other better. Through these partnerships, we find ways to address our common problems that have benefits far beyond our testing and training requirements.

Through these partnerships we protect endangered species, establish parks, build trust, and maintain an ongoing, productive dialogue. With almost all the federal agencies with which we have regular dealings, we have effective partnerships. This includes NOAA, the National Marine Fisheries Service, and EPA. And we're working to build the same sort of collaboration with BOEM. I often have an assistant administrator from those organizations call me and want to talk about (and resolve) an issue. Those conversations are worth millions of dollars. That's how I like to do business. And that's certainly a practice that I hope that my successor will embrace.

Another priority is our need to tell our story. We have to be smart, honest and, most importantly, tell the truth when we tell our stories. Even if we don't have all of the information we need, we should still communicate what we know. If we don't, it can be interpreted as though we're hiding something. Especially when something serious happens, some leaders make things worse by trivializing things. And the biggest part of the story isn't the people who have been hurt when a spill occurs (for example), it's the information that is sometimes withheld to cover it up.



(From left to right:) Mr. Schregardus; Bob Lottie, director, Installations, Environment and Logistics Directorate; Lance Bookless, senior natural resources manager, Environmental Compliance and Protection Department; and Col. Eric W. Schaefer, the commanding officer of Marine Corps Base Hawaii, at the Pacific War Memorial in September 2014.

In our case we're not trying to covering anything up, and we have a good story to tell. But communication isn't our primary mission. I think our Fleet Weeks are great. It's a way to reach out and touch hundreds of thousands of Americans who don't know much about the U.S. Navy. People always ask, "What do you really do?" It's amazing what we really do. I got a chance to go on the USS George Washington (CVN 73) in the spring of 2002, my first few months on the job, and I was dumbfounded. I've been around for a long time and have seen a lot of stuff. But I had never seen three or four thousand young people, younger than my daughter, managing the most powerful weapons in the world. That's scary and impressive. I sail a sailboat. I can't even get the two people on the boat right next to me to do what I say, especially when one of them is my daughter.

And everybody wants a story about what's happening today. The press is going to have their own schedule, and you're either going to be part of it or you're going to be the butt of it. You get to set the terms of the debate if you speak about it first. If you wait for someone else to put it out there, you're going to be debating the issues that are framed by others.

**CURRENTS:** Can you think of an example of a way that you've gotten ahead of an issue in this way?

**MR. SCHREGARDUS:** When I was director of Ohio EPA, the state was in very tough economic times and they were slashing all the state budgets, so at the end of the year we had to decide, "Do we do less and less across the board?" We were either going to do some things well and drop other things, or get more money. So we had an idea. The entities that were requesting permits for their activities would have to pay closer to the true value of producing those permits. They'd been spending 50 to 500 dollars for a wastewater permit which would typically cost us ten thousand dollars. For an air permit, maybe up to 50 or 75 thousand dollars. And we decided that the entity was going to have to pay half of the real cost of obtaining that permit.

This was a controversial concept at the time. I got in front of the issue by going to every one of the major newspapers



Mr. Schregardus (left) is given a tour of the Montford Point Museum by Houston Shinal (right), Montford Point Monument Director, aboard Camp Johnson in August 2014. Mr. Schregardus toured the museum before visiting Camp Lejeune to congratulate the base for receiving three environmental awards for its sustainability, and environmental restoration programs.

Mark E. Morrow

in the state and telling them why we needed to do this and what the viable options were. There was a Republican governor at the time who supported the idea, but both the House and the Senate legislatures, who were also Republican, didn't like the idea. But I told them that the federal government was prepared to take over air pollution control permits in the state of Ohio. Air, drinking water and wastewater are all federal programs—they're delegated to states. I told them I was inclined to turn those back over to the federal government if we didn't get the money. All the newspapers came out in support of increasing the wastewater permit fees as I'd suggested. It was a close vote, but in the end the state House and Senate voted "yes."

**CURRENTS:** Speaking of communication, do you have any ideas about increasing the impact of our communications? Including *Currents*?

**MR. SCHREGARDUS:** I would like to see us make a more committed investment in electronic communications, whether it be blogs or websites. We have to figure out a way to be proactive, a way to touch people. And right now, everybody's using Facebook, Twitter. I don't know how to Tweet and I'm not on Facebook. But the Department



CLOCKWISE FROM TOP LEFT: A view of the Chesapeake Bay Bridge from Mr. Schregardus' boat—*My Fair Lady*; Mr. Schregardus navigating *My Fair Lady* in and around the Chesapeake Bay; Mr. Schregardus cruises by the Drum Point Lighthouse during one of his many sailing trips in the Chesapeake Bay. The lighthouse was decommissioned in 1962, having been replaced by a nearby modern navigational aid, and was eventually moved two nautical miles up the Patuxent River to a pier on Backwater Creek, near the Calvert Marine Museum; Mr. Schregardus relaxing on his boat with downtown Annapolis in the background.



would benefit from broadening the use of those channels, and having some creative ideas will really help. We need to be part of these communities, part of these discussions, because we're certainly part of the answer.

**CURRENTS:** You've talked about some of the challenges and opportunities for your successors. What about your past accomplishments? What are you most proud of?

**MR. SCHREGARDUS:** First of all, I think accomplishments come from a lot of people working hard. I'm proud that we've developed a strong conservation program that recognizes both our need for training and our conservation obligations. And we've established some benchmarks that our children will be proud of, such as endangered species protection. We've done some very impressive things at a time when our natural resources and a lot of our species are threatened by efforts to develop the lands around our installations.

One great example is the success we've had with the San Clemente Island loggerhead shrike. From thirteen birds, we've gotten up to around 100 nesting pairs. We've achieved similar results with snowy plovers and least terns elsewhere. We were able to get DoD to purchase the logging rights to one of the last old growth forests in the Northwest—2,000-year old trees.

And although we have not resolved the issues relating to the impact of sound on the behavior of some marine mammals, we've developed a lot of good science along the way. We can be more assured that the impacts from our use of sonar are much more limited than was initially suspected. And our scientists and others are still trying to better understand the impacts of anthropogenic sound on marine mammal populations in the ocean.

We've also been very successful in cleaning up our legacy installation restoration sites. The Department invests 500 million dollars every year to clean up these sites. And in the time that I've been here, we've made great strides to clean up after our past mistakes. Working cooperatively with a number of federal and state agencies has enabled us to secure a better future based on the financial investments that the Navy have made in environmental restoration.

**CURRENTS:** Can you share with us some of your plans for retirement?

**MR. SCHREGARDUS:** I have so many things I want to do. First, my family. I have two grown daughters and four grandchildren with a fifth one on the way. I clearly want to

spend time with them. I certainly want to do some more activities with my church and my community. And I will probably travel around the United States with my wife. We have a beautiful country, and I want to enjoy all the places I've already visited and more that I haven't yet seen. And my last is, I will undoubtedly be sailing. I'll probably make myself a sailboat. I'll do a little bit of racing. I'll teach my grandkids how to sail. So between my family, my community and sailing, I'll be busy.



The view of the Thomas Point Shoal Lighthouse in Annapolis from *My Fair Lady*.

**CURRENTS:** Is there anything else you'd like *Currents* readers to know?

**MR. SCHREGARDUS:** Just that I appreciate the chance to say a few words to the broader Navy team. A lot of people come to know about the Navy and what we do through your publication.

I've really been honored and happy for the opportunity to work for the Department of the Navy. The people in the organization have been dedicated and passionate. They've been committed to the Navy, the Marine Corps, and more importantly, protecting the environment around us. And I think we do a very good job. We lead in many areas. I know there are more challenges ahead of us, and I'm very confident that with the passion that they bring to their work, we have a good future ahead. ⚓

For more about the Deputy Assistant Secretary of the Navy for Environment, visit [www.secnav.navy.mil/eie/Pages/Environment.aspx](http://www.secnav.navy.mil/eie/Pages/Environment.aspx).

# NSETTI Program's Energy Innovation Demonstration Projects Showing Promise

## Efforts Include Hybrid Electric Vehicle Validation & Use of Seawater for Air Conditioning

### FOUR PROJECTS LAUNCHED

by the newly-formed Navy Shore Energy Technology Transition and Integration (NSETTI) program—ranging from the validation of a hybrid electric utility vehicle to exploring the use of seawater for island base air conditioning—are already showing promise.

The NSETTI program is an energy research, development, test and evaluation program that seeks to address the Navy's emerging energy needs and help to meet the Department of Navy's (DoN) energy goals. The program focuses on demonstration/validation of technologies that fill gaps in the following four areas:

3. Energy Storage
4. Transportation and Fuels (non-tactical)

The program, also known as Directed Energy Research (0928), was formed in 2012, and is managed out of the Naval Facilities Engineering and Expeditionary Warfare Center (NAVFAC EXWC) in Port Hueneme, California.

Sponsored projects support feasibility evaluation, modeling and prototype testing of innovative energy technologies for use at naval installations with the greatest potential for enterprise-wide implementation. Several projects, highlighted below, are already chalking up accomplishments.

heavy bucket truck. Sponsored by the NSETTI program, the project was staged on behalf of the Naval Facilities Engineering Command's (NAVFAC) Base Support Vehicle and Equipment (BSVE) product line.

Heavy duty plug-in hybrid electric trucks are in an early commercial production phase, and have not previously been validated by the Department of Defense (DoD). Generally, these trucks have been found to be more efficient and produce lower tail pipe emissions than conventional diesel trucks. Hybrid trucks also permit clean and quiet work operations that would otherwise require continuous idling of the vehicle.

The vehicle's electric plug-in system was projected to increase fuel economy by 40 percent over the conventional truck.

1. Renewable/Alternative Energy
2. Efficiency and Systems (e.g., lighting, heating, ventilation, and air conditioning (HVAC) microgrids)

### Hybrid Electric Utility Vehicle

In July 2015, utility line maintenance personnel at Joint Base Pearl Harbor-Hickam finished a year-long demonstration of a new electric plug-in

David Cook from NAVFAC EXWC is the Alternative Fuel Vehicle Team Lead and the principal investigator for this NSETTI project. "The non-plug-in hybrid conserves fuel by operating in

a battery-only mode for aerial lift operations, though for limited to short durations,” he said. “The plug-in hybrid trucks have capability for direct grid recharging operations, as well as up to 15 times the capacity for the electric-only work mode. The larger battery pack also enables enhanced efficiency gains for driving operations.”

At the start of the one-year demonstration period, a bucket truck was equipped with special instrumentation for hands-free monitoring. The automated system collected data on the truck’s usage in both the driving mode and the engine-off working mode (used in the aerial lift and hydraulic tools). The system also monitored the truck condition and diagnostic codes, and the on-board telematics system transmitted data to a website several times per day. Factors such as noise, unscheduled maintenance, reliability, and drivability were also captured. These data were used to compare efficiency of the hybrid with the baseline truck, a conventional diesel truck with a similar chassis, engine and utility system.

The vehicle’s electric plug-in system was projected to increase fuel economy by 40 percent over the conventional truck. Results are still being tallied, but the fuel economy was better than predicted when the truck was in aerial lift mode—nearly triple that of the diesel truck. Fuel economy during driving mode was not significantly better than its conventional counterpart.

Noise was greatly reduced as well when the truck was in aerial mode, and overall drivability was slightly improved.

Assuming all results are favorable, NAVFAC BSVE will integrate plug-in heavy hybrid utility trucks into their long-term vehicle procurement plans. Results of the demonstration and a final report will be made available to other non-tactical fleet managers as well.

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David Cook  
Naval Facilities Engineering and Expeditionary  
Warfare Center  
805-982-3477  
DSN: 551-3477  
david.j.cook@navy.mil



The new hybrid truck in lift mode.  
Dave Cook



The hybrid bucket truck in the field.  
Dave Cook

Lighting accounts for approximately 23 percent of total energy use Navy-wide.



The LED fixtures utilize an upward projecting light for indirect lighting as well as a downward projecting light for direct lighting.

*Paul Kistler*

### Hangar Illumination Demonstration

Currently, lighting accounts for approximately 23 percent of total energy use Navy-wide. In an effort to reduce the energy used for lighting in DoD aircraft hangars, an NSETTI-sponsored team conducted an investigation into the appropriate ambient light levels in hangars.

This past summer, the project team, headed by Paul Kistler and Robert Okwera of NAVFAC EXWC, replaced fluorescent lighting with LED fixtures at a hangar at Naval Base Ventura County (NBVC), Point Mugu. LED lighting was chosen for this project because LED lighting can be very easily dimmed over a wide range of light levels.

The current standard for lighting in hangar bays as required by the Unified Facilities Criteria (UFC) is 500 lux. (A commonly used measure of illumination, one lux is equal to the illumination supplied by a single candle at a distance of one meter.) In contrast, the UFC requirement for office interiors is only 300 lux. Experts believe that the ambient lighting in hangars can be reduced to the 300 lux range since aircraft mechanics utilize portable task lights when performing tasks requiring a higher light level.

The main goal of this project is to determine how far the illumination levels could be reduced before visual performance and user satisfaction suffered.

The quantity and quality of light in the aircraft hangars is extremely important given visibility factors such as color rendering, glare, and reflectance that can create various



The new lighting system will include daylight sensors that dim in the presence of adequate natural light.

*Paul Kistler*

safety issues to the working crew performing inspection and aircraft maintenance. It is therefore imperative that the tasks be performed in the most suitable work environment.

In July 2015, existing fluorescent fixtures were replaced with dimmable LED fixtures at the hangar building. The lighting levels will be reduced incrementally over a test period of one to two months. Workers will be given checklists every other week as the lighting levels are reduced from 100 percent to a low of 60 percent of the original 500 lux. These checklists provide an opportunity to report lighting problems such as a dim work environment, defective lamps, strong glare and reflections.

The LED fixtures utilize an upward projecting light for indirect lighting as

well as a downward projecting light for direct lighting. These lights are capable of providing up to 500 lux in the hangar, but this maximum level can be reduced. The fixtures are equipped with internal motion detectors, which further the energy savings by turning off the lights when the building is unoccupied. Each hangar bay also has daylight sensors to dim the lights when the hangar doors are open during the day. Additionally, the LED fixtures are more durable and break-resistant than fluorescent fixtures.

If it is determined that worker safety and performance is not diminished by a reduction from 500 lux to 300 lux conditions, annual energy savings with LED lighting would be at least 40 percent. Controlling the lighting in response to daylight availability and occupancy are expected to increase this savings to 60–70 percent.

Once these light levels are proven to be acceptable for this application, a request will be made to the NAVFAC Atlantic, Engineering Criteria and Programs Office to change the ambient lighting levels for hangars.

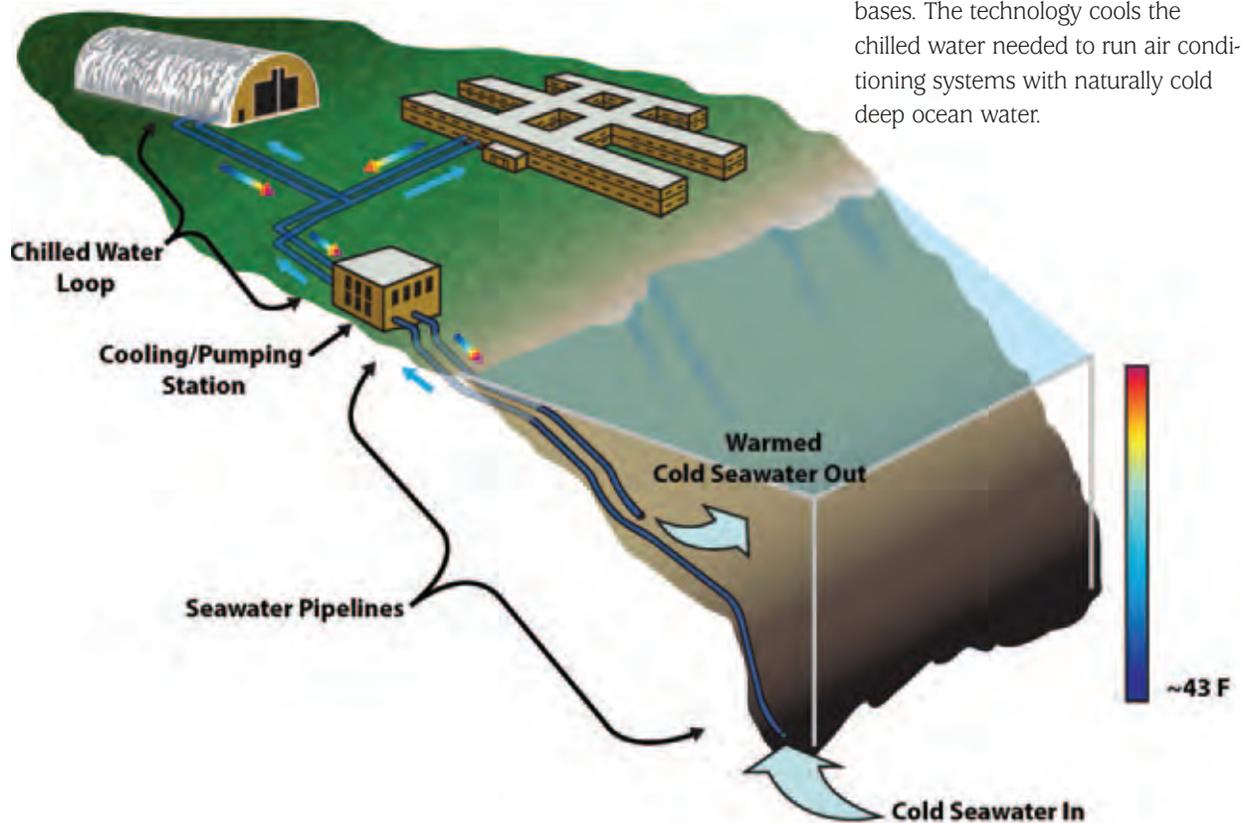
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Paul Kistler  
Naval Facilities Engineering and Expeditionary Warfare Center  
805-982-1387  
DSN: 551-1387  
paul.kistler@navy.mil

Robert Okwera  
Naval Facilities Engineering and Expeditionary Warfare Center  
805-982-5177  
DSN: 551-5177  
robert.okwera@navy.mil

### Seawater Air Conditioning

Seawater Air Conditioning (SWAC) is an existing technology that could dramatically cut energy costs at island bases. The technology cools the chilled water needed to run air conditioning systems with naturally cold deep ocean water.



A conceptual drawing of how SWAC works.

## SWAC would use approximately 85 percent less energy than conventional air conditioning to cool Navy Base Guam.

The NSETTI project team, headed by Nate Sinclair, has conducted various planning, design, and cost estimating activities to assess the technical and economic merit in implementing SWAC systems at Navy bases.

Naval facility buildings are currently cooled with a mix of small direct expansion air conditioners and small chilled water distribution systems. Seawater air conditioning is a means of bypassing the chillers used in both types of cooling systems, and using deep sea water and a heat exchanger to chill the fresh water which is used to condition building air via a district cooling network of pipes.

As an example, there are 160 air conditioning chillers at Navy Base Guam, with a total peak cooling

demand of 8,300 tons. The base has a high energy demand, as the mean average temperature is 81 degrees, with high humidity levels. A SWAC system implemented at Navy Base Guam would likely use a deep seawater intake pipeline extending approximately four kilometers (2.5 miles) offshore, to a depth of approximately 750 meters (2,500 feet); and bring 42-degree Fahrenheit (F) seawater ashore. The pipeline would pass through a tunnel under the reef, across the shoreline, and into a pump station. Heat exchangers inside the pump station would use the cold seawater to chill fresh water that is circulated in a closed loop and delivered to all of the base air conditioning (AC) systems. Each building would receive cold fresh water at 45 degrees F, the

same temperature as with traditional air conditioning.

After it cools the incoming AC chill water, the warmed seawater would leave the pump station and be returned to the ocean, through another pipeline. Operation of the AC air handling units within the buildings on base is basically unchanged.

The idea of seawater AC is particularly attractive at places like Guam because of the ease of access to deep water, the concentration and quantity of buildings requiring AC, the high rate of AC use, and the relatively high cost of electricity.

The results of the study indicate that SWAC is a technically feasible and cost-effective way of delivering air

A representative from the WEC developer, Fred. Olsen Renewables, describes the Lifesaver technology to Navy personnel.  
*Sound & Sea Technology*



conditioning to Navy Base Guam. SWAC would use approximately 85 percent less energy than conventional air conditioning to cool the island base. Carbon emissions would also be reduced by 30,000 tons per year. In addition, energy costs with SWAC will remain relatively flat, providing greater independence from future utility price increases.

Upfront capital costs for SWAC systems are substantial (100 million dollars or more) given the large amount of infrastructure and AC retrofitting required. However, estimates show a favorable payback period.

It is expected that SWAC could be a similarly viable technology for other island-based facilities, such as Joint Marine Corps Base Finegayan, Andersen Air Force Base, Naval Support Facility Diego Garcia, and Naval Station Guantanamo Bay. The technology is best suited to locations where the distance to deep offshore water is relatively short, the AC system output is more than 2,000 tons, AC usage is relatively high, and the cost of electricity is high.

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Nate Sinclair  
Naval Facilities Engineering and Expeditionary Warfare Center  
805-982-1005  
DSN: 551-1005  
nate.sinclair@navy.mil

line. The WETS effort was funded with Congressional Budget and Appropriation dollars.

The first device to be tested at the WETS was a shallow-water buoy developed by Ocean Power Technologies. This buoy assembly was located at a depth of about 100 feet, approximately three-quarters of a mile offshore. A subsea power cable connected the buoy to an onshore data collection facility.

As more and more people became interested in exploring WEC technology, the Navy entered into various partnerships with government and private industry, allowing them to utilize the WETS, and in some cases, assisting with funding.

In 2014, the NSETTI program joined the Office of Naval Research, the Department of Energy's (DOE) Wind and Water Power Program, and the University of Hawaii's Hawaii Natural Energy Institute to construct two additional deep-water berths at the site. The berths, at 60 and 80 meter depths (200 and 262 feet), will enable companies to test their WEC devices in an open ocean environment and connect to a power grid. The electricity produced during testing will be used by the Navy on the Marine base. This infrastructure makes the WETS the nation's only grid-connected, open-water test site.

This infrastructure makes the WETS the nation's only grid-connected, open-water test site.

### Wave Energy Test Site

Ocean waves are a huge, largely untapped energy resource. But Wave Energy Conversion (WEC) technology, which is still in its infancy, converts the energy of waves, tides or ocean currents into electricity.

The Navy entered the field of WEC study in 2003 (then called the "Wave Energy Technology" project) with the construction of what is now known as the Wave Energy Test Site (WETS) in the waters off Marine Corps Base Hawaii. Hawaii is one of the locations in the United States where the wind blows with enough consistency and force to provide continuous waves along the shore-

The new berths will be used for testing two WEC technologies with Navy support—the Lifesaver, deployed by Sound & Sea Technology, and Columbia Power Technologies' StingRAY device.

Both of these devices employ "point absorber" wave energy technology—one of the four main approaches to the science. Point absorbers use floats and a rolling centerpiece called a nacelle to collectively capture wave energy. According to the Bureau of Ocean Energy Management, the relative up and down bobbing motion caused by passing waves is used to drive electromechanical or hydraulic energy converters to generate power.

## More About the NSETTI Program

**THE NSETTI PROGRAM** (Directed Energy Research Program 0928) is sponsored by the Chief of Naval Operations (CNO) Shore Readiness Division (N46). The program is focused on three primary objectives that influence management priorities and directly affect the program's success:

### 1. Collect, Validate & Rank Energy RDT&E Needs

Expand awareness of program opportunities within the Navy shore side community to encourage and facilitate the submittal of well-defined energy needs and requirements.

### 2. Resolve High Priority Needs

Ensure that program investments and the resulting projects maintain a direct and consistent link to the defined user needs.

### 3. Integrate Solutions & Validate Benefits

Maximize the number of program-derived solutions that are successfully integrated into the shore side facility environment and verify that the solutions provide the anticipated benefits.

For FY16, the program launched its first needs solicitation and received 52 needs. Of these, 67 percent fell under the Energy Efficiency, Security and Systems thrust area. Of the remaining needs, 19 percent were in Renewable Energy, and the remaining 14 percent was divided between Energy Storage and Transportation and Fuels.

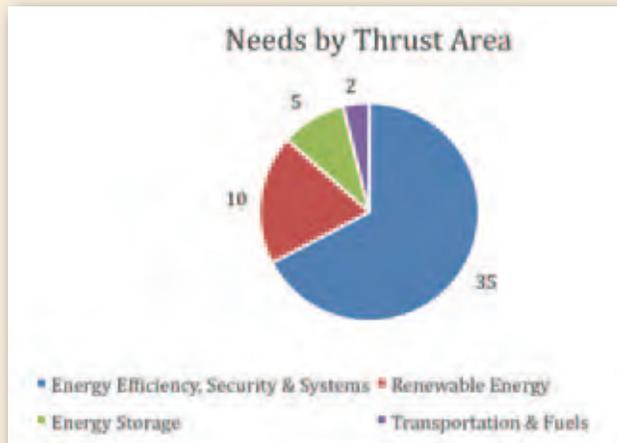
Additionally, the needs were geographically dispersed so Navy-wide representation was achieved.

A total of 23 needs were grouped into the focus areas as shown in the table on the following page. Many of these focus on the problems created by the high penetration of renewable energy and the need to maintain grid stability using energy storage and smart,

autonomous controls. Controlling and managing these systems remotely, autonomously or both creates a cyber-security and information technology vulnerability that the program plans to address in shore energy Research, Development, Technology and Evaluation projects in the future. The FY16 call for proposals is already underway that will begin to address these needs.



Katelyn Staton  
Naval Facilities Engineering and Expeditionary Warfare Center  
805-982-1657  
DSN: 551-1657  
katelyn.staton@navy.mil



The Lifesaver, considered one of the most sophisticated WECs in the market today, was developed in Norway by Fred. Olsen Renewables and will be the first WEC to be tested at the WETS deep berth site. It was scheduled to be installed in October 2015.

According to Alexandra De Visser, NAVFAC EXWC principal investigator, the Lifesaver was successfully deployed for two years at the Falmouth Bay Test Site, an English site where marine renewable energy devices are also being tested.

Bryan Law, Regional Energy Manager for NAVFAC Hawaii, agreed that the Lifesaver is an innovative device that shows considerable promise for Navy applications of wave energy.

“Most installations in the Pacific [Rim] have pretty good access to waves and a shoreline, so there is good potential for those particular bases to reduce their fossil fuel use by being able to plug directly into the grid, so to speak, and harness this kind of wave energy,” he said.

Technology testing supported by the DOE's Wind and Water Power Program will support the efforts of two more companies that will install their devices at the new WETS deep water berths.

Northwest Energy Innovations of Portland, Oregon, is currently testing their Azuza point absorber device in the shallow water berth and will build and test a full-scale model of the device for testing in a deep water berth in fiscal year (FY) 2017 or 2018.

NO.	TITLE	DESCRIPTION	PRIORITY
1.	Utilize Energy Storage to Enable Renewable Generation	There is a need for cost-effective energy storage to enable renewable energy generation. Many bases have met their renewable threshold and cannot add more renewable energy without energy storage.	High
2.	Energy Security through Battery Reuse	The Navy recycles batteries that no longer meet first use criteria but still have additional capacity such as "fleet return" submarine batteries. There is a need to demonstrate and evaluate the ability to reuse these batteries as energy storage for uninterruptible power supply, enabling islanding capability during a power outage, integrating with renewable systems, demand response or other grid stability issues. The demonstration should include a study on the applicability throughout the Navy with different types of used batteries.	High
3.	Reliable and Resilient Power Enabled by a Microgrid, Renewable Energy and Energy Storage	Naval installations need a reliable and resilient power supply with the ability to operate while the main grid is down. In addition, the Navy needs a way to integrate renewable energy resources and energy storage smoothly into the grid. There are several installations that are at the renewable threshold limit and cannot support any additional renewable power without energy storage and Microgrid controls systems. The Navy is involved in Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS). Any projects proposed should build on the work that SPIDERS has already done.	High
4.	More Energy Efficient HVAC systems	The Navy needs more efficient technologies to cool and heat its buildings. In addition, there is a need to provide technology transfer and publicity for energy efficient and effective HVAC technologies that have been successfully demonstrated on Naval installations.	Medium
5.	Lighting	The Navy needs a way to maximize energy savings of lighting while maintaining lighting quality. Areas of interest: wireless controls, innovative lighting controls while meeting cyber security requirements.	Low

Also in the same time period, Ocean Energy USA of Sacramento, California will provide its buoy device for testing at the deepest berth. Their technology is classified as a terminator device, which in this case employs an oscillating water column to convert wave energy into electricity by harnessing the energy from air that is compressed and forced through a turbine with the rise and fall of ocean waves.

The NSETTI program's goal in the ongoing work is to help determine which WEC systems will prove to be most promising for future deployment at appropriate Navy and Marine Corps bases. In addition to assisting with the construction of the new berths, NSETTI is providing support with permit acquisition and project management.

Through the research, the Navy and the companies hope to prove that the connected devices are durable in the open ocean environment, while measuring power output at full scale and evaluating the cost of energy produced by the devices.

It is hoped that this technology will offer a way to offset high electrical costs and to ensure energy security in far-flung geographic regions, and eventually to provide the public with a viable sustainable energy alternative.

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Alexandra De Visser  
 Naval Facilities Engineering and Expeditionary Warfare Center  
 805-982-6070  
 DSN: 551-6070  
 alexandra.devisser@navy.mil

# SSC Pacific Launches Software to Guarantee Compliance With Range Operating Permit

## Sonar Permit Administration & Management Software Simplifies Sonar Use Recordkeeping

**PERSONNEL FROM THE** Environmental Readiness Division of the Space and Naval Warfare Systems Center Pacific (SSC Pacific) have developed software to better track sonar usage and ensure compliance with its range operating permits—the Sonar Permit Administration and Management (SPAM) tool.

The use of active sonar and other types of underwater acoustic emissions is an important tool for the Navy for carrying out its mission. Sonar and underwater acoustic emissions are

used during training will not harm marine mammals, the Navy works with the National Marine Fisheries Service (NMFS) and complies with guidelines set forth by the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA).

In Southern California, these guidelines are have been incorporated into the Hawaii-Southern California Training and Testing (HSTT) Environmental Impact Statement (EIS)/Overseas Impact Statement (OEIS), a document that analyzes all potential

LOA, issued in December 2013, provides each System Command (SYSCOM) with an allotted annual number of sonar hours over a five-year period.

This interactive tool provides an organized, online record of sonar usage so that SSC Pacific can ensure compliance with the LOA and keep a running track of how many hours have been used.

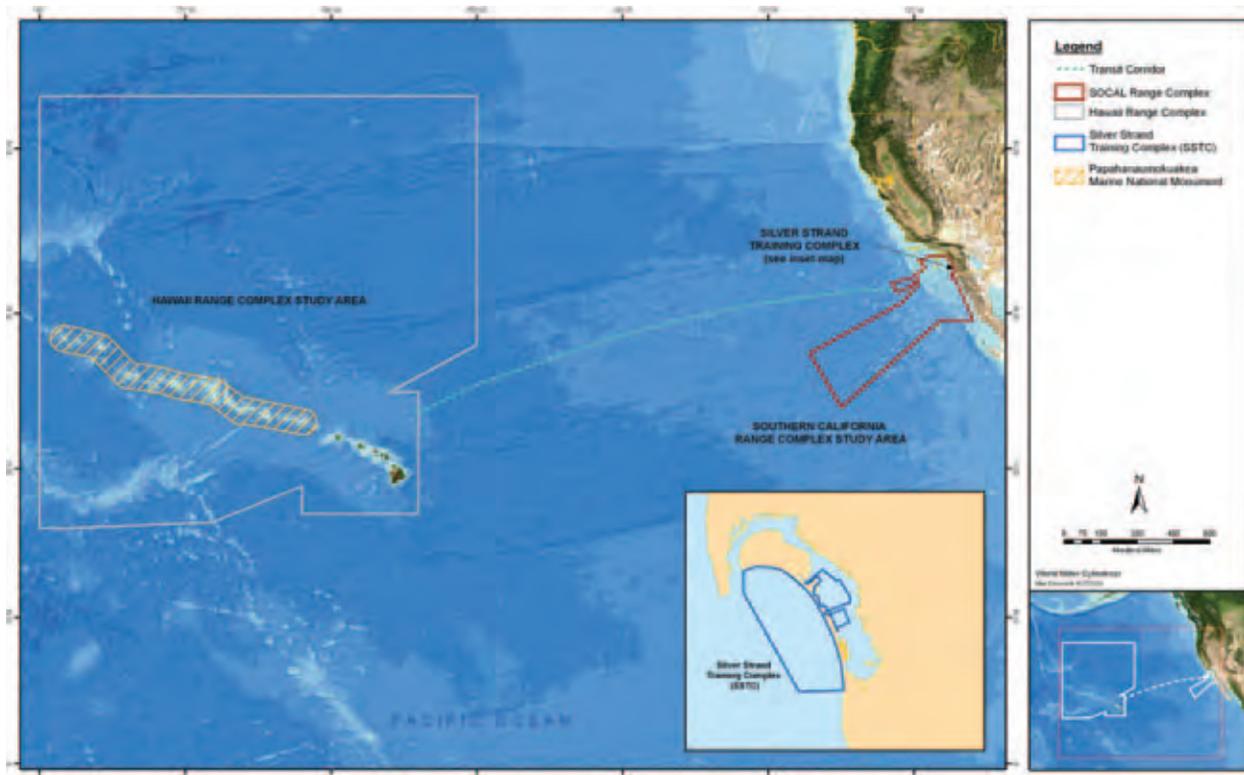


This interactive tool provides an organized, online record of sonar usage so that SPAWAR can ensure compliance with the LOA and keep a running track of how many hours have been used.

used for detecting today's ultra-quiet electric submarines, underwater mines navigating unmanned underwater vehicles to sending information and communicating underwater with acoustic modems. To assure that sonar

environmental impacts for the various forms of training and testing that take place within the HSTT study area. The EIS stipulates the limits/requirements of sonar use, and these are set forth in a Letter of Authorization (LOA). The

Along with the number of hours of sonar used by the command, SPAM collects information such as type of sonar, test location, any materials to be expended during the test, other technologies and equipment to be



The Hawaii-Southern California Training and Testing range.

used such as lasers or towed equipment. SPAM then provides the end-user with the required mitigation measures to be implemented during the test. All of this information is organized within the SPAM tool. The Sharepoint Site that hosts SPAM also provides to the end users access to the Marine Species Awareness

Training (MSAT) video, sonar log templates, and other reference information.

The SPAM tool resides on a SharePoint Site within the Secret IP Network (SIPR) at SSC Pacific. The tool was programmed in Microsoft Access and has built-in

## Lookout Training

**FOR MOST AT-SEA** operations and pier side testing in HSTT, a trained lookout is required. Lookouts are required to complete MSAT annually—a two-part video training program approved by NMFS. The training focuses on marine mammals and sea turtles and provides information on indicators of marine mammal and sea turtle presence, such as floating vegetation, aggregations of fish or jellyfish near the surface, and diving seabirds. It discusses the use of all available sensors and optical systems. The MSAT video is available on the 564 Blog.



A marine wildlife biologist scans for marine mammal activity aboard the guided-missile destroyer USS Mahan (DDG 72).  
MC1 Class Daniel Gay



A sonar technician at work aboard the guided-missile destroyer USS Mustin (DDG 89).

*MC2 Declan Barnes*

functions such as drop down lists and radial buttons to help the end-user quickly navigate the tool. The tool categorizes sonar sources by frequency, source level and the application in which the source would be used. Each SPAWAR project has a folder on the Sharepoint Site where its project-specific information is stored and archived. SPAM has categorized all sonar sources and

provides specific instructions to the end-user which sources must be logged and what mitigation measures must be implemented.

SPAM also incorporates other at-sea testing requirements that involve vessel movement and/or deployment of towed equipment. Certain seasonal and geographical

## Defining Harassment

**THE MARINE MAMMAL** Protection Act defines two broad forms of animal "harassment."

Level A harassment includes any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild. Injury, as defined in the HSTT EIS/OEIS, is "the destruction or loss of biological tissue from a marine mammal. The destruction or loss of biological tissue will result in an alteration of physiological function that exceeds the normal daily physiological variation of the intact tissue." Generally speaking, this means any injury that doesn't result in mortality.

Level B harassment for military readiness activities is defined as "any act that disturbs or is likely to disturb a marine mammal or marine mammal stock by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behaviors are abandoned or significantly altered."

The modifiers "abandoned" or "significantly altered" are key to this definition. The EIS states that a "momentary behavioral reaction of an animal to a brief, time-isolated acoustic event" does not qualify as MMPA Level B harassment.

restrictions are also in place, and these are reflected in the SPAM tool and user's guide as well.

To complete the sonar reporting process with SPAM, a user follows a three-step process.

### Step One: Request to Operate

Three or more weeks prior to an at-sea test, the Test Lead will download a "request to operate" form from the SIPR SharePoint site in their respective project's shared documents folder. The user completes the form, filling in information about time, date, duration, and type of equipment used. The user then uploads the completed form back to the site.

sources are not anticipated to result in harassment or harm of protected species and are categorized as de minimis or exempt. This means that they do not require documentation of transmission times and locations. This is all tracked and accounted for in SPAM for the end users.)

The Test Lead should be sure to review the required mitigation measures before the test, and print out copies of the log form, which is used to record information during the test. If the test lead or other test personnel have not already completed MSAT, it is hosted on the SharePoint site and they can take it when processing their request.

the amount of hours used on the test does not exceed the number of hours approved.

### Automatic Data Compilation

After the closeout ticket has been processed, the number of hours utilized go into the SYSCOM database in which they are added to the hours used by other commands and uploaded into Sonar POSitional Reporting System (SPORTS). (Note: The Navy developed SPORTS to capture its official record of underwater sound sources used under its MMPA permits.) From this database, quarterly reports can be generated, giving any command within HSTT an

SPAM has categorized all sonar sources and provides specific instructions to the end-user which sources must be logged and what mitigation measures must be implemented.

### Step Two: Approval to Operate

Environmental readiness personnel will review the request to ensure it is covered by SSC Pacific's activity descriptions in the EIS and sonar allocations. If it is an approval to operate is issued to the end-user within five working days. The applicant will be notified by email, and the approval ticket will be found in the project's document folder. The ticket will authorize the Test Lead to conduct the at-sea operations, provide instructions on how to record the actual at-sea sonar usage, define the required mitigation measures, and discuss how to close out the ticket after the at-sea test concludes. (Note: Some sonar

### Step Three: Closeout Ticket

The closeout ticket is created by clicking on the "Enter Sonar Usage" button on the Request to Operate page. All data recorded on the log form(s) during the test must be transferred to the SPAM tool within five days of the test date. Use of de minimis sonar sources only does not require a closeout ticket.

### During the Test

Utilizing the log forms downloaded from SPAM, participants should enter hours requested, hours used, latitude and longitude of usage, on/off times, stop reason, and equipment platform. It is the responsibility of the Test Lead to insure that

overview of how many allotted hours have been used and remain. This ensures that the SYSCOMs are able to track their collective sonar usage to ensure compliance with the LOA.

The Navy is a world leader in research to assess, monitor and mitigate the effects of sound on marine mammals. SPAM is the newest tool in the Navy's arsenal to assure that essential Navy training and native marine life can continue to coexist in the oceans of the world. 

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Jerry Olen  
Space and Naval Warfare Systems Center  
Pacific  
669-553-1443  
DSN: 553-1443  
jerry.olen@navy.mil

# NAS Sigonella Named Energy Biggest Loser in Navy Region EURAFSWA Competition

## Second Annual Competition Pits Bases in Energy Reduction Battle

### NAVAL AIR STATION (NAS)

Sigonella won top prize at the 2015 Energy Biggest Loser (EBL) competition hosted by Navy Region Europe, Africa, Southwest Asia (EURAFSWA).

Competing installations in the region were challenged to reduce their energy consumption for the month of July 2015 in the EBL competition. While each installation rivaled another

also award cash prizes of \$50,000 and \$30,000 respectively.

Overall, the goal of the EBL competition is to reduce energy regionally by five percent. The region exceeded that goal by achieving a 5.6 percent reduction, which corresponds to nearly a quarter of a million dollars—easily recouping the prize money awarded.

“Base Energy Monitors, Public Affairs Officers (PAO), Public Works Officers, and Installation Commanding Officers all used a variety of communication vehicles to get the word out about the competition, share tips on what each member of the installation could do to contribute, and educate members about hidden energy waste,” PAO

**NAS Sigonella recorded the largest reduction to win the competition and prize money of \$70,000 towards base improvements.**

for victory, actual reductions were compared to each base’s own energy consumption baseline (from the same period last year). NAS Sigonella recorded the largest reduction—11.6 percent for the month—to win the competition and prize money of \$70,000 towards base improvements. Last year’s inaugural winner, Naval Support Activity (NSA) Bahrain logged an 8.3 percent reduction to earn second place while third place finisher, NSA Souda Bay trimmed energy consumption by 7.5 percent. Second and third place “losers” were

Six EURAFSWA bases participated in the 2015 competition:

1. NSA Bahrain, Bahrain
2. Camp Lemonnier, Djibouti
3. NSA Naples, Italy
4. Naval Station Rota, Spain
5. NAS Sigonella, Sicily, Italy
6. NSA Souda Bay, Crete, Greece

Naval Support Facility (NSF) Deveselu, Romania did not compete in the 2015 EBL competition but did join in the awareness campaign.

Cam Betz of Naval Facilities Engineering Command (NAVFAC) EURAFSWA explained.

The region also sponsored a poster and video contest to encourage wide participation among base personnel. NSA Bahrain won the poster contest and the region selected Camp Lemonnier, Djibouti as the winner of the one-minute video competition. (You can view this video at <https://www.youtube.com/watch?v=zr4Oy7W1Eso>.) EURAFSWA and its commands shared energy saving tips throughout



Navy Region EURAFSWA's 2015 EBL competition included seals for each participating command.



Konstantinos Kavis is the Installation Energy Manager at NSA Souda Bay and the "founder" of Navy Region EURAFSWA's EBL competition.

The intent of the competition was to develop an energy awareness culture and change the way users think about energy consumption.

—Konstantinos Kavis

July on their individual social media accounts to follow on base. Tips ranged from closing blinds, disconnecting unused electronics, and operating washing machines and dishwashers with full loads.

The region calculated the individual energy consumption by using a remote, real-time Advanced Metering Infrastructure (AMI) system. Results were tabulated weekly via the AMI system and posted on EURAFSWA's social media channels so competing bases could gauge their progress and rank throughout the competition.

This "smart" meter system provided an ideal method to quantify each installation's usage and create an energy profile and baseline per consumer. The AMI system served as the inspiration for the competition upon its installation in January 2014. Konstantinos Kavis, Installation Energy Manager at Public Works Department Souda Bay recognized the utility of this system and decided to put the idea into practice by creating a competition focused on trimming energy usage among the region's bases. He noted that providing such data raised awareness that translated into a 12 to 15 percent energy savings.

The Association of Energy Engineers recently named Kavis as the 2015 Western Europe Region Energy Manager of the Year due to his contributions in the region and Souda Bay. Kavis explained his motivation for creating the competition. "The intent of the competition was to develop an energy awareness culture and change the way users think about energy consumption," he explained. "This competency-based approach on energy conservation involves teaching people how to adjust their daily behavior to reduce their energy usage and make them contributors to the Navy's overall energy program."

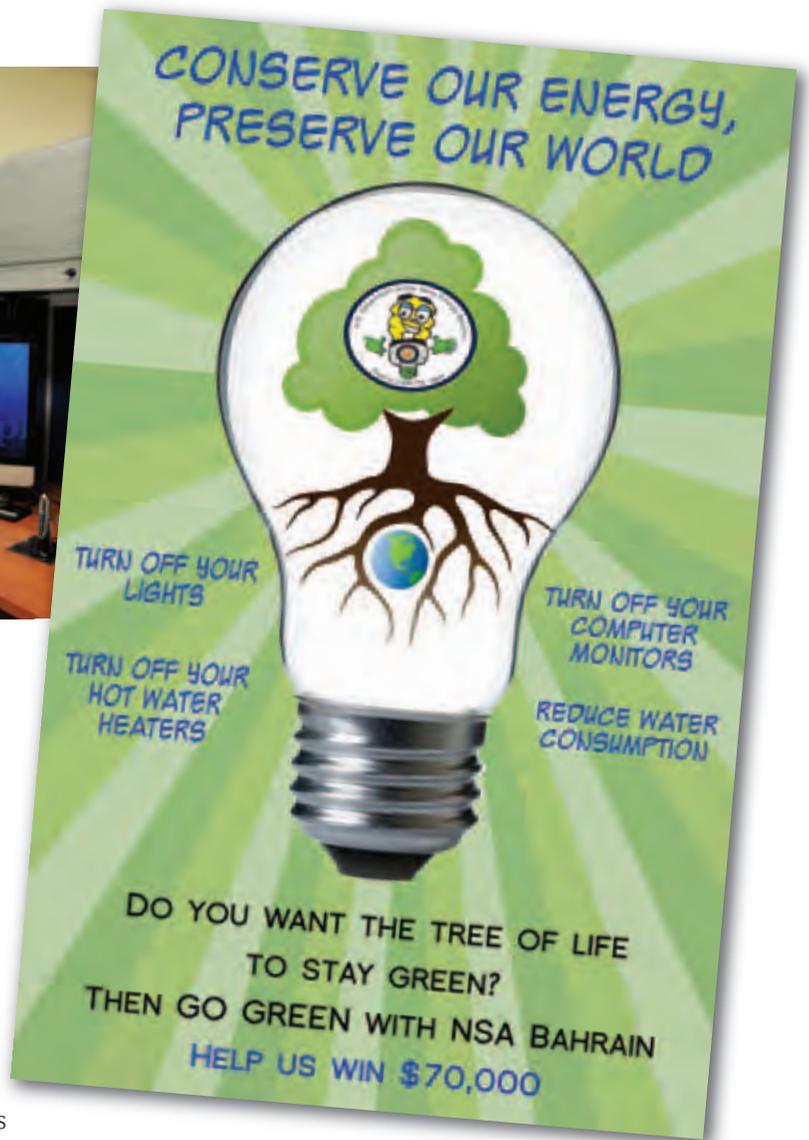
EURAFSWA Commander, Rear Admiral John Scorby released a video kicking off the competition stressing the importance of conserving energy, citing energy costs as the largest expenditure for shore facilities. (You can view



Navy Brite served as the mascot for the EBL competition to remind personnel to enforce energy saving practices such as turning off monitors and unplugging electronics.

this video at <https://www.youtube.com/watch?v=Hvgawd4POJ4>.) “Currently, energy constitutes nearly 30 percent of the Navy’s budget per shore installations. Through friendly competition, we can find ways to reduce that consumption, improve our mission effectiveness, and enable investments in alternative energy sources that reduce our dependency on fossil fuels.” At the conclusion of the competition, Rear Admiral Scorby congratulated NAS Sigonella and stated, “We raised awareness through a variety of media outlets including some extremely creative videos and posters. With your leadership, energy is at the forefront of our community’s minds.”

NAS Sigonella attributes their win to a combination of teamwork and cooperation. “We have an incredibly tight-knit community who care for one another and the resources we’ve been gifted with,” Sigonella Installation Energy Manager Antonio Piluso explained. “When I say it was a community effort that helped us save big and win, I really mean it. In addition to the leadership provided by Capt. Christopher Dennis and Cdr. Deanna Carpenter, special acknowledgement goes to our leaders from Public Works, Public Affairs, Air Forces Network (AFN), and Morale, Welfare and Recreation, all of whom put forth a lot of effort to advertise and create community awareness for this competition. It took the entire community to pull off the win,” Piluso acknowledged.



NSA Bahrain won the poster contest associated with Navy Region EURAFSWA’s 2015 EBL competition.

Sigonella’s Commanding Officer Capt. Christopher Dennis helped instill this energy culture at the installation from the start of his leadership in 2013. Previously, Capt. Dennis served as a Strategy and Policy military professor at the U.S. Naval War College in Newport, RI. There, he founded the college’s energy security course. He was instrumental in drumming up support for the competition through three AFN radio addresses providing energy tips to apply throughout the month. In an address, Capt. Dennis congratulated his command and extended his gratitude in stating, “Thank you again for your commitment to Sigonella citizenship and our responsibility to be better stewards of our resources while rejecting wastefulness. Your efforts really made the difference.”

We raised awareness through a variety of media outlets including some extremely creative videos and posters. With your leadership, energy is at the forefront of our community's minds.

—Rear Admiral John Scorby



Rear Admiral Jack Scorby (right) presents the EBL award for 2015 to the commanding officer of NAS Sigonella Capt. Christopher J. Dennis. The awards were presented at the CNREURAFSWA Executive Steering Committee held at NSA Naples, Italy. For the last two years during the month of July, EBL pitted each installation in the region to see who could reduce energy consumption the most.

Tim McGough



Rear Admiral Jack Scorby (right) presents the EBL award for 2014 to the commanding officer of NSA Bahrain Capt. Cory R. Howes.

Tim McGough

While the prize money created an incentive to curtail energy usage, the intent of the competition was to instill behavioral changes throughout the year.

Daniel Lougen, NAVFAC EURAFSWA Regional Energy Manager explained, “The hype of the event certainly spiked energy conservation for the month of July. But as people hear of the importance of saving energy and are provided with methods to achieve these savings, they will become permanent habits.”

Capt. Dennis is already soliciting ideas from the community for how to best utilize the prize money.

The competition has attracted the attention of other naval commands that seek creative ways to reduce consumption and involve base personnel. Modeled after the EURAFSWA event, Naval District Washington hosted their own EBL competition for the month of November 2015 directly following Energy Action Month. [📍](#)

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Cam Betz  
Naval Facilities Engineering Command  
Europe, Africa, Southwest Asia  
(39) 081-568-7775  
DSN: 314-626-7775  
cam.betz@eu.navy.mil

# Navy Closing in on One Gigawatt of Renewable Energy

## An Important Step Towards Achieving the DON's Consumption Goal from Alternative Energy Sources

**THE RENEWABLE ENERGY** Program Office (REPO) led the Department of the Navy's (DON) efforts to produce or procure one gigawatt (GW) of renewable energy generation capacity by the end of 2015—an important first step towards meeting the Navy's overall goal of 50 percent of total energy consumption coming from alternative sources by 2020.

Secretary of the Navy (SECNAV) Ray Mabus established REPO to oversee efforts across the DON in support of this energy goal. While the construction and deployment of renewable energy benefits the environment, the motivation for the renewable energy strategy is primarily to enhance energy security and better support warfighters. "By establishing these sources of renewable energy, we ensure both energy independence and cost savings well into the future,"

said Secretary Ray Mabus when announcing an agreement to add solar panels to DON housing in the San Diego area.

### Chartering the Renewable Energy Program Office

In May 2014, Secretary Mabus chartered REPO to identify cost-effective renewable energy projects to be built on or off-base to benefit DON installations. Led by Executive Director Robert Griffin, REPO is the central management office for execution oversight, and works closely with Commander Navy Installations Command, Naval Facilities Engineering Command, Marine Corps Installations Command (MCICOM), regional Facilities Engineering Commands, MCICOM Regional Commands, Installation Commanders and the broader DON community to develop renewable energy projects.

To meet SECNAV's goals, REPO has three development models that leverage third-party financing to develop cost-effective, large-scale projects that will increase the DON's energy security:

#### ■ Model 1

The Navy procures and consumes energy produced by an off-base generation facility under a Utilities Energy Services Contract or using long-term authority (via contracts for energy or fuel for military installations as per U.S.C. § 2922a) for up to 30 years.

#### ■ Model 2

The Navy provides land on-base for the development of a renewable energy generation facility that connects to the existing off-base electrical distribution system. The utility provider or private developer is responsible

By establishing these sources of renewable energy, we ensure both energy independence and cost savings well into the future.

—Secretary of the Navy Ray Mabus

for the design, construction and operation of the renewable energy supply system under a real estate outgrant. In exchange for use of the land, the Navy receives in-kind consideration equal to the value of the land in the form of energy security benefits (electrical infrastructure upgrades, new feeder lines, etc.).

■ **Model 3**

The Navy works with a third-party to develop a source of renewable energy on-base to supply the energy needs of the installation. The renewable energy generation asset and transmission system are designed and constructed by a utility provider or private developer, and are connected to the installation's existing electrical transmission infrastructure for on-base energy usage. This process involves both a real estate outgrant for use of the land and a long-term energy contract with the provider.

For more information about REPO, visit <http://greenfleet.dodlive.mil/energy/repo>.



Procuring one GW of renewable energy is an important milestone in meeting the Navy's overall goal of 50 percent of total energy consumption coming from alternative sources by 2020, one of five goals outlined in the DON's 2012 Strategy for Renewable Energy. (From the 1 Gigawatt Task Force, see "A Strategy for Renewable Energy—Meeting Secretary Mabus" Energy Goals for Installations. For a copy of the strategy, contact the Office of the Deputy Assistant Secretary of the Navy (Energy). For more information on the DON's energy program, visit <http://greenfleet.dodlive.mil>.)

Over the past year and a half, REPO has had a laser-focus on achieving the goal of procuring one GW of renewable energy generation capacity by the end of 2015, which has involved frequent working group meetings, conferences, and consultations with industry, coordination with other Federal agencies, and employing lessons learned from recent and ongoing energy projects.

## Renewable Energy: What It Is & How to Get a Gigawatt

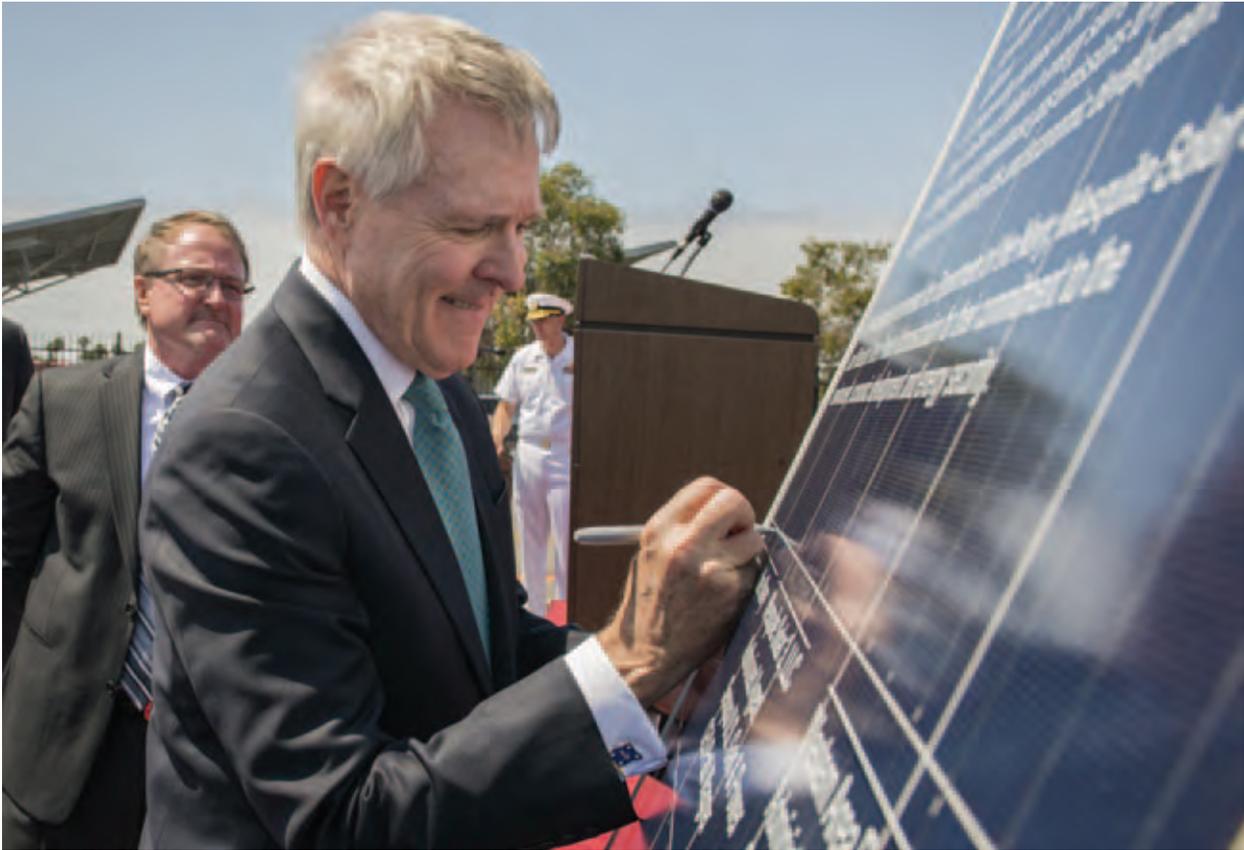
The DON's one GW goal considers all sources of renewable energy, such as energy produced from sunlight, wind, biomass, landfill gas, oceans (tidal, wave, current and thermal), geothermal, municipal solid waste and new hydroelectric generation capacity (from increased efficiency or additions).

One of the DON's interests while working to meet the one GW goal is linking renewable energy generation projects on Navy and Marine Corps to the DON's other

### For More Information

FOR MORE INSIGHTS into the strategy by which Navy and Marine Corps installations will produce or procure one GW of renewable energy by 2015, read our article "From the 1 Gigawatt Task Force: A Strategy for Renewable Energy" from the Winter 2013 issue of *Currents*. You can browse the *Currents* archives at the DON's Energy, Environment and Climate Change web site. Also, see the recent blog by the Hon. Dennis McGinn, Assistant Secretary of the Navy—Energy, Installations & Environment entitled, "What is a gigawatt?" on the Navy Live Blog site.





SECNAV Ray Mabus signs a solar panel during a ceremony commemorating an agreement with WAPA and Sempra U.S. Gas & Power to construct a 210 MW direct current solar facility. The agreement is the largest purchase of renewable energy ever made by a federal entity.

*MCS2 Armando Gonzales*

energy assets and programs, such as microgrids or smart grids, net-zero and energy efficiency maximization. Connecting renewable energy assets to Navy infrastructure through the deployment of microgrids increases energy security, a key objective of the one GW goal.

The renewable energy projects that the DON pursues come in all shapes and sizes. The number of megawatts (MW) that a project produces depends on a number of different factors, including the parcel available for development and project financing. While small-scale projects support the one GW goal, the Navy focuses on large-scale projects which often yield greater cost savings. These larger,

utility scale projects bring the DON closer to its 50 percent goal more quickly and are more attractive for potential third-party investors.

An example of such a deal is the recently signed power purchase agreement that the DON signed with the Western Area Power Authority (WAPA) and Sempra U.S. Gas & Power. The project is contributing more than 210 MW to the one GW goal, providing a third of the energy needed to power 14 Navy and Marine Corps bases in southern California, and will save the DON at least \$90 million over its lifetime. These large-scale Model 1 projects present one of the ways that the DON is moving towards bringing one GW of

renewable energy online and into procurement.

Through considerable work over the past 18 months, the DON was on track to meet SECNAV's goal by the end of 2015. Accomplishing this goal is a major step towards meeting the Navy's goal of 50 percent of total energy consumption coming from alternative sources by 2020. Together, SECNAV's vision and these goals are steering the DON towards an energy secure future, and are building a stronger and more resilient fleet. 📌

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John Kliem  
Renewable Energy Program Office  
202-685-0534  
DSN: 685-0534  
john.kliem@navy.mil

# Tell Your Story in *Currents*

## The Deadline for the Summer 2016 Issue is April 15, 2016

Have some good news about your energy or environmental program? Want to share it with others? *Currents* is the place to do it. *Currents*, the Navy's official energy and environmental magazine, has won first place in the Navy's Chief of Information (CHINFO) Merit awards competition three times. Most recently, the magazine snagged an honorable mention in the 2014 competition. Its people like you and the stories you submit that make *Currents* the best magazine in the Navy.

So if you have a story that you'd like us to promote in our summer 2016 issue, submit your text and images by Friday, April 15, 2016. Any submissions received after this date will be considered for our fall 2016 issue.

You can get a copy of the *Currents* article template by sending an email to Bruce McCaffrey, our Managing Editor, at [brucemccaffrey@sbcglobal.net](mailto:brucemccaffrey@sbcglobal.net). This template has proven to be a tremendous asset in helping us edit and track your article submissions. Bruce is also available at 773-376-6200 if you have any questions or would like to discuss your story ideas. And don't worry. If writing isn't one of your strengths, we'll handle all of the editing necessary to get your submission into publishable form.

As a reminder, your Public Affairs Officer must approve your article before we can consider it for inclusion in the magazine.

Don't forget to "like" us on Facebook at [www.facebook/navycurrents](http://www.facebook/navycurrents). *Currents'* Facebook page helps expand the reach of the magazine and spread the news about all the great work you're doing as the Navy's energy and environmental guardians.

### *Currents* Deadlines

Summer 2016 Issue: Friday, April 15, 2016

Fall 2016 Issue: Friday, July 15, 2016

Winter 2016-17 Issue: Friday, October 21, 2016

Spring 2017 Issue: Friday, January 20, 2017

You can also refer to your *Currents* calendar for reminders about these deadlines.



### *Currents* History of Awards

2014	Russell Egnor Navy Media Award	Honorable mention in "Funded News Publication" category
2011	CHINFO Merit Award	First place medal ("Best magazine in the Navy")
2008	CHINFO Merit Award	First place medal ("Best magazine in the Navy")
2004	CHINFO Merit Award	First place medal ("Best magazine in the Navy")
2004	Department of Defense Thomas Jefferson Award	First place medal ("Best magazine in the Department of Defense")
2003	CHINFO Merit Award	Second place medal
2001	CHINFO Merit Award	Third place medal

Kenneth Hess  
CNO Energy and Environmental Readiness Division (Code N45)  
2000 Navy Pentagon, Room 2E258  
Washington, DC 20350-2000

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