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 aval 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 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 facilities 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. ⚓

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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, select "Projects" then select the "Fact Sheet" link for the project you're interested in.

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.

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.

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

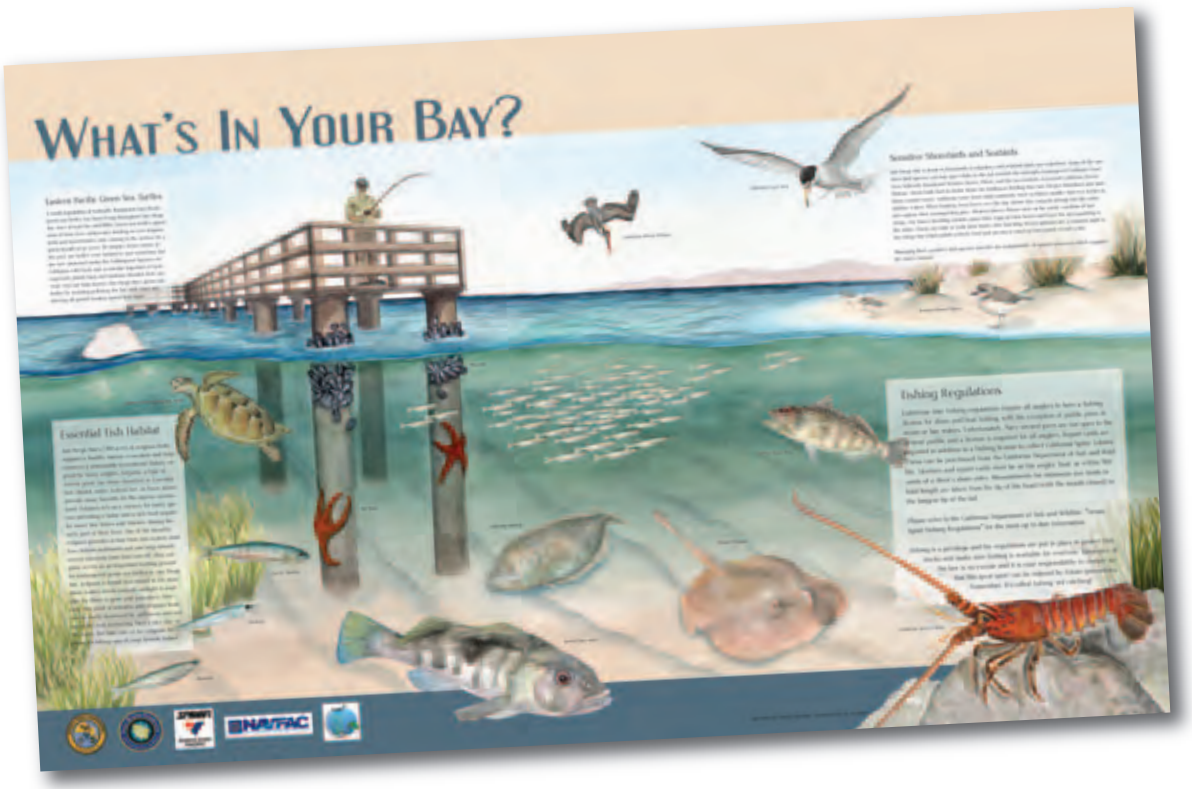
PERSONNEL FROM THE Navy Facilities Engineering Command (NAVFAC) Southwest and the Space and Naval Warfare Systems Center Pacific (SSC Pacific) commissioned the "Life on the Edge" poster on the following pages to highlight the valuable ecological role of tidepools around San Clemente Island as well the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

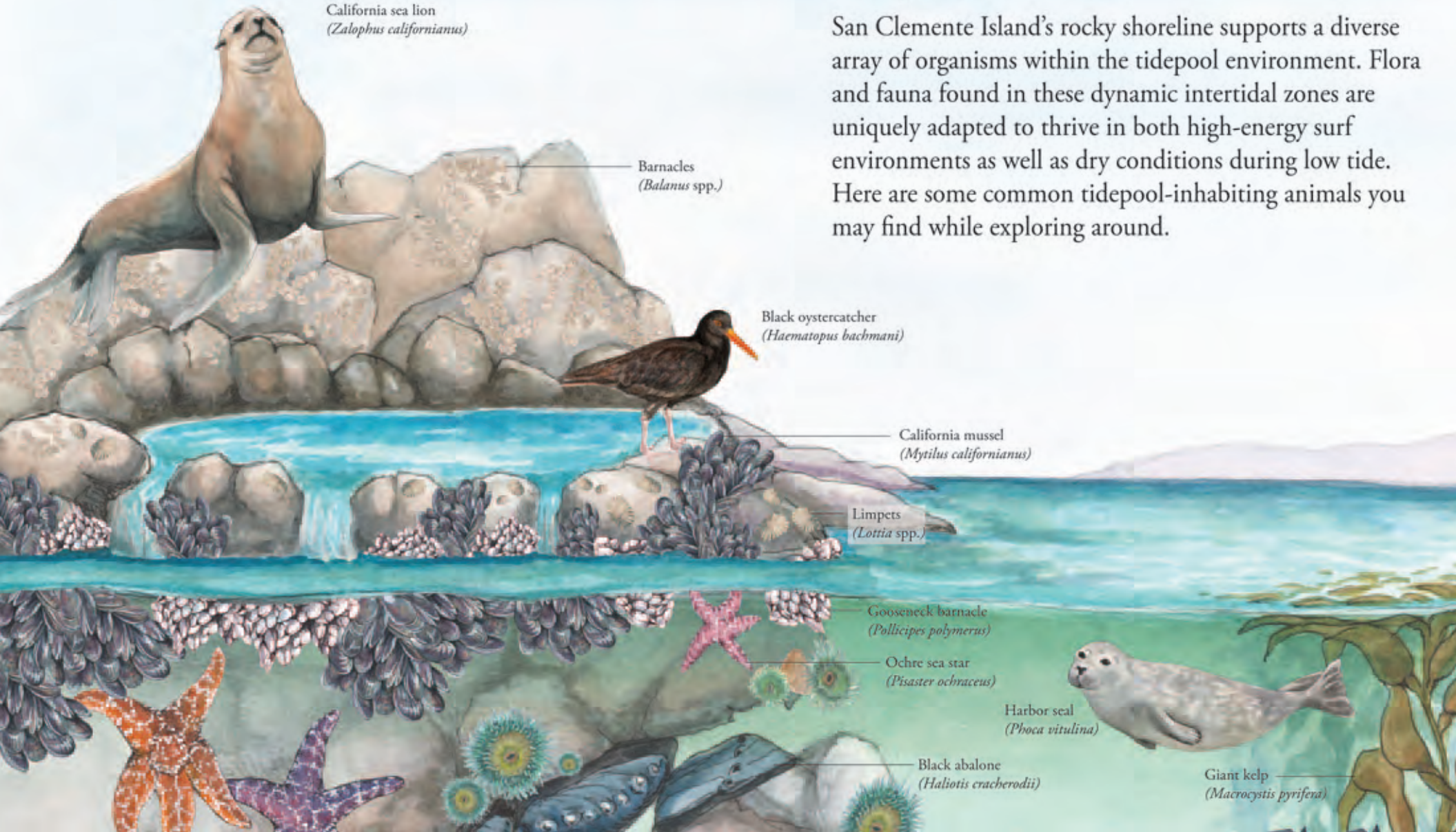
Another poster from our NAVFAC Southwest and SSC Pacific colleagues—What's in Your Bay?—was published in the summer 2015 issue of *Currents*. For an electronic copy of either or both of these posters, contact Jessica Bredvik at jessica.bredvik@navy.mil or 619-532-4182.

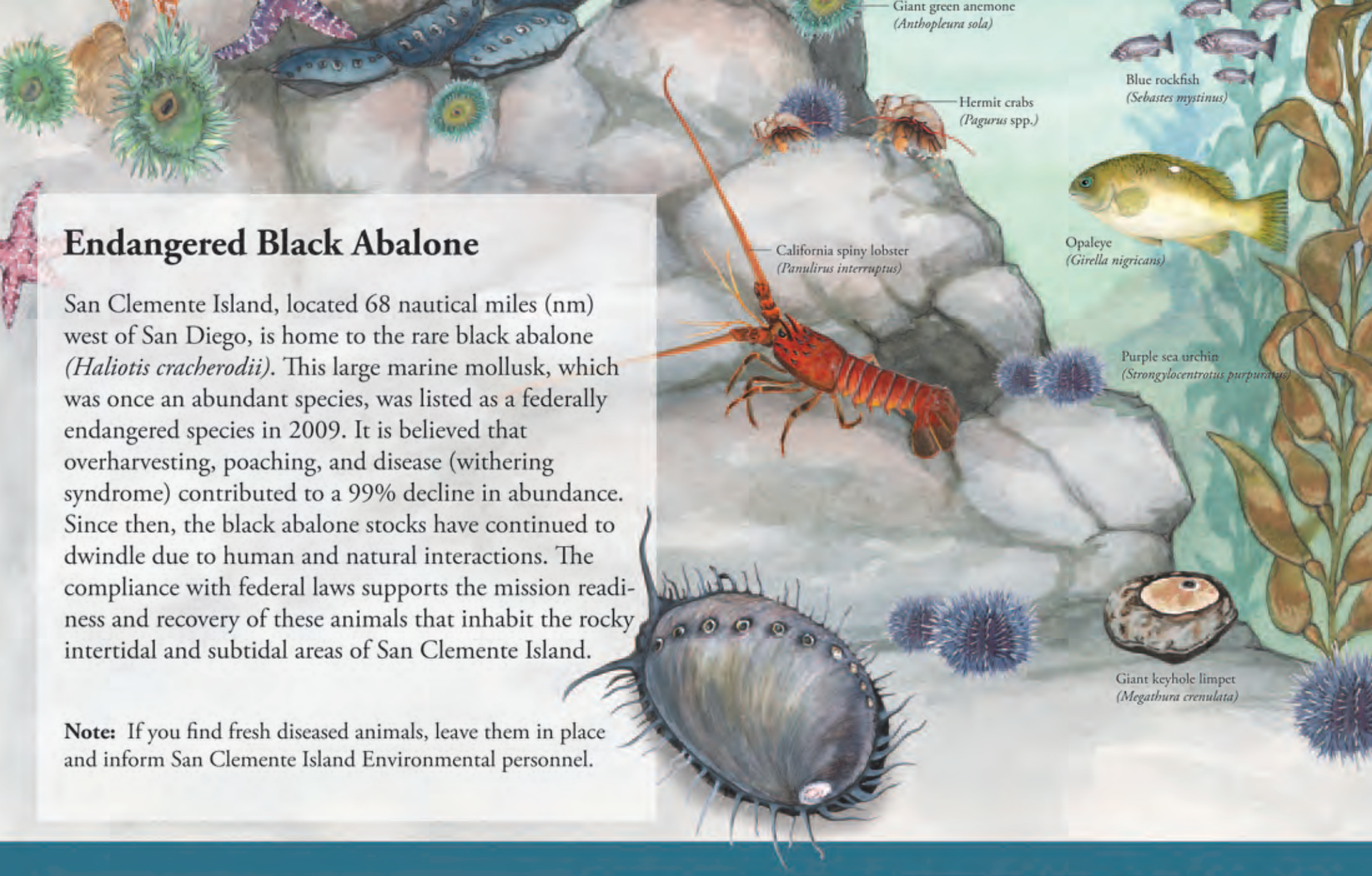


Life on the Edge

Tidepools

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.





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.

NAVFAC Naval Facilities Engineering Command

Approved for public release; distribution is unlimited