



FISCAL YEAR 2011 CHIEF OF NAVAL OPERATIONS (CNO) ENVIRONMENTAL AWARDS

VIEQUES NAVAL INSTALLATION - ENVIRONMENTAL RESTORATION - INDIVIDUAL/TEAM

INTRODUCTION

The former Vieques Naval installation is a 23,000-acre facility located on Vieques Island, which is located off the southeast coast of the mainland of Puerto Rico. The installation provided military training to North Atlantic Treaty Organization (NATO) operations. From the mid-1940s until 2003, more than 300,000 munitions items were fired from military training operations, including naval gunfire, air-to-ground bombing, and marine artillery fire. It was initially estimated that up to 9,000 acres of the property may be contaminated by munitions and explosives of concern (MEC) from these operations.

Between April 30, 2001, and April 30, 2003, approximately 23,000 acres of the former installation were transferred to federal and local agencies. Approximately 16,000 acres of the facility were transferred to Department of Interior (DOI) to be operated and managed by the United States (U.S.) Fish and Wildlife Service (USFWS) as a National Wildlife Refuge (Figure 1).

BACKGROUND

On February 7, 2005, Vieques was placed on the National Priorities List (NPL). The Federal Facilities Agreement (FFA), signed in September 2007, establishes a framework for the stakeholder agencies to schedule and implement the Environmental Restoration Program. The core Project Management Team identified in the FFA includes representatives from Naval Facilities Engineering Command (NAVFAC) Atlantic, the U.S. Environmental Protection Agency (USEPA), Puerto Rico Environmental Quality Board (PREQB), and USFWS. NAVFAC Atlantic is administering the Environmental Restoration Program. The following objectives have been established by the Project Management Team:

- Initiate and implement prompt actions to address imminent and substantial threats to human health, safety, and the environment.
- Prioritize response actions, including investigations and remedial actions, based on risk to human health and the environment, anticipated land use, and available funding.
- Develop cost-effective and innovative cleanup approaches and technologies to maximize program efficiency.
- Promote public stakeholder participation in the cleanup process.
- Establish partnerships with appropriate federal, state and local authorities to accelerate the completion of Records of Decision (RODs) and achieve consensus on the proposed cleanup strategies and decisions.

To integrate the community into the restoration program, an extensive community involvement program has been established to disseminate information regarding the cleanup and provide a forum for the public to provide input.



Figure 1. Approximately 23,000 acres of the former naval facility on Vieques Island, Puerto Rico, have been transferred to federal and local agencies, including the DOI, the Municipality of Vieques (MOV,) and Puerto Rico Conservation Trust. Approximately 16,000 acres of the land transferred to DOI is managed by USFWS as a Wildlife Refuge. NAVFAC Atlantic has entered into agreements with DOI to integrate the cleanup of the facility into the land use plan for the wildlife refuge.

Vieques Environmental Restoration Program Project Management Team:

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| Angela Carpenter, USEPA Branch Chief | Lisa Marie Carrubba, NMFS |



ACCOMPLISHMENTS

Accelerated and Innovative Environmental Restoration

Several remedial actions were initiated at the early stages of the environmental restoration process, to accelerate cleanup where the existing contamination or munitions pose a potential imminent threat to human health and safety. These actions also provided an early transfer of the property to the landowners' beneficial use.

NTCRAs to Reduce Risk to Human Health and Safety

An ongoing program challenge has been the explosive safety risk to trespassers and USFWS workers that travel into the former military training areas that are prohibited from public use. The trespassers include horseback riders in the former training areas and recreational boaters that frequently anchor in the adjacent waters and intrude into the former bombing range. Two Non-time-critical Removal Actions (NTCRAs) were initiated to rapidly reduce the explosive safety risks to the trespassers, and provide USFWS access areas for wildlife management, by removing the MEC exposed at the ground surface.

The NTCRAs involve multi-disciplinary tasks that include biological assessments to minimize impacts to threatened and endangered plants and sea turtles, archeological surveys to protect cultural resources, vegetation clearance, MEC removal, munitions demolition (Figure 2), target demilitarization, and munitions-related scrap metal processing to maximize recycling of the metal. MEC that cannot be moved is detonated in-place using explosives. Munitions debris and

range-related debris generated by in-place detonation of munitions were processed on-site using several technologies: hammermill crushing, cutting with a petrogen torch, and thermal treatment with a flashing furnace. The processing minimizes the danger of transporting explosive materials offsite and enhances the recycle value of the scrap metal.

During fiscal year 2010 (FY10) and FY11, the NTCRAs have effectively reduced the explosive safety risk by completing the following:

- Removing MEC from 486 acres to reduce explosive safety risk to trespassers and allow USFWS access to manage the natural resources of the area.
- Over 500 munitions items have been detonated on-site to minimize the explosive hazard to USFWS workers and trespassers accessing the area.
- More than 1.6 million pounds of scrap have been collected and processed on-site for offsite recycling. Recycling proceeds are re-invested into the cleanup operation.
- Over 24,600 metallic anomalies (1,005 munitions-related items) have been removed from the subsurface at roads and beaches

These NTCRAs have not only significantly reduced the on-site explosive safety risk, but have accelerated remedial actions 3 years ahead of schedule of what would have been implemented under a typical Remedial Investigation (RI)/Feasibility Study (FS)/ROD process under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Biological Assessment for Waterway Barrier Installation

One of the highest explosive safety issues is the anchoring of recreational boaters adjacent to a former live-fire bombing range, in waters where munitions have been identified. For example, in July 2011 alone, over 100 boats were observed anchored in this area. As an interim remedial measure, NAVFAC is installing a waterway barrier to restrict boater access to these waters. The initial phase of this process was to conduct an underwater Biological Assessment to ensure the barrier installation will not impact the endangered coral reef species in the area (Figure 3).

Sustainable Environmental Remediation for the 41-acre Camp Garcia Landfill

The Camp Garcia Landfill is a 41-acre, municipal-type landfill upon which a thriving tropical forest developed in the years since the operations ceased. Embracing Executive Order 13423 and the Department of the Navy's Environmental



Figure 2. A NTCRAs for the subsurface removal of munitions (left photo) and surface removal of munitions have been initiated to reduce the explosive safety risk to the public and to allow USFWS access to monitor the natural resources of the area. During the last two years over 500 munitions items have been removed and detonated (right photo).



Figure 3. The design and installation of a waterway barrier system (left photo) has been initiated to reduce the explosive safety risk to the public. The initial phase of the project was to conduct a Biological Assessment to locate buried munitions (center photo), such that the most appropriate anchor system can be selected to protect the endangered coral reef (right photo).

Strategy, the tenets of sustainable environmental remediation (SER) were applied to develop an innovative remedy that recognizes and enhances the existing native soil and vegetation as a viable cover for the waste. This alternative not only preserves the existing habitat within the wildlife refuge, but it has been embraced by the regulatory agencies and local community and results in a cost savings of over \$11 million (M) when compared to a more traditional Resource Conservation and Recovery Act (RCRA) landfill cap, which would have also destroyed the existing habitat.

Streamlined Approaches

The Navy developed and obtained regulatory acceptance of an approach to utilize a Master Sampling and Analysis Plan (SAP) for terrestrial munitions sites that significantly reduces document preparation and review time and resource burdens and accelerates implementation of investigations and, ultimately, remedy selection. It is estimated that use of this Master SAP for 15 terrestrial munitions sites versus preparing a SAP for individual sites will reduce cumulative document preparation and review time by several years and save over \$1M in preparation costs.

The Navy successfully implemented an Improved Record of Decision (iROD) format for four former waste disposal sites. The iROD has a streamlined format (versus conventional RODs) that summarizes key information in a user-friendly manner and utilizes electronic interactive links to historical documents if readers would like additional detail. This format facilitates translation of the entire ROD into Spanish, such that the RODs can be published bilingually. With the signing of the RODs, approximately 24 acres of land were returned to the MOV for beneficial land use.

Innovative Technology Demonstration/Validation and Implementation

One of the greatest technical challenges has been to locate and recover munitions within a 75-acre area that contains a high density of sensitive, dangerous sub munitions. The munitions items are small, have a high explosive safety hazard, and are difficult to see due to the dense vegetation present in the area. Therefore, traditional manual identification and removal of the sub munitions subjects the workers to a high explosive safety risk. A pilot test was conducted using innovative, remotely operated, vegetation clearance equipment to cut the vegetation and allow safe access to the sub munitions area (Figure 4). The equipment was operated remotely by a worker who remained outside the explosive safety risk zone, several hundred feet away from the equipment.



Figure 4. A pilot test was performed using remotely operated vegetation clearance equipment (left photo) to remove the vegetation at the sub munitions area such that the munitions response contractor could safely detonate the sub munitions, which were hidden in the brush (right photo). The pilot test demonstrated that the equipment could reduce the Unexploded Ordnance (UXO) Technician's exposure duration to the sub munitions by over 95 percent.

The sub munitions were then visually exposed to allow the UXO Technicians to readily detonate the items. The pilot test cleared the vegetation from a 19-acre area to allow the removal of over 1,500 sub munitions. More importantly, the pilot test reduced the UXO Technician exposure duration to the sub munitions by over 95 percent, at a comparable cost to using manual vegetation clearance methods.

Stakeholder Partnerships to Facilitate Environmental Restoration

A wide range of complex site conditions (terrestrial and underwater munitions hazards, environmental contamination, cultural artifacts, endangered species,



Figure 5. A wide range of complex site conditions facilitated NAVFAC Atlantic to team with over a dozen Federal and Commonwealth agencies, most of which are not in close proximity. To promote effective communications, a two-tiered stakeholder involvement approach is used: an upper tier of project managers resolve program-wide issues; smaller technical subcommittees resolve detailed technical matters.

and sensitive habitats) requires the involvement of over a dozen Federal and Commonwealth agencies (Figure 5).

To accommodate such a large stakeholder group and accelerate cleanup decision making, a tiered stakeholder teaming approach is utilized. An upper tier of agency representatives meets periodically to perform joint scoping and resolve program-wide issues. Smaller technical subcommittees meet on a regular basis, including site visits as needed, to jointly scope and resolve more detailed technical issues in environmental restoration, munitions cleanup, community involvement, and risk assessment. Due to the large volume of restoration work executed on Vieques (over \$20M/year), EPA has recently added an additional RPM and Supervisor.

The tangible results of the partnership approach during FY10 and FY11 include:

- Consensus on No Action/No Further Action for 27 sites
- Signing RODs for four sites
- Joint scoping and development of the Master SAP described previously
- Standardization of protocols for munitions removals, incremental sampling for munitions constituents, biological assessments, human health risk assessment and ecological risk assessments that are applied uniformly at all sites. The application of these protocols reduces resource burden and the time required to reach stakeholder concurrence on restoration activities.

The implementation of this partnership strategy has allowed the stakeholders to consistently meet deliverable schedules identified in the Site Management Plan, as required in the FFA.

Community Involvement/ Restoration Advisory Board

The Vieques Community Involvement Program promotes effective, two-way communication about the progress of the Navy’s environmental investigations and munitions response activities. To build trust in the community, the Navy has established an unusually comprehensive bilingual community involvement program, beginning in 2000 (several years before Vieques was placed on the NPL). This ongoing effort requires sensitivity to cultural differences and understanding of the emotional and political history associated with the Navy’s presence on the island, all of which make working in Vieques especially difficult for both the community involvement and the technical teams.

During FY10 and FY11, the following community involvement activities have been implemented:

- Quarterly meetings of the Restoration Advisory Board (RAB), providing a regular forum to discuss the cleanup and helping to gain public support for technical decisions, and informal “mini-RAB” meetings to provide interim updates when staff are on Vieques for field work.
- Bilingual facilitation of RAB meetings with simultaneous translation equipment and professional interpreters, allowing all to participate fully in the discussions, and translation of executive summaries of draft final documents (work plans, reports) into Spanish.
- Public meetings to solicit comments on two Proposed Plans (fully translated into Spanish) and a munitions Engineering Evaluation/Cost Assessment (executive summary translated into Spanish).



- Site visits attended by community members (May 2010) and by the USEPA Regional 2 Administrator, the Governor, and ASN representatives (November 2010), to observe the cleanup progress first-hand.
- Workshops to educate the community on the process for estimating human health and ecological risks.
- Distributing monthly flyers and semi-annual newsletters to the public.
- Maintaining a community computer for access to the Administrative Record (AR) and a public website.
- Participating in an aquatic resources outreach event sponsored by the Puerto Rico Department of Natural and Environmental Resources (DNER)
- Holding an outreach event that educated the public on the progress of the cleanup and promoted explosives safety, with a variety of activities to interest and engage children – a key audience for munitions safety messages.

These activities have resulted in an improved public opinion, which has been reflected by RAB members formally expressing their appreciation.

Green Remediation

During the last 2 years, the following activities have been initiated to implement SER opportunities:

- Over 1.6 million pounds of munitions-related scrap metal has been processed on-site, such that it could then be sent to a recycling facility. Proceeds from the recycling were reinvested in the munitions cleanup.
- The enhanced soil cover remedy at Solid Waste Management Unit (SWMU) 1 is designed to minimize disturbance of the mature site vegetation and habitat while providing necessary protectiveness for human health and the environment.
- A post-removal SAP at a former waste disposal site (Figure 7) was prepared to evaluate key biota indicators (fish and crab) to determine if the generated wetlands provide suitable ecological habitat and adequate protectiveness for both human and ecological receptors.
- A Biological Assessment identified important vegetation at a munitions site where full vegetation clearance was originally planned for investigation. Use of a statistically based, random selection approach for investigation transects reduced the need to clear vegetation by over 90 percent.



Figure 6. Reaching out to the community: October 2010 outreach event, RAB site visit (May 2010), RAB eco-risk workshop (August 2010), DNER aquatic resources event (June 2011), and USEPA Regional Administrator site visit (November 2010). The Navy's mascots, Carlos the Coqui (a native Puerto Rican frog) and Pepita the Pelican, help to convey safety messages to children.



- Munitions removal contractors have implemented green initiatives including: use of All Terrain Vehicles (ATVs) to minimize fuel consumption, installation of solar panels and wind turbines to operate air monitoring and communications equipment, and the use of biodegradable oil for chain saw operation.

Opportunities for Small and Small Disadvantaged Businesses in Environmental Restoration

During FY10 and FY11 NAVFAC Atlantic contracted over \$22M of their prime contracts on Vieques to small businesses (over 50% of their contracts), which exceeded NAVFAC's small business prime contract goals. In addition, one of the prime contractors subcontracted over \$5M in small business contracts (over 80% of their contracts) to small businesses. These small business contracts included: hub zone contractors, woman-owned small businesses, and small disadvantaged small businesses.

An employment initiative by NAVFAC involved the training and hiring of 81 local residents of Vieques. The residents were Occupational Safety and Health Administration (OSHA)-trained and subsequently hired by the munitions removal contractors to assist in the cleanup by removing vegetation and collecting munitions-related debris. To ensure their safety, the trained locals work alongside experienced UXO Technicians. The integration of this local workforce has had significant benefits to the project: 1) the salaries of local workers have contributed over \$5M to the local economy during the last 2 years, and 2) project costs by have been reduced by over \$12M.

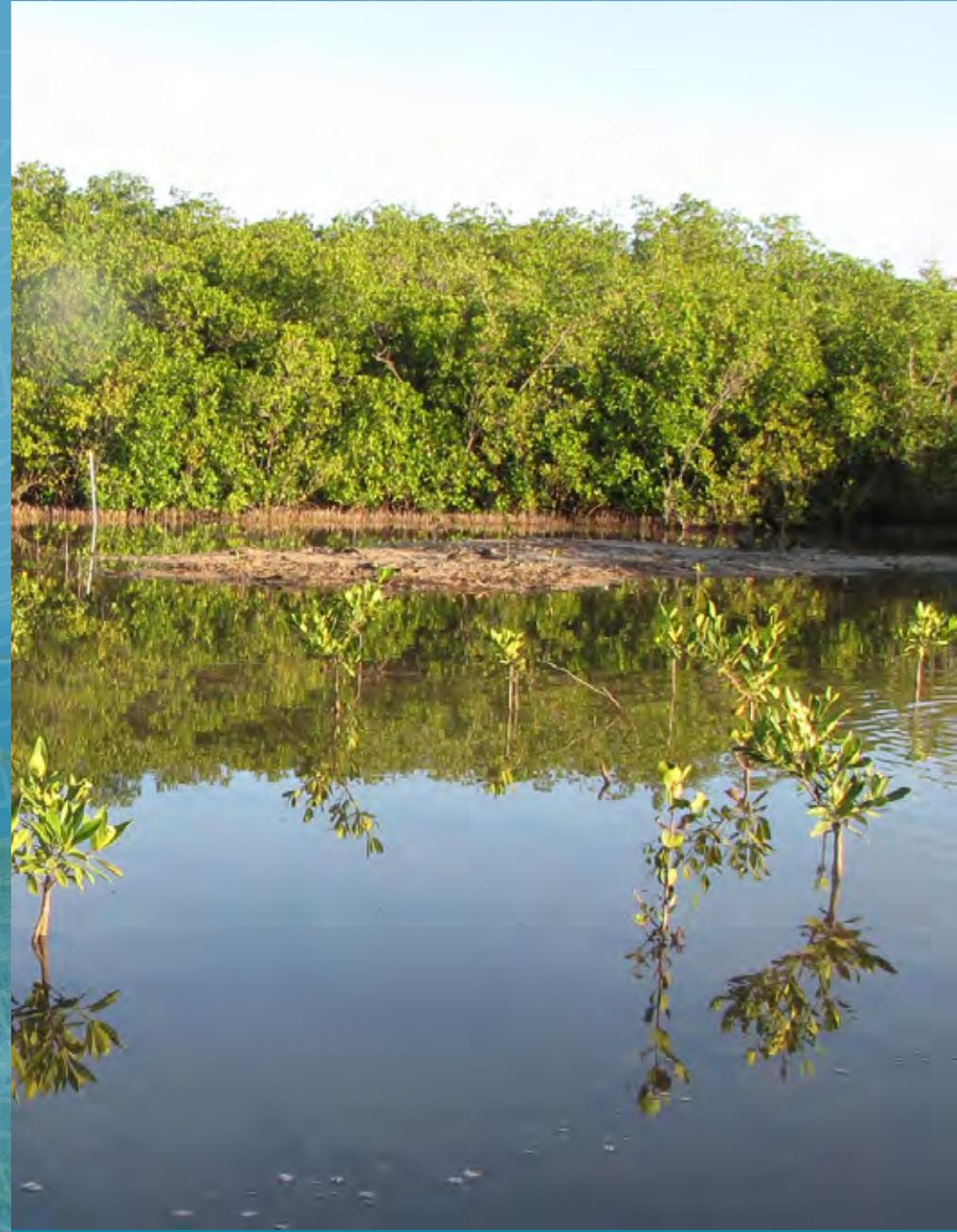


Figure 7. A post-waste-removal confirmatory biota sampling SAP at SWMU 6 was prepared to evaluate key biota indicators (fish and crab) to determine if the generated wetlands provide suitable ecological habitat and adequate protectiveness for both human and ecological receptors.