

SUMMER 2017



NESDI NEWS

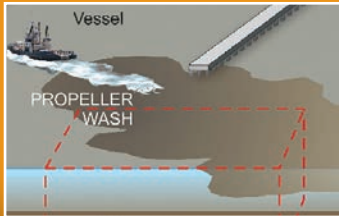
Highlights & Happenings

INSIDE THIS ISSUE:

FY17 Full Proposals Approved
by Program Sponsor3

FY18 Needs Collection
Completed.....3

New Project Initiatives
Underway4



Who We Are

The NESDI program is the Navy's environmental research and development demonstration and validation (6.4) program, sponsored by the Chief of Naval Operations Energy and Environmental Readiness Division (OPNAV N45) and managed by the Naval Facilities Engineering Command (NAVFAC) from the Engineering and Expeditionary Warfare Center (EXWC) in Port Hueneme, CA. The mission of the program is to provide solutions by demonstrating, validating and integrating innovative technologies, processes and materials and by filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Fleet readiness.

<https://epl.navfac.navy.mil/nesdi>





From the Program Manager's Desk

Welcome to the summer 2017 issue of *NESDI News: Highlights & Happenings*—part of our ongoing effort to keep you informed about the NESDI program.

This quarterly update provides you with the latest information about program operations, significant accomplishments and future focus areas for the Navy Environmental Sustainability Development to Integration (NESDI) program. We hope you will find these insights useful and that they encourage you to participate (or increase your involvement) in the program over the coming months.



Ken Kaempffe
Program Manager

Since our last newsletter, subject matter experts (SME) from our resource sponsor (OPNAV N45) completed their review and approval of our most recent set of proposals. We received these proposals in response to the priority needs collected via our fiscal year (FY) 2017 needs solicitation process and recommended by our management team—the Technology Development Working Group (TDWG).

A complete list of those 15 approved proposals is included in the “FY17 Full Proposals Approved by Program Sponsor” section in this issue of *NESDI News*.

Another major milestone on our schedule is the execution of our needs solicitation process for FY18. We received a total of 57 unique needs by our 2 August deadline—needs submitted by personnel from a range of Navy activities and organizations. (See the “FY18 Needs Collection Completed” section in this issue of *NESDI News* for more details.)

Take a quick read through this newsletter and contact me should you have any questions or ideas about improving the program.

Ken Kaempffe
ken.kaempffe@navy.mil

FY17 Full Proposals Approved by Program Sponsor

The following 15 proposals were reviewed and approved by SMEs at our sponsoring organization (OPNAV N45):

No.	ID	Title	Command	PI
1.	188	Development and Demonstration of a Portable, Temporary Barrier to Aid in Cargo and Equipment Inspections to Prevent Brown Treesnake Dispersal	NAVFAC	Jean Pan
2.	189	Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Naval Fleet Readiness Centers	NAVAIR	Alan Grieve
3.	191	Business Processes and Requirements Enabling Technology Integration	NAVFAC	Martin McMorrow
4.	192	Addressing Temporal Variability in Industrial Buildings During Vapor Intrusion Assessments	NAVFAC	Patricia Venable
5.	193	Enterprise-wide Hazardous Material Standardization and Minimization of General Use Consumables	NAVICP	Renata Laing
6.	195	In-situ Automatic Stormwater Sampling Device for Use at Tidally Impacted Sampling Locations	SPAWAR	Ernie Arias
7.	196	Source Metal Particle Removal for Stormwater Compliance	NAVSEA	James Howell
8.	197	Study of Waste Management and Minimization for Aqueous Film-Forming Foams Wastewater	NAVFAC	Daniel Edwards
9.	198	Background Analysis and Tracer Study to Identify Metal Contaminant Source Contributions to Stormwater Runoff	SPAWAR	Jim Leather
10.	199	Implementation of Biotic Ligand Model-Based Water Quality Standards for Copper at Navy Sites	SPAWAR	Gunther Rosen
11.	200	Low-Volatile Organic Compound Primers for Ground Support Equipment Application	NAVAIR	Michael Brindza
12.	201	Biochar Adsorption for Dry Dock Effluent	SPAWAR	Lewis Hsu
13.	202	Demonstrating the Effectiveness of Novel Treatment Technologies for the Removal of Poly- and Perfluoroalkyl Substances from Groundwater	NAVFAC	John Kornuc
14.	203	Initiation Decision Report of Laser Coating Removal on Naval Aircraft Components	NAVAIR	Stephen Starnes
15.	204	Non-chromate Deoxidizer for Resistance Spot Weld Cleaning	NAVAIR	Charles Sims

These proposed efforts will be initiated in stages as sufficient funding becomes available.

FY18 Needs Collection Completed

A total of 57 unique needs were collected via our FY18 needs solicitation process. As in past years, many of the needs pertain to improvements to stormwater and sediment management, validation of green alternatives to existing processes and materials used across our Fleet Readiness Centers,

enhanced drinking water management and proposed improvements to existing water and sediment sampling methods. Once our TDWG has completed its screening and prioritization of these needs, a ranked list will be forwarded to OPNAV N45's SMEs for their final review and approval.



New Project Initiatives Underway

In this section of *NESDI News*, we introduce you to four more of our projects that were launched in FY17:

1. **Stable Carbon Isotopes for Tracing In Situ RDX Remediation (project no. 537)**
2. **Stable-Isotope Labeled Tracers, an Innovative Way to Validate Natural Attenuation of RDX in Groundwater (project no. 544)**
3. **National Pollutant Discharge Elimination System Copper Effluent Control System (project no. 546)**
4. **Impact of Sediment Resuspension by Propeller Wash and Shore Sediment Dynamics on Remediation Options (project no. 551)**

Project no. 537 and project no. 544 above are demonstrating two different methods to quantitatively determine site-specific parameters of RDX degradation (NESDI need no. N-1063-16).

Stable Carbon Isotopes for Tracing In Situ RDX Remediation (project no. 537)

Munitions explosives contamination continues to concern Department of Defense (DoD) facilities, requiring considerable resources in time and money for assessment, cleanup, monitoring and site closure. Acceptable limits of RDX (cyclotrimethylene-trinitramine) are very low, making accurate contaminant degradation measurements a high priority for site managers. If provided with a scientific method for determining RDX degradation rates over site-specific spatial and temporal scales, site managers could more confidently implement successful remediation approaches.

Most assessment methods for degradation rate estimation are

based on indirect measures. These “line of evidence” approaches are expensive and have little forecast capability. They fail to conclusively determine which of many factors and conditions are responsible for the degradation of RDX into its desired end product—carbon dioxide (CO₂).

If provided with a scientific method for determining RDX degradation rates over site-specific spatial and temporal scales, site managers could more confidently implement successful remediation approaches.

The goal of this project is to differentiate contaminant-derived CO₂ from CO₂ produced by the soil’s natural respiration processes. The general approach is to target the contaminant’s carbon backbone using isotopic analyses—the most common being stable carbon



Munitions residue is an ongoing problem across the DoD.

analysis. This type of analysis has been employed by the Naval Research Laboratory to detect chlorohydrocarbons and munitions constituents in contaminated plumes at other DoD sites.

Carbon-13-labeled RDX will be released as a tracer into the groundwater at a Navy site (or sites). RDX with Carbon-13 is traceable into soil gas CO_2 and methane, under both aerobic and anaerobic conditions. Preliminary discussions have identified a site at Naval Base Kitsap-Bremerton. This site meets many of the conditions that make it appropriate for a demonstration, and the site has regulator approval to release small amounts of RDX.

A natural abundance isotope ratio mass spectrometer—designed to work at per mil (1 in 1,000) resolution—will detect shifts in the CO_2 and CH_4 stable

isotope ratios as RDX is degraded to these end-products. Sampling will be conducted seasonally and spatially for dissolved inorganic carbon (CO_2), dissolved methane (CH_4) and bacterial biomolecules in groundwater and if possible, soil. The sum of these measurements can determine the total degradation of RDX by natural methods (attenuation).

The end result of this project will be a protocol usable at sites with either engineered or natural attenuation remediation programs currently in effect. The team will develop a seminar to highlight the results of this project and resultant methodology and deliver it to affected Remedial Project Managers (RPM), regulators and other stakeholders.

Principal Investigator:
Thomas Boyd
(thomas.boyd@nrl.navy.mil)

Stable-Isotope Labeled Tracers, an Innovative Way to Validate Natural Attenuation of RDX in Groundwater (project no. 544)

The Navy has multiple sites impacted munitions explosives contamination. Acceptable limits of RDX—the main contaminant of concern—are very low, making site closure difficult to attain when sites have to meet strict cleanup goals. Many Navy installations with RDX groundwater have active remedies in place, such as pump and treat systems, to mitigate any risks associated with these plumes. Active remediation systems tend to have high operating and maintenance costs, and the persistence of RDX tends to limit their overall effectiveness. Often, sites rely on natural attenuation processes to achieve the site-specific remediation goals; however, it is difficult to demonstrate that natural attenuation really is occurring and at what rate.

This project will conduct a field demonstration based on a technology developed under the Strategic Environmental Research and Development Program (SERDP). This approach uses a stable isotope method for tracking RDX in situ to validate that natural attenuation is occurring and at what rates.

Small natural variations in the composition of isotopes (atoms with small but detectable variations in mass) have proven useful for examining contaminant sources,

New Project Initiatives Underway (continued)

transport and processing, particularly in groundwater environments for a variety of contaminants. However, because natural variations in isotopes are small and can arise for several reasons, this method can be an ambiguous tool to attribute sources or calculate transformation rates. In contrast to relying on natural variations in isotopic enrichment, adding an isotope to a contaminant (known as isotope labelling) provides clear source tracking. This technique can uniquely identify the products of RDX degradation, whether they are organic derivatives or true products of complete mineralization—the latter constituting natural attenuation.

This technique can uniquely identify the products of RDX degradation.

This project team will introduce a stable isotope-labeled contaminant (RDX) into an existing RDX plume to trace the fate of the parent RDX in the environment.

The demonstration is proposed to take place at Naval Base Kitsap-Bangor. The well-established “push-pull” technique will be used to introduce stable isotope-labeled ^{15}N -RDX into the RDX plume. The plume will be monitored for production of RDX mineralization products containing the ^{15}N tracer. Natural attenuation rates will then be calculated from these measurements. This demonstration will provide substantial data that can be utilized to transition sites from active to passive remediation with regulator acceptance.

The project’s final report will be distributed to RPMs for those sites impacted by RDX. Results of the project will also be discussed with relevant working groups and presented at major conferences.

Principal Investigator:
Jennifer Segura
(jennifer.segura@navy.mil)

National Pollutant Discharge Elimination System Copper Effluent Control System (project no. 546)

Over the past several years, regulatory levels for copper in stormwater runoff have become more stringent across the country. Meeting these requirements is particularly problematic at Navy shipyards and drydocks where multiple point and non-point sources of copper exist. In addition, effluent levels vary temporally, and are especially sensitive to rain events, which triple effluent concentrations. National Pollutant Discharge Elimination System (NPDES)-program regulated copper concentrations are based on total copper, which includes all forms (dissolved and bound). Most copper in runoff is in the form of the bound or particulate forms, which are less bioavailable and less toxic than the aqueous (dissolved) form. Conversion of the more toxic forms of copper to the less toxic forms can be environmentally protective, but its regulatory utility has not yet been adopted in some Navy locations.

The NCA is the only instrument capable of measuring all three forms of copper in effluents, in situ and in near real-time.

The ability to measure all forms of copper and demonstrate how much of the metal is bioavailable will aid with analysis of NPDES levels.



The proposed demonstration site at Naval Base Kitsap-Bangor.



The Navy Copper Analyzer.

(Photo Credit: Mike Putnam)

As each shipyard has its own unique conditions, no single treatment technology will be able to cost effectively clean all shipyard and drydock effluents. This project plans to demonstrate an automated approach to selecting appropriate technologies and monitoring their effectiveness.

The Navy Copper Analyzer (NCA) is the latest generation of automated real-time copper analyzers developed at the Space and Naval Warfare Systems Center Pacific and demonstrated under the NESDI program and the Environmental Security Technology Certification Program (ESTCP). The NCA is the only instrument capable of measuring

all three forms of copper (whole, dissolved and bound) in effluents, in situ and in near real-time at environmentally-relevant concentrations.

This precise real-time control system is also capable of diverting copper-laden runoff to the appropriate coordinated treatment systems, without impeding the flow of effluents that are in compliance with regulations. This would result in a significant reduction in treatment technology footprint, and operational cost savings versus treating all effluent with a single technology. This system will also be capable of measuring and controlling

the diversion of stormwater, cooling water, or wastewater in drydocks, treatment plants or receiving waters.

The NCA will be laboratory tested and field tested at Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility, where the regulatory level is many times lower than current discharge levels. Grab samples will be collected and measured using approved U.S. Environmental Protection Agency methods. These results will be compared with the field readings of the NCA.

Principal Investigator:
Iryna Dzieciuch
(iryna.dzieciuch@navy.mil)

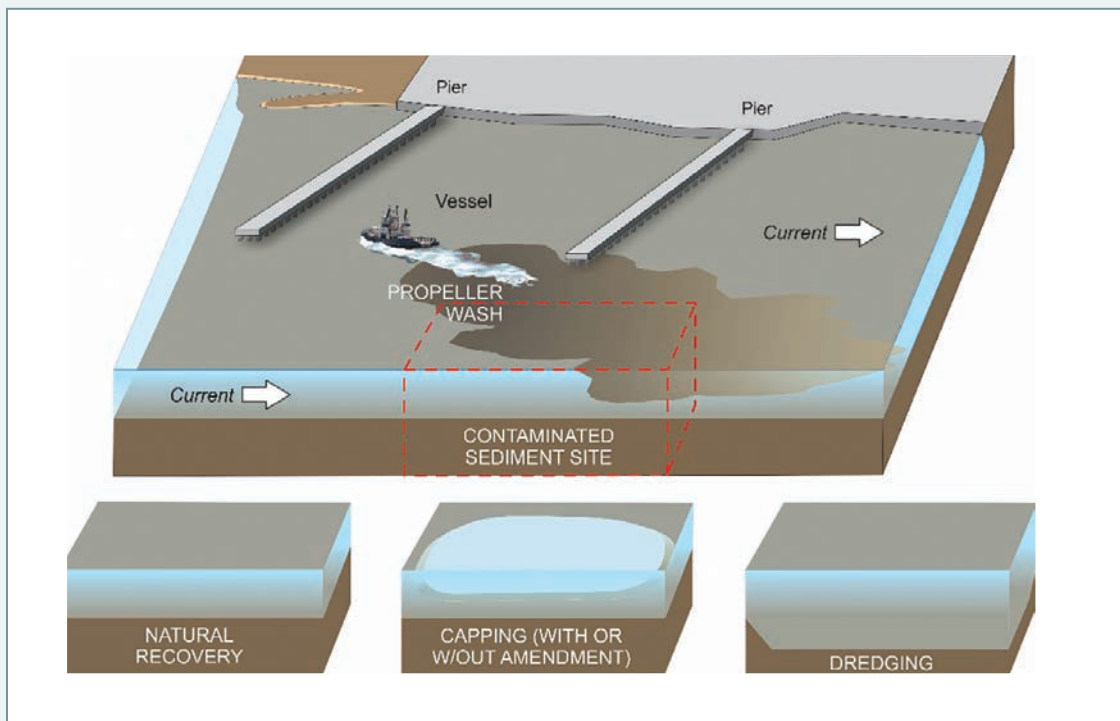
Impact of Sediment Resuspension by Propeller Wash and Shore Sediment Dynamics on Remediation Options (project no. 551)

While there has been significant progress toward both the identification and remediation of contaminated sediments at DoD harbors and waterways, there is a lack of understanding and public confidence on the effectiveness and permanence of these actions. Short-term remedial actions such as removal, and long-term actions such as capping and monitored natural recovery may be affected by site conditions such as propeller wash and wave action. This project was formed to provide more information regarding the effectiveness of various sediment remediation methodologies under real world stressors.

Long-term actions such as capping and monitored natural recovery may be affected by site conditions such as propeller wash and wave action.

Sediment dynamics in harbors and shore regions are complex. The potential for resuspension of contaminated and remediated sediments, remigration of these suspended sediments to other areas, and recontamination of remediated areas by particles generated from other ongoing sources, complicate the performance of remedial actions. Under this project, a rigorous study will be conducted at Naval Base

New Project Initiatives Underway (continued)



Propeller wash impact model. Processes include resuspension of contaminated sediment, near field mixing and re-deposition, far-field transport and re-deposition, and washing (with a portion of the sediment mass washed out of the harbor).

San Diego (NBSD) to examine the effect of sediment resuspension dynamics by propeller wash and shore sediment dynamics (wave action) on short- and long-term remedial options.

Issues covered will address how propeller wash may affect the stability and effectiveness of each remediation technique and how propeller wash and shore sediment dynamics may affect water quality and sediment recontamination.

Two protocols will be developed and demonstrated: one for the evaluation of the effect of resuspension events, the other for the evaluation of recontamination potential.

The protocols are based on data specific for the study site, for which numerical models have been previously validated. Existing estimates of daily tugboat activity at NBSD will be used to characterize and quantify resuspension by propeller wash. These data, in conjunction with baseline sediment chemical characteristics and calculations from the previously developed models, will help to determine the impact of propeller wash on each of the three sediment remediation options, including natural recovery, capping and dredging.

The knowledge and modeling tools to be developed will also

be applied for intertidal shallow shoreline areas, where remediated sediment undergoes persistent and repetitive resuspension, migration and redeposition processes.

This project also leverages ongoing work sponsored by ESTCP and SERDP. At the end of the project, the team will develop a report to help Navy RPMs design and select remediation options for contaminated sediment sites where propeller wash and other factors may be an issue.

Principal Investigator:
Pei-fang Wang
(pei-fang.wang@navy.mil)



Program Schedule

Throughout the month of September and beyond, the program will concentrate its efforts on screening, evaluating and ranking the 57 needs it received via its FY18 solicitation process. Also in September, the program will announce its “new start” projects for FY18. A complete program schedule for the next year is provided below.

No.	What	When
1.	Evaluate & Rank Needs	20-21 September 2017
2.	Obtain Sponsor Review & Approval of Needs	18 September - 6 October 2017
3.	Request Pre-proposals	16 October 2017
4.	Conduct OPNAV N45 Programmatic Review	November 2017
5.	Pre-proposals DUE	15 November 2017
6.	Make Pre-proposals Assignments to FWGs	1 December 2017
7.	TDWG & FWG Comments on Pre-proposals DUE	20 December 2017
8.	Evaluate Pre-proposals	8-12 January 2018
9.	Request Full Proposals	18 January 2018
10.	Full Proposals DUE	14 March 2018
11.	Conduct First FY18 In-Progress Review	12-16 March 2018 (Pearl Harbor, HI)
12.	TDWG & FWG Comments on Full Proposals DUE	30 March 2018
13.	Screen Full Proposals	2-6 April 2018
14.	Conduct Second FY18 In-Progress Review	30 April - 4 May 2018 (Port Hueneme, CA)
15.	Principal Investigator Answers to Full Proposal Screening Questions DUE	4 May 2018
16.	Announce FY19 Needs Solicitation	1 June 2018
17.	Evaluate Full Proposals	by 8 June 2018
18.	Obtain Sponsor Review & Approval of Full Proposals DUE	2 July 2018
19.	Announce FY19 New Starts	31 July 2018
20.	Close FY19 Needs Solicitation	1 August 2018
21.	Screen Needs	13-17 August 2018
22.	Quarterly Status Reports Due	2 October 2017 8 January 2018 2 April 2018 2 July 2018

Check out our web site (<https://epl.navfac.navy.mil/nesdi/Schedule.aspx>) for the latest version of our program schedule.



Mark Your Calendar for 2018 In-Progress Reviews

The dates have been set for the NESDI program's 2018 In-Progress Reviews (IPR). One IPR will be held in Pearl Harbor, HI on 12-16 March 2018 and a second IPR will be held in Port Hueneme, CA the week of 30 April - 4 May 2018.

See future issues of *NESDI News* for more details about both of these IPRs.

Contact Your TDWG Member

For more information about the operation of the NESDI program, contact Ken Kaempffe, the NESDI program manager, or members of the TDWG.

No.	Name	Command	Phone	Email
1.	Kaempffe, Ken (Chair)	NAVFAC	805-982-4893	ken.kaempffe@navy.mil
2.	Bixler, Christy	NAVFAC/CNIC	202-685-9313	christy.bixler@navy.mil
3.	Earley, Pat	SPAWAR	619-553-2768	patrick.earley@navy.mil
4.	Harre, Karla	NAVFAC	805-982-2636	karla.harre@navy.mil
5.	Hertel, Bill	NAVSEA	301-227-5259	william.hertel@navy.mil
6.	Kopack, David	NAVSEA	202-781-3247	david.kopack@navy.mil
7.	McCaffrey, Bruce	Consultant	773-376-6200	brucemccaffrey@sbcglobal.net
8.	Mukherjee, Sandi	NAVSUP	717-605-6854	sandi.mukherjee@navy.mil
9.	Rasmussen, Eric	NAVAIR	732-323-7481	eric.rasmussen@navy.mil
10.	Sugiyama, Barbara	NAVFAC	805-982-1668	barbara.sugiyama@navy.mil
11.	Webber, Cindy	NAVAIR	760-939-2060	cynthia.webber@navy.mil
12.	Youngers, Luzmarie	NAVAIR	904-790-6382	luzmarie.youngers@navy.mil



In the Next Issue of *NESDI News*

There is a lot more information coming your way in the next issue of *NESDI News: Highlights & Happenings*.

In our fall 2017 issue, we will provide you with insights into our progress to screen and rank the 57 needs we collected via our FY18 solicitation process.

If you're not already on our mailing list and want to subscribe to *NESDI News*, please send your email address to Lorraine Wass at ljwass@outlook.com.