

# THE NESDI NEWSLETTER

*Highlights & Happenings*

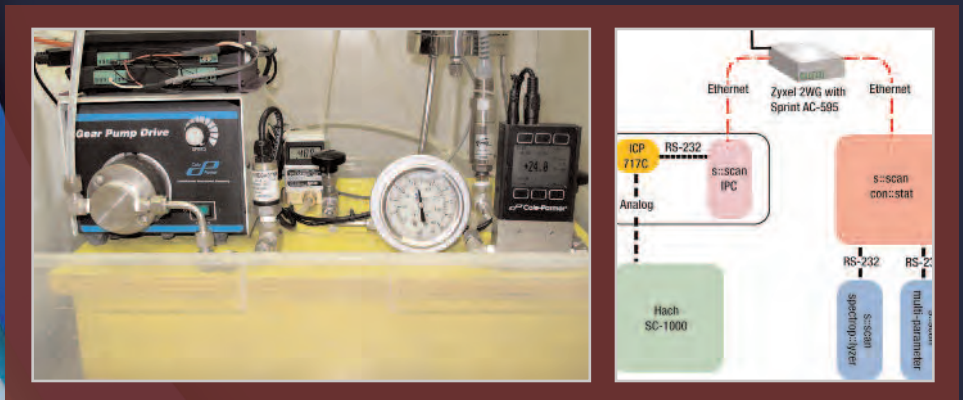


## *Welcome*

This quarterly update provides insights into program operations, significant accomplishments, and future focus areas for the Navy Environmental Sustainability Development to Integration (NESDI) program.

We hope you will find these inside perspectives useful and that they encourage you to participate or increase your involvement in the program over the coming months.

**The NESDI Program: Integrating Green Technologies Into the Fleet**





## From the Program Manager's Desk

**Welcome to the Fall 2012 issue of *NESDI News: Highlights & Happenings*—part of our ongoing effort to keep you informed about the NESDI program.**



Leslie Karr

The next significant milestone on the NESDI program schedule is the collection of pre-proposals and full proposals to address the many needs we collected via our Fiscal Year (FY) 2013 needs solicitation process. The NESDI program collected a total of 58 needs for FY13. After a thorough review by program personnel, a solicitation for pre-proposals was executed to address 20 needs determined to be priorities by personnel from the program's management team—the Technology Development Working Group (TDWG)—and our resource sponsor—the Chief of Naval Operations Energy and Environmental Readiness Division (N45).

Once pre-proposals have been collected, NESDI program management reviews and ranks them using established criteria. This is followed by a final evaluation that determines which pre-proposals will proceed to full proposal development. The results are provided to anyone who submitted a pre-proposal shortly after the evaluation period ends on 30 November 2012.

The call for full proposals will run from 13 December 2012 until 21 February 2013. (Full proposals are solicited by invitation only.) Successful proposals will result in new projects beginning in FY13 and beyond.

Leslie Karr, P.E.  
NESDI Program Manager

### 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 (N45) and managed by the Naval Facilities Engineering Command (NAVFAC). The mission of the program is to provide solutions by demonstrating, validating, and integrating innovative technologies,



processes, materials, and filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Fleet readiness.

## New Projects

We requested pre-proposals for the following priority needs.

NO.	NEED	COMMAND	TITLE
1.	N-0847-13	NAVFAC	Reduce Wastewater Treatment Plant Salinity
2.	N-0861-13	NAVFAC	Compliance Options Study For National Pollutant Discharge Elimination System (NPDES) for Cooling Water Intake Structures at Existing Facilities
3.	N-0862-13	NAVSEA	NPDES Clean Sampling Techniques
4.	N-0867-13	NAVFAC	Reducing Storm Water Management Fees
5.	N-0869-13	NAVFAC	Demonstration of Sustainable Remedy For Treating Low pH Aquifer Contaminated With Continuing Source of Chlorinated Ethenes Tetrachloroethene and Trichloroethene from Closed Landfill
6.	N-0870-13	NAVSEA	Biological Fouling Reduction to Ships Cooling Water Systems
7.	N-0871-13	NAVAIR	Low-Volatile Organic Compound and Low-Hazardous Air Pollutant Wipe Solvent and Paint Thinner Demonstration/Validation
8.	N-0874-13	NAVFAC	Alternative Treatment Technology to Pump and Treat for Munitions Constituent-Contaminated Groundwater
9.	N-0876-13	NAVFAC	Improved Methods and Tools for Remedy Selection at Contaminated Sediment Sites
10.	N-0878-13	NAVAIR	Replace Lead Moldings for Sheet Metal Forming with New Technology
11.	N-0880-13	NAVAIR	Filtering Aqueous Plating and Cleaning Shop Chemicals to Extend Bath Life
12.	N-0883-13	NAVAIR	Ultra High Pressure Water Jet System Equipment Procurement and Related Installation
13.	N-0887-13	NAVSEA	Drydock Sediment Management
14.	N-0895-13	NAVAIR	Elimination of Hexavalent Chromium from Aircraft Structural Adhesive Bonding
15.	N-0898-13	NAVSEA	Develop Process and Equipment for Wholesale Removal of Rubber Coating on Submarines
16.	N-0899-13	NAVAIR	De-Painting of Naval Aircraft — Alternative to Chemical/Media Removal Technology
17.	N-0900-13	NAVSEA	Develop Process and Equipment to Capture Smoke Plume from Oxy-Fuel Cutting Torch During Ship Demolition
18.	N-0902-13	NAVAIR	Revised Chromium National Emission Standards for Hazardous Air Pollutants Housekeeping Compliance
19.	N-0906-13	NAVFAC	Autonomous Underwater Vehicle Monitoring of Marine Environment Contaminants in Harbors and Waterways Impacted by Naval Operations
20.	N-0907-13	NAVFAC	Effective Operation and Maintenance of Storm Water Best Management Practices/ Low Impact Development



## Integrating Technologies

### Real-Time Drinking Water Quality Monitoring, Compliance with Disinfectant By product Rule, and Removing Copper from Oily Water Treatment System Discharge

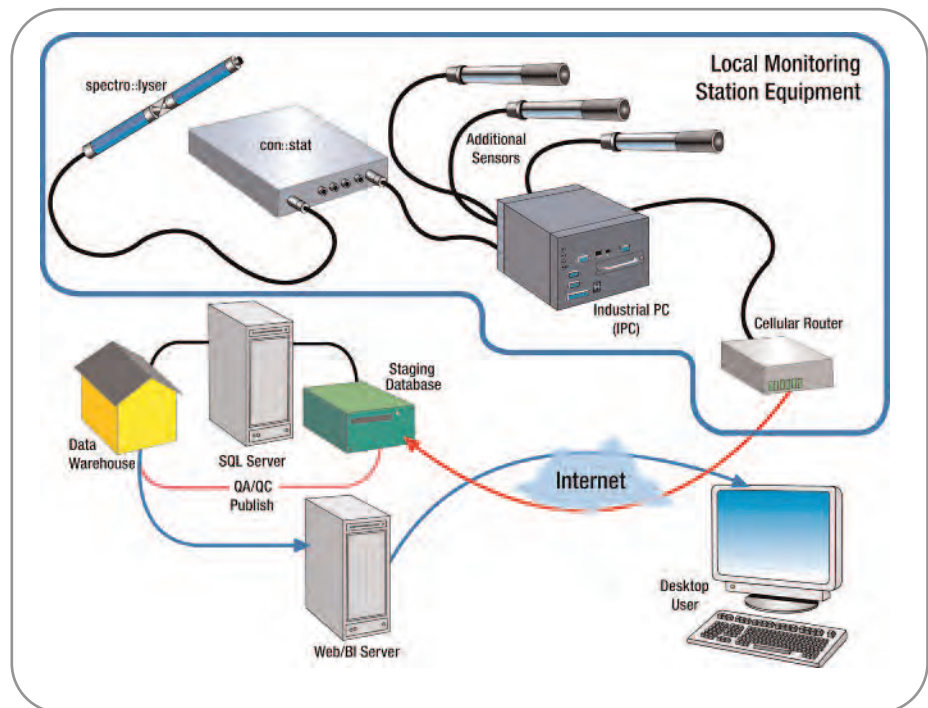
Three of our projects are in various stages of readiness for successful integration across the fleet. All three of these efforts are headed by Steve Fann (profiled in this issue of *NESDI News*) and are described below.

#### Demonstration of Real-Time Drinking Water Quality Monitoring Technologies (project #356)

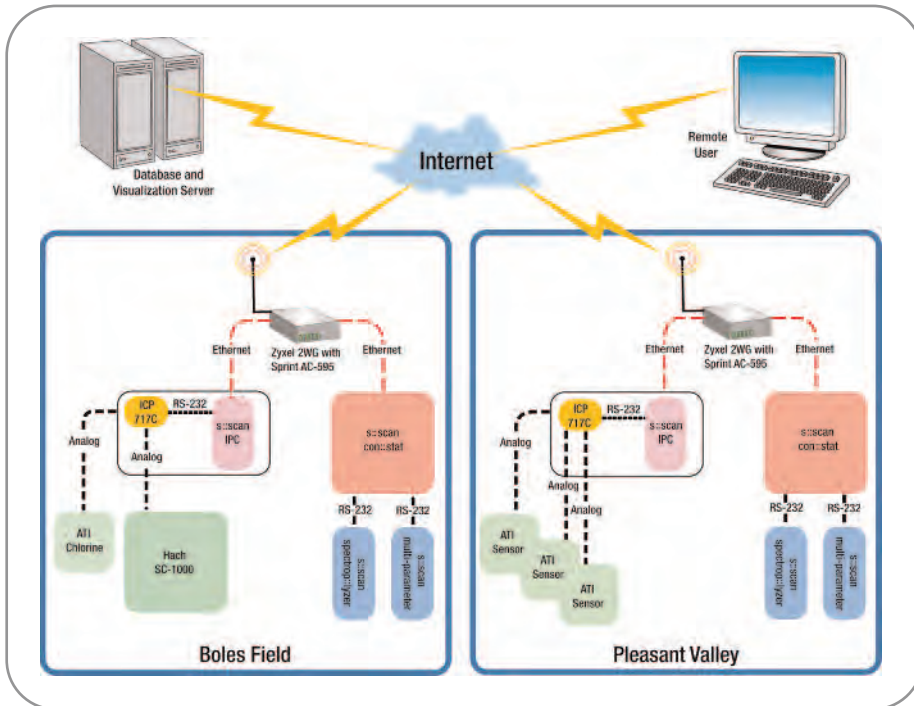
Potable water supplies on Navy bases are vulnerable to interruption from natural disasters such as earthquakes and floods, diminishing supply, water quality upsets, deterioration of infrastructure, and intentionally destructive actions.

In order to respond to unexpected disruptions in a timely manner, and to ensure that water quality continually meets Safe Drinking Water Act (SDWA) compliance, the NESDI program has sponsored the demonstration of a new real-time water monitoring technique.

On-line Water Quality Monitoring (OWQM) has the ability to alert managers of changes in water quality as they happen. However, Navy water utilities have not implemented an OWQM strategy due to the limited availability of proven cost effective technologies.



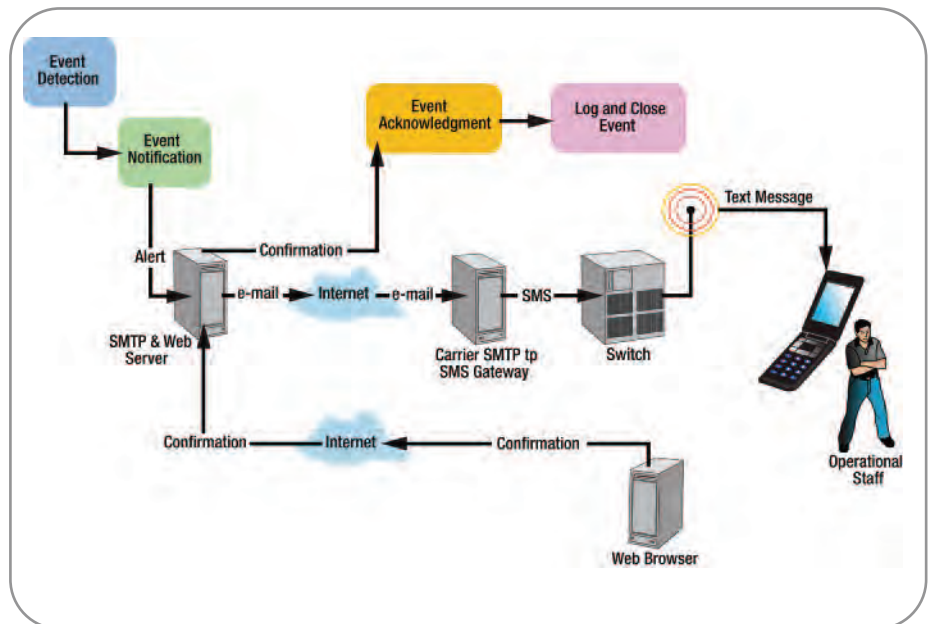
OWQM Information Flow Diagram.



Data Handling System Block Diagram.

Personnel from the Naval Facilities Engineering and Expeditionary Warfare Center (NAVFAC EXWC) have successfully demonstrated and validated two of the latest OWQM technologies at Naval Base Ventura County (NBVC) in Port Hueneme, California. Water quality data was automatically collected and transferred to a central server by cellular data communication. The system demonstrated the ability to alert managers via text message in the event of a water quality anomaly or event.

Qualitative and quantitative results for accuracy, maintenance, and usability were compiled into recommendations for implementation at other sites onboard NBVC and elsewhere. These recommendations also include cost estimates for installation, operation, and maintenance.

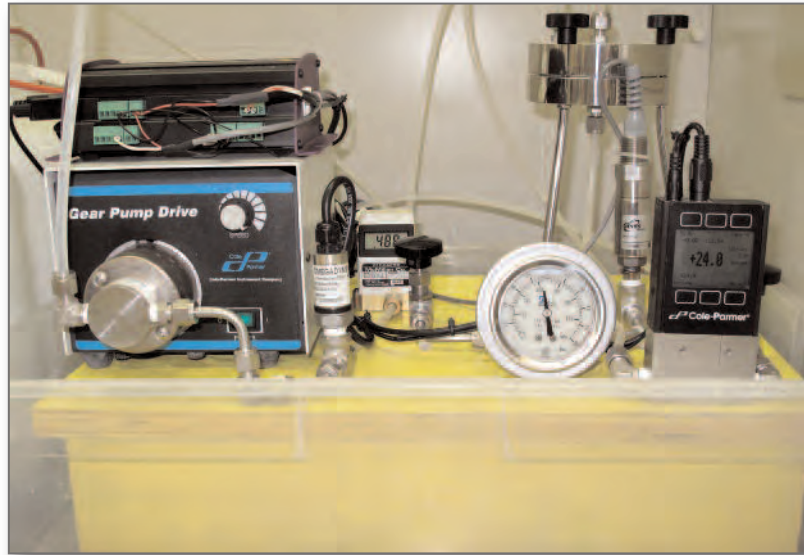


Event Notification and Confirmation Data Flow

### Compliance with the Emerging Requirements of the Stage II Disinfectant and Disinfection Byproduct Rule (project #457)

Free chlorine and chloramines are two of the most commonly used water disinfectants in drinking water treatment. Free chlorine, a stronger oxidizer, reacts with the naturally occurring organic compounds (precursors) found in surface water to form disinfection byproducts (DBP) or trihalomethanes. DBP concentrations exceeding the maximum contaminant level established by the U.S. Environmental Protection Agency (EPA) may pose health risks. Non-compliance with SDWA regulations may result in fines and penalties levied against the Navy, but industry methods for DBP control are not well suited to Navy water systems. For example, the most common approach to control DBPs is to convert the primary disinfectant from free chlorine to chloramines. Chloramines reduce the potential for DBP formation, but the presence of ammonia in these compounds increases the likelihood of nitrification and bacterial growth within distribution systems. Nitrification is the process by which ammonia is converted to nitrites and nitrates, which are also regulated due to associated health risks. These risks are higher for Navy water distribution systems than they are for municipal systems because Navy systems tend to have longer water residence times due to lower demand. Long residence times can result in bacteria growth or biofilms, which are difficult to remove once formed, and promote further nitrification.

The NESDI program sponsored this project to demonstrate and validate a cost-effective Ceramic Membrane Filtration (CMF) technology for the removal of DBPs in Navy drinking water systems. This cross-flow membrane is an effective at removing bacteria, viruses, colors, and suspended solids.



Bench scale system.



Pilot unit at Naval Air Station Lemoore.

A pilot-scale system is being demonstrated at Naval Air Station Lemoore (California). The demonstration is being performed on various water streams from the water treatment plant, such as raw water or effluent from a clarifier, to determine the optimal location for implementing the technology. The demonstration will determine if the CMF technology can

effectively reduce organic precursors so that DBP concentrations will remain below the regulated levels.

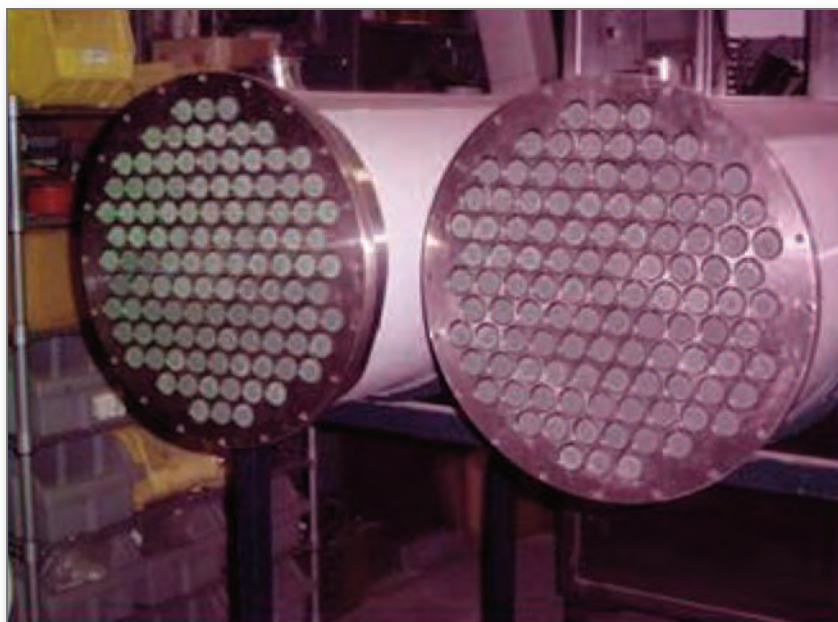
The results of this effort will be shared with Naval Facilities Engineering Command utility and energy management product line coordinators to help them incorporate this technology into their field operations.

## Remove Copper and Other Heavy Metals from Oily Water Treatment System Discharge for Compliance with National Pollutant Discharge Elimination System Discharge Standards (project #479)

The Navy employs Oily Water Treatment System (OWTS) processes to treat wastewater received from various industrial operations, such as bilges, hydro blasting, and ship hull cleaning, as well as dry dock storm water runoff. This system typically uses an oil/water separator to remove oil and grease, followed by chemical precipitation, coagulation and flocculation (to coagulate particulates), clarification (to separate particles as sludge), and bag filters to remove heavy metals. At Puget Sound Navy Shipyard and Intermediate Maintenance Facility (PSNS&IMF), the current technology of OWTS can consistently remove copper to around 50 parts per billion (ppb) level, which is above the NPDES permit's monthly average discharge limit of 19 ppb. However, NPDES limits are becoming more stringent, and the Navy's OWTSs will need enhancement to meet new NPDES discharge limits on heavy metals. Operational costs also need to be reduced, as the current system relies on frequent and expensive filter replacement.

This NESDI-sponsored project plans to enhance the performance of OWTS at PSNS&IMF by using CMF technology as well as improving the heavy metal precipitation processes.

A CMF unit consists of a feed tank, a ceramic membrane module, a pump station, and finished water storage tank. Effluent (outflow) from the existing OWTS clarifier feeds into the CMF feed tank. This water is pumped through membrane elements and back to the feed tank in a recirculation mode. The reject water stream from the membrane



Full-scale ceramic membrane modules, containing 109 elements each.

is concentrated within the feed tank and eventually is disposed of as waste. Pressure forces clean water to pass through the membrane elements and it is collected in a finished water tank. At the end of a work day, the CMF unit is switched to maintenance mode consisting of backwashing with clean water and emptying the concentrated water (reject water) in the feed tank for disposal. The reject water can be sent to the existing OWTS sludge tank for disposal. All of these operations can be automated for ease of operation. When membranes are fouled, they can be re-generated by chemical cleaning, such as back washing first with a caustic then acidic solution.

Because CMF has a smaller pore size than the filters used in OWTS, it can remove metal precipitates that may be too small to be removed by those

filters, thus resulting in a lower metal concentrations in the effluent. This approach should meet the existing discharge standards on heavy metals. However, to meet more stringent discharge standards, an enhancement to the precipitation process may be necessary to reduce the final soluble metal concentration in the effluent.

The project team is conducting bench scale treatability tests on real water samples from PSNS&IMF. Recent results using water samples collected from Puget Sound's oil water separator effluent effectively reduced copper loads to 4 ppb from an initial 170 ppb.

Results of bench scale tests will be utilized to design a pilot unit for demonstration at PSNS&IMF in mid- 2013.



## Names & Faces: **NESDI Profiles**

**In this issue of *NESDI News*, we are profiling Steve Fann—the Principal Investigator for our efforts to demonstrate real-time drinking water quality monitoring technologies (project #356).**

Steve is also heading up two new projects—project #457, an effort to demonstrate and validate a cost effective ceramic membrane filtration technology for the removal of disinfectant byproduct precursors (natural organic material, humic, and fulvic acids) in Navy drinking water systems and project #479, an effort to improve the Navy's OWTS processes for compliance with water discharge standards.



**Steve Fann**

### **Organization**

Naval Facilities Engineering and Expeditionary Warfare Center

### **Education**

B.S. in Chemical Engineering, California State University Long Beach



### **Your Experience**

Prior to joining the Navy, I worked as a machinist in the aerospace industry for five years and as a chemist in an analytical laboratory. My first job with the Navy was working on environmental compliance (air and water) for Naval Construction Battalion Center in Port

Hueneme, California (now Naval Base Ventura County). I joined the Naval Civil Engineering Laboratory (NCEL) in early 1990s, which later became the Naval Facilities Engineering Service Center (NFESC), and is now the Naval Facilities Engineering and Expeditionary Warfare Center (EXWC). During my tenure with NCEL, NFESC and EXWC, I have worked on various environmental technology development projects.

### **Your Role**

NESDI project #356 (Demonstration of Real-Time Drinking Water Quality Monitoring Technologies) was my first NESDI project in the Principal Investigator role. The project demonstrated an on-line water quality monitoring technology that can detect in real time, critical water quality in water distribution system for water security surveillance as well as improving water distribution system operations. I am also the Principal Investigator on two new NESDI projects—project #457 (Compliance with the Emerging Requirements of the Stage II Disinfectant and Disinfection Byproduct Rule) and project #479 (Remove Copper and Other Heavy Metals from Oily Water Treatment System Discharge for Compliance with National Pollutant Discharge Elimination System Discharge Standards).

### **Connections**

I participate in the Water Research Foundation project—Developing Contaminant Warning Systems for Intelligent Distribution Systems—to share the lessons I have learned from NESDI project #356. I also participate in various other technical programs within EXWC, including the Navy Energy Technology Validation program, as well as computational fluid dynamic modeling to support the test operations of the Aircraft Engine Simulation Facility.

### **Perspective**

The NESDI program is a valuable program that advances technological innovation to help solve challenging environmental issues for the Navy. It takes great care of the needs and concerns of its end-users and effectively promotes technology integration and implementation.

**For more information about Steve's projects or his role in the NESDI program, read the Integrating Technologies section of this newsletter or contact him directly at 805-982-1016 and [steve.fann@navy.mil](mailto:steve.fann@navy.mil).**



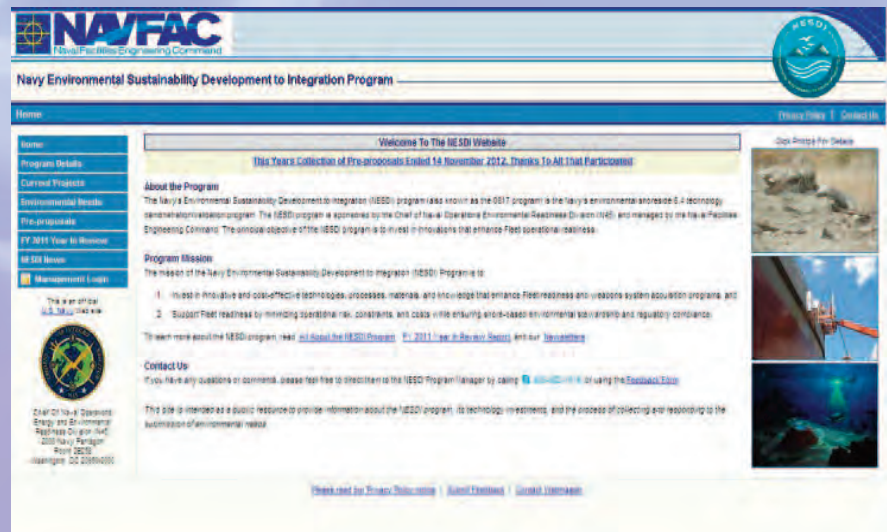


## Using Our Web Site

The next significant milestone on the NESDI program schedule is the collection of full proposals from approved pre-proposals. Authors of approved pre-proposals must submit and complete their full proposals before the evaluation season starts on 21 February 2013. To submit a full proposal, after logging onto the NESDI web site ([www.nesdi.navy.mil](http://www.nesdi.navy.mil)) with your username and password, select the **“Projects and Proposals”** link then the **“Submit a Full Proposal”** link. A list of the pre-proposals available for full proposal submission will be provided.

The **“Submit”** link will migrate the data from the corresponding pre-proposal into the full proposal format including the need addressed, problem statement, and some of the information describing the technology. The web site will generate an automated email to the Principal Investigator confirming this migration and will request additional information necessary to complete the full proposal. This includes the project’s technical objective and risks, a schedule of milestones, financial requirements and performers, as well as any supporting documentation that may be warranted.

# [www.nesdi.navy.mil](http://www.nesdi.navy.mil)



Direct any questions about the use of our web site to Eric Rasmussen, our webmaster, at 732-323-7481 and [eric.rasmussen@navy.mil](mailto:eric.rasmussen@navy.mil).



## Program Schedule

In this section of *NESDI News*, we provide insights into our annual program schedule. For the next few months, the program will concentrate its efforts on the collection, analysis, and ranking of proposals to address the highly ranked needs collected during our FY13 solicitation that concluded on 1 August 2012.

NO.	WHAT	WHEN
<b>1.</b>	<b>Request Pre-proposals</b>	<b>12 October 2012</b>
<b>2.</b>	<b>Close Pre-proposal Collection</b>	<b>14 November 2012</b>
<b>3.</b>	<b>Collect TDWG Comments on Pre-proposals</b>	<b>26 November 2012</b>
<b>4.</b>	<b>Evaluate Pre-proposals</b>	<b>27-30 November 2012</b>
<b>5.</b>	<b>Request Full Proposals</b>	<b>13 December 2012</b>
<b>6.</b>	<b>Collect Full Proposals</b>	<b>21 February 2013</b>
7.	Deadline for Functional Working Group Comments on Full Proposals	15 March 2013
8.	Collect TDWG Comments on Full Proposals	22 March 2013
9.	Screen Full Proposals	25-29 March 2013
10.	Deadline for Principal Investigators to Answer Screening Questions	29 April 2013
11.	Evaluate Full Proposals	10-14 June 2013 (at East Coast IPR)
12.	Obtain Sponsor Review & Approval of Full Proposals	28 June 2013
13.	Announce New Starts	30 July 2013
14.	Announce FY14 Needs Solicitation	20 May 2013
15.	Close FY14 Needs Solicitation	26 July 2013
16.	Screen Needs	12-16 August 2013
17.	Evaluate & Rank Needs	9-13 September 2013
18.	Conduct N45 Programmatic Review	25 September 2013
19.	Obtain Sponsor Review & Approval of Needs	16-27 September 2013
20.	Quarterly Status Reports Due (all Mondays)	7 January 2013 1 April 2013 1 July 2013 7 October 2013
21.	Conduct In-Progress Reviews	28-29 November Storm Water (Silverdale, WA) 6-10 May 2013 West Coast IPR (Port Hueneme, CA) 10-14 June 2013 East Coast IPR (Jacksonville, FL)

Check out our web site at [www.nesdi.navy.mil](http://www.nesdi.navy.mil) for the latest version of our program schedule.



## GETTING ON OUR MAILING LIST

If you're not already on our mailing list and want to subscribe to this newsletter, please contact Lorraine Wass at 207-384-5249 or [ljwass@surfbest.net](mailto:ljwass@surfbest.net) and we'll add you to our distribution.

## CONTACT US

For more information about the operation of the NESDI program, contact Leslie Karr, the program manager, or members of the TDWG—the program's management team.

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13.	Webber, Cindy	NAVAIR	760-939-2060	<a href="mailto:cynthia.webber@navy.mil">cynthia.webber@navy.mil</a>



## 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 winter-13 issue we will:

1. Highlight the results of the second In-Progress Review that we convened to address the emerging requirements associated with the ongoing challenges of effectively managing storm water at Navy facilities. This gathering of storm water users, researchers and policymakers was held in Silverdale, WA on 28-29 November 2012.
2. Provide you with insights into the results of our full proposal collection.