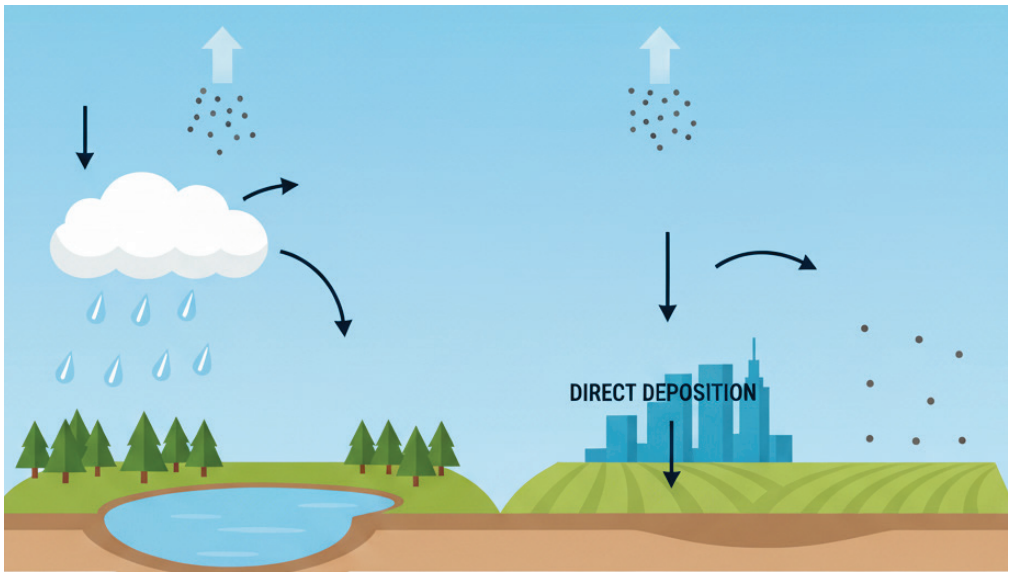
Methodology to quantify PFAS distributions in precipitation and ambient soils at multiple Navy installations

PROJECT ID:
640



Deposition sources of PFAS can be from many sources such as direct on-site use, nearby short-range sources or long-range transport.
(Photo Credit: AI generated image – Google Gemini).

OBJECTIVE

This effort will evaluate and field validate a methodology for quantification of site-specific anthropogenic background per- and polyfluoroalkyl substances (PFAS) concentrations in precipitation and ambient surface soils to support selection of appropriate remediation goals above background concentrations at Navy sites.

PROBLEM STATEMENT

Widespread PFAS use has led to background levels worldwide, even in remote areas. Reliable methods to estimate site-specific PFAS background are urgently needed to distinguish site-related impacts from existing background levels to avoid setting cleanup goals below background at Navy sites. It's also important to understand how environmental transport may contribute non-site-related PFAS to Navy installation soils. With over 400 Navy sites under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigation and more expected, developing a clear approach that accounts for background and off-site sources will help focus remediation efforts where they're most needed.

DESCRIPTION

This project will field-validate and evaluate a methodology for quantifying anthropogenic background PFAS concentrations in precipitation and surface soils. Evaluating ambient soils will determine if environmental transport may contribute anthropogenic background PFAS to Navy on-site soils, based on the concept that an installation could receive PFAS inputs from multiple sources: (1) onsite use of aqueous film-forming foam (AFFF) and other PFAS-containing materials, and (2) short- or long range transport of PFAS from off-base sources. Inputs from off-base sources represent non-site-related ambient PFAS which may be deposited to site soils via processes such as wet deposition (i.e. rainfall). Thus, anthropogenic background contributions to soil and surface water bodies on DoW installations could exist, particularly in regions that are heavily industrialized or populated. This project will quantify anthropogenic background PFAS in precipitation and soils at two Navy installations: one previously sampled under EXWC background studies in the Northeastern US and one on the West Coast to assess regional differences.

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Sampling locations will be selected using best-practice criteria and will be situated away from known PFAS sources. Precipitation will be collected twice seasonally, while soils will be sampled once, representing a variety of land uses, with some off-base sites included if needed. Precipitation and soil samples will be analyzed using USEPA Method 1633, with selected samples assessed for non-target PFAS and precursors. Data analyses will estimate background PFAS levels, evaluate cross-media correlations, and assess contributions of wet deposition to soils. All methods, results, and conclusions will be summarized in a project report to support understanding of site-specific PFAS background and inform management decisions.

RETURN ON INVESTMENT

By providing validated methods to quantify site-specific PFAS background in soils and precipitation, this project enables Navy site managers to set remediation goals above background levels, avoiding unnecessary cleanup costs. Accurate background characterization across 400+ Navy PFAS sites could save tens of millions of dollars by reducing cleanup of PFAS above background, particularly given the high cost and energy intensity of PFAS treatment technologies. In addition, the methodology and training materials ensure rapid adoption and defensible, consistent decision-making, increasing efficiency and confidence in environmental management actions.

NAVY BENEFITS

The field-validated methodology will give Navy site managers and their consultants defensible tools to quantify PFAS background in soils and precipitation, assess regional contributions, and strengthen conceptual site models. Establishing accurate background levels is critical given the extremely low USEPA PFAS screening levels and the widespread occurrence of PFAS in the environment, and it can help set cleanup goals that avoid unnecessary remediation costs. Demonstration at two sites, along with a “how-to” guide and training through RITS and OER2, will ensure the methodology is practical, defensible, and ready for Navy-wide adoption.

TRANSITION DESCRIPTION

Work products from this effort will include a final report with practical methodology documents, checklists, and templates to help Navy personnel and consultants plan and conduct PFAS background studies in precipitation and soils. Results will be shared via Navy ER Managers, NAVFAC workgroups, conferences, and webinars, supported by robust site-selection rationale and data review, and may also be published to build credibility and public confidence.

CONTACT

For more specific information about this project, contact the Principal Investigator at jarod.s.snook.civ@us.navy.mil

ABOUT THE NESDI PROGRAM

The Navy Environmental Sustainability Development to Integration (NESDI) program is the Navy’s environmental research and development demonstration and validation program, sponsored by Office of the Chief of Naval Operations (OPNAV) Compliance and Mission Readiness Division (N4I1) and managed by the Naval Facilities Engineering Systems Command (NAVFAC) from the Engineering and Expeditionary Warfare Center (EXWC) in Port Hueneme, CA.

The mission of the NESDI program is to support Fleet readiness by minimizing operational constraints associated with environmental and human health risks and to reduce cost of environmental compliance by demonstrating, validating, and integrating innovative technologies, processes, materials, and by filling knowledge gaps.

For more information, visit the program’s web site at www.navfac.navy.mil/nesdi
or contact the NESDI Program Managers at NESDI@us.navy.mil