

**Strategic Environmental Research and Development Program
(SERDP)**

FY 2022 STATEMENT OF NEED

Environmental Restoration (ER) Program Area

**IMPROVED UNDERSTANDING OF THE ECOTOXICITY OF MIXTURES
OF PER- AND POLYFLUOROALKYL SUBSTANCES**

1. Objective of Proposed Work

The objective of this Statement of Need (SON) is to solicit proposals to develop an improved understanding of the ecotoxicity of chemical mixtures associated with the release of Aqueous Film-Forming Foam (AFFF), specifically mixtures of per- and polyfluoroalkyl substances (PFAS) found in environmental media. Proposed research should focus on one or more of the following specific objectives in order to fill gaps in the current knowledge base:

- Produce data to determine the toxicity of PFAS mixtures considering mode of action, bioaccumulation kinetics, critical effects as well as cumulative effect on the quantitative dose-response (i.e., additive, synergistic, or antagonistic) for applicable model wildlife receptors.
- Develop or apply a mixtures methodology for predicting potential toxicity including toxic endpoints of PFAS mixtures considering the dose-response for specific PFAS, environmental media, and/or ecological receptor.
- Identify PFAS mixtures of most concern in order to enhance risk management decisions and address risk communication concerns. Identification of such mixtures should be associated with relevant environmental media and ecological receptor.

Proposals may address one or more of the sub-objectives listed above. Proposers must provide the rationale and justification for the parameters of the study, including selected species, specific PFAS, biological endpoints, and environmental media. Substantial work has been conducted on understanding the ecotoxicity of specific PFAS. Investigators are encouraged to view past research and demonstrate how the proposed effort builds on previous efforts. A summary of SERDP funded efforts can be found on the [SERDP website](#).

The ecotoxicity of PFAS mixtures at environmentally relevant concentrations is of particular concern and proposed efforts should include such an assessment.

2. Expected Benefits of Proposed Work

The knowledge of the potential environmental risk of PFAS associated with AFFF will assist in the development of appropriate site-specific risk assessments and the decisions related to mitigation of exposures and/or future environmental cleanup.

3. Background

PFAS, such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), have been used to manufacture a variety of industrial, commercial and military products, including (through 2001) PFOS-based fluorochemical surfactants used in AFFF. AFFF is used to extinguish flammable liquid (e.g., hydrocarbon) fires. Environmental releases of AFFF have occurred from tank and supply line leaks, use of aircraft hangar fire suppression systems, and from firefighting training activities. PFOA and PFOS have attracted regulatory scrutiny because of their resistance to degradation, ability to bioaccumulate, and growing evidence of toxicity in animal studies. There is also increasing regulatory concern about PFAS other than PFOA and PFOS.

Due to their chemical structure, PFAS are very stable in the environment and are resistant to biodegradation, photo-oxidation, direct photolysis, and hydrolysis. Individual PFAS have been found to negatively affect autotrophic and heterotrophic food webs, but little is known regarding the toxicity of PFAS mixtures outside of PFOS and PFOA. Whether these other compounds are toxic, contribute additive or synergistic toxicity, or do not significantly contribute to toxicity remains largely unknown. Additional data is needed to improve the understanding of mixture ecotoxicity to wildlife, particularly given that AFFF-impacted sites have been shown to contain many PFAS, not just PFOA and PFOS.

4. Cost and Duration of Proposed Work

The cost and time to meet the requirements of this SON are at the discretion of the proposer. Two options are available:

Standard Proposals: These proposals describe a complete research effort. The proposer should incorporate the appropriate time, schedule, and cost requirements to accomplish the scope of work proposed. SERDP projects normally run from two to five years in length and vary considerably in cost consistent with the scope of the effort. It is expected that most proposals will fall into this category.

Limited Scope Proposals: Proposers with innovative approaches to the SON that entail high technical risk or have minimal supporting data may submit a Limited Scope Proposal for funding up to \$250,000 and approximately one year in duration. Such proposals may be eligible for follow-on funding if they result in a successful initial project. The objective of these proposals should be to acquire the data necessary to demonstrate proof-of-concept or reduction of risk that will lead to development of a future Standard Proposal. Proposers should submit Limited Scope Proposals in accordance with the SERDP Core Solicitation instructions and deadlines.

5. Point of Contact

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For Core proposal submission due dates, instructions, and additional solicitation information, visit the [SERDP website](#).