

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

**FY 2012 STATEMENT OF NEED**

**Resource Conservation and Climate Change (RC) Program Area**

**ASSESSMENT AND MONITORING OF BIOLOGICAL DIVERSITY:  
METHOD DEVELOPMENT**

**1. Objective of Proposed Work**

The objective of this Statement of Need (SON) is to improve our fundamental and applied understanding of how to assess the status of and monitor trends in native species biological diversity (biodiversity<sup>1</sup>) on lands and in waters that are of relevance to Department of Defense (DoD) resource managers. Research proposals are sought that **both**: (1) build on theoretical models of estimating the number of species across spatial scales, taxonomic group, and environmental context and (2) provide practical assessment and monitoring methods for resource managers to implement on an ongoing basis at relevant spatial scales.

Research needs include but are not limited to improvements in the scientific basis for and practical applications of methods for assessing and monitoring the native species component of biodiversity that address the following:

1. Effects of spatial and temporal scales and sampling periodicity on data collection protocols, interpretation, and the ability to relate information across scales of relevance to DoD resource managers.
2. Sampling issues, including sample bias, at small spatial scales and statistical methods that can be efficiently applied by resource managers.
3. Theoretical and applied issues, such as:
  - a. interaction effects of non-native species on the number of native species,
  - b. effects of the taxonomic group considered, especially when a particular taxonomic group is used as a surrogate for one or more other groups, and
  - c. effects of variation in habitat quality (from the perspective that individual species will have differential responses).
4. Development of ecological models that enable assessing/projecting the effects on the number of native species through modifying habitat by use or management.

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<sup>1</sup>Biodiversity can be defined in a variety of ways that are inclusive—for example, variety of life from genes to ecosystems and include even ecological process—or exclusive—for example, only address the number of native species (i.e., species richness). For purposes of this SON, the number of native species is the central assessment focus, though interactions with other potential components of biodiversity, such as non-native species, may need to be considered.

Proposals submitted in response to this SON may address one or more of the research needs listed above. Proposals must demonstrate an understanding of current theory regarding species-area relationships or other theoretical grounds for measuring species biodiversity as a basis for proposed work.

## **2. Expected Benefits of Proposed Work**

The desired outcome is knowledge that: (1) improves our understanding of assessing, monitoring, and managing the status of native species biodiversity at multiple spatial and temporal scales, (2) assists resource managers in providing effective and cost-efficient methods for accomplishing such biodiversity assessment and monitoring and for forecasting the effects of land-use plans and management actions, (3) addresses a variety of theoretical and applied questions associated with the assessment and monitoring of native species biodiversity, and (4) promotes the assessment and monitoring of native species biodiversity within and across land management and administrative units.

## **3. Background**

Biodiversity, its status and trends, has been of regulatory, social, and management interest for decades; however, despite this interest and a fair amount of research related to its ecological importance and measurement, few efforts have been made to develop and implement standard methods for the assessment and monitoring of biodiversity at local to national spatial scales. Method development and implementation have been thwarted to a certain extent by unresolved issues associated with, for example, habitat quality gradients and the ability to identify both sampling methods and statistical tests easily applied by resource managers.

Although a variety of approaches have been investigated for measuring components of biodiversity, the focus of this SON is on approaches associated with estimating the number of species. Most theoretical work has been associated with species-area relationships that built off, in part, island biogeography theory. This work has been both retrospective in attempting to assess past biodiversity patterns and prospective in trying to understand the potential long-term evolutionary effects on number of species due to human land-use change. Recent empirical studies have attempted to incorporate gradients in habitat quality to the construction and interpretation of species-area curves that the earlier theoretical work did not address. Other approaches have attempted to use species-habitat relationships without invoking any particular theoretical foundation for how many species should be able to occur in a given area.

Tools are needed that, while addressing remaining theoretical questions associated with species biodiversity status measurement and forecasting, are practical for resource managers to use and are scalable across multiple spatial scales. Moreover, such tools should be capable not only of accurately assessing and monitoring native species biodiversity at different spatial scales, they also should enable managers and decision-makers to determine the effects on such biodiversity of different land use and management actions.

#### **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 \$150,000 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 web site at [www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations](http://www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations).