**Partnership for
Small Area Estimation**

PHASE 1 REQUEST FOR PROPOSALS

SMALL AREA ESTIMATION TECHNIQUES

USING NATIONAL FOREST INVENTORY DATA

May 17, 2023

Contents

SUMMARY INFORMATION

AWARDING AGENCY NAME: NCASI Foundation

FUNDING TITLE: Small Area Estimation Techniques Using National Forest Inventory Data

FUNDING SUMMARY: The Partnership for Small Area Estimation (PSAE) is a cooperative effort between the National Council for Air and Stream Improvement (NCASI), Inc., NCASI Foundation, and the US Forest Service to develop a unified approach to evolving the USFS Forest Inventory and Analysis (FIA) Program's estimation capacity. PSAE is seeking proposals to conduct national forest inventory (NFI)-based small area estimation (SAE) techniques research with an emphasis on sample data from the FIA Program. SAE refers broadly to statistical techniques for deriving reliable estimates, and associated estimates of uncertainty, for target attributes which: 1) span domains of administrative and/or ecological interest; and 2) contain too few forest inventory ground measurements to yield estimates meeting minimum standards for precision using status quo FIA estimation procedures. A key requirement of any small area estimator of a forest subpopulation parameter is the provision of statistically valid estimators of its variance, bias, and/or mean squared error.

KEY DATES: Proposal materials must be received no later than 11:59 pm Eastern Time on June 30, 2023.

CONTACT: Questions regarding the submission process can be directed towards Susan McCord, Director, NCASI Foundation (SMcCord@ncasi.org). Questions related to specific information contained within this RFP (e.g., clarification on dates, eligibility, or technical content) should be directed towards Steve Prisley, Principal Research Scientist, NCASI, Inc. (sprisley@ncasi.org) or George Gaines, Research Mathematical Statistician, RMRS FIA (george.gaines@usda.gov).

IMPORTANT DOCUMENTS: Important documents, including this RFP and the USDA Form AD 1048, budget template, and example donation letter referenced in following sections, can be found here: `https://www.ncasifoundation.org/psae-rfp/`

DESCRIPTION AND FUNDING PRIORITIES

BACKGROUND

PSAE is seeking proposals to conduct national forest inventory (NFI)-based small area estimation (SAE) techniques research with an emphasis on sample data from the USDA Forest Service's Forest Inventory and Analysis (FIA) Program. SAE refers broadly to statistical techniques for deriving reliable estimates, and associated estimates of uncertainty, for target attributes which: 1) span domains of administrative and/or ecological interest; and 2) contain too few forest inventory ground measurements to yield estimates meeting minimum standards for precision using status quo FIA estimation procedures. A key requirement of any small area estimator of a forest subpopulation parameter is the provision of statistically valid estimators of its variance, bias, and/or mean squared error.

Funding for the research to be conducted through this Request for Proposals comes from the FIA Program, through a partnership with the National Council for Air and Stream Improvement, Inc. (NCASI) and the NCASI Foundation. PSAE has convened User, Science, and Development panels of experts who will provide guidance, review, and recommendations for the research to be conducted with this funding.

Through The Department of the Interior, Environment, and Related Agencies Appropriations Bills (hereafter referred to as "Appropriations Bills") for both fiscal years 2022 and 2023, Congress directed $2,000,000 ($4,000,000 in total) to the US Forest Service "...to support new and existing academic partnerships to further explore the use of available technologies like remote sensing and methodologies such as small area estimation to further refine county and State biomass estimates as outlined in Sec. 8632 of Public Law 115-334." The specifications below outline a related request for proposals to conduct SAE-specific techniques research and/or development activities targeted toward this directive, and ultimately toward implementation of SAE protocols in FIA's national operations more broadly. We enthusiastically invite your engagement, collaboration, and innovation.

SCOPE OF INTEREST

Proposals should seek to apply new or existing SAE methods to generate estimates of and estimated uncertainties for domain parameters of high-priority target attributes, as identified by the Appropriations Bills and the three PSAE Panels. For example:

A. Annual, county-level forest area and forest biomass (or other small geographic areas – e.g., wildfire or other disturbance perimeters, watersheds, ecological regions).

B. Statistical simulation applications for characterizing the bias added or introduced by inherently biased SAE strategies.

C. Forest area change/biomass change.

D. Consideration will also be given to high-potential investigations into new or existing multivariate estimation procedures (e.g., methods for simultaneously generating estimates of forest area by forest type, biomass by species group, etc.), though larger awards are more likely to be allocated to multivariate techniques research endeavors in subsequent phases of the PSAE project.

To facilitate synthesis and comparisons across research projects, investigators will be required to compile their results according to standardized criteria to be defined by the PSAE Executive Committee in the near future. Sharing of these standardized results will begin at the next in-person PSAE meeting.

AWARD INFORMATION

Available Funding

A. **Estimated Funding**

Future RFPs may be forthcoming. In this Phase 1 RFP we anticipate distributing approximately $800,000 – $1,000,000 in awards.

B. **Performance Period**

Funding awards will be made in August-September 2023. Projects must be completed within the pre-agreed upon timeframe (3-12 months maximum for short term projects; 36 months maximum for longer term projects). Funding agreements will not be extended beyond 2027.

C. **Estimated Funding**

The total funding request for any proposer, whether made through one or multiple proposals, is not to exceed $300,000, including a maximum of 20% indirect costs. Non-federal cost sharing of 10% is required.

Eligibility Information

Recipients cannot have active exclusions in the System for Award Management (sam.gov). All recipients and contractors must complete the form AD-1048, Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion, Lower Tier Covered Transactions.

APPLICATION AND SUBMISSION

Proposal Submission

Proposals must be submitted as a single PDF document via e-mail no later than 11:59 pm Eastern Time on June 30, 2023. Please e-mail to Susan McCord, Director, NCASI Foundation (SMcCord@ncasi.org).

Proposal Content Package

A. **Project Narrative**

The project narrative should be no more than five pages with 1-inch margins and in a standard typeface (e.g., Times New Roman, Arial, Calibri). Text should be single-spaced and in 12-point font. This page limit applies to only the project narrative, and does not include the timetable, budget, or collaborator CVs.

The project narrative should demonstrate familiarity with existing applied NFI-based SAE research and current FIA estimation procedures. Proposals should provide evidence that the research team has relevant experience in small area estimation, use of FIA data, and technical knowledge of pertinent auxiliary data.

The project narrative should include the following:

(a) **Project Title:** Please choose a distinct and descriptive title for your project and use consistently on all correspondence and supplementary materials.

(b) **Project Applicant and Collaborators:** Provide the name, organization, and contact information for the project collaborators. Please identify the project lead. **Research teams are encouraged to collaborate with FIA scientists as appropriate and engage with relevant stakeholders in the user community (e.g., state forestry agencies and private companies)**

(c) **Project Background and Motivations:** Articulate linkages to/summary of relevant recent literature, where appropriate, and describe the broad goals and/or hypotheses.

(d) **Project Objectives:** List the project objectives.

(e) **Implementation Strategy and Methodology:** Please address overarching framework for estimation, including but not limited to domain delineations, study area, and auxiliary data sources. Proposals should describe how auxiliary data will be combined with FIA sample data in the construction of estimators: the statistical estimation method(s) to be evaluated and basis for inference, whether methods require data considered by FIA to be confidential, and the specific ancillary data to be tested. Please note that submission of a proposal to conduct research requiring confidential data (e.g., true FIA sample location coordinates) does not guarantee conferment of confidential data by FIA to the proposer(s). Proposals requiring confidential data should address one of the following:

    i. Indicate that the work proposed falls within the administrative bounds of an existing material transfer agreement (MTA) between the proposer and FIA, and the names and affiliations of the associated FIA collaborator(s).

    ii. Indicate, with an expected date of execution provided by FIA Spatial Data Services (SDS), that a MTA will be in place by the time of award receipt, and the names and affiliations of the associated SDS personnel and FIA collaborator(s).

(f) **Technology Transfer:** Award recipients will be required to share the code, scripts, etc., they develop throughout the course of PSAE funded research. Moreover, preference will be given to research proposals that outline a technology transfer strategy, including but not limited to:

    i. Partnership with specific members of the PSAE Development Panel to port methods to high-priority distribution mechanisms.

    ii. Provision of annotated scripts; written, video and/or interactive (e.g., R Swirl, Rmarkdown, Jupyter Notebook) tutorials; and other instructional materials through version control repositories, virtual training sessions and in-person workshops.

    iii. Development of a prototype tool (e.g., web-based dashboard, open-source library, etc.) for application by users.

iv. Workflow diagrams and discussions showing how results from the research could be disseminated to the user community through research products and/or online tools.

B. Budget

An itemized budget following the categories in the budget template should be submitted on a separate page but does not count toward the 5-page project narrative page limit. Proposals should include a budget item for attendance at an annual meeting of the PSAE to present intermediate and/or final results and should reflect the 20% indirect cost cap and required 10% non-federal cost sharing.

C. Timeline

Include a timeline for the completion of the project objectives and intermediate products and tasks on a separate page. This does not count toward the 5-page project narrative page limit. The timeline should include, but is not limited to:

(a) Timing of quarterly milestones and biannual progress reports

(b) Expected timing of and venues for publications

(c) Funding recipients will present progress to the Partnership Science Panel approximately quarterly (including 1-page written progress reports twice a year)

(d) Modifications to analyses and plans will be made in conjunction with the Panel and within the proposed budget.

D. Statement of Experience

Provide an overview of the qualifications of the PI and collaborating investigators. This should include relevant training, experience, and publications. Specific areas to address include relevant experience and expertise in: 1) working with the publicly-available FIA database, 2) small area estimation statistical approaches, and 3) delivery of resource information from web tools. This does not count toward the 5-page project narrative page limit.

E. Curricula Vitae

Maximum of two pages each, using NSF-style format, for the PI and all substantially involved co-PIs and collaborators (*See* http://www.nsf.gov/pubs/policydocs/papp/gpg_2.jsp).

F. **Current and Pending Funding Disclosure**

List any SAE-relevant current or pending USDA, USFS, or other relevant funding sources for the PI and collaborating investigators, if the disclosed funding supports research with any relationship to the PSAE effort (i.e., forest inventory applications of small area estimation statistical methods, SAE tool/platform development). Please include the agreement numbers where appropriate, and please provide a summary of that work and how the proposed project differs from or adds to it. This does not count toward the 5-page project narrative page limit.

G. **Letter of Commitment**

Submit with your proposal package a Third-Party Donation Letter confirming your cost matching level. A sample letter is attached for your reference.

EVALUATION CRITERIA

Proposals will be evaluated by the PSAE User, Science, and Development Panels based on the following criteria:

- Does the proposed work address the user needs detailed in the "Scope of Interest" section?

- What is the intellectual merit (potential to advance knowledge) of the proposal?

- What are the broader impacts (potential to contribute to the achievement of specific, desired outcomes; in this case, as can be achieved through advancement of NFI-based SAE methods and tools) of the proposal?

- What is the extent and nature of the research team's experience?

- What is the overall fitness of the research team for executing the proposed work?

- To what extent does the proposal address a pressing research need suggested by the relevant peer-reviewed literature?

- Is a technology transfer plan detailed in the proposal and what is the level of ease of implementation for the project output (e.g., opensource and reproducible)?

DIRECT RESEARCH CONTRACT AND FEE-FOR-SERVICE OPPORTUNITIES

In addition to awards for successful proposals, the PSAE Executive Committee anticipates strategic distribution of smaller direct contracts to successful applicants for high-priority, near-term research objectives or fee-for-service tasks in support of the unification and modernization of FIA's approach to statistical estimation. In a broad sense, Direct Research Contracts imply work involving the development of new intellectual input (e.g., simulation-based testbed development or benchmarking method development), while Fee-for-service Contracts will be used to conduct other essential technical and administrative tasks (e.g., data compilation, shared platform or web development).

Please e-mail George Gaines (george.gaines@usda.gov) and Steve Prisley (sprisley@ncasi.org) for more information about the direct research and fee-for-service contract application process.