

## ECOSYSTEM SERVICES MARKET RESEARCH CONSORNIUM (ESMRC) WORKING GROUP PROJECT PROPOSAL

Ecosystem Services Market Consortium LLC (ESMC) is working with partners and collaborators across the agricultural supply chain to invest in critical research to build a technologically advanced ecosystem services market to reward and incentivize beneficial impacts of sustainable agricultural practices and systems. The member-driven research consortium – known as the ESMRC - will support development of a cost-effective and scalable approach to farmer and rancher engagement in ecosystem service markets, an approach needed to scale the beneficial impacts of sustainable practice adoption on working agricultural lands. The ESMRC will also meet corporate and societal needs by quantifying, monitoring, and verifying the environmental benefits achieved on an annual and ongoing basis. To achieve these goals, four ESMRC Working Groups have been established and tasked with developing and implementing specific research and development initiatives. The Working Groups, co-led by ESMC members and informed by Science Advisors chosen from a slate of national experts, will focus on the research, development, demonstration, and deployment of cost-effective, scalable technologies and approaches to launch the market.

**PROJECT RELEVANCE TO ESMC FFAR GRANT:** ESMRC Working Groups support the research, development, demonstration, and deployment of cost-effective, scalable technologies and approaches to achieve the ESMRC Foundation for Food and Agricultural Research (FFAR) Grant Objectives and Outcomes. Working Group 1 specifically is charged with 1) developing a framework to identify the science- and outcomes-based impacts of agricultural management practices on soil C and net GHG (carbon, methane, and nitrous oxide) at multiple scales.

### **This project specifically addresses:**

FFAR Grant Objective 1. Develop ability to quantify science- and outcomes-based impacts of agricultural management practices on ecosystem services from agriculture rigorously and cost-effectively at multiple scales. This project will test various soil sampling levels to the most cost-effective protocol that meets Scope 3 certification standards.

The ESMRC Soil Sampling SOP Strike Team was established by participants from Working Groups 1 and 4 to improve the clarity and specificity of the soil sampling procedures in the ESMC Protocol and to provide guidance for evolving pilot projects to ensure consistency and alignment with current standards. The team established the following purpose and goals:

- review the current soil sampling methodology in the ESMC protocol and evaluate potential modifications and/or new requirements needed
- develop a Scope 3 soil sampling SOP, and make recommendations for pilot implementation, potential pilot comparisons, and needed research projects

ESMC is committed to maintaining a culture of diversity and equity as we develop and launch an ecosystem services marketplace and lead the research necessary to facilitate that effort. As a consortium, our strength is in our commitment to be inclusive, with purposeful strategies to engage with and collaborate with historically marginalized people and groups, like farmers and ranchers, technical contractors, etc. who are black, indigenous and/or people of color.

All qualified responses to this RFP will receive equal consideration without regard to race, color, religion, gender, gender identity or expression, sexual orientation, national origin, genetics, disability, age, or veteran status. Proposals from black, indigenous and people of color researchers and representative institutions/organizations are strongly encouraged.

#### **PROJECT TITLE: WG1: PROJECT 4 – Pilot Project Soil Sampling Protocol Evaluation**

**PROJECT SUMMARY:** The purpose of this RFP is to design and implement comparative research studies in the context of ESMC pilot projects – pre-soil sampling stratification across selected ESMC pilot projects, evaluate soil sampling SOPs, associated uncertainties, and sampling costs; compare options for an ESMC Scope 3 Soil Sampling SOP against the full Scope 1 soil sampling SOP for model calibration/validation and uncertainty in asset generation; test sampling intensity for optimal and accurate determination of baseline SOC stocks for prediction of Scope 3 SOC accretion using DNDC. The results of this are to determine a soil sampling SOP that will satisfy asset certification requirements equal to or better than current accepted protocols.

#### **PROJECT GOALS:**

1. Field scale stratification across three ESMC 2020 pilot projects covering up to approximately 22,000 acres.
2. Evaluation of four pre-determined soil sampling protocols within specific ESMC pilot projects for accuracy in predicting change in soil carbon stocks associated with practices employed within the pilot.
3. Determine cost effectiveness of each sampling protocol measured in personnel time, time per site to pull samples and total cost of sampling and laboratory analysis for Scope 3 asset generation.
4. Determine uncertainty calculations associated with each sampling protocol and appropriate comparisons across all pilots/protocols evaluated.
5. Coordination between Module 1 and Module 2 principle investigators will be accomplished by scheduled meetings with the appropriate ESMC staff.

6. Collaborate with ESMC staff toward utilization of project results in development of recommendations for Gold Standard certification of Scope 3 assets.

#### MODULE 1. Stratification:

This research will address goals 1, 5-6 above to provide stratification of fields across three ESMC pilots will be conducted prior to soil sampling. These ESMC pilots are in collaboration with The Fertilizer Institute (approximately 2,000 acres), Illinois Corn Growers Association (approximately 10,000 acres) and the National Cattlemen's Beef Association (approximately 10,000 acres). Stratification on the TFI pilot will be needed in early September 2020, and stratification on the remaining two pilot projects must be in time to allow for fall post-harvest soil sampling. Stratification will be provided to ESMC, the PI conducting Module 2 of this project and the collaborating pilot lead for personnel doing the soil sampling (to be determined within each pilot) on all fields prior to initiation of soil sampling.

#### MODULE 2. Analysis of Scope 3 soil sampling protocols:

This research will address goals 2-6 above to analyze four soil sampling protocols across ESMC 2020 pilots for optimal prediction of change in soil carbon within each pilot, determining the optimal balance with reduced cost, and reduced uncertainty calculations associated with generating Scope 3 GHG assets. The intended outcome of this analysis will address questions, ideas and recommendations of the Soil Sampling SOP Strike Team concerning the level of soil sampling possible, dependent on available funding in each pilot and in conjunction with establishing a Scope 3 soil sampling protocol with the associated uncertainties. Key issues and questions that are critical to the accuracy of quantifying and validating change in soil carbon and GHG assets form the basis for the work outlined in this RFP. The optimum protocol determined through this work will optimize accuracy, minimize costs, reduce uncertainty, and both inform and ultimately meet the criteria for asset certification.

#### Scope 3 Soil Sampling SOPs to be evaluated:

1. Full complement of samples. Soil should be sampled at a depth of 30 cm or to the limitation of sampling capability (whichever is shallowest) and extrapolated to 30 cm. Bulk density determination requires a 2-inch diameter soil core (5.08 cm diameter Giddings probe). In some locations, rockiness, or presence of a lithic or paralithic contact (rock) may prevent sampling to 30 cm. In this case the soil sampling depth must be recorded and used in the bulk density and carbon stock calculation. Sampling density should be no less than 1 sample per 10 acres within each strata with a minimum of 27 samples per 80 acre equivalent (or 17 for fields under 50 acres).
2. Hybrid (A.) soil sampling SOP. Soil sampling at a full complement (as described in #1 above) but scaled back to include a few of the total fields within the pilot (number of fields to be proposed within the proposal).
3. An "adaptive" design currently being developed as part of the ESMC/ TNC-Nebraska pilot.

4. Hybrid (B.) soil sampling SOP. Soil sampling a minimum of 3 samples per strata over every field in the pilot.

Identification of a pilot(s) to test each protocol will be coordinated with ESMC staff.

Stratification will be provided prior to soil sampling and soil samples should be taken as close to the specified location as possible. Deviations from identified locations should be noted with justification and coordinates for the revised location. Sampling costs should be included separately within the proposed budget (note: some of the selected pilots may conduct soil sampling internally). Soil sample laboratory analysis should also be included as a separate line item within the proposed budget.

Laboratory analysis of samples will follow the same protocol for all samples across all soil sampling SOPs being evaluated within this requested work. Laboratory analysis methods will be used to determine SOC, bulk density, pH and Mehlich-3 available phosphorus; preferred analysis methods should follow FAO guidelines <http://www.fao.org/3/CA2934EN/ca2934en.pdf> – dry combustion for SOC, with removal of SIC by direct determination (small-scale acidification technique using HCl) or by the difference between total soil C and SOC.

#### **COLLABORATION:**

Applicants may develop proposals in collaboration with others to bring together the needed expertise as required to strengthen the proposal. In all cases, it will be expected that project leads will work closely with the ESMRC Research Director (Paul Meints), ESMRC Project Manager (Caroline Wade) and in collaboration with Soil Stratification Strike Team members, the ESMRC Project Advisory Team and key project partners during project implementation, including monthly project meetings. Project design and results should be focused on developing recommendations for practical application in the context of ESMC's ecosystem services market program.

#### **ESMRC PILOT PROJECT IN-FIELD RESEARCH:**

In field testing projects must be done on sites enrolled as ESMC Pilot Projects and in collaboration with an ESMC Member lead. Proposals should include acres, cropping system, location, timing, project partners as well as the proposed research and any connection to overlapping research projects in progress.

Soil Sampling Strike Team - (ESMC Staff), Bill Salas, Catherine Stewart, Cristine Morgan, Hannah Birge, Jamie Burr, Jen Moore-Kucera, Mahdi Al-Kaisi, Ron Turco, Stephen Wood, Steve DelGrosso, Steven Rosenzweig, Jacob Penner, and Laura Gentry.

ESMRC Project Advisory Team – Caroline Wade, ESMRC Project Manager; ESMRC Research Director Paul Meints; Working Group Members: Steve Rosenzweig, Bill Salas; Working Group Science Advisors: Steve Wood, Steve Del Grosso, Cathy Stewart, Hannah Birge, Ron Turco.

**PROJECT DELIVERABLES:** (including necessary documentation)

1. Reports and recommendations.
2. Contributions to DNDC cal/val work.
3. Pilots should address detection of SOC change given 1) special variability 2) time 3) sampling depth, and 4) specific management shift/practice change (no-tillage, cover crop, buffer strips, perennial; grasses etc.).
4. Documentation to be submitted to ESMC as the Scope 3 soil sampling SOP for GS. Data management will follow the ESMC Protocol v.8.2. Section 9.1.

**PROJECT TIMELINE:**

Module 1: Pre-soil sampling deadlines -September 2020 – December 31, 2020

Module 2: September 2020 (post-harvest 2020 pilot sampling deadline) – June 2021

**PROJECT BUDGET:**

\$TBD

**PROPOSAL FORMAT:**

- Executive summary
- Vendor/Researcher Background information \* Number of projects and time in business/field of study \* Experience in similar or related business/research \* Project management strategy/techniques
- Proposed services or deliverables
- Detailed description of proposed approach that will be followed for each of the Project Deliverables listed above
- Plans for collaboration and coordination with key ESMRC and ESMC Member contacts
- Timeline and budget
- Project Team
- Portfolio of similar or related work/research projects
- Contact information for two references
- Risks and mitigation strategies to executing services, deliverables, timeline, and on budget

Funding notes for contractors: Identification of in-kind or cash match funding (non-federal) is encouraged but not required. Institutional overhead is limited to 10% by FFAR. The unrecovered overhead CANNOT be used as match.

**SELECTION CRITERIA:**

Proposals will be reviewed for technical and scientific soundness by the Soil Sampling Strike Team led by ESMRC's Research Director for completeness of application, feasibility of approach and timeline, budget requirements, and commitment to collaboration to develop a

recommendation delivered to ESMRC Working Group 1. The reviewers may request additional information as part of the review process.

**SELECTION TIMELINE:**

Proposals must be submitted as a PDF document via email to Paul Meints, ESMRC Research Director, at [pmeints@ecosystems-services-market.org](mailto:pmeints@ecosystems-services-market.org) by September 18, 2020, 5:00pm Eastern. Final decisions will be made by October 9, 2020 and all vendors will be notified by October 15, 2020. If you have questions regarding this RFP please contact Paul Meints directly at [pmeints@ecosystems-services-market.org](mailto:pmeints@ecosystems-services-market.org) or 507-508-2852 during regular business hours (CDT).