

Request For Proposals by ESMC/ESMRC: Bulk Contracts for Soil Sampling and Lab Analysis

Ecosystem Services Market Consortium (ESMC) and Ecosystem Services Market Research Consortium (ESMRC). *Ecosystem Markets. Built for Producers. Backed by Science.*

ABOUT ESMC

Ecosystem Services Market Consortium (ESMC) is a non-profit, member-based organization launching a national scale ecosystem services market program to recognize and reward farmers and ranchers for their environmental services to society.

ESMC and its research arm, the Ecosystem Services Market Research Consortium (ESMRC), are a public-private partnership of partners and collaborators across the agricultural value chain investing in critical R&D to build a technologically advanced market program and infrastructure that is cost-effective and scalable. The program and infrastructure are intended to maximize participation opportunities for farmers and ranchers in ecosystem service markets that are science-based and standards-based and that meet demand side requirements, since both are necessary for a thriving market program.

ESMC's scientifically rigorous approach meets corporate, stakeholder and societal needs by quantifying, monitoring and verifying the environmental impacts of sustainable agricultural sector outcomes annually and on an ongoing basis.

ESMC is launching a voluntary national ecosystem services market in 2022 that issues and sells ecosystem services credits including increased soil carbon and reduced GHG credits, water quality and quantity credits, and biodiversity credits from US agricultural producers.

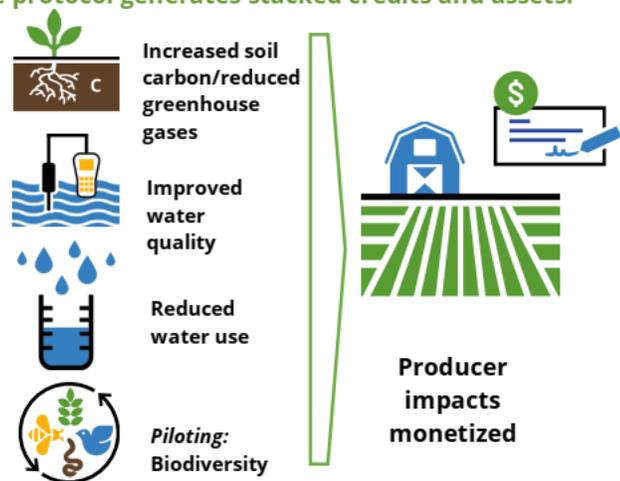
BACKGROUND INFORMATION

ESMC's Market Program design is unique in that we operate in more than one market and generate multiple "stacked" credits in one program. The same land stewardship practices that improve soil carbon and reduce GHG emissions often have additional benefits, including improved water quality and water conservation, and biodiversity benefits such as habitat for



pollinators, insects and birds. Our market program rewards farmers and ranchers for these benefits demanded by society. Our program meets the needs of corporates for “scope 1” carbon offset credits, compliance grade water quality credits desired by policymakers and municipalities, as well as corporate “scope 3” supply chain reporting requirements for increased soil carbon, reduced GHGs, water quality and water quantity.

One protocol generates stacked credits and assets.



Each producer’s carbon, GHG, water quality and water quantity outcomes are quantified at a field scale, and the credits generated can be stacked and sold together or disaggregated and sold individually in our streamlined program. ESMC is committed to maximizing the value returned to producers while meeting multiple market needs of diverse buyers.



ESMC is conducting pilot tests leading up to the targeted 2022 market program launch. Working with our extensive network of partners and collaborators, we are testing and refining our integrated ecosystem services credit protocol and other new technologies for every major farm commodity across the nation. We will quantify environmental assets generated by participating producers and arrange the sale of credits or assets through the ESMC market program. Farmers and ranchers will be recognized and rewarded for their documented impacts to soil carbon, net greenhouse gases, water quality, and water use conservation.

SOIL SAMPLING AND ANALYSIS CONTRACT

ESMC has launched projects [within specific regions](#) and production systems where program buildout has been completed. ESMC's [map](#) continues to expand as ESMC adds more regions and production systems.

As part of the asset quantification process, soil from a producer's field must be analyzed for soil organic carbon, bulk density, pH, and, in some cases, phosphorus. ESMC/ESMRC has developed a [Soil Sampling Protocol](#) to establish and standardize the process of collecting and analyzing soil samples for use in quantifying outcomes from producer management practice changes at the field-scale.

Soil sampling occurs during two periods of time - in the Fall post-harvest season, and in the Spring pre-planting season. To implement the [Soil Sampling Protocol](#) on project sites, we need consolidated contracts for soil sample collection and for laboratory analysis of the samples. Sub-contracts are expected to be annual, encompassing both of the sampling seasons each year, and renewable.

Please refer to Requirement sections below or the *Soil Sampling Protocol* for any questions on ESMC requirements for soil sampling and analysis or contact Neville Millar at nmillar@ecosystems-services-market.org

Note that on November 30, 2021 @ 11.00 am EST, we will host a virtual Q & A session for potential applicants.

To register, contact Neville Millar at nmillar@ecosystems-services-market.org

PROPOSAL REQUIREMENTS

Further information is available in the Proposal Submission Process section at the end of this RFP. In short, there are no page limits to the proposal, but each proposal, submitted as a single pdf, should be concise and clear, and should include a one-page cover sheet outlining the detailed content of the proposal, with a Point of Contact (POC) for the organization identified.

Proposals are due on or by December 21, 2021 and should be sent to Neville Millar (nmillar@ecosystems-services-market.org) by 5:00 pm U.S. EST.

REQUIREMENT OVERVIEW

To help prepare for the Fall 2022 Market Program Launch, ESMC is seeking proposals from organizations that provide:

- 1) Cost estimates for soil sampling services or soil analytical services or both *to be carried out as a sub-contract* on behalf of ESMC. These estimates are to be based on the three hypothetical soil sampling and analytical project scenarios and the additional information noted below.
- 2) Additional information on organizational operation and capabilities including but not limited to:
 - a. Service region (e.g., sampling area covered, regions accepting samples from)
 - b. Sampling and / or analytical team numbers and resources
 - c. Equipment details (field and laboratory) to ensure ESMC requirements are met
 - d. Sample transportation (i.e., from field to laboratory) costs
 - e. Sample processing capabilities (e.g., volume throughput on daily, weekly timescales)
 - f. Chain of custody experience and methods
 - g. Approach to and definitions of Quality Control and Assurance as it relates to uncertainty associated with SOC, bulk density, pH and P measurement.
 - h. Sample volume discounts (e.g., % reductions and volume needed to generate)
 - i. Criteria for volume discounts (e.g., client level, methodology specific, etc.)
 - j. Options and costs for longer term (e.g., 6-12 months) soil sample storage
 - k. Any other discounts and their requirements to be met
 - l. Current or potential ‘partnerships’ within same or separate organization(s) that will enable better integration between field and laboratory operations, such that efficiencies in time, energy and cost can be maximized
 - m. Technical capabilities, e.g., data output formats, flexibility and ability to connect via API to ESMC’s Monitoring, Reporting and Verification (MRV) platform
 - n. Data privacy policies and compatibility with ESMC producer requirements

Note that additional information can take the form of web and document links where appropriate.

REQUIREMENT DETAILS

1. Soil sampling and analytical scenarios

For the three scenarios below, please provide your best cost estimates for each.

Please note that there is no specific template for providing this information. Please provide estimates with as much clarity and detail as possible for consideration. This can include a spreadsheet or text document with line-item cost estimates or a 'mock' invoice with a detailed breakdown of costs. *Note that the final overall submission should be as a single pdf document.*

Not all scenarios may be suitable for each submitting organization. Please note where not applicable (NA) for those items for which you are unable to provide information for, and provide a reason, e.g., soil sampling organization unable to provide soil analysis.

For soil sampling organizations:

Typically, these scenarios assume that a single sample (\geq 2-inch *external* core diameter, 0-30 cm) is collected from each sampling point (sampling locations will be provided, for details see Stratification section below) and that all required analyses are conducted on this single sample.

However, if alternative sampling approaches are being or can be used (e.g., a single core for bulk density [BD] measurement only and a single or composite core [\sim 1 inch diameter, 0-30 cm] for other analyses [i.e., soil organic carbon (SOC), pH, available phosphorus (P)]), then please also note this and include these cost estimates in addition to or in place of the single core assumption.

For soil analytical organizations:

Please provide information on the QA/QC that is included in these analytical cost estimates, and the ranges in costs associated with the reduction and elimination of QA/QC (to facilitate increased sample analysis over a specified time period) along with the impacts that these have on the accuracy of the estimate.

Please provide cost estimates based on the assumption that a single sample (\geq 2-inch *external* core diameter, 0-30 cm) is collected from each sampling point and that all analyses are conducted on this single sample.

Please also provide cost estimates for the alternate approach (i.e., analysis of the single core [\geq 2-inch external core diameter, 0-30 cm] for BD measurement only and a single or composite core [\sim 1 inch diameter, 0-30 cm] for other analyses [i.e., SOC, pH, available P]).



Providing both estimates will allow ESMC to better evaluate organizational flexibility and compatibility with other proposals across the entire sampling and analytical process.

Sampling scenarios

Scenario 1: Soil sampling:

- 750 fields (45,000 acres total; 15,000 sample points, based on 1 sample per 3-acre density)
- All fields located in similar geography and within short (e.g., 1-2 hour) driving distance of a sampling team 'hub'. Team can return to hub after each sampling day if needed.

Scenario 1: Soil analysis:

- All samples (15,000) analyzed for bulk density (BD, < 2mm fraction) and corrected for volume of fraction > 2mm. Oven dried to ~105 degrees C.
- All samples (15,000) analyzed for soil organic carbon (SOC) using dry combustion preceded by inorganic C (IC) removal (no IC quantification required) using an acid-wash treatment.
- 20% of samples (3,000) analyzed for pH (1:1 water or CaCl₂ - provide costs for both).
Samples identified and labeled accordingly prior to laboratory arrival and processing.

Scenario 2: Soil sampling:

- 200 fields (12,000 acres total; 4,000 sample points, based on 1 sample per 3 acre density)
- 50% of fields (6,000 acres, 2,000 sample points) located in similar geography and within short (e.g., 1-2 hour) driving distance of a sampling team 'hub'. Team(s) can return to hub after each sampling day if needed.
- 50% of fields (6,000 acres, 2,000 sample points) scattered over a large geography (organizations should define their parameters for this in the submission) in multiple locations beyond daily driving distance to and from a central hub. May require sampling team(s) spending periods overnight or multiple teams from different locations covering the required area.

Scenario 2: Soil analysis:

- All samples (4,000) analyzed for bulk density (BD, < 2mm fraction) and corrected for volume of fraction > 2mm. Oven dried to ~105 degrees C.
- All samples (4,000) analyzed for total organic carbon (TOC) using dry combustion preceded by inorganic C (IC) removal (no IC quantification required) using an acid-wash treatment.

- 100% of samples (4,000) analyzed for pH (1:1 water or CaCl₂ - provide costs for both).
- 100% of samples (4,000) analyzed for available P (e.g., Bray 1, Olsen, Mehlich III - provide costs for all laboratory available options).

Scenario 3: Soil sampling:

- 20 fields (3,000 acres total; 500 sample points, based on 1 sample per 6-acre density)
- 25% fields (750 acres, 125 sample points) located in similar geography and within short (e.g., 1-2 hour) driving distance of a sampling team 'hub'. Team(s) can return to hub after each sampling day if needed.
- 75% fields (2,250 acres, 375 sample points) scattered over a large geography (organizations should define their parameters for this in the submission) in multiple locations beyond daily driving distance to and from a central hub. May require sampling team(s) spending periods overnight or multiple teams from different locations covering the required area.

Scenario 3: Soil analysis:

- All samples (500) analyzed for bulk density (BD, < 2mm fraction) and corrected for volume of fraction > 2mm. Oven dried to ~105 degrees C.
- All samples (500) analyzed for soil organic carbon (SOC) using dry combustion preceded by inorganic C (IC) removal (no IC quantification required) using an acid-wash treatment.

Field Stratification and sampling locations

Note that soil sampling organizations should plan to use the SoilStack Stratification and Soil Sampling application (App) during their field campaigns. <https://app.soilstack.io/auth/login>

SoilStack is a Progressive Web App that:

- Fetches and clips public soil, satellite and elevation data to each field boundary
- Uses those data layers to develop smart sample plans by using an automated stratification toolkit
- Guides soil samplers to each sampling location in that sample plan, capturing key sampling metadata, generating sample numbers, and creating exportable lab forms
- Automates merging of sampling metadata and lab analysis of Soil C, pH, P and bulk density data to feed asset quantification models

SoilStack was developed by our technical contractor Our Sci, with the purpose of building an automated data pipeline to interact with our Monitoring, Reporting and Verification (MRV) platform and to reduce manual data processes and their associated errors and delays. The App



is straightforward to use. Resource materials including training videos and slide decks will be made available to help soil sampling organizations (re)familiarize themselves with the App. More details about how interaction with this App occurs throughout the process of soil sampling and analysis is outlined below in the Project Timeline.

Additional pricing structure information required

Please note that there is no specific template for providing this information. Please provide estimates with as much clarity and detail as possible for consideration. *Note that the final overall submission should be as a single pdf document.*

Field sampling organizations

Please provide any additional details on your pricing structure as it relates to, for example:

- Number of fields
- Total acreage
- Total sample number
- Travel distance from a sampling team ‘hub’
- Other criteria

Laboratory analysis organizations

Please provide any additional details on your pricing structure as it relates to, for example:

- Sample volume discounts
 - Are there standard discount rates?
 - What are these discount rates?
 - What are these based upon?
- What are the criteria for volume discounts, e.g.,
 - Single client (i.e., ESMC)
 - Identical sample treatment
 - Others

Analytical methods

Please provide details on your pricing for *individual samples* for the separate analyses below. If unable to conduct the analysis, please note this. Please also provide the citation or reference for the method used.

Where applicable, please also include any approaches used that quantify the analytical uncertainty of the measured value and any differences in analytical costs (e.g., based on the number of replicates, standards or checks) based on these varying uncertainties.

- Bulk density
 - Coarse (>2mm) fragment removal (sieving) for BD correction on <2mm fraction
 - No coarse fragment removal – simplified BD

ESMC is investigating the option in certain soils to remove the need for coarse fragment (sieving) removal for BD analysis if the soil is pre-determined to have low/negligible coarse fragment content. *If you have experience with this option, please provide any information on the threshold for excluding and the process to determine removal of this step.*

- Inorganic C removal
 - Acid pre-treatment (without fizz test)
 - Acid pre-treatment (with fizz test)
 - Carbonate quantification
 - Pressure calcimeter
 - IR spectroscopy

ESMC is also investigating the option in certain soils to remove the acid pretreatment (for inorganic C removal) before SOC analysis if the soil is pre-determined to have low/negligible inorganic C content. *If you have experience with this option, please provide any information on the threshold for excluding and the process to determine removal of this step.*

2. Information on organizational operation and capabilities

Please note that there is no specific template for providing this information. Please provide estimates with as much clarity and detail as possible for consideration. *Note that the final overall submission should be as a single pdf document.*

For the relevant items below, please provide as much additional information as possible on:

- a. Service region (e.g., sampling area covered, regions accepting samples from)
- b. Sampling and / or analytical team numbers and resources
- c. Equipment details (field and laboratory) to ensure ESMC requirements are met
- d. Sample transportation (i.e., from field to laboratory) costs

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- e. Sample processing capabilities (e.g., volume throughput on daily, weekly timescale)
 - f. Chain of custody experience and methods
 - g. Approach to and definitions of Quality Control and Assurance as it relates to uncertainty associated with SOC, bulk density, pH and P measurement.
 - h. Options and costs for longer term (e.g., 6-12 months) soil sample storage
 - i. Any other discounts and their requirement to be met
 - j. Current or potential ‘partnerships’ within same or separate organization(s) that will enable better integration between field and laboratory operations, such that efficiencies in time, energy and cost can be maximized
 - k. Technical capabilities, e.g., data output formats, flexibility and ability to connect via API to ESMC’s MRV platform
 - l. Data privacy policies and compatibility with ESMC producer requirements

Note that additional information can take the form of web and document links where appropriate.

CONTRACT TIMELINE

ESMC anticipates setting up annual contracts with soil sampling and analytical organizations early in 2022 in time for Spring 2022 soil sampling and analysis of our 2022 Pilot Project fields, which will take place after March 15, 2022, the deadline for project field boundary upload to our Producer Portal (MRV platform).

Note that a number of steps must take place prior to this deadline and after this deadline and prior to soil sampling:

- Producer fields are identified
- Producers are enrolled on MRV platform
- Field boundaries are submitted to the MRV platform (by March 15, 2022)
- Field boundaries undergo a QA/QC process
- Stratification of fields conducted through the SoilStack Stratification App and sampling locations generated

For fields uploaded to the MRV platform on March 15, 2022, it is anticipated that soil sampling will take place any time prior through to the end of April, 2022, but in any case, before any crop planting and spring management activities are conducted. For these 2022 Pilot projects all data



from analyses of the soil samples must be entered into the MRV platform prior to December 31, 2022.

As noted above, soil sampling organizations should plan to use the SoilStack application. ESMC will provide more detailed resource materials, including training videos and slide decks to help organizations familiarize themselves with using the App. Components of the process (that are being refined and further automated) relevant for soil sampling and analysis organizations include:

- Prior to stratification, each soil sampler is sent an invitation to accept and install the App on their device home screen
- After stratification, soil sampler is notified that fields are ready for sampling
 - Sampling points for each field are sent to the soil sampler
- Soil sampler will log on to the App and will see all relevant fields to sample
- After sampling, soil sampler (via the App) will be able to
 - Submit the collected metadata directly to ESMC MRV database
 - Submit the sampling inventory to laboratory conducting the analysis

BUDGET

ESMC's aim is to increase efficiency and minimize costs to create a scalable ecosystem services market program. We encourage applicants to develop and describe approaches of how to achieve this scaling through their budget proposals.

To that end, we will pay particular attention within the budgets and cost estimates to discount rates, the sample volume thresholds at which they occur, and the criteria and rationale by which the threshold values are determined.

ESMC will also focus on current or potential 'partnerships', formal or otherwise within and between organizations that will enable better integration of the field sampling and laboratory analysis operations, such that efficiencies in communication, time, and cost can be optimized.

Another area of focus will be the technical capabilities of each organization, such as the ability and willingness of soil sampling organizations to adopt and be comfortable with use of the SoilStack App, and for soil analytical organizations to be flexible in terms of their data output format, including compatibility with data transfer via an application programming interface (API) to the MRV platform.

STATEMENT OF QUALIFICATIONS

Applicants should include in the proposal a statement of organizational and staff or partner qualifications to perform this work, to include:

- Any past and current activity and understanding as it relates to the sampling, handling, processing, and analysis of soil samples for the accurate quantification of bulk density and organic carbon for the purposes of determining carbon stock in an environmental marketplace setting.
- Accreditations and Certifications (for analytical laboratories) that can include but are not limited to:
 - NAPT (North American Proficiency Testing Program)
 - ALP (Agriculture Laboratory Proficiency Program)
 - ALTA (formerly ISTA, Agricultural Laboratory Testing Association)
 - NELAP (National Environmental Laboratory Accreditation Program)
 - State Deps. of Agriculture and Soil Testing Associations
 - State EPA and State Depts. of Environmental Quality

PROPOSAL SUBMISSION PROCESS

The submission deadline for receipt of proposals by ESMC/ESMRC is 5:00 pm U.S. EST on Friday, December 21, 2021. Proposals should be submitted via email to Neville Millar at: nmillar@ecosystems-services-market.org.

There are no page limits to the proposal, but each proposal should be concise and clear and should include a one-page cover sheet outlining the content of the proposal, with a Point of Contact (POC)* identified. Components of the proposal can be created in spreadsheet, text, or other formats (e.g., for any invoices), but all should be collated and submitted as a single pdf document.

* Application Point of Contact (POC): Applicants must identify a designated POC, to include phone and email coordinates; and all designated project leads.

PROPOSAL REVIEW TIMELINE

- **November 17, 2021:** Request for proposals is released by ESMC/ESMRC.

- **November 30, 2021 @ 11.00 am EST:** ESMC/ESMRC to host a virtual Q&A session for applicants (to register contact Neville Millar at nmillar@ecosystemservicesmarket.org).
- **December 21, 2021:** Proposals due to ESMC/ESMRC designated POC (Neville Millar, nmillar@ecosystemservicesmarket.org) by 5:00 pm U.S. EST.
- **January 14, 2022:** ESMC/ESMRC notifies contract awardees.