

PHYTOPLANKTON CARBON SOLUTIONS PROGRAM

REQUEST FOR PROPOSALS

RFP#2: Evaluation and Improvement of Biogeochemical and Earth Systems Modeling Capacity to Enhance Assessment of Phytoplankton Carbon Solutions Risks and Benefits

REQUEST FOR PROPOSAL OVERVIEW

- **RFP #:** 2
- **RFP Title:** Evaluation and Improvement of Biogeochemical and Earth Systems Modeling Capacity to Enhance Assessment of Phytoplankton Carbon Solutions Risks and Benefits
- **Award Period:** Up to 30 months
- **Award Amount:** Up to \$4.0 million USD
- **Letters of Intent (LOI) Due:** Sunday, November 15, 2026, at 23:59 Eastern Time (ET)
- **Full Proposal Due:** EDF will invite full proposals and communicate due date to LOI applicants invited to submit a full proposal.
- **Proposal Contact Email:** oceanspcs@edf.org

EDF's Phytoplankton Carbon Solutions Program is soliciting proposals to evaluate and advance model-based capabilities for the assessment of carbon dioxide removal (CDR) benefits and environmental impacts of Phytoplankton Carbon Solutions (PCS), focusing particularly on ocean iron fertilization (OIF) pathways. The successful team will propose and advance priority modeling approaches to inform future decisions about the efficacy and safety of PCS and OIF pathways.

This solicitation is one of several PCS focus areas, and successful applicants will join a broader consortium to collaboratively advance PCS research priorities, working closely with other funded teams (see RFPs underway on [EDF's PCS funding opportunities page](#)). Ongoing implementation of projects under this RFP will be informed by and coordinated with findings from RFP #1 *Characterization of Critical Uncertainties for Ocean Iron Fertilization*.

I. BACKGROUND

Previous PCS modeling studies have explored scenarios under which OIF and other PCS pathways could potentially scale to climate-relevant CDR. PCS CDR and social-environmental impact estimates remain highly model-, assumption-, and boundary-condition-dependent. The field lacks consensus on what the magnitude and uncertainty of CDR potential is under realistic deployment scenarios, which CDR measurement uncertainties matter most, which are reducible with near-term research, and which will likely remain unresolved.

Without that clarity, research investments cannot be prioritized, and decision makers cannot judge whether PCS pathways warrant the further scientific advancement needed to establish whether

PCS could deliver safe, climate-relevant, durable, measurable, socially acceptable, and governable CDR at scale. This RFP and the associated PCS Research Program are guided by a comprehensive research framework published by Ocean Visions (further described in Section 9), which prioritizes research on OIF pathways due to theoretical scalability.

Robust evaluation of OIF depends on the ability of physical oceanographic, biogeochemical, and ecological models to sufficiently simulate:

- Accurate carbon accounting, including net CDR, additionality, and durability;
- Assessments of the biogeochemical and ecological impacts of CDR over time scales of days to at least 100 years and up to 1000 years for both near-field and far-field spatial scales;
- OIF scenarios that span present and projected future ocean conditions.

Particularly needed model improvements include:

- Comprehensive and consistent representation of biological, biogeochemical and ecosystem processes relevant to assessing the changes in the biological carbon pump (BCP) in response to an OIF deployment;
- Resolution of physical processes at small scales (meters to kilometers), which impact the dispersal of materials to stimulate phytoplankton blooms;
- Detailed near-field deployment models, capable of assessing phytoplankton responses to iron additions and their impacts on carbon dynamics during the initial phases of an OIF deployment;
- Resolving far-field and long-term responses, which remain highly uncertain, particularly in relation to natural BCP status and trends;
- Structural differences across model classes limit consensus on OIF viability and reflect uncertainty both globally and at regional or site-specific scales.

This Request for Proposal solicits OIF modeling improvement projects to improve the capacity to comprehensively evaluate OIF and BCP-based CDR risks and benefits from local to global scales. Funding will support up to two teams with lead PIs who coordinate additional research teams or working groups, operating under shared protocols. Successful applicants will join the PCS Consortium that will align and coordinate work among PCS Research Program grantees throughout the study period.

II. OBJECTIVES

The objectives of this call for proposals are four-fold. Proposal team(s) will be selected that together address modeling needs to comprehensively evaluate OIF benefits and risks. Proposals should clearly state areas of focus in the context of a comprehensive program.

Objective 1: Assess current capacities in modeling that support effective assessment of OIF efficacy and safety at local, regional, and global scales under realistic deployment scenarios

and prioritize advances that can best contribute to decision-relevant knowledge pertaining to OIF efficacy and ecological ramifications.

The modeling capacity assessments should identify specific strengths and weaknesses of existing models for the specific application of quantifying OIF mCDR potential and biogeochemical/ecological effects resulting from purposeful iron addition to the ocean.

This could include the assessment of structural differences across models and the impact of the inclusion or exclusion of specific processes or parametrizations on the ability of models to assess OIF efficacy and safety. To the extent appropriate, this may also entail identifying, quantifying and reconciling sources of uncertainty across existing models, particularly as applied to realistic deployment scenarios.

The development of realistic deployment scenarios is an objective of RFP #1 and it is expected that the funded team(s) under RFP #2 will provide input on these scenarios. The audience for this assessment includes Consortium members.

Objective 2: Advance specific areas of model improvement for OIF that demonstrate the greatest benefit for OIF quantification under realistic deployment scenarios.

Advancements must be relevant to the operational quantification of OIF impacts and decision making (e.g., contribute to improved carbon accounting in evolving monitoring, reporting, and verification or MRV sense).

Project narratives should explicitly articulate the potential impact of the proposed work, including the quantitative significance of model advancements and the scope of biological characterization, explicitly addressing treatment of and inferences about impacts to higher trophic level production adjacent and downstream. Areas of advancement could include but are not limited to:

- Higher resolution; improved representation of physical and biogeochemical dynamics; use for MRV; operational models to optimize deployments and observing systems (OSSEs) for planning and tradeoff analyses; application of Lagrangian / fluid parcel following modeling; and other innovations.
- Better representation of the size, composition, settling velocity of the PCS-induced sinking particles, their aggregation / disaggregation dynamics and interactions with the other biogeochemical pools contribute to the BCP, organic matter remineralization, or iron cycling.
- Characterization of PCS-induced phytoplankton community structure (particularly toxic forms), biological response variability due to nutrient availability and limitations, and impacts on higher trophic levels.

Objective 3: Quantify efficacy and safety of OIF interventions over a range of deployment scenarios.

Apply deployment scenarios developed by the PCS Consortium to the improved numerical modeling frameworks. Target scenarios will be developed by the grantee selected under RFP 1 and coordinated through the PCS Consortium. The goal is to help build scientific consensus on model

strengths and limitations and future development priorities for PCS under realistic deployment scenarios.

Objective 4: Participate in and guide PCS Consortium discussions.

Project outputs are intended to help guide research priorities for other PCS Consortium research teams focused on an uncertainty analysis and framework, the natural biological carbon pump, and socioecological impacts. Contributions from RFP #2 will help to prioritize observational needs and future cost trade-offs for future modeling efficiency, accuracy and precision gains.

Required activities include participation in annual PCS Consortium Meetings and regular cross-project leads meetings, development of shared goals, tracking progress toward uncertainty reduction, and leading iterative scalability and uncertainty analyses in support of stage-gate assessments throughout the program's lifetime. Consortium teams are expected to adapt their research plans as new findings emerge from within and outside the Consortium. Principal Investigators may adjust their team composition to accommodate shifting priorities.

III. VISION OF SUCCESS

A successful outcome under this RFP is the advancement of novel innovations in current climate, Earth system and oceanographic models that can best contribute to decision-relevant knowledge pertaining to OIF efficacy and safety. Up to two OIF modeling team(s) will advance modeling approaches that can be used to advance understanding of PCS risks and benefits against natural BCP conditions and trends and contribute to evaluation of OIF at local, regional and global scales.

The team(s) will work closely with other PCS Consortium teams developing an uncertainty framework, assessing social and environmental ramifications and considering natural BCP conditions.

Using new, ambitious but realistic, deployment scenarios developed through the PCS Consortium as input for model experiments will ultimately yield more realistic quantification of the magnitude and uncertainty in OIF efficacy and environmental impacts (risks, benefits, costs, tradeoffs). Improved realism of model studies will inform further investments and contribute to the overall PCS Consortium objectives.

By advancing modeling capacities the potential CDR benefit and extent of environmental and social risks will become more relevant to real-world decision-making, enabling constructive comparisons of OIF scalability scenarios to 'business as usual' scenarios and other CDR approaches.

IV. SCOPE OF WORK

Overview

This RFP will support up to two teams, each led by a Lead PI, who coordinate additional research teams or working groups, operating under shared protocols, to develop and execute a Scope of

Work designed to address objectives noted previously to identify, prioritize and execute priority model improvements or advances that best support OIF evaluation globally and regionally.

Research Questions

Guiding research questions include, but are not limited to:

- What modeling capacities currently exist in support of OIF evaluation?
- What priority innovations and advances are needed and possible to more accurately assess and predict efficacy and safety of OIF interventions at regional and global scales?
- Where do the greatest benefits accrue from specific model innovations or other advances?
- What modeling strategies should be employed, and how can we most effectively advance those strategies to inform future OIF decisions and carbon accounting systems?
- How do we best align modeling improvement efforts with proposed targeted regional OIF initiatives?
- What new observational capacities and associated data are emerging that could be prioritized for model evaluation and / or improvement?

Out of Scope Activities

- Non-OIF scenarios
- Field experiments
- Field data collection (potentially addressable in future RFPs)
- Social and ecological risk assessment (addressed in future RFPs).

V. REQUIRED DELIVERABLES

Within the first 6 months:

- Deliver a detailed scope of work that proposes priority topics, approaches and team roles for executing the 30-month project plan. Synchronize that plan through the PCS Consortium with the PCS Uncertainty and Viability Assessment Framework developed under RFP 1.

Months 6 to 30:

Annual Status Reports, detailing:

- Overview of project activities conducted over the reporting period
- Progress towards Consortium objectives
- Preliminary findings
- Challenges (if any)
- Priorities for the next reporting period

Throughout the grant period

- Active participation in annual PCS Consortium Meetings, regular cross-project leads meetings and EDF check-in meetings, and any additional collaborations emerging from shared goals within the Consortium.
- Recommended updates to models for different scenarios, and responsive to uncertainty analyses as new findings or priorities emerge from within and outside the Consortium.
- Regular progress reporting to EDF, aligned with project milestones and EDF synthesis activities; format and frequency to be determined jointly by the grantee and EDF.
- Contributions to EDF-led synthesis and public communication of PCS research progress.
- Open-access publication of the framework, the data used to parameterize it, model source code and configuration files, and associated scenarios and outputs, following FAIR practices.

Project Conclusion:

- Final report (EDF to provide template)
- A peer-reviewed scientific publication, submitted within 6 months of the award conclusion.
- Open-access data publications, at the same time as the scientific publication.

VI. BUDGET AND GRANT DURATION

EDF intends to fund work that comprehensively addresses the four objectives listed above. The total funding available is up to \$4 million over a period of up to 30 months, inclusive of indirect costs (capped at 15%), and this may be allocated to one team for an amount up to \$4 million or up to two teams at lower amounts. Following the LOI stage, EDF may suggest the addition of expertise or request the integration of proposals or elements of proposals to formulate a team.

Funds may be used to support personnel, research expenses, workshops and convenings, participation in PCS Consortium meetings, scenario evaluation activities, targeted lab experiments to inform models, and publication and dissemination costs.

Consistent with the principles of the PCS Research Program, funds may not be used to support commercial PCS activities or activities tied to carbon credit transactions.

Budgets should reflect the full scope of potential activities from evaluation and planning to targeted improvements.

VII. APPLICANT TEAM

Principal Investigators (PI) Criteria

All PIs must hold a PhD, be affiliated with a research institution, and have a publication record relevant to the scope of work and role on the project. Multi-institution and international teams are encouraged.

We require the designation of a Financial Lead who is the person responsible for financial and grants management for the project as a whole and acts as the lead reporting entity on finances and

grant management to EDF. We also require the designation of a Lead PI who is responsible for the overall success of the project, bringing together distinct workstreams and technical aspects of the work to achieve overall objectives of the project. The Lead PI will act as the point for EDF for the scientific and technical aspects of the project. The Financial Lead and Lead PI could be the same for the project, but it is not required.

Full proposals will require a description of the proposed leadership structure, beyond the designation of the Financial Lead and Lead PI. For example, the Lead PI may choose to share leadership across various work streams within a project among multiple co-PIs. The definition of these roles is for operational clarity but not meant to impose a particular structure for the day-to-day functioning of the team. Applicants applying to multiple RFPs may serve in the Lead PI role in only one proposal.

At least one PI on the team must demonstrate prior experience leading a research project of comparable scale. Early Career Researchers (<10 years since obtaining a PhD) may serve as a PI. PIs of the successful team may be part of applicant teams to future Consortium funding opportunities but may not serve as Lead PI on multiple proposals. This approach helps ensure broad participation and leadership opportunities across the funding portfolio.

Team Criteria

The project team will be evaluated based on the collective expertise, [designed collaborative approach](#), and demonstrated ability to execute the proposed work. Team structure will also be considered, including the extent of international collaborations, career stage diversity, early career researchers in substantive rather than nominal roles, and representation of and beyond the established marine CDR research community. Teams will be expected to articulate plans to implement best practices in the conduct of research, including in the application of codes of conduct such as the [AGU Scientific Integrity and Professional Ethics Policy](#) and [Aspen Code of Conduct for Marine Carbon Dioxide Removal](#).

Teams may include members affiliated with non-research institutions (e.g., consulting, marine industry).

Ideal Team: Integrated team of core BCP and PCS scientists, modeling experts with capacity to envision and execute critical innovations related to PCS evaluation, including near-field and far-field considerations and export process modeling. Strategic capacity, leadership skills and open collaborative spirit will be essential.

VIII. Application Process

Step 1: Letter of Intent

LOIs must be prepared using the EDF-provided template and submitted as a single PDF through the webform on EDF's PCS funding webpage. Submissions are due by **Sunday, November 15, 2026, at 23:59 Eastern Time (ET)** and will undergo internal review by EDF.

Step 2: Full Proposal

LOIs selected to advance will be invited to submit a full proposal. EDF will provide invited applicants with a proposal template and submission deadline. Invited proposals will be evaluated via a scientific peer-review panel, which will provide a funding recommendation to EDF. EDF makes the final funding decision.

RFP#2 Proposal Timeline

LOI submission deadline	15 November 2026
Invitation for full proposal	25 November 2026
Full proposal due	<i>EDF will communicate the full proposal due date to applicants invited to submit a full proposal.</i>
Anticipated award decision	12 February 2027
Expected grant start date	1 April 2027

Please submit any questions related to the LOI and/or Full Proposal for this RFP to oceanspcs@edf.org.

IX. Connection to Ocean Visions Phytoplankton Carbon Solutions Research Framework

In January 2026, Ocean Visions published the [Phytoplankton Carbon Solutions Research Framework](#), which identified PCS / OIF modeling advances among the highest research priorities.

EDF's PCS Research Program, supported by the Grantham Environmental Trust through the Ocean Resilience and Climate Alliance (ORCA), responds directly to that recommendation. This RFP seeks proposals to evaluate and advance model-based capabilities for the assessment of carbon dioxide removal (CDR) benefits and environmental impacts of Phytoplankton Carbon Solutions (PCS), focusing particularly on ocean iron fertilization (OIF) strategies.

This RFP funds the modeling component of the overall PCS Research Program and that will help inform and advance the work of the broader PCS Consortium. The objectives of this RFP build on the following recommendations from the [Ocean Visions' PCS report and PCS stage-gate framework](#):

- **PCS Recommendation 2:** Improve Utility of Ocean Biogeochemical models
“Initiate a model improvement program specific to PCS to adequately assess and predict PCS impacts. Primary areas of focus will include model intercomparisons to build consensus around current conclusions and potential enhancements, improved ecosystem inputs to better characterize and assess biological trends under natural and perturbed conditions, prioritization of model input needs, and identification of opportunities for advanced computing and artificial intelligence innovations.”

- **PCS Recommendation 5:** Sharpen Understanding of Southern Ocean Iron Fertilization Scalability Potential: “Develop realistic deployment scaling scenarios to better characterize CDR potential, operations, and risks; Fund research to reduce uncertainties and/or better characterize environmental and socio-economic risks.”
- **PCS Recommendation 6:** Improve Understanding of Subtropical Nitrogen Fixation-based Iron Fertilization: “Support assessments of the viability and effects of subtropical nitrogen-fixation-based iron fertilization. Assess macronutrient dynamics, potential co-benefits, and site-based limitations to further inform future CDR potential.