

CVP Program Information Sheet

Program Name

Climate Variability and Predictability Program

Program Mission

The Climate Variability and Predictability (CVP) Program supports research that enhances our process-level understanding of the climate system through observation, modeling, analysis, and field studies. This vital knowledge is needed to improve climate models and predictions so that scientists and society can better anticipate the impacts of future climate variability and change. The CVP Program sits within the Earth System Science and Modeling (ESSM) Division of the NOAA Office of Oceanic and Atmospheric Research (OAR) Climate Program Office (CPO; see <http://cpo.noaa.gov/CVP>). CVP is a critical component of the integrated research enterprise at CPO and maintains important connections to the other CPO program areas, such as Modeling, Analysis, Predictions and Projections Program (MAPP), Climate Observations and Monitoring Program (COM), and Climate and Societal Interactions (CSI) Division; as well as OAR Laboratories and Programs and NOAA line office organizations.

To achieve CPO's mission, the CVP Program supports research carried out at NOAA and other federal laboratories, NOAA Cooperative Institutes, and academic institutions. The Program also coordinates its sponsored projects with major national and international scientific bodies including the World Climate Research Programme (WCRP), the International and U.S. Climate Variability and Predictability (CLIVAR/US CLIVAR) Program, and the U.S. Global Change Research Program (USGCRP).

Focus for FY24

Advancing understanding of ocean variability and change in support of NOAA's Climate Ecosystems Fisheries Initiative

There is an additional coordinated solicitation through the Modeling Analysis Predictions and Projections program. Please see the MAPP Program's Information Sheet for details. Proposals may only address one program's solicitation.

Funding for FY24

Pending the availability of funds, it is anticipated that there will be \$2,000,000 available in FY24 for this competition. It is anticipated that most awards will be at a funding level between \$175,000 and \$250,000 per year for 3 years, depending on the availability of funding.

Competition Information

Background

Changing climate and oceans are affecting the nation's valuable living marine resources (LMRs) and the people, businesses and communities that depend on them. From warming oceans and rising seas to droughts and ocean acidification, these impacts are expected to increase with continued changes in the planet's climate system¹. There is much at risk. In 2020, United States Fisheries produced \$253 billion in sales, created 1.7 million jobs, and added an additional \$117 billion to the economy through broader impacts of the industry². Coastal habitats help defend coastal communities from storms and inundation and provide the foundation for tourism and recreation-based economies in many coastal communities. Climate-related information is needed to fulfill NOAA Fisheries mandates, and provide decision-makers with the information they need to reduce impacts and increase resilience to changing climate and ocean conditions³.

To meet these needs NOAA is bolstering its climate-related science as it relates to our changing ocean, and fisheries and marine ecosystems regionally and nationally through the [NOAA Climate Ecosystem Fisheries Initiative](#)⁴ (CEFI) aligned with [NOAA's Strategic Vision and Plans](#)^{5,6}. In addition, the science community, through example U.S. CLIVAR, has also organized around this challenge to synthesize current understanding and highlight research needs through the recent [Daily to Decadal Marine Ecological Forecasting Workshop](#)⁷ as part of the larger [Research Challenge on Climate at the Coasts](#)⁸. As a component of NOAA's initiatives and broader science community efforts, foundational climate process-oriented research is needed to better understand how climate impacts LMRs, how to reduce impacts, and how to increase resilience of LMRs and LMR-dependent communities.

The Office of Oceanic and Atmospheric Research (OAR) Climate Program Office has identified *marine ecosystems in a changing climate* as a priority societal challenge⁹ and programs are uniquely positioned to advance climate science needs in support of fisheries and living marine resources, extending, complementing, and accelerating research at OAR Research Laboratories and NMFS Fisheries Science Centers via the engagement of the broader research community. In FY 2024, the Climate Variability and Predictability (CVP) program and the Modeling Analysis Predictions and Projections (MAPP) program are coordinating research initiatives to address climate marine ecosystem/fishery needs that further understanding of climate and its impacts. CPO's Climate and Fisheries Adaptation (CAFA) program focuses on reducing impacts and increasing resilience, and does not have a competition this year.

In FY20 CVP awarded six projects focused on climate research related to fisheries and ecosystems, in support of the emerging CEFI for two regions. These projects worked to

¹ Fourth National Climate Assessment, Oceans and Marine Resources chapter
<https://nca2018.globalchange.gov/chapter/9/>

² https://www.fisheries.noaa.gov/s3/styles/media_750_x500/s3/2022-11/FEUS2020-Infographic-final-v2.png

³ NOAA Fisheries Climate Science Strategy <https://www.st.nmfs.noaa.gov/ecosystems/climate/national-climate-strategy>

⁴ [Climate Ecosystem Fisheries Initiative website](#)

⁵ [NOAA Strategic Plan FY22-FY26](#)

⁶ [NOAA Weather Water and Climate Strategy FY23-FY27](#)

⁷ [US CLIVAR Daily to Decadal: North American Ecological Forecasting Working \(Recordings\)](#)

⁸ [US CLIVAR Research Challenge on Climate at the Coasts White Paper](#)

⁹ [CPO Societal Challenges Framework](#)

advance our understanding of processes driving physical variability and change in the ocean relevant to North East US Shelf fisheries, predictability of ocean physics and biogeochemistry in the California Current, and our process-based understanding of Marine Heat Wave events. CVP-funded projects worked individually and as part of the Modeling Analysis Predictions and Projections Marine Ecosystem Task Force.

In addition, since 2020, NOAA OAR laboratories and programs, and other line offices - NMFS, NOS, and NESDIS - have bolstered investments in NOAA's observing and modeling capabilities in support of CEFI. For example, the initiative leverages GFDL's Modular Ocean Model (MOM) through development of a regional implementation of this model coupled with ocean biogeochemistry. Regional implementations are being developed and configured to provide both near-term forecasts and longer-term projections at high resolution for integration into fisheries management decision making. Regions are in varying stages of development and include the Northwest Atlantic (NWA; Caribbean to southern edge of the Labrador), Northeast Pacific (Baja through the Bering Sea), Great Lakes, Pacific Islands region (Hawaiian Islands and potentially outlying regions relevant to NOAA management responsibilities), and Arctic Ocean.

In FY24 CVP program is continuing its focus in this area, and its coordination with MAPP program, in support of the research needs of NMFS. Proposals targeting process-understanding, predictability and variability, and bridging observations with models are encouraged to apply to the CVP program competition. Proposals targeting advancing modeling, predictions, and projections should apply to the MAPP competition.

FY24 Competition

In FY24 CVP is soliciting coupled-or ocean-model process studies linked with observational data analysis to better understand **physical and biogeochemical** ocean processes for improved modeling and observing. Investments will support the science needs of NOAA Fisheries and advance the research foundation for NOAA's CEFI. CVP program is interested in fostering research across all regions: Northwest Atlantic (NWA; Caribbean to southern edge of the Labrador), Northeast Pacific (Baja through the Bering Sea), Great Lakes, Pacific Islands region (Hawaiian Islands and potentially outlying regions relevant to NOAA management responsibilities), and Arctic Ocean.

In addressing **one of the following priority areas 1 - 3** below, applicants are encouraged to **consider any of the italicized questions** as motivation:

- *What/Where do we need improved understanding of processes, ocean variables, and the limits of their predictability that could address skill gaps in models for management-relevant predictions and projections?*
- *Where/How could improved process understanding of the Earth System enhance their observation and/or prediction?*
- *To what extent do well-characterized processes with predictability translate into prediction skill?*
- *What processes are key in propagating climate signals across boundaries (oceans to coasts, global to regional models)?*

CVP Priorities include 1-3:

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1. Advancing understanding of variability and change, and the mechanistic drivers for ocean variables, indices, and processes relevant to the management of species and ecosystems. Where appropriate, applicants are encouraged to consider interactions across variables and processes (i.e. multi-stressor).
 2. Advancing understanding of sources of predictability and mechanisms of variability in the Earth system that could inform future improvements to NOAA observing and modeling systems and their future applications for marine resource management actions.
 3. Advancing understanding of the large-, regional-, and small-scale processes (local and remote) and the scale interactions between large-scale climate phenomena and small-scale ocean features (e.g. fronts, eddies, etc.). Where appropriate, applicants are encouraged to consider the use of high resolution products (e.g. regional ocean models, reanalyses).

The goal of this work is to strengthen the fundamental understanding of physical and biogeochemical mechanisms that affect ocean conditions in the context of climate variability and change, relevant to fisheries and marine ecosystem management.

For relevance to this competition, proposals should clearly describe how outcomes will advance our understanding of ocean variability and change in meaningful ways for management/decision contexts OR how outcomes can inform future NOAA observing and modeling strategies that could have potential future benefits to fisheries and ecosystem-related science or decision needs.

Collaboration opportunities with NOAA

Investigators are encouraged to consider collaborations with NOAA laboratories, centers, cooperative institutes and other NOAA entities.

Projects selected for funding will be required to participate and engage with ongoing NOAA research in support of NOAA's Climate Ecosystems Fisheries Initiative through participation in the Marine Ecosystem Task Force and other potential engagement activities with regional NOAA modeling teams. The Marine Ecosystem Task Force is made up of PIs and collaborators funded through competitions supported by the Modeling Analysis Predictions and Projections (MAPP) program and Climate Variability and Predictability (CVP) program. Past Task Force foci and activity examples are on the [MAPP website](#)¹⁰. Investigators should anticipate and include these collaborative, coordinating activities in their budgets.

Applicants interested in applying to both CVP and MAPP competitions

Applicants should only submit one application either to the CVP or MAPP CEFI-related competitions as lead Principal Investigator. Applicants may be included as Co-Investigators on multiple proposals submitted to the CVP and MAPP CEFI-related competitions. If applicants are submitting coordinated proposals to both the CVP and MAPP competitions, applicants may articulate this in the relevance section; however, proposals should be able to be funded independently of each other.

Additional Guidance for Applicants

¹⁰ MAPP website: [Marine Ecosystem Task Force FY20 - FY23](#)

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- **Contact:** Program Contact information: For additional program announcement information, investigators should contact the following CVP Competition Managers: Virginia Selz; Virginia.Selz@noaa.gov and Jose.Algarin@noaa.gov.
 - **LOIs:** Letters of Intent should be submitted directly through this [Google Form](#). CVP will **only** accept and review LOIs submitted through this form. In the event that investigators need to submit an LOI after the date specified in the NOFO, please contact the Competition Managers directly for guidance.
 - **Webinar:** A webinar will be offered to potential applicants for background on the CVP program and this solicitation, and related research on-going at NOAA, soon after publication of this announcement. For Information on webinar timing and registration procedures please check the CVP website; prior to when the webinar is held, potential applicants can also [sign-up](#) to receive an email notification.

Data Information and Sharing Plan

Data Management Guidance The Responsible NOAA Official for questions regarding this guidance and for verifying accessibility of data produced by funding recipients: Virginia Selz virginia.selz@noaa.gov

Data Accessibility: The CVP Program requires that public access to grant/contract-produced data be enabled in one of the following ways (select one):

- Funding recipients are planning to submit data to NOAA National Centers for Environmental Information (NCEI), which will provide public access and permanent archiving¹ Point of Contact for NCEI is Nancy Ritchey (Nancy.Ritchey@noaa.gov)
- Data are to be submitted to an International Council for Science (ICSU) World Data System facility: <https://www.icsu-wds.org/community/membership/regular-members>)
- An existing publicly accessible online data server at the funded institution is to be used to host these data (describe in proposal).
- Data are to be submitted to a public data repository appropriate to this scientific domain (describe in proposal).
- Proposal may request permission not to make data publicly accessible (proposal to explain rationale for lack of public access, and if funded approval to be obtained from Responsible NOAA Official listed above).
- Archival of data at an established Cloud Computing facility, if cost effective and reliable

Technical recommendations: The CVP Program requires the following data format(s), data access method(s), or other technical guidance:

- Data must be made available in a common machine-readable non-proprietary format with appropriate metadata and clear labels and descriptors. Use of netCDF is encouraged.
- Data should be available via public and discoverable data portals, as described above.
- At a minimum, investigators should plan to archive and make available modeling data used in producing any figures in publications from research supported by their grants,

as well as data that support conclusions reached in papers or stated publicly. Only those data which are necessary for demonstrating reproducibility of published results need be archived and made public unless otherwise required as part of the solicitation.

- In situ observational data collected during the field campaign should be made freely available to the public either 2 years after collection and validation or at the time of publication, whichever is sooner.
- Model data should be made available for at least 3 years after it is initially published or made otherwise publicly available.

Resources: Proposals are permitted to include the costs of data sharing and/or archiving in their budgets within solicitation specified proposal cost limit. Proposed methods and approaches should use reasonable means to minimize data management costs.
