

# Topics at the nexus of climate change, fisheries, and blue foods

*A webinar series highlighting the impact of climate change on fisheries, aquaculture, and the communities who depend on them*

This webinar series is jointly hosted by the UN Ocean Decade endorsed programs Blue Food Futures, FishSCORE, SmartNET, SUPREME, and as of August 2024, FishMIP and Basin-Scale Events to Coastal Impacts (BECI). While each of our Ocean Decade efforts have different goals and objectives, we have an overlapping focus on the impact of climate change on ocean ecosystems, fisheries, and communities. Through this joint webinar series, we aim to support the Ocean Decade's goal to encourage knowledge exchange and capacity strengthening. By combining our outreach efforts, we can foster cross-pollination among diverse participants who seek to understand ocean and fisheries systems and apply the latest knowledge to implement effective strategies. This collaboration supports learning across new themes and broadens the ocean-climate-fisheries community of practice.

Beginning in September 2024, with the addition of BECI and FishMIP as co-hosts, our series will feature more technical and skills-focused webinars on ocean and ecosystem modeling, forecasting, and downscaling. These technical webinars will be provided as part of the jointly hosted series while maintaining a rotation of webinar topics of importance to all the jointly hosted partners. A standalone technical workshop series will be started in 2025 to provide deep dives on particular skills of interest for ocean modeling. We are excited to welcome FishMIP and BECI as co-hosts of this series!

## September 2024 Webinar: Marine ecosystem model ensembles to support regional applications

### Presentations

#### **Presentation 1: Regional marine ecosystem models of the Fisheries and Marine Ecosystem Model Intercomparison Project (FishMIP)**

As the urgency to evaluate the impacts of climate change on marine ecosystems increases, there is a need to develop robust projections and improve the uptake of ecosystem model outputs in policy and planning. FishMIP is a network of more than 100 marine ecosystem modellers and researchers around the world, aiming to better understand and project the impacts of climate change on fisheries and marine ecosystems. Currently the FishMIP ensemble comprises over 30 regional marine ecosystem models and we are striving towards regional model ensembles that support regional climate risk assessments and fisheries management adaptation plans. To achieve these objectives, we developed an implementation workflow to standardise the climate and fishing forcings used by regional models contributing to FishMIP and to facilitate comparative analyses across models and a wide range of regions. This workflow will facilitate the development of regional ensembles and enhance future research on marine ecosystem model development and applications, model evaluation and benchmarking, and global-to-regional model comparisons.

Webinar Presenter: Kelly Ortega Cisneros is a Research Officer at the Department of Biological Sciences, University of Cape Town. She has a background in biology and fisheries science, and her research focuses on using ecosystem modelling to investigate the functioning of marine ecosystems and support ecosystem-based management. She is particularly interested in the influence of environmental variability and climate change on marine ecosystems, and the vulnerability and adaptive capacity of ecosystems to climate change. Kelly is the lead coordinator for the regional models of the [Fisheries and Marine Ecosystems Model Intercomparison Project](#) (FishMIP).

*For more information:*

- [FishMIP modelling teams](#)
- Ortega-Cisneros, K., Fierros-Arcos, L. D., Lindmark, M., et al (2024). *An Integrated Global-to-Regional Scale Workflow for Simulating Climate Change Impacts on Marine Ecosystems*. *ESS Open Archive*. May 16, 2024. DOI: <https://doi.org/10.22541/essoar.171587234.44707846/v1>

## **Presentation 2: Developing a Southern Ocean Marine Ecosystem Model Ensemble to assess climate risks and uncertainties**

Climate change could irreversibly alter Southern Ocean ecosystems. Marine ecosystem model (MEM) ensembles can help policymakers by projecting future changes and assessing management approaches. However, projections from the Fisheries and Marine Ecosystem Model Intercomparison Project (FishMIP) global MEM ensemble reveal an uncertain future for the Southern Ocean, indicating a need for a region-specific ensemble. Significant model uncertainty arises from the Earth system models (ESMs) used to drive FishMIP models, particularly regarding future changes to lower trophic level biomass and sea-ice coverage. To enhance confidence in regional MEMs as tools for ecosystem-based management in a changing climate, we propose developing a Southern Ocean Marine Ecosystem Model Ensemble (SOMEME) as part of the FishMIP 2.0 regional model intercomparison initiative. A key challenge is balancing global standardized inputs with regional relevance. As a first step, we design a SOMEME simulation protocol that builds on and extends the FishMIP framework. This includes: detailed skill assessment of climate forcing variables for Southern Ocean regions, extending fishing data to include whaling, and new simulations assessing ecological links to sea-ice processes in an ensemble of candidate regional MEMs. These efforts will improve assessments of climate change impacts on Southern Ocean ecosystems.

Webinar Presenter: Dr. Kieran Murphy is a research associate at the Australian Centre for Excellence in Antarctic Science (ACEAS), a Special Research Initiative funded by the Australian Research Council and led by the University of Tasmania. In his role at ACEAS, Kieran specializes in the development of size- and trait-based ecosystem models for the Southern Ocean. Kieran's work focuses on integrating multidisciplinary data, including observational datasets from various sources, to enhance our understanding of how Southern Ocean ecosystems are responding to climate change and fishing pressures.

*For more information:*

- ACEAS: <https://antarctic.org.au/>

- Murphy, K., Fierro Arcos, D., Rohr, T., et al. *Developing a Southern Ocean Marine Ecosystem Model Ensemble To Assess Climate Risks and Uncertainties*. ESS Open Archive. May 15, 2024. DOI: 10.22541/essoar.171580194.49771608/v1

This webinar series is jointly hosted by the UN Ocean Decade Programs [Blue Food Futures](#), [Fisheries Strategies for Changing Oceans and Resilient Ecosystems \(FishSCORE\)](#), [Sustainability, Predictability, and Resilience of Marine Ecosystems \(SUPREME\)](#), [Sustainability of Marine Ecosystems through Global Knowledge Networks \(SmartNet\)](#), and [Fisheries and Marine Ecosystem Model Intercomparison Project \(FishMIP\)](#) and endorsed project [Basin Scale Events to Coastal Impacts \(BECI\)](#).

This webinar series highlights current efforts and challenges at the climate-fisheries nexus. Presentations and discussions will range from data-driven efforts to better understand oceanographic and biological changes affecting fisheries, to how the results can be used to inform fisheries management, aquaculture, and sustainable food decisions, to the many ways people and broader communities are being impacted by and adapting to changes in marine ecosystems and marine resource use.



Blue Food Futures

