

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

June 2026: Climate mitigation, fish, and the ocean carbon cycle

Presented by the Fisheries and Marine Ecosystem Model Intercomparison Project (FishMIP)

Webinar Date/Time: June 25, 2026 9:00am US EDT (UTC-4)

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Presentation 1: The High Value of Climate Mitigation in Limiting Global Fish Biomass Losses to the year 2300

It is widely understood that future climate change will have large deleterious impacts on marine ecosystems. Large synthesis efforts conducted to date by FishMIP with higher trophic level (HTL) models have shown that under high emissions scenarios, future fish biomass losses of the order of 20% can be expected by 2100. However, the impact of anthropogenic climate change beyond 2100 remains largely unexplored, even though policy choices made now will have implications over multiple centuries. Here we identify to 2300 the degree to which Marine Ecosystem Models (MEMs) driven offline with ESMs under CMIP forcing protocols provide consistent projections of fish biomass changes, under an approximately 2°C climate stabilization scenario (SSP1-2.6), and we also assess the value of climate stabilization at 2°C relative to a high emissions future (SSP5-8.5). The value of mitigation is identified by defining mitigation gain as the difference in fish biomass losses between the low emissions (SSP1-2.6) and high emissions (SSP5-8.5) scenarios, using a total of 18 climate realizations under each scenario.

We highlight two main findings. First, we identify that under approximately 2°C stabilization, by 2300, forced ensemble-mean (average of 18 realizations) changes in fish biomass are not regionally emergent above the 90% confidence interval defined by inter-model disagreement. This is important, as it means that the fish modeling community cannot yet estimate the regional vulnerability of fish communities to climate perturbations under a 2°C target that rise above model structural uncertainty, or by implication under a more stringent 1.5°C target. This is due to model structural uncertainties found in both ESMs and MEMs. Second, the models are nevertheless able at 90% confidence intervals to demonstrate mitigation gain (the difference between results under SSP1-2.6 and SSP5-8.5 forcing) under 2°C stabilization over more than half the global domain by 2300. This second main result offers potentially important value in informing efforts towards sustainable development goals. We discuss the broader implications of these findings.

Webinar Presenter: [Keith Rodgers](#), AIMEC-Tohoku University, Japan, received his PhD in 1998 at the Lamond Doherty Earth Observatory of Columbia University. He is currently a PI at the AIMEC-Tohoku University in Japan, where he has worked since 2024. This presentation is co-authored with Daniele Bianchi (UCLA, US) as well as with a number of participating co-authors.

Presentation 2: The role of fish in the ocean carbon cycle in a climate change and fishing context

The research on the ocean carbon cycle and the “biological carbon pump” commonly assumes that the dominant component is dead photosynthetic organisms because they have the fastest life cycle. However, due to their small size, dead phytoplanktonic organisms sink slowly and are remineralised before reaching the sea floor. It has recently become clear that larger organisms, such as fish, are also important

contributors to the biological carbon pump. Even though their rate of production of sinking faecal pellets is slow, the pellets are large and sink rapidly into the ocean interior, where the carbon is sequestered over a long time. Drawing on recent publications, we will understand how fish and other large organisms contribute to the sequestration of carbon in the ocean, and discuss progress and challenges in answering the following questions: How do fishing and climate change affect the contribution of large organisms to the ocean carbon cycle? Will reducing fishing and restoring ecosystems lead to increased carbon sequestration in the ocean?

Webinar Presenter: **Gaël Mariani** is a post-doctoral researcher in Marine Ecology at the University of Montpellier, France. He earned his Ph.D. in Functional Ecology in December 2023 from the University of Montpellier, where he studied the contribution of fish to the ocean carbon cycle and the potential impacts of climate change and fishing on this contribution. Ultimately, his work aims to assess whether fish can be part of the Nature-based Climate Solution portfolio via the development of sustainable ocean-based strategies that balance ecological integrity with human well-being.



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.