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climate change-related measures, but a more coordinated approach to scale adaptive fisheries management is still needed.

adopt

implement ecosystem-based fisheries management (EBFM),

1. RFMOs Should Adopt Climate Adaptive Harvest Strategies

Harvest strategies–or management procedures–are an important adaptive tool that can be designed to include the impacts of climate change on fish populations and fisheries. Harvest strategies shift managers' perspective from short-term, reactive decision-making to longer-term objectives—typically based on the numbers or biomass of a given fish population—and involve agreeing in advance how fishing rules (often catch or effort limits) will be adjusted to meet those aims. An important part of harvest strategy development is the use of detailed scientific models, called management strategy evaluation (MSE), to ensure that the adopted rules will meet fisheries' objectives under a variety of environmental conditions. This tool provides scientists and managers with the ability to incorporate expected or potential impacts from climate change into their decision making. Those impacts may include changes to expected biomass, reproductive success or changes in the geographic distribution or migration patterns of fish stocks. The tropical tuna stocks in the Pacific Ocean are a prime example where MSE should be used to help managers develop a climate-ready harvest strategy. As these tunas move from national jurisdictions to the high seas and from east to west in the face of changing ocean conditions, the relevant RFMOs—the Western and Central Pacific Fisheries Commission (WCPFC) and the Inter-American Tropical Tuna Commission (IATTC)—will need to collaboratively develop MSE-tested harvest strategies that extend across both Convention Areas (Goodman et al., 2022).

2. RFMOs Should Mainstream Ecosystem-Based Fisheries Management (EBFM)

The Intergovernmental Panel on Climate Change has determined that EBFM is a feasible and effective way to address the impacts of climate change in ocean ecosystems and related human activities (Cooley et al., 2022). EBFM harnesses advances in scientific knowledge, like MSE, to consider the interactions among species, fisheries, and a changing ocean. EBFM means transitioning from single species management to more comprehensive strategies that consider the overall health of ocean ecosystems. To accomplish that, managers should:

- Commission ecosystem models to forecast the future status of specific species in an ecosystem context and under changing conditions and provide actionable scientific advice that incorporates relevant climate considerations.
- Consider the full range of possible ecological consequences of fishing, when making management decisions about fishing opportunities. In addition to considering impacts such

Table 1 – Climate change actions at select RFMOs:

RFMO	Progress to date
The International Commission for the Conservation of Atlantic Tunas (ICCAT)	Adopted Resolution 22-13 to initiate climate work through a joint experts meeting and develop a Commission workplan.
Inter-Americ	

References

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