

## **A Review of Potential Approaches for Managing Marine Fisheries in a Changing Climate.**

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### **Abstract:**

Climate variability and change may affect marine fisheries by altering: ecosystem functions, fish abundance and productivity, species and fishery distributions, fish phenology, interactions with non-target species and bycatch rates and levels, and habitat use and/or availability (e.g., shifting nursery grounds). Because managers may not be aware of the many approaches available to respond to or plan for environmental change, we conducted a literature review and compiled a list of options. In general, management approaches can be either proactive and plan for change, or reactive and respond to change after it has occurred. Pro-active management alternatives can be implemented to increase resilience of stocks, species, ecosystems, and/or fishing businesses. Given the large uncertainties surrounding the effects of climate change, two good approaches are to either reduce the uncertainty, or embrace the uncertainty and rely on management options that will be robust to the given uncertainties. On a whole, management actions that seek to increase management flexibility and provide incentives to the fishing industry to try new approaches while preserving genetic diversity of the fished populations should prove to be beneficial. Ideally, the pros, cons, and tradeoffs associated with various management options should be evaluated to determine the best approach (or mix of approaches) given the information available. New approaches will continue to emerge as management across the globe grapples with this complex issue.

Full Tech Memo available here: [http://www.nmfs.noaa.gov/sfa/publications/technical-memos/nmfs\\_osf\\_tm6.pdf](http://www.nmfs.noaa.gov/sfa/publications/technical-memos/nmfs_osf_tm6.pdf)