

**CLIMATE CHANGE AS AN EMERGING ISSUE IN FISHERY GOVERNANCE- SPECIAL SESSION REPORT**

Alistair McIlgorm, [amcilgorm@nmsc.edu.au](mailto:amcilgorm@nmsc.edu.au),  
Susan Hanna, [susan.hanna@oregonstate.edu](mailto:susan.hanna@oregonstate.edu) Gunnar Knapp, [afgpk@uaa.alaska.edu](mailto:afgpk@uaa.alaska.edu), Pascal Le Floc'H,  
[pascal.lefloch@univ-brest.fr](mailto:pascal.lefloch@univ-brest.fr) Minling Pan, [Minling.Pan@noaa.gov](mailto:Minling.Pan@noaa.gov).

**ABSTRACT**

There is an increasing realisation that the earth's marine environment is being adversely impacted by the production of carbon dioxide in the earth's atmosphere. Climate change in the oceans and atmosphere will impact fisheries production and management and have implications for governance of fish stocks. Climate change may have substantial impacts on fish stock productivity, migratory patterns, trophic interactions and the vulnerability of fish populations to fishing pressure, changing the distribution of fishery benefits across harvesting groups or national fleets. Physical changes in ocean thermal structure, circulation dynamics and sea-water chemistry (e.g. ocean acidification) can be expected to have complex impacts on oceanic food webs. The session seeks to explore this gap between the fishery management/economics and the atmospheric science community.

**Keywords: Climate change, Fishery governance**

**PAPERS IN THE SESSION.**

Author and presenter - Alistair McIlgorm, National Marine Science Centre, Australia.

Title: How can fisheries governance meet the challenges of oceanic climate change?: examples from South West Pacific ocean fisheries.

Author and presenter - Minling Pan, NOAA, Hawaii.

Title: Fisheries Policy Choices in Response to Climate Variability - A case study of the Hawaii based pelagic longline fisheries.

Author and presenter - Susan Hanna, Oregon State University, Oregon

Paper Title: Climate Change and Fishery Governance in the Pacific Northwest US: the Case of Columbia River Basin Salmon

Author and presenter - Gunnar Knapp, University of Alaska.

Title: Managing Alaska Commercial Fisheries for Adapting to Uncertain Effects of Climate Change.

Author and presenter - Pascal Lefloc'h, University of Western Brittany

Title: Investment and capital dynamics under long-term changes in marine fish communities: the case of French fleets exploiting the Bay of Biscay fisheries

## OVERVIEW OF THE PANEL FINAL DISCUSSION

The issues of climate change will see a wider range of issues being brought into fisheries economics and management. Information from fisheries biology will be accompanied by supporting information from oceanography on physical ocean drivers and their prospective physical impacts.

Climate change will also force a re-evaluation of river and watershed fisheries and interact with land based initiatives in water policy. Similarly coastal fisheries will be impacted by the levels of water entering the coastal system and any changes in sea level rise causing inundation of the coast.

These changes are set within the realisation of the need to take account of valuing ecosystem services in long term sustainable policy which is a significant move away from the emphasis on fisheries as a good and latterly as an ecosystem good.

Each of the participants in the session made the following short summary comments:

### **Susan Hanna**

Climate change will exacerbate the challenges already faced by fishery management. Redesigning governance will require strategic planning for variability and uncertainty, a broader information base, Integration at the ecosystem level, and the promotion of flexibility. At the same time, the uncertainty of climate change creates barriers to redesign. Uncertainty encourages the use of short planning horizons that focus on immediate problems, and supports the delusion that mitigating actions can wait until more information is available. The global scale of the climate change issue means that there are uncertain benefits of taking local action. The effect of climate change may be experienced as a slow “squeeze” exacerbating existing problems rather than a push generating new action. Fisheries governance can mitigate the effects of climate change by explicitly addressing these effects, but it will take considered action.

### **Gunnar Knapp**

Climate change and fisheries encompasses a wide variety of topics and issues, including but not limited to (a) effects that climate change is having or may have on specific fisheries; (b) policy issues raised by the effects of climate change on specific fisheries; and (c) the implications of increased uncertainty about future fisheries resources due to climate change. As was illustrated by the diversity of papers presented at the session, “climate change and fisheries” is thus becoming a very broad subject, which is already part of the backdrop of fisheries management in numerous fisheries around the world. It may be useful to focus future discussions of “climate change and fisheries” more narrowly. For example, an entire session or book could usefully

focus on the challenges to international fisheries agreements resulting from geographic shifts in fisheries stocks associated with climate change. As I discussed in my own paper, it is important for fisheries managers to think explicitly about what the implications of climate changes may be for the fisheries which they manage, and for how they can best manage them.

### **Minling Pan**

It was a good idea to identify what kind of issues to look at and what climate change will bring to fisheries resources and fisheries management. Climate change could result in the decline of broad ecosystem services and the decline of ocean productivity. How will these impact on the fishing industry and

other fisheries resource users, and how fisheries management may respond to these changes? The next step is to list out a set of topics for climate change and to search for funding to support research.

**Pascal Le Floc'H**

This is a paradigm of fishing activity including protection of multi-product marine eco-systems and ecosystem services. This new paradigm can be summarized as the ecosystemic approach for fisheries, linking more strongly fisheries sciences (biology, economics, technology) to others sciences (oceanography, ecology). In this new context the fishery sector is becoming one of a multitude of activities existing in the marine area. As a first attempt to study the impact of long term changes on marine ecosystems in the French context, a national project (<http://www.projetchaloupe.fr/>)

is focusing on the effects of fishing and of climate change on the evolution of marine populations and communities. The principal objective of the CHALOUPE Project, which was launched in February 2006, consists in the quantification of these changes and the relative weight of different factors on a regional scale (the temperate continental shelf of the Bay of Biscay, the tropical shelf of French Guyana, and the upwelling ecosystem of Morocco).

**Alistair McIlgorm**

The session has shown that climate change brings a range of new influences into the management of fisheries. The fisheries management culture has taken a certain stability in the ocean environment and in the water cycle as a given, and recognises inherent variation. Part of that variation may have been climate driven? We are realising that systemic change in the biosphere has implications for fisheries and we need to start widening our studies to include the value of eco-system services, to supplement our emphasis on goods valuation (fish).

**Moderator's Summary**

The advent of climate change means that ocean science, and water science on land, will be driving policy to a greater extent than previously. It is important that fisheries economics rises to work with these other initiatives, or we will find ourselves coming late to represent fish in structures set up on environmental and scientific policy lines. Without our involvement in developing regimes to address climate change, the global fisheries sector risks being left behind having marginal involvement in global environmental responses to climate change. This is a challenge to which we encourage IIFET members to respond.