**Shifting species and ecosystems in response to climate change - North Pacific Fisheries Commission**

History, Text of the Convention and Convention Area

The North Pacific Fisheries Commission (NPFC) is a relatively new intergovernmental organization established in 2015 by the Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific (NPFC Convention). The consultations to establish the organization began in 2006 following the UN General Assembly (UNGA) resolutions urging States to take action to protect vulnerable marine ecosystems (VMEs) in the deep sea from destructive fishing practices and ensure sustainability of deep sea fisheries (UNGA 2004, 2005, 2006 and Moon 2016). The deep sea is the largest ecosystem on Earth full of organisms that are still mysteries to science. (Rogers 2015). But these species are particularly vulnerable to overexploitation due to their slow growth and maturation, long life expectancy, and intermittent recruitment (Glover and Smith 2003, FAO 2009, Rogers 2015).

NPFC covers “waters of the high seas area of the North Pacific Ocean, excluding the high seas areas of the Bering Sea and other high seas areas that are surrounded by the exclusive economic zone of a single State” (NPFC Convention: article 4). The southern border follows approximately 20° north latitude and extends to around 10° north latitude around Hawaii (NPFC n.d.).

NPFC’s objective is to “ensure the long-term conservation and sustainable use of the fisheries resources in the Convention Area while protecting the marine ecosystems of the North Pacific Ocean in which these resources occur” (NPFC Convention: article 2). Management and conservation measures are to be adopted and implemented in accordance with the precautionary approach and an ecosystem approach to fisheries, as well as the FAO International Guidelines for the Management of Deep-Sea Fisheries on the High Seas (FAO Deep-Sea Guidelines, NPFC Convention article 3).

Conservation Measures and Reporting

NPFC adopted Conservation and Management Measures (CMM) 2016-05 for the northwest area and 2016-06 for the northeast area implementing the UNGA Resolutions and the FAO Deep-Sea Guidelines. The CMMs outline standards and criteria for identification of VMEs and assessment of significant adverse impact (SAI) on VMEs and marine species; provide exploratory fishery protocol for new fishing areas and gear types; and list VME indicator species, the encounter protocol and the move-on rule.

For the northwest region, the more intensely fished zone of the Convention area, parties agreed to limit their fishing effort to the level set in 2007 and to areas less than 1,500m deep; and subject fisheries outside of the agreed upon historical footprint, fishing effort, and depth to the exploratory fishery protocol (Gianni et al. 2016). They also instituted a closed season, a precautionary closure of certain seamounts, and mandatory observers. For the northeast region, parties agreed to conduct SAI on VMEs and marine species by their fishing vessels operating in the area and to limit fishing effort to “the level of a historical average” to be agreed upon by consensus in the SC (CMM 2016-06: para 3(i)).

NPFC also has adopted two species-specific CMMs, CMM 15-02 for Pacific Saury and 2016-07 for Chub Mackerel. For Pacific Saury, members agreed to “refrain from rapid expansion” (para 1) of the number of fishing vessels until a stock assessment is conducted in 2017. They also agreed to adopt compatible measures in areas under national jurisdiction. Under the CMM for Chub Mackerel, members are “encouraged to refrain from expansion” of the number of fishing vessels fishing for Chub Mackerel and adopt compatible measures in areas under national jurisdiction until further advice and recommendations from the SC (CMM 2016-07: para 1). Discussions are underway at the Small Scientific Committee on a CMM for the North Pacific Armorhead (SCC-NCA 2016).

In 2016, NPFC reported on its activities at the UN workshop on implementation of the measures protecting VMEs from bottom fishing and ensuring sustainability of deep-sea fish stocks (UN 2016). The workshop brought together States, RFMO/As, intergovernmental, and non-governmental organizations. Participants recognized progress that was made to address these issues and identified scientific uncertainty and difficulties in obtaining the necessary scientific information as common challenges. The next UNGA review of implementation is scheduled for 2020 (UNGA 2016).

An evaluation of the implementation of the UNGA resolutions by NPFC conducted by Deep Sea Conservation Coalition recognized the NPFC parties as some of the few flag states that completed the required impact assessments on VMEs (Gianni et al. 2016). However, the report raised concerns that the criteria for identifying VMEs was too narrow and the amount of coral brought up in a trawl may not be an accurate indicator of damage. It also noted that that less than 1 per cent of seamount areas at fishable depths are protected and stock assessments are lacking for target species.

Science providers and Climate Change Considerations

The Commission relies on an internal science provider, the Scientific Commission established by Article 6, for advice and recommendations. The SC has had its first meeting in 2016; its 5-year research plan, currently under development, will be discussed at the next meeting in 2017 (SC-NPFC 2016).

To date, climate change considerations have not been discussed at NPFC. The documents also do not mention if the models that will be used to conduct stock assessments incorporate climate change considerations. This is despite the fact that scientists anticipate changes on the surface to impact deep water communities (Glover and Smith 2003, Polovina et al. 2008, Rogers 2015). Cold-water corals appear to be particularly vulnerable, since it is likely that they also are going to be negatively affected by ocean acidification (Rogers 2015).

Incorporating climate change considerations would not be inconsistent with the UNGA resolutions and FAO Guidelines NPFC is trying to comply. Climate change was first mentioned in UNGA 62/177 welcoming FAO proposal to study key effects of climate change on fisheries and possible adaptations. The following year, in UNGA 63/112, the General Assembly began to express concern over the possible adverse effects of climate change on sustainability of fisheries and urged States to take action. It also took note of the FAO workshop of experts on impacts of climate change for fisheries which recommended that regional fisheries organizations “place climate change awareness and response preparedness clearly on their agendas” (FAO 2008: 7). In subsequent years, UNGA has reiterated its concern over effects of climate change on fisheries and urged States to assess and address impacts of climate change on fisheries and habitats (UNGA 2009, 2011). In the latest resolution, the General Assembly specifically asked States, individually and through RFMOs, to “take into account the potential impacts of climate change and ocean acidification in taking measures to manage deep –sea fisheries and protect vulnerable marine ecosystems” (UNGA 2016: para 185).

Based on Article 10 of the NPFC Convention, it falls within the responsibilities of the SC to identify climate change as a research issue and recommend a research plan. It is within the purview of the SC to make recommendations to the Commission to help achieve the objectives of the Convention, which include protection of the North Pacific ecosystems, and provide scientific advice it considers appropriate.

One way to incorporate climate change considerations is by making them a part of the criteria for identifying VMEs. The current criteria is based on the extent of alteration experienced by a population, community or habitat as a result of fishing activity and how long it will take to recover (CMM 2016-05, 2016-06). The SC has the authority to expand the criteria since Article 10(4)(c) tasks it with their development.

Another way to incorporate climate change considerations is through collaborations with other scientific organizations. Since the SC is precluded from duplicating scientific work done by other organizations in the Convention area, it is allowed to exchange information with such organizations (NPFC Convention article 10(5) and 10(6)). Collaborating with PICES would be a logical step given that PICES’ area of interest overlaps with the NPFC Convention area.

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