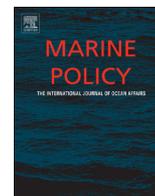




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Short Communication

A precautionary approach to fisheries in the Central Arctic Ocean: Policy, science, and China

Min Pan^a, Henry P. Huntington^{b,*}^a Center for Polar and Oceanic Studies, Tong Ji University, Shanghai, Peoples Republic of China^b Pew Charitable Trusts, Eagle River, AK, USA

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ABSTRACT

In recent years, up to 40% of the central Arctic Ocean has been ice-free in summer. This open water makes access possible for ordinary vessels, including fishing boats. The five Arctic Ocean coastal states (Canada, Denmark/Greenland, Norway, Russia, and the United States) have agreed to develop an international agreement to prohibit unregulated fishing in international waters of the central Arctic Ocean. Non-Arctic countries, including China, and regional organizations such as the European Union will be invited to join the ensuing negotiations. Participation would strengthen China's interest in Arctic affairs in a cooperative fashion, in contrast to a perception that China is interested solely in extracting Arctic resources and is thus a competitor with Arctic states. China's scientific capacity, including the icebreaker *Xuelong* (Snow Dragon), provides it with an opportunity to practice marine and polar science diplomacy and to contribute further to Arctic cooperation and collaborative understanding. The precautionary approach of managing resources before extraction begins may make cooperative actions easier, as no one yet has a stake in the resource, and could provide a model for other regions that are developing international mechanisms for governance of international waters.

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1. Introduction

The waters of the central Arctic Ocean (Fig. 1) have been increasingly ice-free in summer for the past 15 years, particularly north of the Chukchi Sea, off the coasts of Russia and the United States [1]. In the summer of 2012, as calculated from National Snow and Ice Data Center data, 40% of the international waters of the central Arctic Ocean (CAO) had less than 15% ice cover, thus appearing as open water in maps of sea ice extent. For the first time in human history, a new ocean is opening up [2]. And as warming continues, the likelihood of an ice-free Arctic in the next few decades becomes greater [3].

With the summer retreat of sea ice and warming of ocean waters, fish species are moving north [4], including in subarctic waters [5]. The combination of open water and north-moving fish raises the prospect of Arctic fisheries, though it remains unclear which species might move into the waters of the CAO, in what numbers, and when [6]. The management of fisheries in the CAO, beyond national jurisdictions, has nonetheless become a more pressing issue in Arctic marine governance. In July 2015, the five Arctic coastal states signed the “Declaration Concerning the

Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean,” including their intent to create a broader international agreement on the same principles.

But CAO fisheries governance is not only about fishing. It has many other aspects, such as cooperative governance of the Arctic, the relations among Arctic states, and the relations between Arctic and non-Arctic states. The sequence of events surrounding CAO fisheries may provide a novel opportunity for countries such as China to become involved cooperatively and constructively in Arctic affairs. By acting in advance of any fishing activity and any negative impacts to fish stocks, a CAO agreement creates an unusual pathway for participation on the basis of caution rather than reaction. Such an agreement is thus a question of policy, science, and international relations.

With these themes in mind, this paper explores first the interactions of policy and science concerning the CAO, noting that in this instance policy is leading science rather than the reverse. Then it examines China's interest in the CAO and its evolving role in Arctic affairs, including Arctic science as a form of diplomacy. It concludes with observations on the implications of China's participation in CAO fisheries discussions as a symbol of the potential shift towards greater international involvement in the development and management of Arctic resources.

* Corresponding author.

E-mail addresses: panmin417@163.com (M. Pan), hhuntington@pewtrusts.org (H.P. Huntington).



Fig. 1. The central Arctic Ocean (CAO), international waters more than 200 nautical miles from any coast.

2. Fishing, science, and policy

Typically, issues are raised as societal or economic ones, which in turn generate political interest, resulting in policy planning and eventual policies. Fisheries in the international waters of the Bering Sea, the so-called Donut Hole, demonstrate this pattern. International fishing fleets operated in these waters, eventually attracting attention from American fishers who feared that unregulated fishing could undermine management of pollock (*Gadus chalcogramma*) in U.S. waters. Their economic concerns led to a U.S. policy supporting an international agreement for the Donut Hole. The Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea was signed in 1994, too late for the pollock stocks that were by then depleted and have yet to recover to levels that would sustain a fishery [7]. Scientific efforts helped identify management targets for the Donut Hole stock and continue to support sound management of pollock harvests in U.S. waters [8].

By contrast, the CAO fisheries issue began as a policy matter, as the United States Senate passed a resolution in 2007, directing the U.S. government to pursue an international agreement for the CAO. The resolution was signed into law in June 2008 and is based

on the same logic that supported the U.S. Fishery Management Plan for the Fish Resources of the Arctic Management Area, which established a catch quota of zero for U.S. waters in the Chukchi and Beaufort Seas until there is sufficient information to support an economically and environmentally sustainable fishery [9]. This approach was also taken by Canada for its portion of the Beaufort Sea in 2014 under the Beaufort Sea Integrated Fisheries Management Framework, where new commercial fisheries will only be considered after research has shown surplus and sustainable stocks [10]. Rather than being driven by scientific findings or by unsustainable or unmanaged activities already taking place, the policy-driven approach is based in part on the lack of scientific information concerning fish stocks and ecosystem dynamics in the CAO.

One challenge in this approach is the potential lack of incentive to act before there is clearly a problem to address. Some countries and some scientists considered a CAO fisheries agreement unnecessary or not urgent, on the grounds that there was no fishing taking place nor any evidence that such a fishery might begin in the foreseeable future [6]. There has been little advocacy by non-governmental organizations, other than the Pew Charitable Trusts [11]. These circumstances also meant that no one has a stake in

Table 1

Events and meetings regarding the management of CAO fisheries from 2008–2015. In the third column, “Science” refers to events with a focus on scientific understanding or research; “Policy” refers to events that establish or discuss policies; “Diplomacy” refers to events that seek international agreement concerning either science or policy. Note the predominance of policy and diplomacy as well as the minimal involvement of non-Arctic states.

Date	Event	Science, policy, diplomacy?
June 2008	U.S. Senate Joint Resolution 17 becomes law	P
January 2009	Norway bans fishing in unregulated waters	P
August 2009	The U.S. sets a quota of zero for its Arctic waters	P
October 2009	International Arctic Fisheries Symposium, Anchorage, Alaska	S
June 2010	First meeting of officials from Arctic coastal states, Oslo	P, D
January 2011	The European Union adopts a CAO policy	P
June 2011	First meeting of scientists from Arctic coastal states, Anchorage, Alaska	S, D
August 2011	Denmark sets new policy for CAO fisheries	P
April 2012	Pew releases letter signed by 2000 scientists	S, P
May 2012	The U.S. circulates a draft agreement	D
September 2012	The Russian International Affairs Council hosts a workshop	S, P
April 2013	Second meeting of officials from Arctic coastal states, Washington, D.C.	D
October 2013	Second scientific meeting, Tromsø, Norway	S, D
December 2013	Russian International Affairs Council hosts conference in Moscow	S, P
February 2014	Third meeting of officials from Arctic coastal states, Nuuk, Greenland	D
October 2014	Canada prohibits commercial fishing in Beaufort Sea	P
January 2015	Tongji University hosts roundtable discussion, Shanghai	S, P
April 2015	Third scientific meeting, Seattle, Washington	S, D
July 2015	Arctic coastal states sign declaration, Oslo	D

CAO fisheries at present, so there is little or no active opposition. The lack of activities in the region also meant that states all approached the issue from a similar standpoint, with no need to justify or protect current practices. Instead, all parties had the opportunity to engage cooperatively. This idea has important implications for the engagement of non-Arctic states such as China, as discussed below.

To date, formal diplomatic discussions have been limited to the five Arctic Ocean coastal states: Canada, Denmark (for Greenland), Norway, Russia, and the U.S. The policy meetings have been complemented by three closed scientific meetings involving the same countries, in addition to various events outside the channels of international diplomacy (Table 1). Despite tensions between Russia and other countries concerning the Ukrainian crisis, the five countries signed the “Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean” in July 2015, a year after it was drafted in Nuuk, Greenland. The progression of events and meetings concerning a CAO fisheries agreement is shown in Table 1. Among the key next steps is the engagement of non-Arctic actors such as the European Union, South Korea, Japan, and China.

3. China and the Arctic

China is a near-Arctic nation [12]; what happens in the Arctic increasingly has great impacts on China, and vice versa. Climate change in the Arctic can affect China's weather, which in turn may have great impacts on China's agricultural production and living conditions [13]. The opening and commercial use of Arctic shipping routes also have great potential impacts on China's economic development and trade [13]. The development of Arctic mineral and petroleum resources is of great interest to China, as a major consumer of raw materials and producer of manufactured goods [14].

China has a long history of participation in the Arctic. China signed the Svalbard Treaty in 1925, and opened the Huang He research station there in Ny-Ålesund in 2004 [15], an icon of what Chinese scholar Kai Sun has called China's “substantive presence” in the Arctic. China has conducted six scientific expeditions in the Arctic since 1999, and in 2012 committed to making these voyages every two years. In August 2012, Chinese scientists aboard the

icebreaker *Xuelong* (Snow Dragon) completed the country's first trans-Arctic voyage from Shanghai to Iceland [16]. The goals of China's scientific expeditions to the Arctic include environmental concerns, aurora observations, and marine biological research. Social scientists have also contributed to Arctic research through various conferences and collaborations, such as the Sino-Russia Arctic Forum (established in 2012), China-Nordic Arctic Cooperation Symposium (2013), and Sino-U.S. Arctic Social Science Forum (2015).

China has realized from the beginning that cooperation with the Arctic states is the preferred path for China's participation in Arctic matters [17]. In 2012, Prime Minister Wen Jiabao visited Iceland and signed deals with Iceland for Arctic and marine scientific cooperation, and also agreements on trade, joint business ventures, and so on [18]. The same year, President Hu Jintao visited Denmark to consolidate and strengthen friendly cooperation between the two countries, including in the Arctic [19]. Those all paved the way for China's acceptance in the Arctic Council (a regional intergovernmental organization) as an observer in 2013, which it had sought since 2008 [15].

China has also been investing in Arctic areas. For example, in March 2015 China provided US\$15 billion to contribute to the financing of a US\$27-billion liquefied natural gas (LNG) plant on Russia's Yamal Peninsula, in cooperation with the Russian natural gas producer Novatek [20]. A Chinese company attempted a co-operative project with UK-based London Mining to develop the Isua iron ore mine in Greenland, but this failed when London Mining went bankrupt after iron ore prices plunged in 2014. However, the Chinese company retains the exploration rights for Isua as it acquired London Mining's subsidiary in Greenland. In 2015, General Nice Group, a Chinese private trading company, took over a large iron ore mine in Greenland, which was reported to be worth around US\$2 billion [21]. Chinese companies are also interested in investing in local infrastructure in the Arctic [22].

The potential for CAO fisheries, too, is of interest to China. With the collapse of fish stocks in China's coastal seas [23,24] and the rapid increase in the income of the Chinese population, China's demand for fish has been increasing rapidly [25]. This demand has led to recent expansion and improvement of China's distant-water fishing fleet (XG Lai, personal communication, January 2015). Specialists in the Chinese Academy of Social Sciences proposed that the long-term priority of China's agricultural development

should be its overseas fisheries [26]. China will inevitably be interested in fisheries throughout the world, including the CAO.

4. Science and diplomacy

At the intersection of China's interest in fisheries and its interest in the Arctic is its role in a CAO fisheries agreement. Observer status at the Arctic Council is recognition of China's contributions to Arctic research and Arctic affairs more generally, but observers play no role in the decisions that are made there. While the five Arctic Ocean coastal states have so far limited participation in CAO fisheries discussions, the recent declaration is the start of wider engagement, including perhaps a more substantive role for China and others than they enjoy at the Arctic Council. While China's role in developing Arctic resources causes concern in some areas, China's participation in a cooperative agreement to safeguard the CAO ecosystem and its fish stocks offers another pathway for China. And China brings its research and ice-breaking capacity to the discussion.

China could play an important role in investigating the marine living resources in the CAO. Scientists agree that there is little information about the CAO ecosystem, especially in the deep area [27]. Much information will be needed to manage sustainable fisheries in the CAO. By strengthening research in the region, China could demonstrate the importance it attaches to Arctic fisheries issues and to the Arctic in general, and its willingness to act cooperatively with Arctic states and others. For example, China could help to promote scientific cooperation agreements for the CAO and could push to establish appropriate research institutions that bring together the expertise, capacity, and funds of the Arctic and non-Arctic states.

The government of China is further strengthening diplomatic relations with Arctic states through scientific research. Science diplomacy can help build trust and foster intercultural understanding. Science diplomacy is not new [28]. A prominent example is the governance of Antarctica, where the soft power of science has helped strike a balance between national and common interests [28]. In 1959, the Antarctic Treaty was signed and came into force in 1961 [29]. The most important common interest articulated in the Treaty is the freedom of scientific research, including the exchange of data and people. This is crucial for informing management strategies to protect the Antarctic environment and ensure the sustainable use of its resources [28]. During the Cold War, the Antarctic Treaty kept the region peaceful and fostered scientific cooperation, despite tensions and battles elsewhere in the world [29].

In the near future, China might take several steps further towards the governance of Arctic fisheries. First, China must attach great importance to the Arctic fisheries issues and strengthen the scientific research on the Arctic marine living resources. Second, as a stakeholder in Arctic fisheries, China needs to strengthen international cooperation with the Arctic countries, individually and collectively. Some journalists in China argue that the sooner China participates in the Arctic fisheries issues, the better it can act in its own interests for this and other Arctic matters [30].

5. Conclusions

CAO fisheries is more than a fishing issue, it opens a new path for Arctic governance and for international cooperation in general. The policy-first approach to CAO fisheries is an innovative way to address potential problems before they become real problems, following the precautionary principle and avoiding the exploit-first, manage-second disasters seen in many fisheries around the

world [31]. Doing so allows all participating states to act cooperatively from the beginning, rather than separating into competing sides and judgments about which are the good actors and which the bad. The alternative could lead to power struggles and missed opportunities for good governance.

China is trying hard to strengthen the connection between China and the Arctic and to participate in Arctic affairs. An over-emphasis on resource development may alienate Arctic states or at least some constituencies in those states. Contributing to the research of Arctic marine living resources and the protection of the Arctic environment, however, is likely to be seen as a more benign role. The CAO fisheries negotiations may thus provide an opportunity for China to be involved in Arctic affairs in a new and non-threatening way, perhaps reducing concerns among Arctic states about China's intentions and thereby creating new opportunities for collaboration based on better relations and better mutual understanding.

The management of CAO fisheries is at the intersection of geopolitics, policy, diplomacy, and science. The countries' individual interests can only be achieved through effective management of the CAO fisheries, which can only be achieved cooperatively. In this case, cooperation also means the involvement of non-Arctic states such as China. The recognition of the respective roles of policy and science may be an effective way of putting the precautionary principle into practice and harnessing the mutual interests and abilities of the various states that have Arctic interests. Such a precedent would be a valuable contribution to effective governance of international waters in the Arctic and could provide a useful model for other regions as well.

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