A case for the commons: The Snow Crab in the Barents

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ABSTRACT

Closing of the marine commons increases economic returns and slows depletion of valuable ocean resources. Rights-based management is widely used for fisheries rationalization. Regulators with sound biological and economic information can in theory set overall harvest control rules that protect the fish stocks, and manage for external costs and benefits from harvest. These may include ecosystem damages, overcapitalization in the fishery, and/or equity concerns. Regulatory efforts and related rights-based management instruments may increase the returns to fishery stakeholders but miss important challenges that are increasing under climate change. These include transboundary resource management and tradeoffs between local economic returns and Total Economic Value. The case of the valuable, yet invasive, crab species, Chionoecetes Opilio (Snow Crab) in the Barents Sea illustrates the concerns. The spread of the crab has known and unknown ecosystem and commercial fishery risks, particularly to uncertain ecosystem values. We show how the progression of the biological invasion interacts with human strategic behavior to identify limitations of management options. Open access harvesting of the species in international waters has generated a positive spillover effect by slowing the westward spread of the species to sensitive benthic ecosystems. This benefit is threatened by reclassification of the crab as a “sedentary species” (one which is not capable of leaving the seabed when harvestable (UNCLOS, 1982, article 77, part VI)). This shifts the regulatory environment for the crab in ways that exacerbate the invasion in exchange for protection of local gains. Such problems will increase in magnitude and impact as climate changes increasingly affect species’ ranges. Optimal decision-making regarding profitable species in new ecosystems must incorporate how strategic institutional shifts occurring in response to the economic incentives asymmetrically affect local and global stakeholders in addition to standard concerns over ecological and economic damages.

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1. Introduction

The global fishing commons has shrunk and become increasingly overtaxed in the past half century (Jasper, 2010). This general trend has led to recommendations and actions that promote limited access through sovereign claims in the world’s fisheries. It is well established in the fisheries economics literature that closing the commons produces a clear economic boon (Birkenbach et al., 2017; Munro and Scott, 1985), when utilized with private, decentralized, or common property management regimes (Ostrom et al., 1999). When concerns have been raised in the literature, they have generally focused on shifts in equality and distribution of benefits rather than overall benefit levels (Da-Rocha and Sempere, 2015). Here, we argue that the details of the ecological process matter significantly in determining the net benefits, further mitigating the realized economic gains. This is particularly true in cases of invasive species and species range expansions, which will continue to increase in frequency and extent under current climate change projections (Perry et al., 2005). We examine this complex story through the case of the Snow Crab (Chionoecetes opilio) invasion in the Barents Sea in order to bring awareness to important dimensions of commons management that the literature has missed.

The Snow Crab’s recent introduction and spread in the Barents Sea is a harbinger of expected marine impacts from climate change. The biological invasion of this profitable species reflects the limitations of political, economic and ecological management of fisheries and transboundary marine resources that become more salient as climate change shifts habitat ranges for commercial
species. We provide a framework for understanding how the shifts in incentives initiated by such species movements may be inte-
grated with biological factors, climate factors, and economics to
inform policy analyses and decisions for improved outcomes. Multiple spatially differentiated property rights regimes affect the
Barents’ Snow Crab fishery. These provide comparative evidence
from which we draw to illustrate the limitations of applying con-
tensional wisdom regarding how to maximize benefits of marine
resources, particularly in the case of invasive species.

The expanding presence of the Snow Crab in the Barents Sea has
become a topic of growing interest for political analysts and sci-
entific experts. The biological invasion has political, economic and
ecological ramifications that extend far beyond the typical case of
an introduced species. Political scientists have pointed out some of
the existing challenges. These include the applicability of interna-
tional invasive species agreements to a case with significant po-
tential economic benefits, behavior of different stakeholders in
international waters in the Barents, and the complex and disputed
property rights surrounding Svalbard, into which waters the inva-
sion is heading (Hansen, 2016; Tiller and Nyman, 2017). They
rightly surmise that the stakes for Norway are higher than the value
of the fishery alone. Norway is acting as though the Snow Crab’s
classification as a sedentary species creates a test case for
involving property rights to the Svalbard Continental Shelf (CS).

What the approaches of these papers have missed are the
connected shifts in incentives that illustrate the importance of fully
integrating biology, climate factors, and economics into policy an-
alyses and decisions. Two property rights issues are at play in the
Barents that affect the overall net benefit of the crabs’ presence in
the region. We examine economic incentives under these rights,
and their biologically imposed constraints and spillovers, to explain
how strategic regional decisions to conserve the crab stocks in the
Barents may reduce global social welfare outcomes, and how
maintaining uncertainty about these reductions increases the
ability of local stakeholders to benefit at global expense.

The first property rights issue is the contention and uncertainty
surrounding the extent of Norway’s sovereignty over the Svalbard
CS. Both the water column and the continental shelf of the Svalbard
Fisheries Protection Zone (FPZ) have provided controversy for
years. While Norway asserts the Svalbard CS and the Svalbard FPZ
are theirs to manage and benefit from (Ministry of Foreign Affairs,
2009), Russia and others contest this view through the 1920 Sval-
bard Treaty, with the unique terra nullius arrangement on land
extending to the continental shelf (Rossi, 2013; Thomassen, 2017).
The Treaty recognizes Norwegian sovereignty over the area, while
it simultaneously ensures equal access and treatment of the sig-
natory parties for commercial activities and natural resource
extraction. The intensity of this controversy is increasing as
resource pressures mount around the world.

The second property rights issue stems from changes involving
the international waters of the Loop hole between Russia and Nor-
way. Fishing activity in the international waters of the Loop hole,
which is outside the Russian and Norwegian Exclusive Economic
 Zones (EEZs), is formally under the jurisdiction of the North-East
Atlantic Fisheries Commission (Ebbin et al., 2005), but the new
Snow Crab fishery there began with open access harvesting in 2012.
At that time, both Norway and Russia had been studying the Snow
Crab invasion and had yet to open fisheries inside their EEZs. In
Norway, this is because there is little Snow Crab population in the
EEZ; in Russia, this is because they wish the stock to support a long-
term fishery.

During the 20th North Atlantic Fisheries Ministers’ Conference
(Valletta, Malta, 16–17 July 2015), Norway and Russia agreed on the
designation of the crab as a sedentary species. This decision
transferred its status from a water column species to a continental
shelf resource (Joint Norwegian Russian Fisheries Commission,
2015; Tiller and Nyman (2017) point out that there is a general
disagreement among states on whether the Snow Crab is sedentary
or not, but Hansen (2016) notes that no countries have directly
questioned its sedentary status in the Barents and therefore it falls
under full sovereignty of Russia and Norway. Formal EU recogni-
tion of this designation remains part of the currently-defunct negotia-
tions between Norway and the EU, with a proposed July 2017
statement confirming such recognition going unsigned (Council
of the European Union, 2017). In the meantime, its designation as
a sedentary species has shifted the crab from being a fishery
resource in the international waters of the Loop hole to a shelf
resource that is Russian and Norwegian property on their respective portions of
the continental shelf. These rights extend beyond the 200 nautical
miles of both the Russian and the Norwegian EEZ. This closes the
Loop hole, placing about 85% of it on Russian CS and the rest on
Norwegian CS.

The provisions of the United Nations Convention on the Law of
the Sea (UNCLOS) allow the two countries to exercise sovereign
rights over their extended continental shelves and therefore to
explore and to exploit the natural resources lying on the shelf, one
of which is now the Snow Crab. Furthermore, the designation of
the species as sedentary implies that there is also no requirement by
the UN Fish Stocks Agreement for managing the species in coop-
eration. This is not undisputed. The North-East Atlantic Fisheries
Commission (NEAFC) has the responsibility to “ensure the long-
term conservation and optimum utilization of the fishery
resources in its Convention Area, providing sustainable economic,
environmental and social benefits,” within the international waters
of the NEAFConvention, which includes the Barents Sea Loop hole
(NEAFC, 2017). This organization tracks licenses issued by the Eu-
ropean Commission to vessels for Snow Crab fishing in the Loop
hole. In fact, NEAFC’s authority to track European Commission
licenses in the Loop hole stems from earlier disagreements over cod
fishing that began when climatic changes increased cod in the
Loop hole (Stokke, 2001), serving as another precedent for the
challenges ahead.

The sedentary species designation increases the potential
Russian stake in the Barents Snow Crab by increasing their control
of the fishery asset. The extent to which they exercise control over
this area will be a function of the incentives to spend on enforce-
ment of their fishery regulations. Russian and Norwegian incen-
tives and management of the crab before and since the
designation mean that the positive externality generated by the
open access harvesting in the Loop hole (67,100 km² on the in-
vasion’s frontier) is disappearing as the Russians extend enforce-
ment outside their EEZ. We argue that, as the Russians have so far
maintained a closed and limited experimental, and now TAC
controlled commercial, fishery for C. Opilio in the Barents, such
extension of the enforcement is expected to continue. Russian
enforcement may also help Norway more than it helps Russia itself;
Russian closures increase the probability of more and longer term
crab stock in Norwegian waters. Thus Norway may have more
incentive to close their portion of the commons and to encourage
the Russians to do the same.

Should both Russia and Norway successfully close the commons
and manage the areas for maximum economic yield, the question
of whether the capture of these resource rents is greater than global
losses from the spread of the invasion westward is still an open one.
Concerns about uncertain damages remain unalleviated. Potential
externalities from a spread of the crab beyond Norwegian and
Russian jurisdictions present additional, though uncertain, costs.

Finally, lessons from dynamics of Snow Crab populations in
Canada, Greenland and the Pacific may be pertinent to the man-
agement in the Barents. Evolving climatic conditions may have
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