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Commentary

Reforming Atlantic Fisheries

Lessons from Iceland

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The collapse and subsequent moratorium on Atlantic cod has had profound economic, political, and sociological consequences in Atlantic Canada. Following the 1992 moratorium, the federal government transferred billions of dollars to Atlantic fishers to compensate for the rise in unemployment. It has since failed to reform fisheries management in Atlantic Canada, where unemployment remains persistently higher than the remainder of the country.

Despite several exogenous factors that contributed to the decline of Atlantic Canada's cod stock, the federal government's mismanagement of the country's fisheries effectively in the years preceding the 1992 moratorium also played a crucial role. More disturbing, however, is the failure to produce meaningfully reform fisheries management. Instead of consulting with local communities about sustaining their ecosystems or pursuing alternative management schemes, the federal government opted to uphold the status quo, which has failed to improve cod stocks or create alternative employment prospects for those affected. The status quo, in fact, creates an incentive

to rely on government transfers, reinforcing unemployment.

Iceland, much like Canada, experienced the collapse of its herring stock in the 1970s, prompting the government to implement a four-year moratorium, during which the government reformed fisheries management and implemented an individual transferable quota (ITQ) regime. The ITQ is a property rights mechanism that affords shares as a percentage of the annual total allowable catch (TAC) to individual fishers and fishing fleets to encourage long-term sustainability and fleet economization. In Iceland, for instance, the ITQ management system applies to the majority of the country's fisheries, resulting in greater fleet economization and stock regeneration above sustainable levels.

The similarities between Iceland and Newfoundland constitute a natural experiment, whereby the success of Iceland's ITQ management system can inform Canadian fisheries reform. Furthermore, British Columbia adopted a limited ITQ system, which, according to the Department of Fisheries and Oceans

(DFO), has yielded positive results (although opponents assert that these results are misleading).¹ There are, nevertheless, very clear lessons to be learnt from Iceland’s fisheries management system, which has since facilitated Iceland’s herring stock regeneration above pre-moratorium levels, in addition to strengthening Iceland’s other marine species stock.

The most obvious lesson is relinquishing managerial control of Canada’s fisheries to the provinces, which are invariably familiar with managing their local resources. In this way, local fishers (who were, in the years preceding Atlantic cod’s collapse, frequently ignored), regional scientists, and industry experts, all of whom are capable of offering sound advice to fishers and politicians, have a greater capacity to manage their local environment. Furthermore, adopting an ITQ system reduces waste by compelling fishers to economize their catch (the added effect of which is increased landed catch values and reduced overcapitalization).

Under the current system, fishers have no incentive to economize their efforts since fish are a commonly held resource. This is a classic public goods problem. When resources are commonly held, there is an incentive to free ride (since the costs are diffused, not absorbed). In Canadian fisheries, for instance, there is an incentive to use smaller nets that catch more fish, since fishers are competing with one another over a commonly held resource. In this scenario, every fisher is interested in catching *as much fish as possible*, in fear of not catching any at all. Because it is possible, in theory, for a single fishing fleet to harvest the entire available supply, fishers and fleets engage in a race to the bottom. The ITQ system, however, offers an incentive to economize the catch, since, via property rights, each fisher and fleet has a prescribed portion of the TAC and, thus, a chronic interest in the long-term sustainability of the fishery.

Introduction

Despite the Atlantic Northwest’s vast fishing history, the Canadian government implemented a moratorium on Newfoundland and Labrador’s (NL) cod industry

¹The DFO’s report, *Employment Impacts of ITQ Fisheries in Pacific Canada*, can be found at <http://www.dfo-mpo.gc.ca/Library/336921.pdf>.

in 1992, begging the question: What is responsible for the collapse of NL’s cod stock and what policy alternatives are available to help bolster fisheries management?

Certainly, there were developments beyond Ottawa’s control that contributed to the decline of NL’s cod stock. The inability to implement laws governing the country’s coastal regions beyond twelve nautical miles, for instance, placed the federal government in a peculiar position, such that applying restrictive regulations to fishers and fleets *within* Canadian territory disproportionately benefited those *outside* Canadian territory. The political will to enforce these regulations on domestic industry was, therefore, absent.² Furthermore, rapid technological innovation in the fishing industry made it possible for trawlers to increase their landed catch dramatically beyond levels previously anticipated, resulting in the rapid decline of Atlantic Northwest cod (and other species).

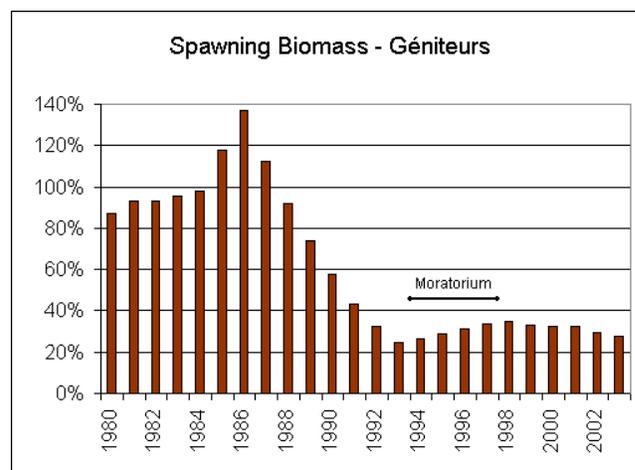


Figure 1: Spawning Biomass of Cod in the Northern Gulf

Although it would be unreasonable to fault the federal government for issues *beyond* its control, we cannot ignore Ottawa’s missteps on issues *within* its control. The inability (and unwillingness) to pursue meaningful fisheries reform after the 1992

²Mason, F. (2002). “The Newfoundland Cod Stock Collapse: A Review and Analysis of Social Factors.” *Electronic Green Journal*, UCLA, 1-21; Wappel, T. (2005). “Northern Cod: A Failure of Canadian Fisheries Management.” *Report on the Standing Committee on Fisheries and Oceans*, Parliament of Canada. In addition, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), recently nominated Atlantic Northwest cod for ‘endangered species’ status.



moratorium is a prime example. Instead, Ottawa transferred billions of dollars to the Atlantic Provinces for nearly a decade in an attempt to revive a struggling industry. These transfers created perverse incentives that reinforced, and, perhaps, encouraged, unsustainable behaviour. As a result, the Atlantic Northwest cod stock remains dangerously low and there are no signs of regeneration (**Figures 1, 2, and 3**).

Suffering from strikingly similar circumstances, Iceland’s herring stock collapsed in the 1960s, prompting the government, in 1972, to implement a moratorium on capturing herring. The logic behind Iceland’s decision to implement a moratorium was that prohibiting fishers and fleets from capturing herring would allow its stock to regenerate. Unlike Canada, however, Iceland removed the moratorium in 1976 and implemented an ITQ management system to sustain future generations of herring, which has since repopulated beyond sustainable levels (**Figures 4 and 5**). In addition, Iceland extended the ITQ in 1991 (and again in 2004) to nearly all of its fisheries, resulting in greater fleet economization and regeneration of other species above sustainable levels.

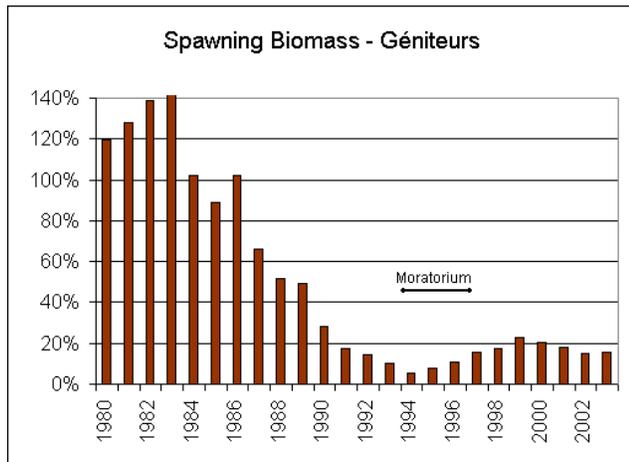


Figure 2: Spawning Biomass of Cod in the Southern Gulf

It is clear that Iceland’s success with the ITQ provides an alternative to Canada’s inability to enforce common-property resource management. An overview of Iceland’s herring collapse and subsequent experiment with property-rights resource

management is, therefore, useful for Canadian policymakers concerned with not only the Atlantic fishery’s recovery, but also its re-emergence.

Newfoundland Before and After the 1992 Moratorium

Before joining the Dominion of Canada in 1949, Newfoundlanders managed their coastal fisheries using local expertise acquired through a vast history of subsistence and commercial fishing. The native Beothuk people fished cod until the arrival of British and French settlers in the 16th century, after which European fleets monopolized the capture and production of Atlantic cod until finally relinquishing control to Newfoundlanders at the turn of the 20th century. Until 1949, English and Irish settlers–NL’s primary demographic–used their historical and cultural understanding of the Atlantic region to develop a prosperous cod fishing industry that persisted until 1949, when Newfoundlanders yielded control of their coastal fisheries to the DFO.

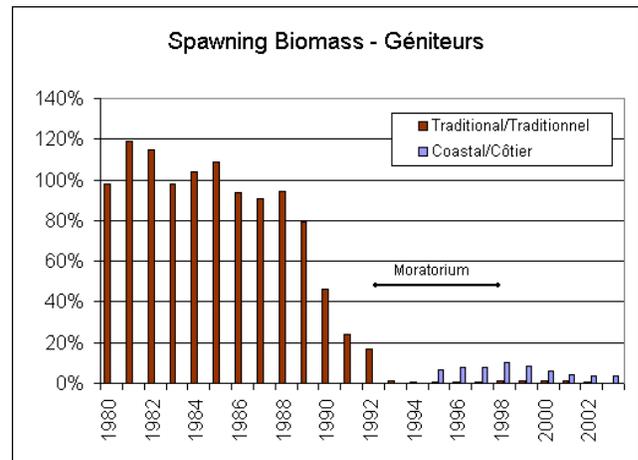


Figure 3: Spawning Biomass of Northern Cod

After 1949, NL’s fishery underwent a series of developments that led to their eventual collapse. In the 1960s, for instance, larger and more powerful trawlers (many of which were equipped with onboard freezing and processing capabilities) proliferated in the Atlantic fishery. This allowed fleets to remain at-sea for longer periods, yielding larger catches than before. In addition, new technologies, such as sonar, radar, GPS, and long-lines (a single stationary line



with multiple hooks), increased fleet capacity for both locating and capturing cod. These successes made the Grand Banks fishery, located southeast of Newfoundland, an attractive spot for international fleets from Asia, Europe, and the Soviet Union. The combined effect of larger, technologically advanced trawlers and the surge of international fleets in Atlantic waters led to unprecedented annual catches throughout the 1960s and 1970s (Figure 6).

The ratification of the United Nations Convention on the Law of the Sea in 1977 extended jurisdictional control over coastal waters from 12 nautical miles to 200 nautical miles, prompting the federal government to impose restrictions on fishing in the Grand Banks fishery and other coastal waters within Canada’s exclusive economic zone (EEZ). Canada’s conservation efforts, however, failed to prevent exploitation for three reasons: 1) a heavily populated portion of the Grand Banks fishery—its Nose and Tail—is located beyond Canada’s EEZ and is, therefore, not subject to domestic regulations, 2) domestic regulations reflected industry demands (instead of scientific evidence), placing the emphasis on employment and revenue, as opposed to efficient production and sustainable fisheries management, and 3) government subsidies and tax exemptions created perverse incentives that encouraged overfishing. Furthermore, the DFO frequently overestimated the TAC, choosing, instead, to ignore fleet efficiency gains, discarded cod rates, and various other determinants of stock biomass.

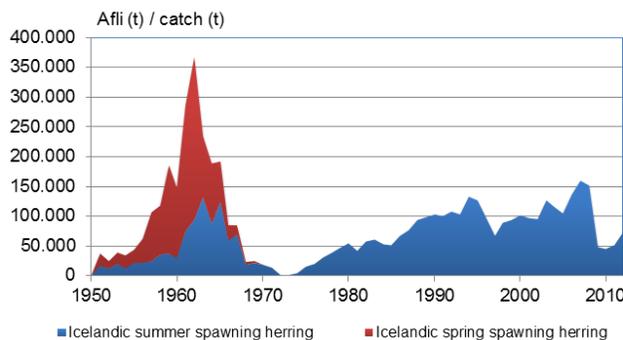


Figure 4: Total Catch of Icelandic Summer-spawning and Spring-spawning Herring

In addition, international conservation efforts beyond Canada’s EEZ failed to manage the declining fish

population. The non-binding nature of the Northwest Atlantic Fisheries Organization (NAFO)³, for instance, permitted international fleets to shirk regulations and recommendations, resulting in a tragedy of the commons.⁴ The common-property status of international waters, similar to the common-property status of Canadian waters, resulted in a race to the bottom. Furthermore, the polarity of the Cold War, and its effect on political and economic consensus building, precluded all chances of introducing (let alone enforcing) an international directive against overfishing. In Canada, the federal government ignored warnings from local fishers about smaller yields and younger fish populations (both of which, as it turns out, indicated a massive decline in cod stock biomass). As a result, the 1968 annual catch peaked at 810,000 tonnes (despite overwhelming evidence suggesting the demise of the Atlantic Northwest cod) and, between 1988 and 1991, the annual catch dropped 64 per cent. In 1992, the federal government—unable to enforce regulations beyond its territorial control (and, seemingly, *within* its territorial control)—implemented a moratorium on cod fishing with Canada’s EEZ.⁵

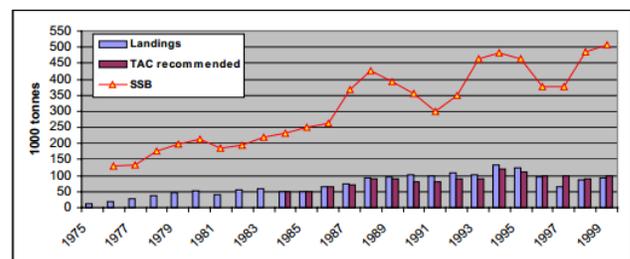


Figure 5: Spawning Stock Biomass, Landings, and Recommended TAC for Icelandic Herring

The circumstances that led to the 1992 moratorium illustrate a “tragedy of the commons.” Following decades of mismanagement, a lack of defined property rights, and the inability to enforce international standards destroyed one of Canada’s

³NAFO is the international body responsible for setting TACs in regions of the Atlantic that are beyond territorial control.

⁴A tragedy of the commons occurs when individuals (in this case, fishers and fleets) aggressively pursue a common-property resource until depletion, despite the negative impact this has on each individual.

⁵Hutchings, J. and R. Myers. (1994). “What Can Be Learned from the Collapse of a Renewable Resource? Atlantic Cod, *Gadus Morhua*, of Newfoundland and Labrador.” *Canadian Journal of Fisheries and Aquatic Sciences*, 51, 2126-2146, p. 2128.

most valuable renewable resources, pushing 35,000 fishers into unemployment and crippling an entire industry. In response, the federal government introduced a variety of relief programs intended to support and retrain unemployment individuals. From 1992 until 1994, for instance, the Northern Cod Adjustment and Rehabilitation Program provided weekly benefits to 28,000 individuals and, from 1994 until 1998, the Atlantic Groundfish Strategy offered individuals a monetary incentive to either retire or retrain in another industry. At the same time, though, two significant developments occurred that alleviated pressure in the provincial labour market: 1) NL experienced a relatively large out-migration that accounted for 10 per cent of the province’s total population and 2) thousands of fishers entered the shellfish industry, which emerged in response to the decline in Atlantic cod (Figure 7). In any case, however, government transfers are short-term solutions to long-term problems. In the context of the 1992 moratorium, for instance, it would have been more beneficial to implement a more responsive management structure that emphasized property rights and afforded Atlantic fishers a stake in their industry. Instead, Ottawa maintained the status-quo—arguably to the chagrin of Atlantic Canada.

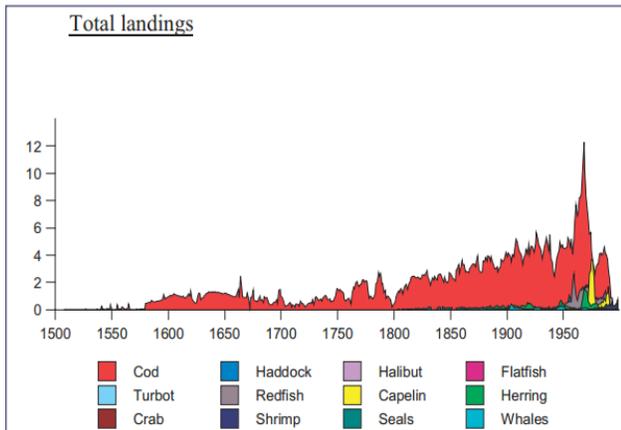


Figure 6: Species Landing by Ton in Newfoundland and Labrador (1850-2000)

It has been just over 20 years since the federal government imposed a moratorium on Atlantic cod—17 years longer than Iceland’s herring moratorium—and there are few signs of a sustainable recovery. Iceland, however, managed to implement sweeping

reforms that facilitated both stock regeneration and employment stabilization—a result replicated in British Columbia.⁶ One study, for instance, highlights how Iceland’s fisheries management costs are lower relative to NL’s, while its annual catch value is substantially higher (Figures 8 and 9). In Canada, though, the federal government insisted that maintaining the status-quo, while also transferring billions to unemployed fishers on the misguided premise that they would find employment elsewhere in the province’s fishing industry, was the most viable solution. As a result, the Canadian outcome is dramatically different from its Icelandic counterpart.

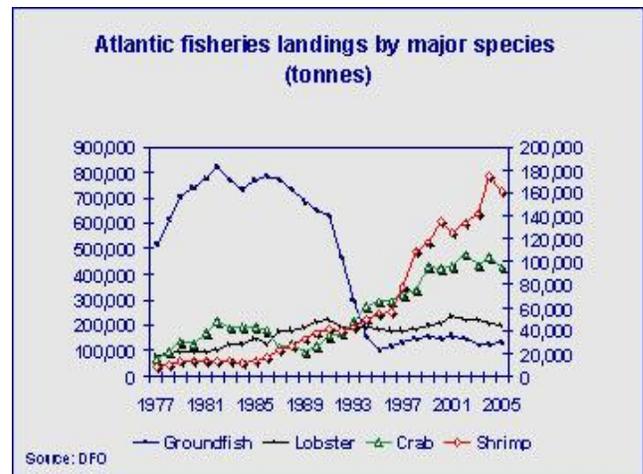


Figure 7: Atlantic Fisheries, Species Landing by Ton

Ignoring these problems and, instead, transferring billions in welfare payments creates a dangerous precedent, especially considering the overcapitalization of Canada’s fishing industry. Until the federal government acknowledges this, however, and addresses its management deficiencies, Atlantic fishers will continue to suffer. Furthermore, these problems will undoubtedly manifest in other parts of the region’s fishing industry if Ottawa endures its current management regime. For instance, the shellfish industry—similarly overcapitalized with processors and harvesters—operates under the same conditions as the formerly prominent cod industry and, as a result, faces the same risk of collapse. The outcome, assuming no change in Ottawa’s approach

⁶The DFO’s report, *Employment Impacts of ITQ Fisheries in Pacific Canada*, can be found at: <http://www.dfo-mpo.gc.ca/Library/336921.pdf>.



to fisheries management, will likely resemble Ottawa's previous efforts to stabilize the region: federal transfers. Reforming Canada's fisheries management regime is not only, therefore, a corrective measure, but also, in fact, a proactive one.

In the meantime, what lessons can we draw from Iceland's herring collapse and subsequent reforms and how can the Canadian government facilitate sustainable fisheries management in Atlantic Canada?

An Overview of Iceland's Herring Collapse and ITQ Reforms

By virtue of their striking similarities, comparing Newfoundland⁷ and Iceland is somewhat a natural experiment, through which we can evaluate the effectiveness of different policy approaches in terms of fisheries management. These similarities facilitate a much smoother comparison than, say, Newfoundland and British Columbia (which, like Iceland, also implemented the ITQ in various provincial fisheries). Newfoundland and Iceland have similar histories, cultures, economies, and, most importantly, demographics. Therefore, looking carefully at Iceland's reforms and considering whether they may be successful in Newfoundland is beneficial. Some key similarities are:

- Iceland's population is 320,000; Newfoundland's population is 480,000
- Iceland is 103,001 km²; Newfoundland is 108,860 km²
- Both Iceland and Newfoundland have a vast history of fishing and rely on the fishing industry as a primary source of revenue (of which cod represents, or represented, a large share)
- The water surrounding both Iceland and Newfoundland, up until the 1970s, was considered "common property" and was largely occupied by international fleets that contributed to stock depletion until the United Nations extended both Iceland and Canada's EEZ to 200 nautical miles

⁷Newfoundland refers to the Island of Newfoundland, not the Province of Newfoundland and Labrador.

- Iceland's herring stock collapsed in the 1960s and Newfoundland's cod stock collapsed in the 1980s, resulting in government-imposed moratoria
- In 2012, Iceland's fishing industry employed 2.9 per cent of the country's labour force⁸; Newfoundland's fishing industry employed 3.3 per cent of the province's labour force⁹
- Both Iceland and Newfoundland have abundant energy sectors that require additional skilled labour

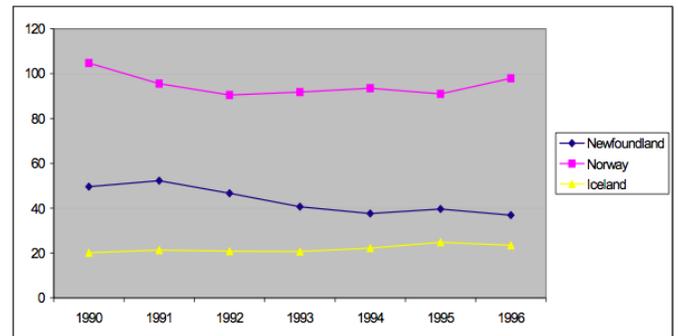


Figure 8: Fisheries Management Costs in Iceland, Newfoundland, and Norway (USD)

There are, however, four important distinctions between Iceland and Newfoundland:

- 1) Iceland gained independence in 1944 and its government acquired control of the country's coastal fisheries, whereas NL joined the Dominion of Canada in 1949 and its government relinquished control of its coastal fisheries
- 2) Iceland utilizes an ITQ regime that gives fishers property rights that support sustainable fisheries management, whereas NL's fisheries, and the resources therein, are "common property resources" that are

⁸Statistics available at:

<http://static.is/?PageID=1191&src=https://rannsokn.hagstofa.is/pxen/Dialog/varval.asp?ma=VIN01103%26ti=Employed+persons+by+economic+activity%2C+sex+and+regions+2008%2D2012+%28NACE+REV+2%2E%29++++%26path=../Database/vinumarkadur/rannsoknir/%26lang=1%26units=Fj%F6ldi>

⁹Statistics available at:

http://www.stats.gov.nl.ca/statistics/labour/pdf/employment_fishing_industry.pdf

- managed by the federal government, which issues a TAC that applies to each species
- 3) Iceland’s government lifted its herring moratorium four years after its implementation, after which the government implemented an ITQ regime, whereas Canada has yet to lift its cod moratorium after 20 years and continues to treat its marine resources as common property
 - 4) Iceland’s herring stock has regenerated above sustainable levels and the ITQ has been extended to the majority of the country’s marine species, whereas Newfoundland’s cod stock has not regenerated and Canada’s fisheries remain federally managed using a common property TAC scheme

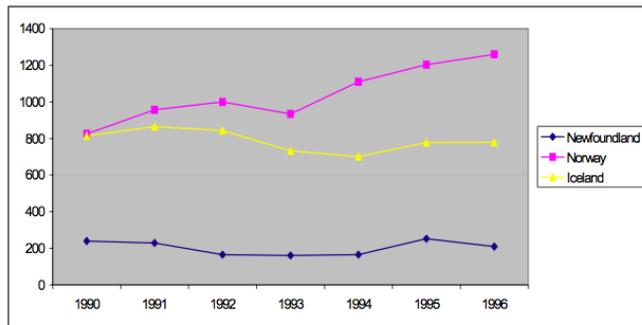


Figure 9: Landed Catch Value in Iceland, Newfoundland, and Norway (USD)

In the latter half of the 20th century, Iceland engaged in a series of small nautical confrontations with the United Kingdom over sovereign rights in the Northern Atlantic. The series of disputes, aptly named the “Cod Wars,”¹⁰ began in the 1950s and continued through the 1970s until the United Nations extended to all nations territorial control over the coastal waters within 200 nautical miles of a country’s land-border. Similar to the collapse of the Atlantic Northwest cod, the stock of several species within Iceland’s coastal waters declined to historically low levels, many of which faced collapse. Following Iceland’s herring stock collapse in the 1960s, the government imposed a moratorium on capturing herring so that stocks could regenerate. In

¹⁰Despite the name “Cod Wars,” there were no casualties. Rather, both conflicts were a show of strength between the two countries.

1976, however, Iceland’s government lifted the moratorium and implemented the country’s first comprehensive ITQ management system. Instead of treating marine resources as common property, the government sets an annual TAC based on scientific recommendations, which determine, for each species, how much an individual fisher or fishing fleet is permitted to catch.

By determining and apportioning shares of the TAC, which is both rigorous and robust in its estimations, the government invariably creates a more transparent and accountable environment for managing the country’s fisheries. Using property rights, for instance, compels quota-holders to maximize their annual harvest in the most efficient manner.¹¹ Anything short of this damages the wellbeing of not only the shareholder, but also the community. In effect, the ITQ creates an incentive for fishers and fleets to take measures that safeguard the fishery’s long-term sustainability, as opposed to common-property resource management, which creates an environment that compels fishers and fleets to consider only the short-term return of their respective fisheries. In Canada, for example, the common property status of the country’s fisheries obliges fishers and fleets to catch as many fish as possible, regardless of the long-term impact on the fishery. Competing for common-property resources, in other words, is a zero-sum game in which the loss of one fisher is, theoretically, the gain of another.

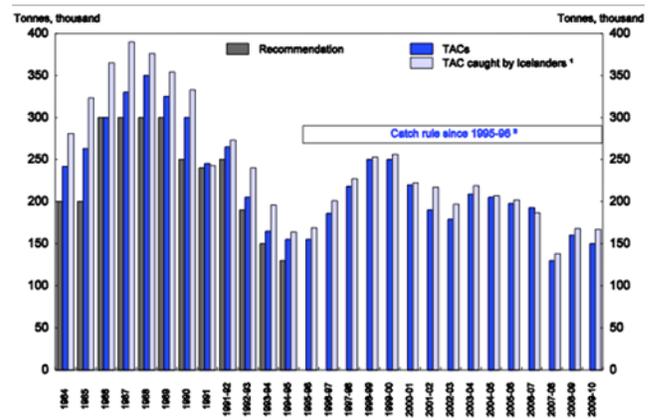


Figure 10: Recommendation, TAC and Actual Cod Landings

¹¹For more information, see Costello C., S. Gaines, and J. Lynham (2008): “Can Catch Shares Prevent Fisheries Collapse?” in the journal *Science*.



The downside of an ITQ system is its exclusiveness. Using property rights to manage any resource, by necessity, limits access. Short-term unemployment may occur, as a result, but employment stabilizes in the long-term (Figure 10). In a report commissioned by the DFO, “Employment Impacts of ITQ Fisheries in Pacific Canada,” the authors analyze the ITQ’s impact on British Columbian fisheries and determine that, “Changes in the economy usually involves the substitution of capital for labour. This is what happened in ITQ fisheries where each active vessel or operating unit caught more fish, but each ITQ crew member worked much longer and generally earned more money over the season.” The question, however, is whether long-term sustainability is more important than immediate gains (Figure 10). In any case, fish stocks, like any commodity, are exclusive and stand a much better chance of surviving as private property.

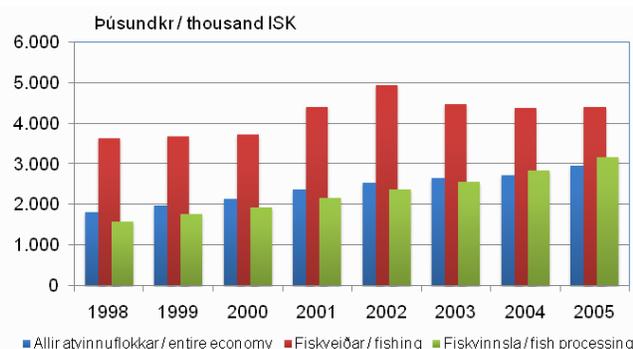


Figure 11: Average Yearly Income by Main Economic Activity in Iceland

Iceland’s initial experiment with the ITQ was successful. The United Nations Food and Agriculture Organization, for instance, asserts, “Herring catches have increased almost ten-fold” and “fishing effort has declined substantially.”¹² These statements demonstrate that ITQs have the potential to reverse stock depletion, mitigate overfishing, and encourage fishers and fleets to economize their portion of the TAC. In addition, the increase in catch value and

subsequent decrease in operating costs offset the aforementioned risk of short-term unemployment (Figure 11). The system not only worked, but it worked well.

Despite Iceland’s success with stock regeneration, however, NL faces a number of biological and ecological impediments that adversely affect the province’s ability to regenerate Atlantic Northwest cod stock. Because NL’s cod stock plummeted for such an elongated period, and because both the federal and provincial government failed to implement reforms in a timely manner, other marine species assumed its predatory status, stunting its ability to regenerate as quickly as Iceland’s herring stock. It is, therefore, unlikely that Atlantic Northwest cod will regenerate back to sustainable levels, not to mention not to mention *beyond*. Atlantic fishers, however, have shifted their resources toward catching shellfish—such as crab, lobster, and shrimp—and, thus, extending the ITQ to these resources can potentially safeguard the Atlantic’s shellfish industry (which is beginning to experience similar signs of collapse).¹³

Iceland’s success with the ITQ model suggests that other jurisdictions, such as Newfoundland, may benefit from implementing a similar management system. Adopting ITQs in a country the size of Canada, however, where the federal government retains a great deal of control over the country’s coastal fisheries is much harder than adopting an ITQ in a smaller country, such as Iceland. Iceland benefits, for instance, from a smaller population and landmass, making it much easier to include input from communities that are more knowledgeable and better equipped to manage their local resources. Furthermore, Iceland is a sovereign state and, as a result, it is not subject to the same barriers and impediments as NL faces as a province. Nevertheless, neither NL, nor any province, requires full sovereignty to manage their respective fisheries. Canada’s federal structure, in fact, exists to apportion powers between the federal and provincial governments and, therefore, the provinces need only

¹²Runolfsson B. and R. Arnason. (2010). “The Effects of Introducing Transferable Property Rights on Fleet Capacity and Ownership of Harvesting Rights in Iceland’s Fisheries.” *FAO Corporate Document Repository*. Available online at <http://www.fao.org/docrep/005/y2498e/y2498e04.htm>.

¹³A June 2006 report published by the DFO demonstrated that snow crab fisheries currently risk collapse. The DFO suggested reducing the TAC and limiting the fishing season to three months. (See http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/reports-rapports/sc-cn_e.pdf).



negotiate with the federal government to obtain greater control over their coastal resources.

The federal government could conceivably implement an ITQ regime and apportion shares of the TAC without relinquishing control to the Atlantic Provinces. However, Atlantic Canadians are inherently familiar with their local resources (both constitutionally and environmentally) and, therefore, devolving powers to the provinces is a safer measure of ensuring that regional concerns are represented in the most efficient manner possible. For instance, the ITQ is not, in and of itself, the sole determinant of successful fisheries reform in Canada. In fact, it is additionally necessary to create a structure in which the provinces exercise a greater amount of control over their respective fisheries than previously. This not only facilitates communities-based input from local fishers, but also it ensures a more transparent and accountable governance arrangement. Iceland's smallness, for instance, naturally permits a more inclusive discussion about fisheries management that includes academics, scientists, lawyers, politicians, and the public. In Canada, however, Ottawa's relationship with its provincial counterparts is highly bureaucratic and, as a result, it is necessary to devolve as much power to the provinces as constitutionally permitted. Nevertheless, Ottawa could serve an important role by controlling the transition of power and advising the provinces about fisheries management.

Initial Allocation, Transferability, and Enforcement

There are several ways to determine and apportion shares of the TAC in the form of individual quotas. Some countries, for instance, allocate shares based on vessel size, whereas other countries distribute shares based on catch history. Furthermore, some countries restrict shares to vessels that meet a minimum tonnage requirement or, in Iceland's case, limit ownership of ITQ shares to domestic fishers and fleets. In any case, however, the process must adapt to the cultural, economic, and political realities of not only each region, but also each individual fishery.

ITQs in Iceland, for instance, are permanent, divisible, and transferable.¹⁴ The government, in consultation with fishers and vessel-owners, determines the size of each share based on catch history: "In the demersal fisheries, the initial allocation was equal to the vessel's average share in the total catch during the three years prior to the introduction of the ITQ system."¹⁵ On the contrary, New Zealand allocates shares based on a fisher or vessel's "commitment to the fishery": "Catch levels were combined with the company's degree of investment in on-shore processing, employment, and fishing capital to determine commitment. Allocations of quota were only to be made where this commitment would provide at least 2000 tonnes per company."¹⁶ To compensate smaller vessel-owners, many of whom expressed concern about receiving an equitable share of the TAC, the government permitted them to "combine into consortia," which recognized their *joint* commitment to the fishery.

In the United States, the National Marine Fisheries Service determines the TAC and there eight Regional Fishery Management Councils responsible for its recommendation and enforcement. These regional councils, such as the South Atlantic Fishery Management Council, determine shares of the TAC by "dividing] half of the initial shares based on historical catch [data] and the other half are divided evenly among qualified participants."¹⁷ Similarly, following British Columbia's implementation of an ITQ system in its halibut fishery, the government established the Halibut Advisory Board, which determined the initial allocation of shares based on catch history and vessel length: "The catch history used was based on the one best catch year, adjusted for variations in the annual total catch. The catch had to be attributable to the current owner of the halibut license, regardless of what vessel fished the license.

¹⁴Runolfsson B. and R. Arnason. (2001). "Initial Allocation of ITQS in the Icelandic Fisheries." *FAO Corporate Document Repository*. Available online at http://www.fao.org/docrep/005/y2684e/y2684e05.htm#PO_0

¹⁵Runolfsson B. and R. Arnason. (2001). "Initial Allocation of ITQS in the Icelandic Fisheries." *FAO Corporate Document Repository*.

¹⁶Connor, R. (2001). "Initial Allocation of ITQS in New Zealand Fisheries." *FAO Corporate Document Repository*. Available online at http://www.fao.org/docrep/005/y2684e/y2684e21.htm#PO_0

¹⁷Gauvin, J.R. (2001). "Initial Allocation of Individual Transferable Quotas in the United States Wreckfish Industry." *FAO Corporate Document Repository*. Available online at http://www.fao.org/docrep/005/y2684e/y2684e10.htm#PO_0



To determine the length-factor in the initial allocation formula, the vessel's overall length was divided by the total length of all vessels with halibut licenses. This percentage was then multiplied by 30% of the annual TAC."¹⁸

The ITQs initial allocation also depends on whether the quota is permanent and transferable. In many cases, for example, quota-holders retain permanent ownership of the initially allocated share and can transfer their share to other quota-holders. This is not, however, a necessary condition. The government can also allocate shares on an annual or semi-annual basis and choose to permit or prohibit transferability. In fact, there are no specific ways in which to implement, allocate, and enforce the ITQ. There are, however, several benefits of both permanency and transferability.

Allowing quota-holders to own their share of the TAC in perpetuity, for instance, changes the nature of ITQ ownership. In a non-permanent ITQ system, such as the United States, ITQ ownership is merely a right to fish a certain percentage of the TAC during a *specific period*. On the contrary, permanent ITQ ownership compels quota-holders to consider the long-term effect of their behaviour. Non-permanent ITQs are, in effect, a *leased* right, which compels the quota-holder to consider only the duration of the lease, after which the quota is absorbed by the government and auctioned back into the market. In this scenario, the quota-holder has less of an incentive to ensure the long-term sustainability of the fishery, since the government effectively sequesters and reapportions the share at the end of the leasing period. As a result, non-permanent quota-holders have a greater incentive to take measures contrary to the long-term sustainability of the fishery, such as misreporting their total landed catch (which, of course, precludes the ability to determine accurately the TAC).

Non-transferability creates a separate set of issues. In a non-transferable quota regime, the quota-holder cannot rent, lease, or transfer their share to another

quota-holder. Instead, the government resumes control of the quota when a quota-holder withdraws from the fishery, upon which it decides whether to reapportion the share into the market or destroy the share. The ability to rent, lease, or transfer a share, however, allows quota-holders to maximize their return through either exercising their right to fish or chartering that right to someone else (for a price). In theory, non-transferable quotas could reinforce the equitable distribution of TAC shares (provided the government values parity), though, it is likely that preference will alienate the process of apportionment. In any case, transferability ensures that fishers and vessel-owners have the opportunity to economize their share of the TAC by permitted them to rent, lease, sell, or transfer the right to their share during seasons in which they wish not to fish. Furthermore, the option to rent, lease, sell, or transfer a share affords quota-holders the option of exiting the industry altogether. In Iceland, for instance, many small-boat anglers sold their shares to industrial vessels, which is an attractive option for Newfoundlanders.

Enforcing an ITQ regime requires much less capital than enforcing regulations under common-property resource management systems. By issuing a prescribed share of the TAC, the government can hold accountable those who overfish their quota and punish them accordingly. On the contrary, open-access licensing creates an environment in which the government is virtually incapable of identifying who is responsible for abuse. Furthermore, the ITQ, by virtue of being a property-rights mechanism, creates an incentive for quota-holders to economize their behaviour, reducing the likelihood of abuse. The rationale is that a quota-holder's welfare reflects the welfare of the fishery and, therefore, no quota-holder will knowingly damage their property. Nevertheless, human beings are rent-seeking individuals and all systems are prone to abuse. It is, thus, necessary to create, alongside the ITQ, effective measures to enforce their implementation.

Reforming Fisheries Management in Atlantic Canada

The future of fisheries management in Canada depends on the ability of the provinces to regulate

¹⁸Sporer, C. (2001). "Initial Allocation of Transferable Fishing Quotas in Canada's Pacific Marine Fisheries." *FAO Corporate Document Repository*. Available online at http://www.fao.org/docrep/005/y2684e/y2684e23.htm#P0_0



and enforce their own jurisdictions. The provinces are inherently intimate with their local environment, a relationship that the federal government cannot possibly replicate, allowing for input that is more specialized, in addition to responsible management and greater accountability and transparency. Furthermore, adopting an ITQ management system, which places the onus on individuals to sustain and maximize the use of their resources, changes the relationship between fishers, fleets, and vessel-owners and their relationship with their respective fisheries. Affording fishers and fleets *ownership* of the fishery in which they operate, for instance, induces elements of pride, refuge, and endurance, whereas Canada's current fisheries management system provides only the incentive to contemplate short-term gains.

Some possible solutions for reforming fisheries management in Atlantic Canada include:

- Delegating managerial powers to the provinces, which are more knowledgeable about their local ecosystems and, therefore, better equipped than the federal government to manage fisheries
- Involving fishers in discussions about fisheries management, as this is the first step toward implementing an ITQ in the Atlantic Provinces
- Involving economists, political scientists, biologists, and lawyers from Atlantic Canada who have a more specialized knowledge of the Atlantic region
- Reducing regulatory oversight by shifting management costs to fishers and fleets that own shares of the TAC
- Ending programs that create perverse incentives to enter the fishing industry (which reduces overcapitalization and, thus, overfishing)
- Depoliticizing the TAC recommendation process and emphasizing the importance of scientific evidence over political preference
- Adopting the ITQ, which would facilitate both economization and sustainability in the Atlantic fishery, in addition to shifting

responsibility to those who utilize Canada's fisheries

- Ending programs that endorse protectionism

Furthermore, implementing a system that emphasizes property rights and places the onus on individuals reduces the need for government subsidies and transfers, both of which create perverse incentives that are antithetical to the core tenets of a vibrant and flexible economy. Enforcing individual responsibility, in fact, is much less onerous when individuals have a perceptible stake in the economy and its wellbeing. This is important, particularly for NL, considering the opportunities and potential benefits of the Comprehensive Economic and Trade Agreement (CETA) between Canada and the European Union (EU), which comes into effect in 2015. CETA, for instance, reduces trade barriers between Canada and the European Union (EU) and establishes new market opportunities for Canadian businesses and, particularly, Atlantic Canada's fishing industry. In order for Atlantic Canada to realize the benefits of free trade, however, the provinces must end programs that endorse protectionism and allow the economy to function free of restraint.

In NL, for instance, provincial regulations mandate that fish and seafood caught in NL must be processed in-province before export. NL's *Fish Inspection Act* schedules minimum processing requirements (MPR) for over thirty-eight species, spanning from, "salted and packed in a carton not to exceed 100kg" for capelin and mackerel to "head on gutted with stomach tube attached and in frozen form" for monkfish. Premier Kathy Dunderdale, however, confirmed that the province would relinquish MPR legislation in exchange for tariff-free access to European markets.

NL originally adopted MPRs in response to its declining fishing industry. Despite claims that MPRs are the cornerstone of NL's fishing industry, however, the province's departure from protectionism is a major step forward. Amidst rising unemployment, an effect of the 1992 cod moratorium, the government enacted protectionist legislation that shielded domestic industry from foreign competition. These regulations, nevertheless,

are inefficient and unnecessary, especially considering CETA's economic potential. Earle McCurdy, president of the Fish, Food, and Allied Workers Union (FFAW), for example, argues that, "Canada has been operating in Europe with one hand tied behind our back for a long time. Compared to our principal competitors, we have unfair market barriers they don't have, both in terms of tariffs and end-user requirements that are costing us value and jobs in the province."

EU-imposed tariffs on marine imports currently average 16.5 per cent, representing a significant economic barrier for Canadian exporters. CETA's ratification in 2015, however, affords NL's fishing industry unrestricted access to the largest fish and seafood market in the global economy. Under the terms of the agreement, all EU fish and seafood tariff lines will be duty-free by 2022. Furthermore, CETA compels the EU to eliminate end-user restrictions on Canadian imports (an ironically similar concession to NL's MPR surrender), which prevent Canadian exporters (including sole-proprietor fishermen) from branding, marketing, and selling their products directly to European consumers by requiring European companies to first process marine imports before final sale. Not to mention that Canadian industry has lower energy, labour, and production costs compared to its European counterparts. Canada's comparative advantage against Europe and the opportunities that CETA provides Canadian industry, in general, is hugely beneficial for Atlantic Canada.

NL's fishing industry has been struggling to revive itself since 1992 and accessing European markets provides a strong incentive to abandon harmful protectionism. Relinquishing the MPR (as well as EU-imposed end-user restrictions) creates diversity in the province's fishing industry by allowing fishers to market their product directly to European consumers, encouraging processors to economize by operating doubly as storage facilities, and permitting NL exporters to manufacture and brand their products before final sale in Europe. Nevertheless, realizing CETA's full potential requires liberating the *entire* industry from protectionist restrictions and allowing the relationship between Atlantic Canada and the global economy to flourish. This, in unison with an

ITQ management system that emphasizes individual responsibility and affords fishers, vessel-owners, and fleets a greater stake in their operations, is not only a positive step towards reforming fisheries management in Atlantic Canada, but also reviving its economic and political livelihood and positioning Atlantic industry to, once again, become a major force in the global economy.