

Snow Crab Fishery Management in Japan, Canada, and the USA

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Abstract

Total snow crab landings in the USA were over 150 thousand tons at the beginning of the 1990's, but they decreased to fewer than 20 thousand after 2000. Those in Canada increased throughout the 1990's, from 26 thousand tons to over 100 thousand after 2000. Fukui Prefecture, Japan (Fukui), the provinces of Newfoundland and Labrador, Canada, (NFLD), and the state of Alaska, USA (Alaska) were adopted as case studies. While snow crab fisheries in Fukui, NFLD, and Alaska are managed under Total Allowable Catch (TAC), the actual situations of fishery management are different in these areas. TAC was introduced to Fukui in 1997, however its direct impact is doubtful. TAC was decided based on historical catch, and even today, it is calculated to 'maintain today's landings'. It is believed that input control, which was previously introduced to Fukui, is more influential. In NFLD, TAC was divided into quotas, with total allowable catch divided into smaller fishing areas, under which individual fishing quotas (IQ) are allocated to each fisher. In Alaska, individual transferable fishing quota (IFQ) and individual transferable processing quota (IPQ) are allocated to each fisher and processing company under TAC. The close relationship between IFQs and IPQs is unique to Alaskan management. Snow crabs harvested in Japan have different markets than those imported to Japan. Japanese snow crabs are circulated as fresh whole form. Canadian and American snow crabs are processed into frozen section form after landings.

Introduction

Total snow crab landings in the USA were over 150 thousand tons at the beginning of 1990's but they decreased to fewer than 20 thousand after 2000. Those in Canada increased throughout 1990's from 26 thousand tons to over 100 thousand after 2000. Fukui Prefecture, Japan (Fukui) the province of Newfoundland and Labrador, Canada (NFLD), and the state of Alaska, USA (Alaska) were adopted as case studies. While snow crab fisheries in Fukui, NFLD and Alaska are managed under Total Allowable Catch (TAC), the actual situations of fishery management are different in these areas. Not only is the fishing gear, fishery construction, and fishing communities different, the history of fishery and its management are also different, which means the appropriate way of fishery management is also different. The purpose of this presentation is to examine reality of fishery management in this context.

In Canada, the increase of landings in NFLD had contributed to Canadian trend itself. While snow crabs are harvested in the other provinces of Atlantic Canada, the landings have been rather stable and the quantity itself is low compared to that of NFLD. The snow crab landings

in Alaska are almost same as the total landings in the USA itself. With this change in the trend of landings as a turning point, the positions of both Canadian and American snow crabs in the world market has changed.

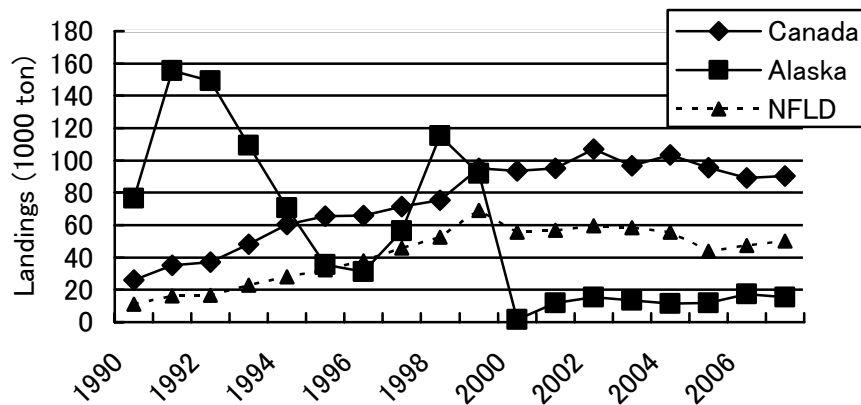


Fig. 1 Snow Crab Landings

Source: The Canadian Department of Fisheries and Oceans
The Alaskan Department of Fish and Game

Materials and Methods

The primary research method was fieldwork conducted at the targeted areas. Interviews were also conducted with the Canadian government's Department of Fisheries and Oceans, Newfoundland's Department of Fisheries and Aquaculture, the USA government's National Oceanic and Atmospheric Administration (NOAA), and the Alaskan Department of Fish and Game. These agencies' websites and statistics, along with government published reports, were used as sources. The fieldwork, including interviews with fishers and processing companies in NFLD, were conducted from 2001 to 2009. Fieldwork and interviews with processing companies in Alaska were conducted in 2009. Those in Fukui were conducted in 2008.

Results and Discussions

1. Snow Crab Fishery Management in Fukui

In Fukui, snow crabs are harvested with bottom trawls and circulated as fresh whole form. There are two kinds of permits, the Minister's and Governor's Permit. The Japanese national government's Minister of Agriculture, Forestry and Fisheries issues the Minister's Permit. The Governor of Fukui Prefecture issues the Governor's permit. The number of Minister's permits in 2009 for offshore bottom trawls is 27, and the Governor's permits for small bottom trawls is 53, for a total of 80. Soft-shelled crabs and female crabs are targeted only in Japan. The fishing seasons are as follows: November 6th to March 20th for male snow crabs, January 10th to March 20th for soft-shelled crabs, and November 6th to January 10th for female snow crabs. The fishing areas are mainly offshore of Fukui and the neighboring offshore areas of Kyoto and Ishikawa Prefectures, where the water's depth ranges from 200m to 400m.

After peaking at 2,091 tons in 1961, landings in Fukui trended towards a long-term decline, with a record low of 210 tons in 1979. However, after 1979, the trend reversed, eventually increasing (and recovering) to 576 tons in 2007. All over the western Japan Sea, which includes the offshore areas from Toyama Prefecture to Shimane Prefecture, the long-term resource trend is increasing, even with total landings all over Japan stabilizing to between 5,000 to 6,000 tons. Although TAC, which was introduced 1997, is allotted to each prefecture, allocation to Fukui is a little bit higher than actual landings. All throughout the western area of the Japan Sea, the actual landings had never been over the TAC. Moreover, even though some prefectures' landings are over the TAC that was allocated to them, the government has never stopped the fishery's activities. Presently, TAC is calculated 'to maintain today's landings'. Therefore, management with TAC is not considered a factor of resource recovery.

Besides the regulations sent by the national government, 'The Special Committee for the Japan Sea Snow Crab' was formed by people concerned about the western part of the Japan Sea, and introduced policies, which are reconsidered every year. Moreover, Fukui Prefecture adheres to self-imposed controls, which are as follows: 1) Shortening the fishing season for soft-shelled crabs, and instituting a ban on catching male crabs with a carapace width of under 10cm, 2) Protection of snow crab fishing areas, which includes a ban on all other fishery activities except the snow crab fishing season in areas where the water's depth is between 210m to 350m, 3) Adoption of special nets designed to prevent by-catch of snow crabs, 4) Setting the nursery reefs to seven areas, where the depth of the water is 250m, and a ban on fisheries because of the high number of female snow crabs there, and 5) Limiting of the quantity of both soft-shelled and female snow crabs.

2. Snow Crab Fishery Management in NFLD

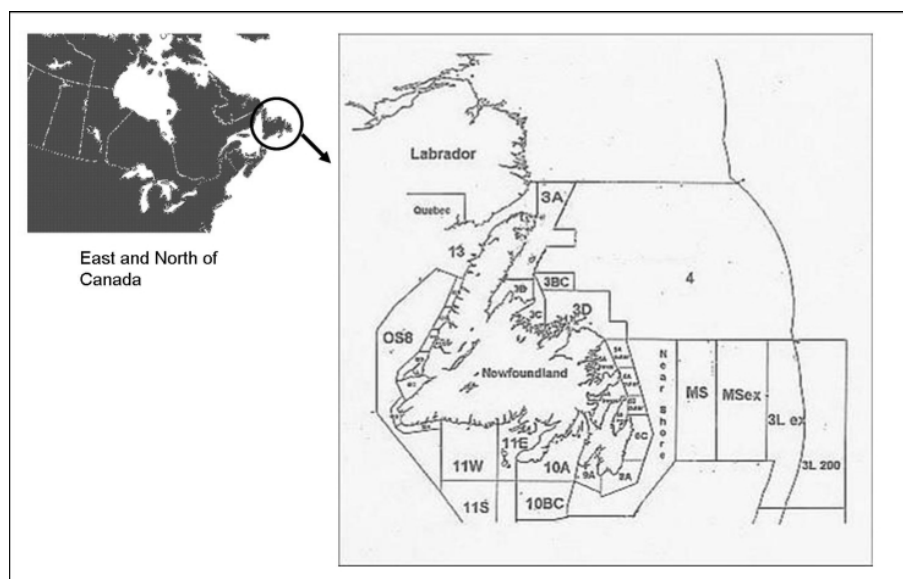


Fig. 2 NFLD Fishing Grounds

Source: The Canadian Department of Fisheries and Oceans

In NFLD, snow crabs are harvested with crab pots, and processed to frozen section form by rather small-scale processors. Because companies are not allowed to be engaged in this fishery in NFLD, all fishers are owner operators. Among them, coastal fisheries operate with 35 feet vessels, with offshore fisheries using 65 feet vessels. Concerning with fishery management should be referred Fig.2, which indicated fishing grounds were detailed defined.

The TAC is divided into total allowable catch to each fishing ground as a 'Quota'. Before 1995, every fisher who was allowed to harvest at a certain area conducted derby fishery; after 1995, each fisher was allocated Individual Quota (IQ). As they try to harvest all their IQs, the trends of Quotas and actual landings have been similar (Table 3).

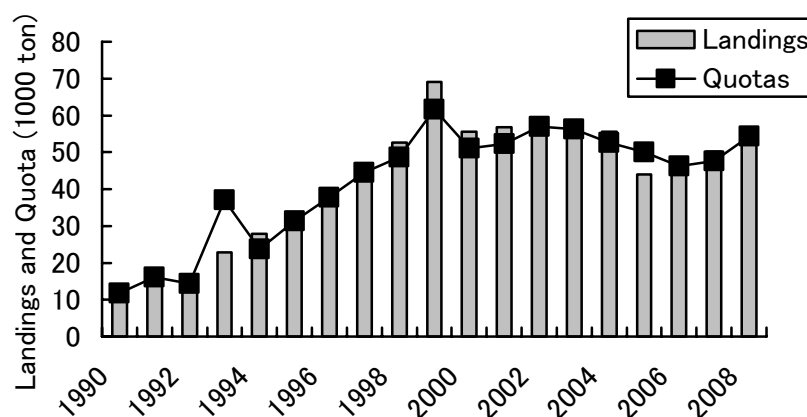


Fig. 3 Landings and Quotas in NFLD

Source: The Canadian government's Department of Fisheries and Oceans

Before discussing the Quota and IQ system, the license system should be mentioned. If one is engaged in certain fishery activities in Canada, he or she must be issued a license for the fishery. In NFLD, cod fishing was main activity until that resource collapsed in the late 1980's; at the same time, snow crab fishery became attractive as a commercial fishery. Even though some fishers had snow crab fishing licenses, they actually had not engaged in it in the past. Incidentally, such fishers become prosperous during these years. Fishers without snow crab fishing licenses lost almost everything in those areas where there is no major employment opportunity besides fishery or seafood industry. A tense atmosphere spread in the areas where relationships between people had once been close.

Therefore, facing increased demand for the federal government to issue new licenses for snow crab fishing, the government issued new licenses. In 1997 there were 71 full-time licenses, but by 1998 some 650 'Supplementary' licenses had been added to the fishery. The Supplementary licenses reached its current level of 696 in 2001. Participation in the fishery also greatly expanded in 1995, when 400 temporary seasonal permits were issued to eligible harvesters in inshore fishers. These license-holders were granted access to replace income lost due to the groundfish (cod) moratorium¹. By 1998, all those defined as fishers gained access

to the snow crab fishery through temporary permits. By 2000, the inshore fishers had expanded to 2,434 licenses, and participation reached 2,560 licenses by 2005². There are 3,339 licenses in 2008, which are mostly inshore licenses, with new license issues suspended.

Here is an example of a quota table for division 3K, including area 3A, where I conducted my field research.

Table 1 2008 Quota Table (tons) of Division 3K

Area	Description	Inshore	Supplementary	Full-time	Total
3A	Canada Bay	385			385
3B	White Bay	500			500
3C	Green Bay	700			700
3D	Fogo/Twillingate	1570			1570
3BC	Inshore 3K	300			300
4	Near shore 3K	50			50
4	Offshore 3K		8870	2700	11570
Total-2008			8870	2700	15075

Source: The Canadian government's Department of Fisheries and Oceans

The license description indicates not only the license type, but also the kind of fishery, fishing grounds, size of vessel, and fishing gear. Using division 3K as an example, there are varying licenses, such as Inshore: coastal fishery, Supplementary: offshore with a supplement for groundfish, and Fulltime: offshore and historical fishers. If you have an inshore 3A license, and there are 100 fishers, your IQ is 3.85 tons, because the coastal fishery IQ is allocated equally. Some part of the first IQs were based both on historical catch for offshore fisheries, with the major for equal allocation between fishers. The rate of IQs has not changed since the first allocation in 1995.

Table 2 NFLD Snow Crab Fishery Profile, 2005

	Inshore	Supplementary	Full-time	Communal
License Holders	2434	677	71	8
Quota/license (kg)	11,657	28,700	106,831	
Landings				
Snow crab (tons)	10,232	26,091	6,180	502
Average/license (kg)	4,204	38,540	87,043	138,395
Crab as % of total	53%	59%	64%	99%

Source: Pinfold G. 2006 Overview of the Atlantic Snow Crab Industry p.35

Table 2 indicates how the actual situations of the snow crab fisheries were conducted in 2005.

IQ for Full-time is almost 10 times larger than those for Inshore. Of the three types of licenses, Supplementary is considered to be the main type, because the corresponding amount of holders and IQs are considerably higher than the other two types. Because fishers of all license types depend on snow crab for over 50% of their fishery income, this resource is important for every fisher. Thus snow crab fishery is rather newly developed and almost all of the IQs are allocated equally.

There are other measures that were introduced besides IQ to snow crab fishery. As such measures are different by area, those for 3A (Inshore) are adopted as an example. IQ was 5628.3kg for 2008. The gear limit for 2008 was 100 pots per license per trip³. The fishing season is also limited. While the federal government decided that the season would be from April 1st to July 21st, they actually started to harvest on April 26th, and finished on July 7th when all IQs were harvested. Size regulations state that the vessel should release male snow crabs with a carapace width under 95mm, if they accidentally by-caught, along with soft-shelled crabs and female crabs. During my research on the vessel, no female snow crabs was by-caught.

All quantities of landings and holdings of under sized male snow crabs, soft-shelled crabs and female snow crabs are monitored at a dock. Private companies, which are independent from both the government and fishers, conduct this monitoring. This cost is paid out of the federal government's Department of Fisheries and Oceans budget.

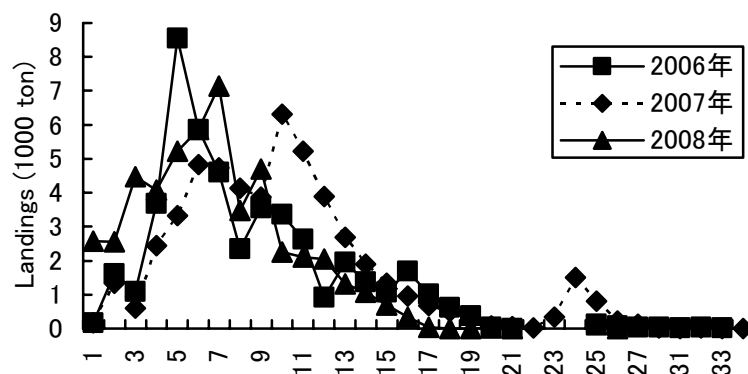


Fig. 4 Snow Crab Landings by weeks

Source: The Canadian government's Department of Fisheries and Oceans

A problem is the shortening of the fishing season. Fig. 4 indicated snow crab landings records by weeks from 2006 to 2008. Fishers have IQs, which means they choose when they harvest their IQs. In theory, this provides fishers with the balanced approach to fishery, resulting in a smooth flow of landings⁴. However, the actual situation is different. The reasons why there is a rush in harvesting at the beginning of the season are as follows: 1) Fishers want quick money, because the snow crab fishery is the first fishery after winter stoppage. This is the opposite of the theory of the IQ, which should result in a balanced approach; however, the

situation itself is understandable. 2) Fishers want to harvest efficiently. 3) Fishers want to harvest snow crabs of better quality. 4) Fishers want to avoid the ban on fishing by the federal government for the protection of soft-shelled crabs. In order to explain the reasons of 2), 3) and 4), here is the Fig.5 which indicates the lifecycle of snow crab in NFLD.

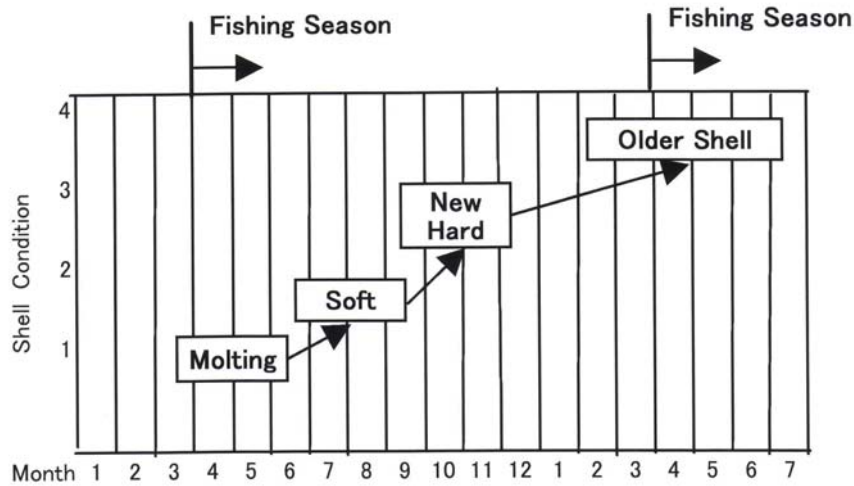


Fig.5 Lifecycle of Snow Crab in NFLD

Source: The Canadian government's Department of Fisheries and Oceans

Snow crabs molt in the early spring, but the new crab shells are too soft, which makes it difficult for the crabs to climb. By July, the snow crabs' shells harden enough to climb into pots, which become new hard-shelled snow crabs in the autumn. Finally, in April, which is the beginning of the fishing season, there are many hard-shelled crabs that can be caught efficiently. Another factor is if too many soft-shelled crabs are by-caught in the summer, the federal government bans the snow crab fishery itself to protect those soft-shelled crabs. One important point is that IQ is the maximum allowable catch, not an assurance to catch. Therefore, if fishers have not harvested all of their IQs before the ban, there will not be any compensation. This is one of the reasons why fishers try to harvest their IQs as soon as possible, resulting in the rush to catch snow crabs at the beginning of the fishing season.

3. Snow Crab Fishery Management in Alaska

In Alaska, snow crabs are harvested with crab pots and processed into frozen section form by big fishery companies' factories. Snow crab fishery and its processing industry have been managed under the Bering Sea Aleutian Islands Crab Rationalization Program since 2005. The program is a limited access system that balances the investments of groups who depend on the some crabs fisheries⁵. The main purposes of the program are to control excess competition of fishery, reduce overcapacity in harvesting and processing sections, and the enhancement of crews' safety by ending the race to fish. For these purposes, transferable shares are allocated to both fishers and processing companies (Individual transferable fishing quota; IFQ and Individual transferable processing quota; IPQ) which allows them to trade their shares. The first shares were allocated based on historical catch and processing. The

program also provides fishers with an incentive to participate in fishery cooperatives (Coops). As protection of community interests is also a purpose of the program, 10% of TAC are allocated to some eligible communities, which do not harvest themselves but rather sell those allocations to fishers. This process of quotas allocation to eligible groups is indicated Fig.6.

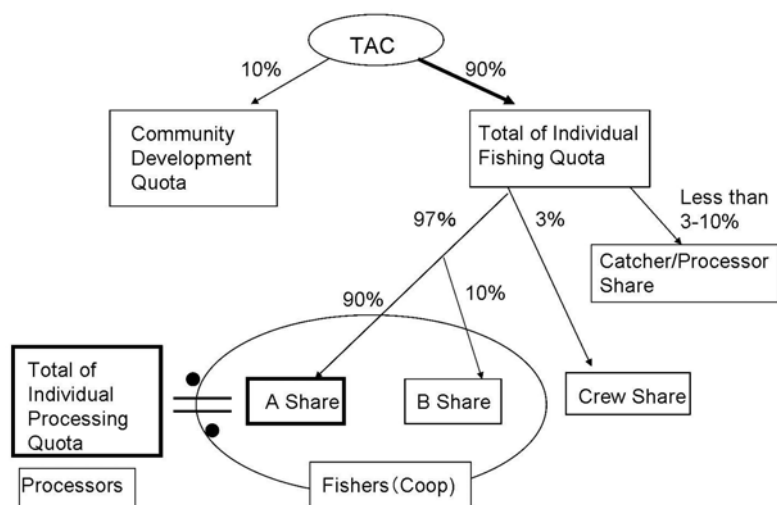


Fig.6 Process of Allocation Quotas

Source: Hearings from NOAA, USA and a processing company

When the TAC is decided, 90% are IFQs; with the remaining 10% allocated to eligible communities as a Community Development Quota. 3 to 10% of IFQs are allocated as Catcher/Processor Share, depending on the year. On top of this, 3% are allocated as Crew Share. And then 97% go to Fishers, dividing 90% of A share and 10% of B share. On the other hand, processors got IPQs, whose total is nearly equal to the total of A share. A share snow crabs have to be sold to the processors with IPQ. Therefore, processors got raw materials equal to their IPQs, and fishers also sell 90% of their share to some processors. This system's intentions seem to be to maintain stability. B shares and Crew shares may be sold to processors without IPQ, which is thought to be an important solution for any problems concerning anti-trust laws.

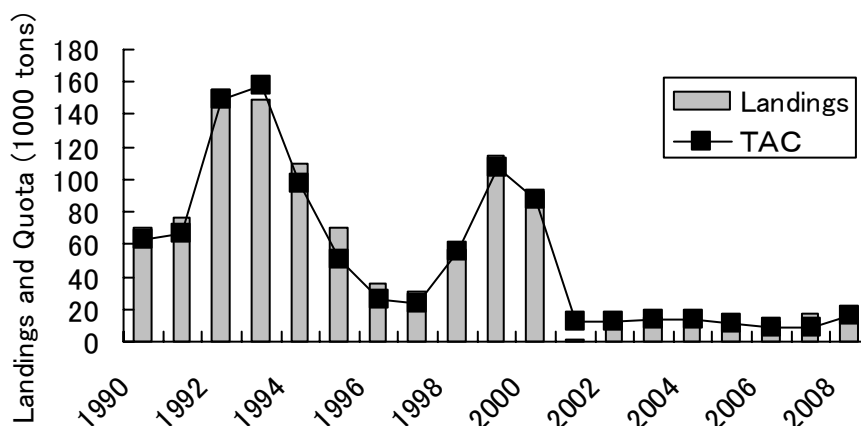


Fig.7 Landings and TAC in Alaska

Source: Alaskan Department of Fish and Game

Under the program, as fishers enter into Coop and trade their IFQs, the number of vessels has decreased from over 200 to about 80 now. Concentration of IFQs is avoided because the maximum limit of holding of IFQ is 1%. As Fishers try to harvest all of their IFQs, the trend of TAC and actual landings are same (Fig. 7). As for IPQ, the maximum limit of holding is 30%, which includes some big fishery companies and the subsidiaries of Japanese companies. While there are no financial relationships between fishers and processors, they are dealing with almost same fishers and processors every year.

3.The Japanese Market for Snow Crabs

Japan consumed roughly 48% of all consumed snow crab in the world in 2005⁶. Although Japan consumes both Japanese domestic snow crabs as well as imported, Japanese-harvested snow crabs have quite a different market than those imported in Japan. The prices for those harvested in Japan are almost from 5 to 10 times of imported those. Among Japanese domestic snow crabs, those harvested in the Fukui are most expensive. Snow crabs harvested in Japan are circulated as fresh whole form. Canadian and American snow crabs are processed to frozen section form after landings and are exported, or circulated to the USA mainland.

Conclusions

Fishery management in the Japan Sea, which includes Fukui, was conducted with various input controls, and has achieved the recovery of resources and landings. Japanese domestic snow crabs, especially Fukui's, are recognized as a big-name brand. Also, snow crabs are the most important resource for those fishers who engaged in those activities. Until recently, TAC was decided to be a little bit higher than actual landings, however it may become possible that TAC will play a larger role in limiting landings if the resources start to decrease. As Japanese snow crab fishery is operated by bottom trawls that harvest various resources, IQ and/or ITQ are not appropriate as management tools.

Snow crab fishery in NFLD is a rather new fishery, which was improved during the 1990's, with the majority of fishers being coastal fishers who started to engage in snow crab fishery after 1995. Thus kind of equal allocation of IQs was possible. TAC (Quota) and IQ, as well as other fishing measures were introduced to NFLD snow crab fishery. However, the shortening of the fishing season has become a problem. Due to the rush of raw materials to rather small processors, they are only able to process on a daily schedule, and must quickly sell them to big American and Japanese fishery companies, without any effective marketing activities by themselves. Effective fishery management should include a marketing aspect.

In Alaska the Crab Rationalization Program has certainly been effective on both fishery and processing industries. At a minimum, the number of vessels has decreased, and there are some big processing companies, which can conduct marketing activity. As the most important goal

in the Alaskan system is the recovery of the snow crab resources, there seems to be, although weak, some signs of recovery.

The appropriate way of fishery management depends not just on fishing gear, fishery structure, and fishery communities, but also on the history of fishery and its management. The different reality of the fishery management situations in Japan, Canada, and the USA makes this quite clear.

Acknowledgements

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Key words

snow crab, management, Japan, Canada, USA

¹ Because of the collapse of resources, the federal government announced a cod fishery moratorium in 1992.

² Pinfold. G. 2006. Overview of the Atlantic Snow Crab Industry, *Submitted to Department of Fisheries and Oceans and Atlantic Council of Fisheries and Aquaculture Ministers*, p.23-24

³ The gear limit for 2005 was 150 pots and inshore fishery and 800 ports for offshore fishery.

⁴ Pinfold. G. 2006. p.28

⁵ BSAI Crab Rationalization FAQ. 2008. *National Oceanic and Atmospheric Administration Fisheries, National Marine Fisheries Service, Alaska Regional Office*. P.2

⁶ Pinfold. G. 2006. p.11