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Japan Fisheries Research and Education Agency, Japan

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1. INTRODUCTION

Japan joined NAFO in 1980 and has conducted fishing operations in the Convention area continuously for 29 years (1980-2008). From 2009, fishing operations stopped for 7 years (2009-2015) due to various reasons, i.e., socio-economics problems of fishing companies, Tsunami disasters (2011) and others. Fishing operations resumed in 2016 with one otter trawl fishing vessel and have continued till now (2023) (8th year after the resumption).

This document is the National Research Report (Japan), responding to a series of requests by SC and NAFO Secretariat (Table 1). Table 1 summarizes progress of these requests as reference.

Table 1. Summary of requests by SC and the Secretariat and responses by Japan (as of May 5, 2023).

Information requested	NAFO circulation No.	Deadline	Response
● Environmental data	NAFO/23-040	May 5, 2023	No data available
● STATLANT 21A	NAFO/23-040	May 1, 2023	To be submitted by Fisheries Agency of JAPAN.
● National Research Report		May 5, 2023	This document
● Planned Surveys for 2023 and Early 2024			No surveys planned
● Lists of Biological Sampling Data during 2016-2022			Figs 7-9 of pages 13-15, Annex A of pages 22-24 (this document)
● List of Tag Releases in 2022 and early 2023			None
● Information on research vessel surveys on a stock-by-stock basis			No research vessel surveys
● STATLANT 21B			Aug 31, 2023

2. DATA (1980-2022)

Three data sources used for this National Research Report of Japan are 'STATLANT21A (1980-2022)', 'STATLANT21B (1980-2022)' and 'Japanese Observer data (2016-2022)', which were officially provided by the Fisheries Agency of JAPAN.

3. OVERVIEWS (NAFO CA) (1980-2022)

Before describing subarea-based information, the overall situation (1980-2022) since Japan joined NAFO in 1980, is reviewed.

3.1 Gear types

Table 2 shows gear types used in operations by year based on STATLANT 21 available in the NAFO database downloaded from the NAFO homepage (April 2023). Circles indicated gear types used, but numbers of vessels are unknown. Only the numbers of bottom otter trawlers operated are available, which were obtained from Ms Jana Aker (NAFO Fisheries Information Administrator) (January 2019) and the Fisheries Agency of Japan (September 2022). However, numbers are unknown for nine years.

Table 2. Gear types used in fishing operations (1980-2022).

Gear types used in fishing operations by Japan. Circles indicate that at least one vessel used the corresponding gear, but actual number of boats are unknown except bottom otter trawl in column [A]

NAFO area code [STATLANT21B]	8	9	10	12	15	49	51	56	70	
[A]*	[B] Gear type (STATLANT21B)									
Year	No. of bottom otter trawl operated	Bottom otter trawl (charters)	Midwater trawl	Bottom otter trawl (not specified)	Bottom otter trawl	Midwater trawl (stern)	Longlines (charters)	Set lines	Mechanized squid jigger	Dredge (charters)
1980	17	○			○	○				
1981	?	○			○	○				
1982	?	○	○		○	○				
1983	9				○	○				
1984	?	○			○	○				
1985	?	○			○	○				
1986	15	○			○		○			
1987	?	○			○	○	○			
1988	?	○			○	○	○			○
1989	21				○		○			
1990	?				○	○			○	
1991	?	○			○	○			○	
1992	?	○			○	○				
1993	2	○			○					
1994	2	○	○		○					
1995	2	○			○					
1996	2	○			○					
1997	2	○			○	○				
1998	2	○			○	○				
1999	2				○	○				
2000	2				○					
2001	2				○					
2002	2				○					
2003	2				○			○		
2004	1				○					
2005	1				○					
2006	1			○						
2007	1				○					
2008	1				○					
2009										
2010										
2011										
2012										
2013										
2014										
2015										
2016	1				○					
2017	1				○					
2018	1				○					
2019	1				○					
2020	1				○					
2021	1				○					
2022	1				○					

*: Sources from NAFO Secretariat (1980,1983,1986,1989) and Fisheries Agency of Japan (1993-2022).

?: numbers are unknown.

Data

source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.

- (1) Japan joined NAFO in 1980.
- (2) Majority gear is the bottom otter trawl.
- (3) Fishing vessel operated in recent years (2016-2022) is described in Annex B.

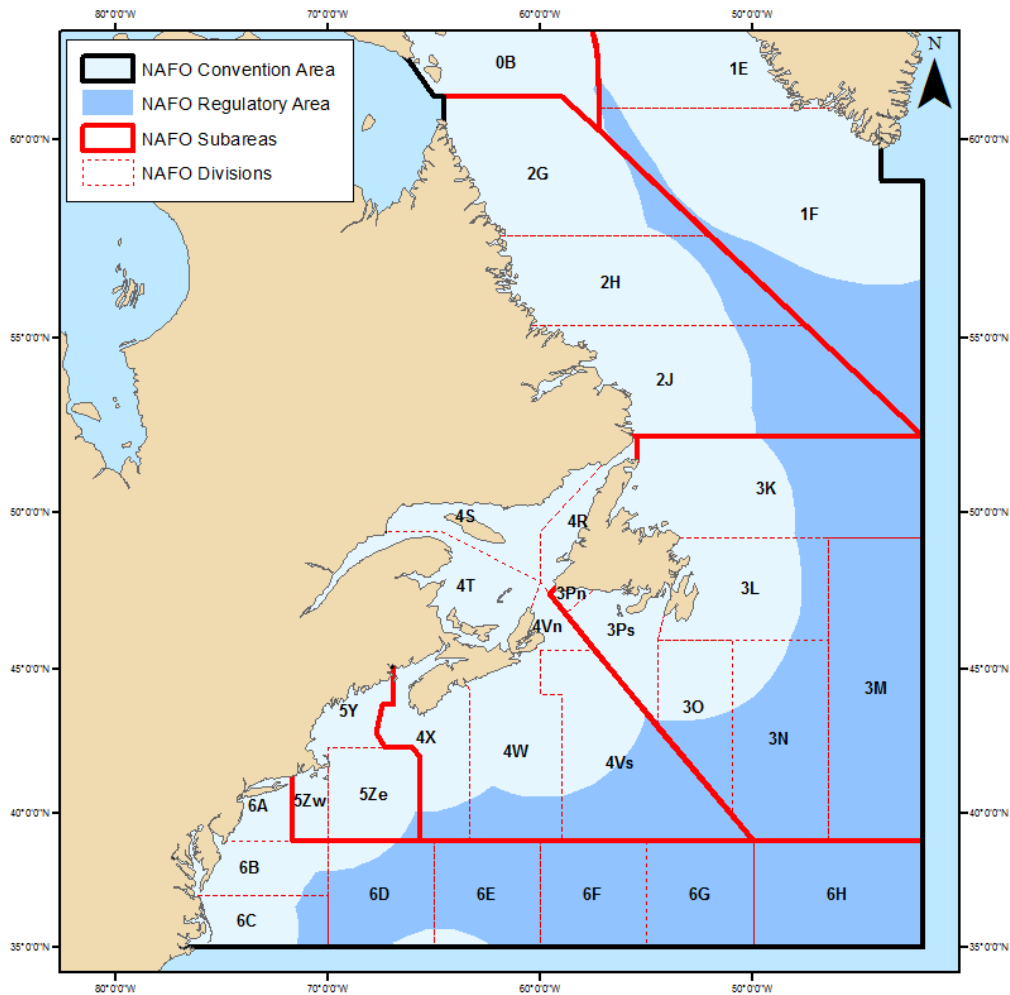
2.2 Catch by subarea (Table 3 and Map 1)

Table 3. Annual catch by sub-area (tons). All species and gears are combined (1980-2022).

Year	Subarea						Total	
	0	1	2	3	4	5		6
1980				2,223	18,683	4,652	5,850	31,408
1981				3,191	6,556	3,035	7,795	20,577
1982				6,479	1,416	1,853	5,204	14,952
1983				410	1,360	1,335	1,190	4,295
1984		802	1,221	3,667	2,094	718	1,548	10,050
1985		1,680	111	4,983	1,161	103	379	8,417
1986		2,079	1,546	6,077	1,845	79	229	11,855
1987		1,765	1,705	5,467	1,651			10,588
1988		2,045	1,463	5,085	1,041			9,634
1989		1,428	531	6,546	830			9,335
1990	124	1,189	1,745	6,797	2,182			12,037
1991	235	794	1,774	3,009	1,622	45		7,479
1992	386	3,011	968	5,715	763			10,843
1993	270	1,284	579	3,863				5,996
1994	674	874		1,822				3,370
1995	1,085	376		2,872				4,333
1996	522		28	3,333				3,883
1997				2,565			7	2,572
1998				3,109				3,109
1999				3,112				3,112
2000				2,941				2,941
2001				3,627				3,627
2002				3,389				3,389
2003				3,216				3,216
2004				1,948				1,948
2005				1,996				1,996
2006				1,901				1,901
2007				2,011				2,011
2008				1,972				1,972
2009								
2010								
2011								
2012				No operations				
2013								
2014								
2015								
2016				2,409				2,409
2017				2,595				2,595
2018				2,990				2,990
2019				2,786				2,786
2020				1,764				1,764
2021				1,716				1,716
2022				1,284				1,284

Additional Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
(2) Japan joined NAFO in 1980.
(3) Majority gear is the bottom otter trawl.



Map 1. Map of NAFO CA highlighted subareas and Divisions.

Figure 1 shows catch compositions among subareas (all species and gears combined but the majority gear is bottom otter trawler as indicated in Table 1). Japan operated in all of seven subareas (0-6) in the past, and subarea 3 was the major fishing ground during 1980-1996. From 1997 to now, subarea 3 is the only fishing ground for Japan.

Figure 2 shows catch trends by subareas (all species and gears combined, but majority gears are bottom otter trawls). There is a shift of three different catch levels, i.e., during 1st stage (1980-1982), the catch level was the highest (15,000-31,000 tons), then in the 2nd stage (1983-1993) decreased by half (6,000-12,000 tons except 4,000 tons in 1983) and in the 3rd stage (1994-2008 and 2016-2022), it further decreased to less than 4,000 tons. The decreases are considered mainly due to constraints by TAC.

Subarea 3 has been the only fishing ground for Japan since 1997, thus this report describes the information in subarea 3.

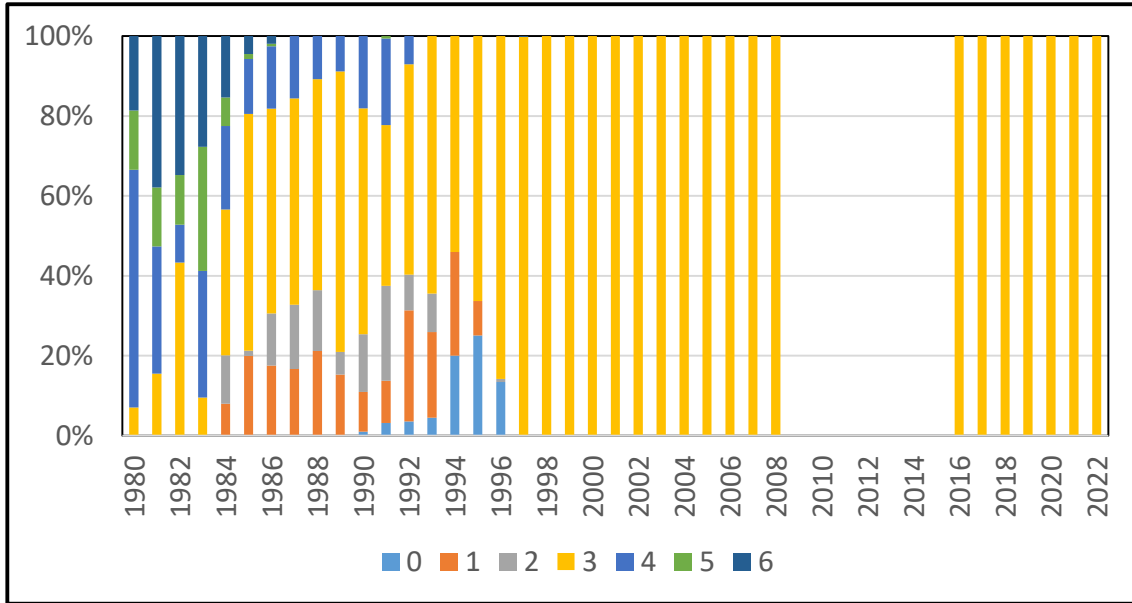


Figure 1. Catch compositions among subareas(1980-2022). All species and gears are combined.

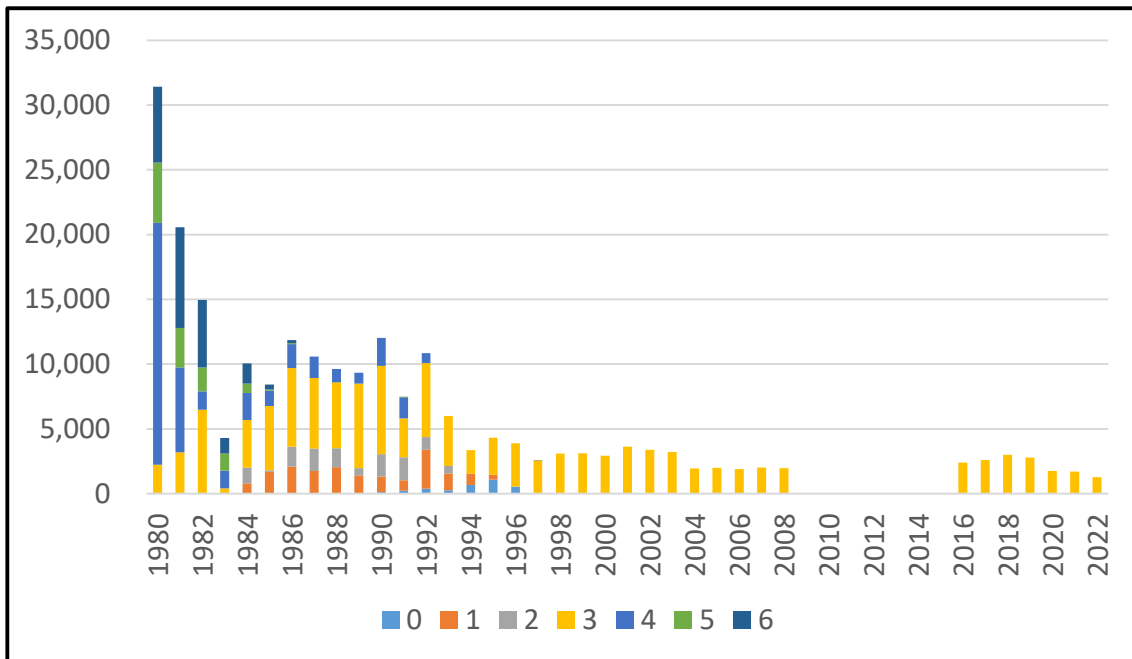


Figure 2. Catch by sub-areas (tons) (1998-2022). All species and gears are combined. No operations were done during 2009-2015.

Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (2) Japan joined NAFO in 1980.
- (3) Major gear used is the bottom otter trawl.



4. SUBAREA 3

A. Status of the Fisheries

This should be broken down by species and should first indicate the changes that have been observed in the catches. Any available information regarding quantities of fish, by species if possible, being used for industrial purposes should also be presented. An explanation should follow for these changes based on scientists' best judgement. Reference to biological conditions (e.g. length and age composition), fishing conditions (e.g. effort and availability) and environmental conditions, should be made where necessary and appropriate. Any forecasts for the coming year should be included here. Graphic presentations supporting the text are acceptable.

We will first review the overall situation in subarea 3 then will analyze by Division in subarea 3.

4.1 Overview

(1) Fisheries

Table 4 shows annual catch (tons) by Division in subarea 3 (all species and gears combined) (1980-2022). There are catch for almost all period in Division 3L+3M, while more in the first half for 3K+3N+3O.

Figure 3 shows catch compositions among Divisions in subarea 3 (all species and gears combined). Japan operated in five Divisions (3K, 3L, 3M, 3N and 3O), but major fishing Division shifted by period, i.e., Division 3L was the major fishing ground in 1980-1981, then shifted to 3K (1984-1987), 3N (1988-1990), 3M (1991-1995), and 3L (1996-2008 and 2016-2022).

Figure 4 shows annual catch trends by Division in subarea 3 (all species and gears combined). There are two different catch levels, i.e., the higher catch level (average 4,500 tons) in the first half period (1980-1993), while the lower level (average 2,500 tons) in the latter half period (1994-2008 and 2016-2022) resulting 2,000 tons difference.

Table 4. Annual catch by Division in sub-area 3 (tons). All species and gears are combined (1980-2022).

Year	Subarea					Total
	3K	3L	3M	3N	3O	
1980	208	983	1,030		2	2,223
1981	40	2,708	442		1	3,191
1982	3,462	2,014	455		548	6,479
1983			406		4	410
1984	1,257	461	416	85	1,448	3,667
1985	3,790	133	339		721	4,983
1986	4,270	140	444	12	1,211	6,077
1987	2,671	298	436	845	1,217	5,467
1988	856	347	507	1,537	1,828	5,075
1989	526	141	1,409	2,701	1,769	6,546
1990	261	175	2,494	2,431	1,436	6,797
1991	88	488	2,096	103	234	3,009
1992		1,810	3,748	21	136	5,715
1993		1,254	2,441		168	3,863
1994		649	1,173			1,822
1995		847	1,759		266	2,872
1996		2,093	813		427	3,333
1997		2,032	224	15	294	2,565
1998		2,162	577		370	3,109
1999		2,739	370	3		3,112
2000		2,794	147			2,941
2001		3,228	399			3,627
2002		3,071	318			3,389
2003		2,978	238			3,216
2004		1,724	222		2	1,948
2005		1,404	591		1	1,996
2006		1,490	410		1	1,901
2007		1,293	654		64	2,011
2008		1,334	638			1,972

No operations

2016	624	168	1,573	44	2,409
2017	1,178	242	1,168	7	2,595
2018	1,555	707	724	4	2,990
2019	1,813	585	378	10	2,786
2020	1,399	344		21	1,764
2021	949	767			1,716
2022	1,085	199			1,284

Additional Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (2) Japan joined NAFO in 1980.
- (3) Majority gear is the bottom otter trawl.

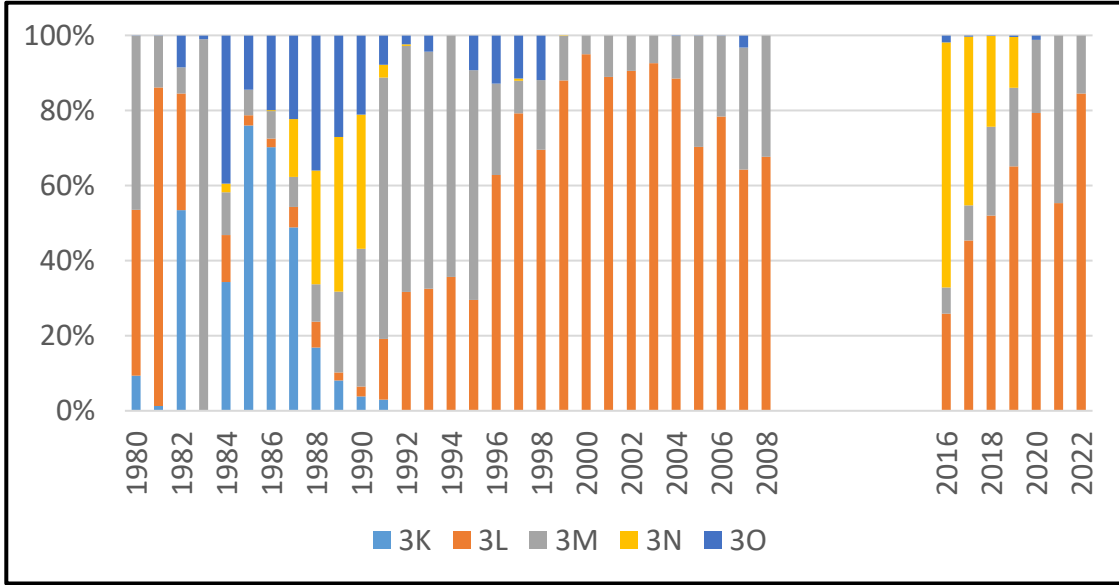


Figure 3. Catch compositions among Divisions in sub-area 3 (1980-2022). All species and gears are combined.

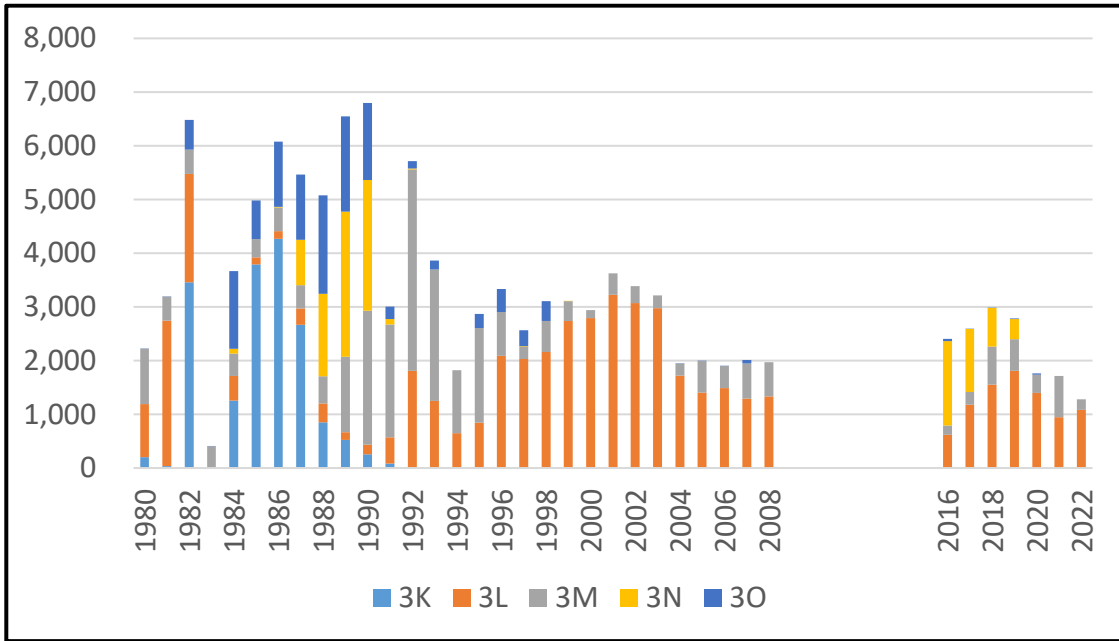


Figure 4. Annual catch (tons) by Division in sub-area 3. All species and gears are combined (1980-2022).

Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (2) Japan joined NAFO in 1980.
- (3) Majority gear is the bottom otter trawl.



Figure 5 shows TAC species compositions of catch for Japan in subarea 3, i.e., Greenland halibut, Atlantic cod, Atlantic redfish, caplin and squid. Major species compositions vary by period, i.e., Atlantic cod and red fish (1980-1983), redfish (1984-1991), Greenland halibut and redfish (1992-2008), Greenland halibut and yellowtail flounder (2016-2017), Greenland halibut and red fish (2018-2021), and Greenland halibut (2022). Yellowtail flounder is not TAC species for Japan, but its ratio was high in 2016-2017 because of quota transfers (Greenland halibut, red fish and yellowtail flounders) between Japan and Canada in 2016-2017, thus catch in this period did not reflect the allocation of quota (TAC).

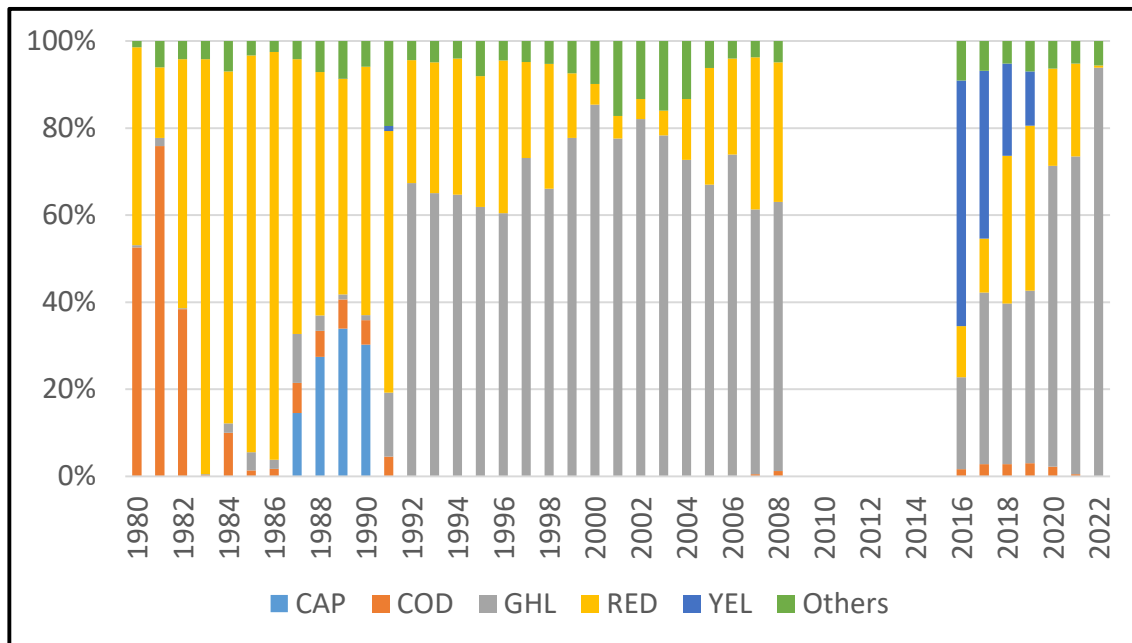


Figure 5. Species compositions of catch in Subarea 3. All gears are combined (1980-2022).

Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (2) Japan joined NAFO in 1980.
- (3) Majority gear is the bottom otter trawl

Figure 6 shows annual catch trends by species in subarea 3 during two periods (1980-2022 and 1994-2022). There are high and low catch level periods, i.e., high (1980-1993) (average=4,500 tons) and low (1994-2021) (Average=2,500 tons), the difference of which is 2,000 tons. Yellowtail flounder catch was high (2016-2017) as explained above.

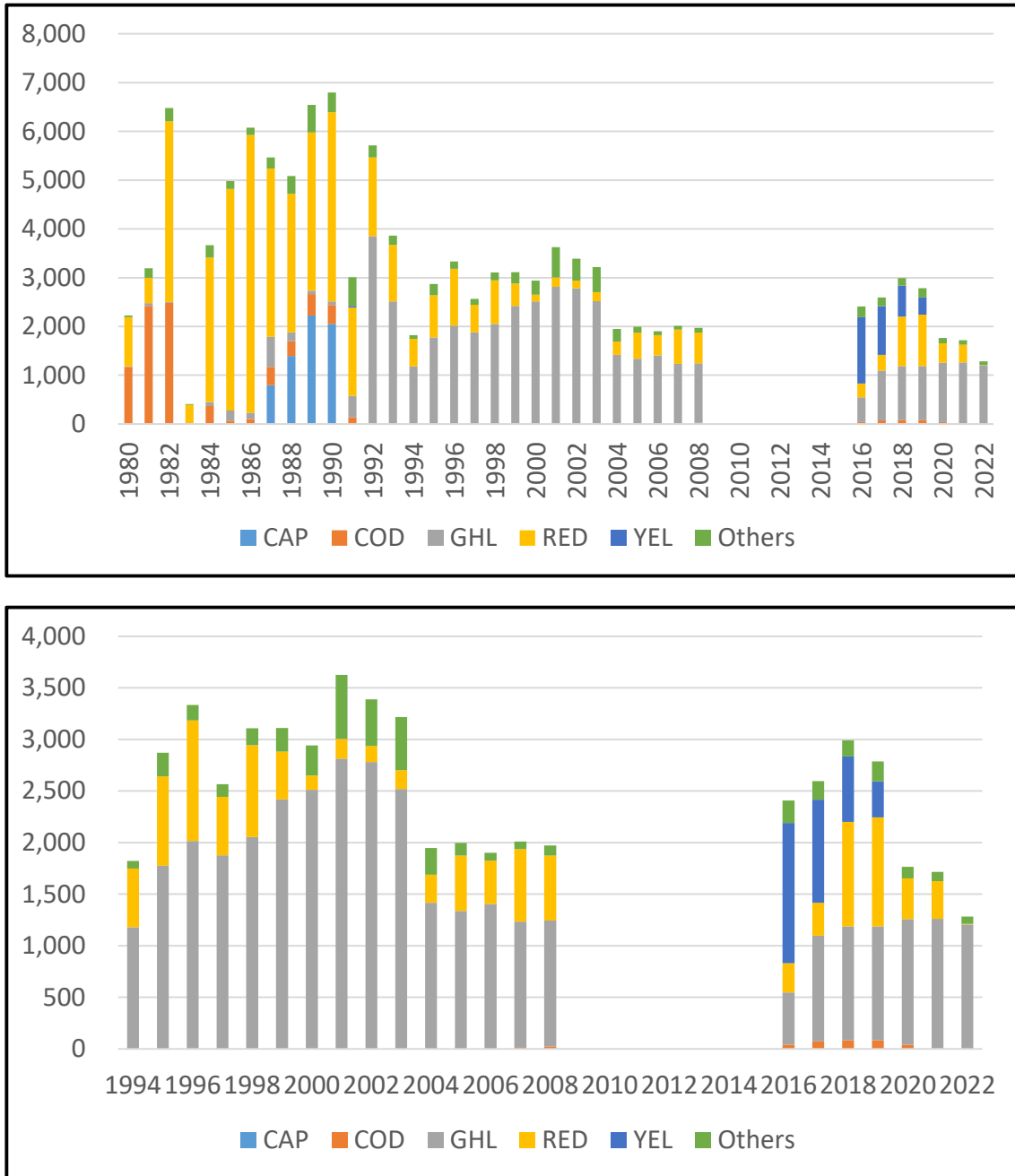


Figure 6. Catch by species (tons) in Subarea 3. All gears are combined (1980-2022: upper, 1994-2022: lower).

Note:

- (1) Horizontal broken lines represent averages.
- (2) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (3) Japan joined NAFO in 1980.
- (4) Majority gear is the bottom otter trawl.

(2) Size frequencies (Total/Fork length by 0.5cm is shown in Annex A)

• Greenland halibut

Size of Greenland halibut showed bigger (50.5cm) in 2016 but became slightly smaller during 2017-2021 (about 48.7cm). The size has become further smaller (average=48.0cm) in 2022.

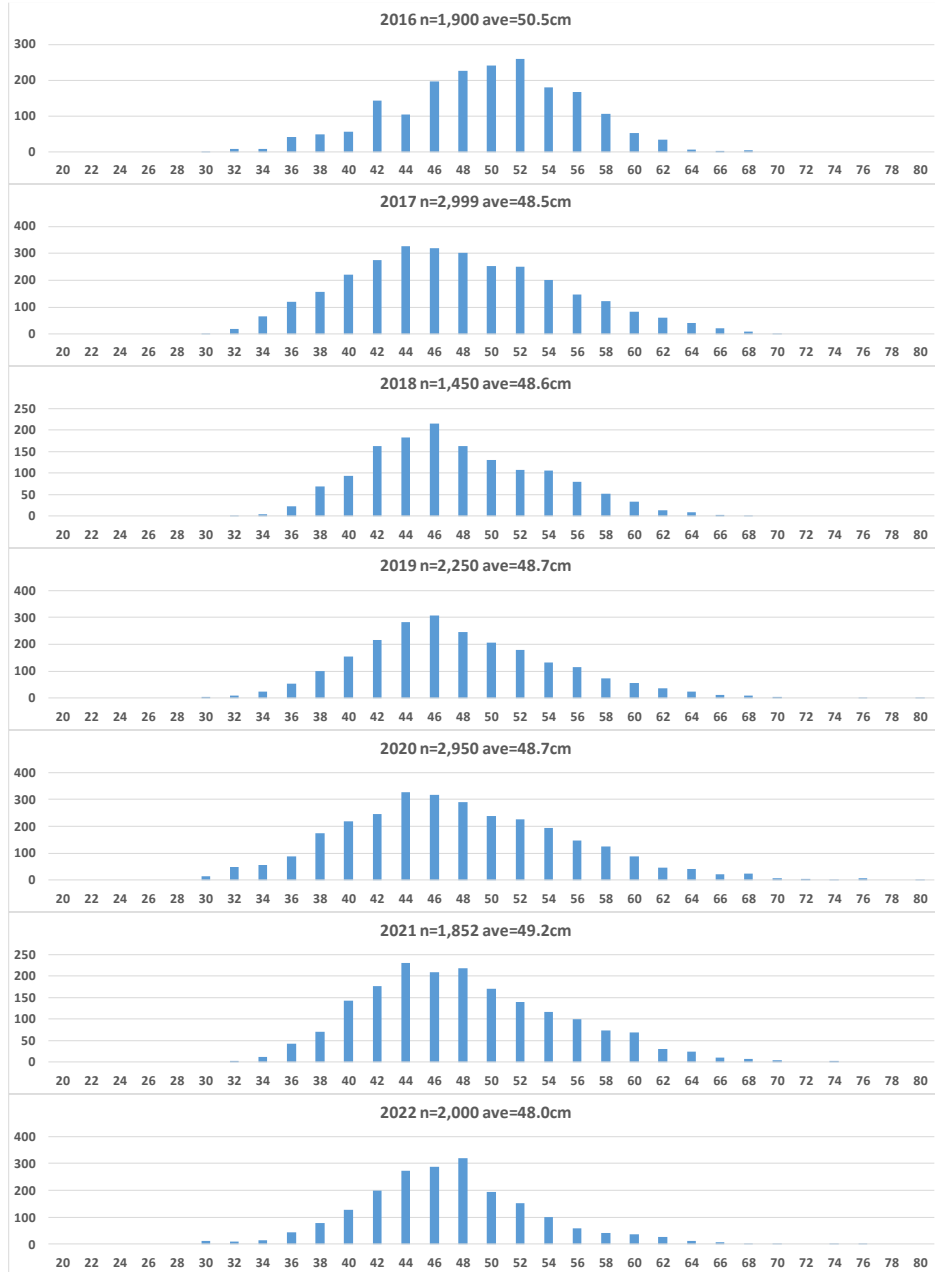


Figure 7. Size frequency distribution based on the total length data measured by one on-board observer for Greenland halibut (2016-2022) (subarea 3).



• **Red fish**

Average sizes (fork length) tended to be larger as years with the largest sizes in 2021 (ca. 37cm). Size frequency distributions formed the bimodal (peaks around in 23cm and 32 cm) in 2016 but the unimodal in 2017-2021 (peak was around 26cm in 2017, 32cm in 2018-2020 and 36cm in 2021). The size data in 2022 is very small in number (only 100 individuals) with the small catch, thus the result is omitted here.

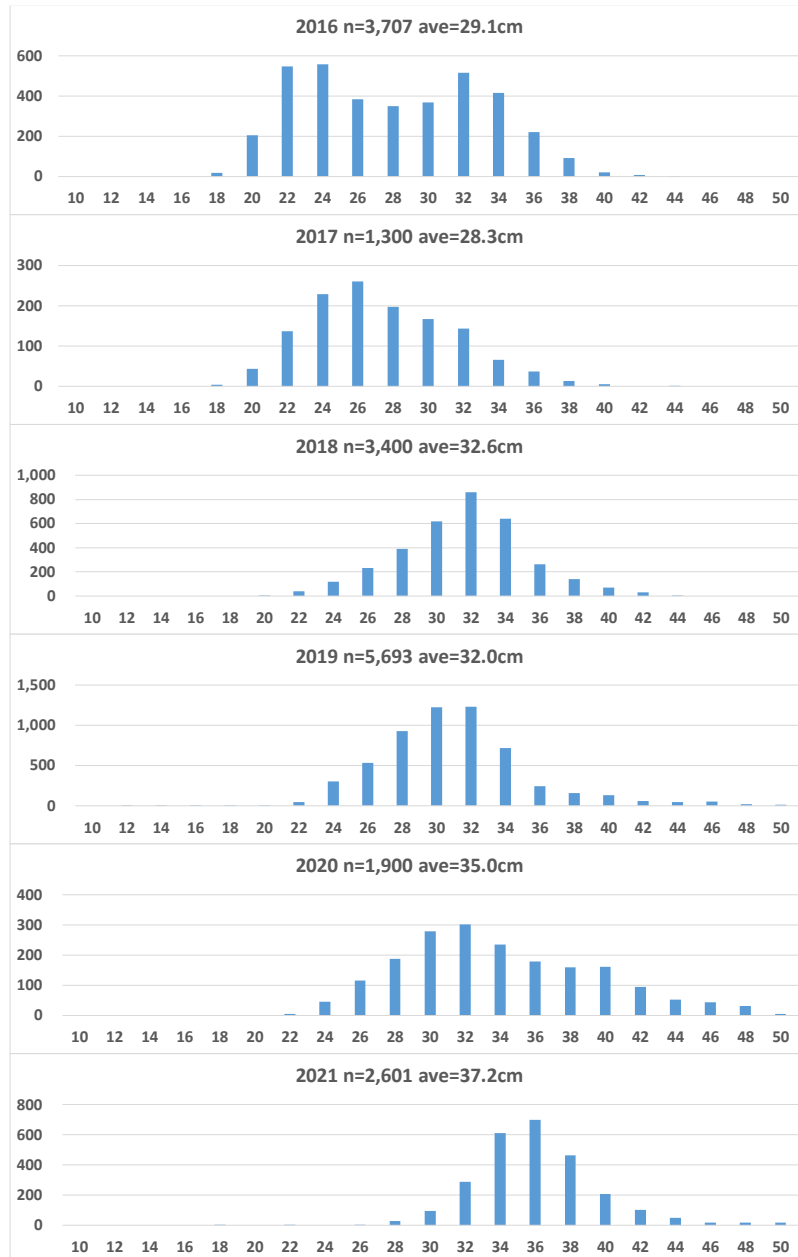


Figure 8. Size frequency distribution based on the fork length data measured by one on-board observer for redfish (2016-2021) (subarea 3).

-Yellowtail flounder

No catch was made from 2020 to 2022. Average sizes were similar during 2016-2019 (ave. 34-35cm). Size frequency distributions for four years formed unimodal (peak around 33 cm).

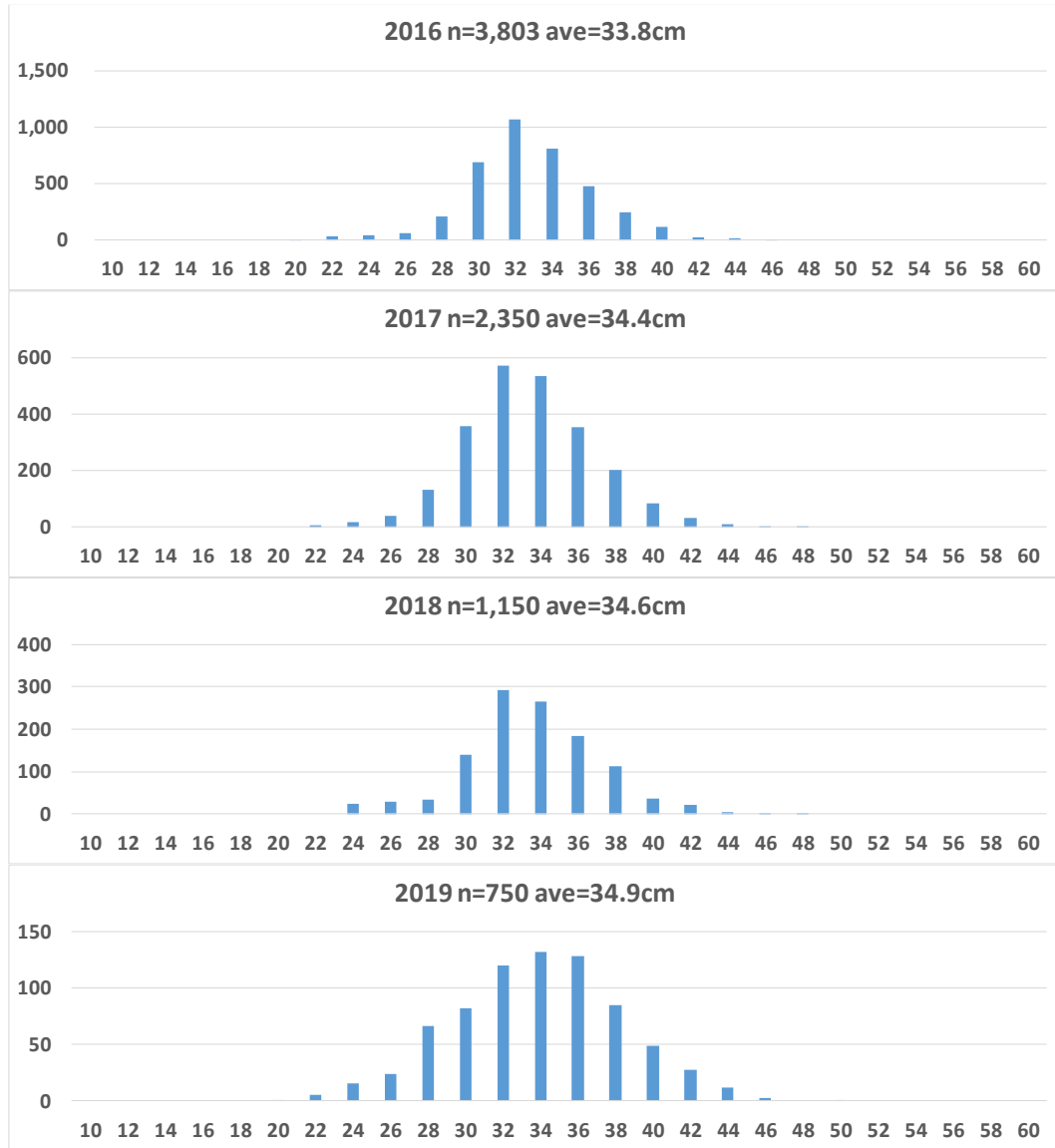


Figure 9. Size frequency distributions based on the total length data collected by one on-board observer for yellowtail flounder (2016-2019) (subarea 3).

4.2 Division 3K

Table 5 shows catch by species in Division 3K (1980-2022) (all gears combined). There were operations only for 11 years (1980-91 except 1983). Redfish was the largest catch (average=1,345 ton), followed by Cod (119 tons) and Greenland halibut (85 tons).

Table 5. Catch (tons) by species in Division 3K (1980-2022) (all gears combined)

CODE	CAT	COD	DGX	FIN	FLW	FLX	GHL	GRO	HAL	PLA	RED	RNG	SHX	SKA	WIT
1980		194				5					9				
1981	2	33									4				1
1982	12	752	1	7			9		2		2,662			2	15
1983	There were operations in NAFO CA, but not in Division 3K.														
1984		40					67	7			1,132		4		7
1985	5	60					196	23		12	3,439				55
1986	27	97					87	9	10	2	3,986	11	9		32
1987		96					431	20	3	8	2,079	9	1		24
1988		17	1				104	19	1	3	693	9	3		6
1989		8					18	6		1	485	5			3
1990		9			1		10				239		1		1
1991				2			8	2		2	63	3	1		7
1992															
1993															
1994															
1995															
1996															
1997															
1998															
1999															
2000	There were operations in NAFO CA, but not in Division 3K.														
2001															
2002															
2003															
2004															
2005															
2006															
2007															
2008															
2009															
2010															
2011															
2012	No operations in NAFO CA.														
2013															
2014															
2015															
2016															
2017															
2018															
2019	There were operations in NAFO CA, but not in Division 3K.														
2020															
2021															
2022															

Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (2) Japan joined NAFO in 1980.
- (3) Majority gear is the bottom otter trawl.
- (4) Blank means catch (tons) < 0.5 (including 0 catch) or no operations.

4.3 Division 3L

Table 6 shows catch by species in Division 3L (1980-2022) (all gears combined) except 1983 and during 2009-2015. Redfish and Greenland halibut were major target (TAC) species, but the catch was very small (7 tons) for Redfish in 2022.

Table 6. Catch (tons) by species in Division 3L (1980-2022) (all gears combined)

CODE	CAT	COD	DGX	FIN	FLX	GHL	GRO	GSK	HAL	PLA	POK	RED	RHG	RNG	SHX	SKA	SQI	WIT	YEL
1980		938				12			1	6		26							
1981	68	2,379				60			2	29		128				18		24	
1982	60	1,707				5			5	43		159				29		6	
1983	There were operations in NAFO CA, but not in Division 3L.																		
1984	11	317		1	1	2	5		2	15		105						2	
1985		1					2		1			129							
1986		1				1				3		135							
1987			1			152	16		2			114		8	5				
1988		114				49	17		6	2		152		6	1				
1989		2				4				21		114							
1990		1				8	1			6		151		3				5	
1991		4				302	11			44		84		5				2	36
1992						1,642	17		16	21		67		3				44	
1993						1,168	48					37						1	
1994			2			516	4		2	1		82		41	1				
1995			6			691	50					47		32	16			5	
1996			35		7	1,900	25			11		74		21	9			11	
1997			3		19	1,849	15		4	7		69		40	22			4	
1998			2		34	1,927	33		3	16		98		34	13			2	
1999					92	2,376	35		5	21		141		39	28			2	
2000					72	2,511	25		3	21		107		27	24			4	
2001					244	2,666	8		33	6		109		134	24			4	
2002						2,645	82		14	78		88		92		34		38	
2003	26					2,505	27		2	71		86	2	183		64		12	
2004	5					1,413	18		5	39		61	3	119		54		7	
2005						1,237	7		5	29		52		53	17			4	
2006						1,383	5		2	15		36		43		2	2	2	
2007						1,198	2			27		29	24			8		5	
2008						1,210	15			43		29	20			9		8	
2009																			
2010																			
2011																			
2012	No operations in NAFO CA.																		
2013																			
2014																			
2015																			
2016	2					474	1		2	4		125		11				5	
2017	5	1				1,024			1	3		125		13		1		5	
2018	8	1				1,101			4			412		28				1	
2019	19	1	1			1,075	1		6	1		606	88	1		10		4	
2020	22	2				1,204		2	4	1		108	53					3	
2021	7	3				788		10	3			109	28			1			
2022	13					1,019		9	1			7	35						

Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (2) Japan joined NAFO in 1980.
- (3) Majority gear is the bottom otter trawl.
- (4) Blank means catch (tons) < 0.5 (including 0 catch) or no operations.

4.4 Division 3M

Table 7 shows catch by species in Division 3M (1980-2022) (all gears combined). Redfish and Greenland halibut were major target (TAC) species, but no Redfish catch was made in 2022.

Table 7. Catch (tons) by species in Division 3M (1980-2022) (all gears combined)

CODE	CAT	COD	DGX	FIN	FLX	GHL	GRO	GSK	HAL	PLA	POK	PRA	RED	RHG	RNG	SHX	SKA	WIT
1980		37		16							1		976					
1981		9									47		386					
1982		10									53		392					
1983		1			3	1	2				9		390					
1984		9		3	1	10	2		1	1			389					
1985		5				13	5		1	2			313					
1986		6				35				3			400					
1987		269				33	2						131		1			
1988		5				27	2			78	1		393		1			
1989		38	2			44	25			402			885		9			4
1990		24				58	6			308			2,082		16			
1991		54				128	26		1	450			1,431		6			
1992		2				2,185	78			50			1,424		5			4
1993						1,341	75			49			967		7			2
1994						663							488		22			
1995			8			1,086	82		4				553		25	1		
1996			1			114	7						678		2	11		
1997						12							212					
1998					3	123	6						439		3	3		
1999					5	42							320		1	2		
2000					1	1						114	31					
2001					24	149			3			130	80		12	1		
2002						137	3			5		100	67		6			
2003						14	1			3		117	98	3	2			
2004	1					3				4			209		4			1
2005	1					100	1		5				483			1		
2006	1					21			3				383					2
2007	1	10				24			6				613					
2008		24				9			2				603					
2009																		
2010																		
2011																		
2012																		
2013																		
2014																		
2015																		
2016		1				35			3				128		1			
2017		1	49						1				190					1
2018		11	82			2			4	2			600		2		3	1
2019		7	81			29			3	3			450	3			7	2
2020		3	37			15			1				286	1				1
2021		6	5			465		10	3				257	20				1
2022		2				186			0					11				0

Note:

(1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.

(2) Japan joined NAFO in 1980.

(3) Majority gear is the bottom otter trawl.

(4) Blank means catch (tons) < 0.5 (including 0 catch) or no operations.

4.5 Division 3N

Table 8 shows catch by species in Division 3M (1980-2022) (all gears combined). Fisheries were not so active comparing to other Divisions except for the high capelin catch (1987-1990) (average =1,616 tons) and the high yellowtail flounder catch (2016-2019) (834 tons). No operation was made in this Division from 2020 to 2022.

Table 8. Catch (tons) by species in Division 3N (1980-2022) (all gears combined)

CODE	CAP	CAT	COD	DGX	FIN	GHL	GRO	HAL	PLA	RED	RNG	SKA	WIT	YEL
1980														
1981														
1982														
1983														
1984					4					81				
1985														
1986										12				
1987	793					1				51				
1988	1,395	2	114					24	2					
1989	2,222		391	1	3	3	7		31	39	1		2	1
1990	2,054		350				2		21	4				
1991			77			2	2		5	4			13	
1992						18	1			1			1	
1993														
1994														
1995														
1996														
1997						13	1						1	
1998														
1999						2	1							
2000														
2001														
2002														
2003														
2004														
2005														
2006														
2007														
2008														
2009														
2010														
2011														
2012														
2013														
2014														
2015														
2016			38					6	145			22	7	1,355
2017			22					3	116			23	4	1,000
2018									77			12	1	634
2019			2						17			11		348
2020														
2021														
2022														

Note:

- (1) Data source: STATLANT21A based on the official statistics provided by Fisheries Agency of Japan.
- (2) Japan joined NAFO in 1980.
- (3) Majority gear is the bottom otter trawl.
- (4) Blank means catch (tons) < 0.5 (including 0 catch) or no operations.

4.6 Division 30

Table 9 shows catch by species in Division 30 (1980-2022) (all gears combined). Fisheries were not so active comparing to other Divisions except high redfish catch during 1982-1993 and 1995-1998 (average =701 tons).

Table 9. Catch by species in Division 30 (1980-2022) (all gears combined).

CODE	ANG	ARG	BET	BFT	CAT	COD	DGX	FIN	GHL	GRO	HAD	HAL	HKR	HKS	HKW	PLA	POK	RED	RNG	SHX	SKA	SQI	SWO	WIT	YEL	YFT	
1980															2												
1981																							1				
1982	1	11				16		1				8		3	6	5		496							1		
1983											1				2			1								1	
1984	1	12				1		10		5	29	14	13	16	69	5	1	1,258					1			13	
1985	3	2								3	7	6		2	19	2		661								16	
1986		4				1		1	3	1	4	7		16	8	1		1,162	1	1						1	
1987		9	5			14				4	44	18		1	34			1,074		1			2			10	
1988	1	12	2	2	1	50			1	5	7	9	2		101	4		1,606		2			2		2	21	
1989	1	4					2		5	11		14			6			1,724		2							
1990	1	3						1		5	2	5			5	2		1,406					4			2	
1991	1	1							3	1		2						226									
1992	1								2	5		1						125			1					1	
1993	2	1							3	2		1						159									
1994	There were operations in NAFO CA, but not in Division 30.																										
1995											1				1			264									
1996						1				1		1			1			417		4			1			1	
1997									2	3		2						285		2							
1998									3	7		4						355		1							
1999																											
2000																											
2001																											
2002																											
2003																											
2004																			2								
2005																			1								
2006										1																	
2007										1							1		61				1				
2008																											
2009																											
2010																											
2011																											
2012																											
2013																											
2014																											
2015																											
2016	2					1					3				1	1		30				1			1	4	
2017											1							6									
2018																		4									
2019															1									9			
2020															1				1					19			
2021																											
2022																											

Note: Data source: (1) STATLANT21A based on the official statistics provided by Fisheries Agency of Japan. (2) Japan joined NAFO in 1980, (3) Majority gear is the bottom otter trawl and (4) Blank means catch (tons) < 0.5 (including 0 catch) or no operations.

B. Special Research Studies

1. Environmental Studies

- a) Hydrographic studies
- b) Plankton studies (including eggs and larvae)
- c) Benthic studies
- d) Observations on ice conditions in Subareas 0 to 4
- e) Other environmental studies

2. Biological studies by species

Material should be presented in the order of the life cycle, reporting studies on eggs and larval stages first.

3. Gear and selectivity studies, including studies on fishing operations

4. Miscellaneous studies

Not conducted in 2022.

Annex A. Frequency of total/fork length by 0.5 cm for GLH, RED and YEL

1) Frequency of total length for Greenland halibut

TL (cm)	2016	2017	2018	2019	2020	2021	2022	TL (cm)	2016	2017	2018	2019	2020	2021	2022
	30.0-30.5	0	0	0	0	2	0		1	60.0-60.5	25	19	12	16	33
30.5-31.0	0	0	0	2	3	0	4	60.5-61.0	12	17	6	16	13	18	7
31.0-31.5	1	0	0	0	3	0	3	61.0-61.5	12	25	11	13	21	22	12
31.5-32.0	0	1	0	2	6	0	4	61.5-62.0	4	22	5	11	22	11	8
32.0-32.5	0	6	0	2	3	0	0	62.0-62.5	20	13	4	12	18	9	9
32.5-33.0	2	6	0	2	13	0	3	62.5-63.0	6	19	8	9	18	9	4
33.0-33.5	6	3	1	4	18	1	2	63.0-63.5	6	16	2	4	8	10	14
33.5-34.0	1	3	0	1	15	1	5	63.5-64.0	3	12	0	12	3	3	0
34.0-34.5	2	6	0	3	12	0	2	64.0-64.5	3	15	6	8	15	6	5
34.5-35.0	2	17	0	6	13	0	3	64.5-65.0	2	10	0	6	8	3	3
35.0-35.5	2	22	2	9	10	5	6	65.0-65.5	2	6	2	4	10	12	2
35.5-36.0	3	21	3	7	20	7	3	65.5-66.0	0	10	1	7	9	3	1
36.0-36.5	18	23	6	16	18	9	10	66.0-66.5	0	9	2	4	4	4	4
36.5-37.0	7	25	1	11	14	8	7	66.5-67.0	2	5	0	2	10	4	1
37.0-37.5	9	36	10	13	26	11	14	67.0-67.5	1	5	0	3	4	2	1
37.5-38.0	8	36	6	14	31	15	13	67.5-68.0	0	2	1	3	3	0	1
38.0-38.5	13	40	18	15	52	13	16	68.0-68.5	0	6	0	2	14	3	2
38.5-39.0	8	45	14	27	39	14	14	68.5-69.0	0	2	0	5	4	1	0
39.0-39.5	11	41	22	30	38	20	24	69.0-69.5	5	1	0	1	2	2	0
39.5-40.0	18	32	15	29	44	24	23	69.5-70.0	0	1	1	2	3	1	1
40.0-40.5	12	42	20	35	52	30	29	70.0-70.5	0	1	0	0	3	0	0
40.5-41.0	13	57	16	46	44	32	36	70.5-71.0	0	0	0	2	5	2	0
41.0-41.5	21	50	29	28	53	41	26	71.0-71.5	0	0	0	1	0	0	2
41.5-42.0	10	72	28	45	69	40	36	71.5-72.0	0	0	0	1	0	2	1
42.0-42.5	35	58	36	56	50	37	36	72.0-72.5	0	0	0	0	1	0	0
42.5-43.0	30	69	34	52	51	57	49	72.5-73.0	0	0	0	0	3	0	0
43.0-43.5	44	73	41	51	70	36	63	73.0-73.5	0	0	0	0	0	0	0
43.5-44.0	35	76	51	58	75	47	50	73.5-74.0	0	0	0	0	0	0	0
44.0-44.5	32	81	30	61	76	60	67	74.0-74.5	0	0	0	0	0	0	1
44.5-45.0	13	79	46	75	77	65	86	74.5-75.0	0	0	0	0	1	1	0
45.0-45.5	49	82	49	68	95	57	54	75.0-75.5	0	0	0	0	0	1	0
45.5-46.0	11	84	58	78	78	49	66	75.5-76.0	0	0	0	0	1	1	1
46.0-46.5	71	82	42	73	76	55	77	76.0-76.5	0	0	0	0	0	0	0
46.5-47.0	27	72	62	72	88	60	70	76.5-77.0	0	0	0	0	0	0	0
47.0-47.5	67	88	58	81	70	44	66	77.0-77.5	0	0	0	0	6	0	1
47.5-48.0	32	77	53	81	82	50	75	77.5-78.0	0	0	0	1	0	0	1
48.0-48.5	71	89	41	61	70	54	94	78.0-78.5	0	0	0	0	0	0	0
48.5-49.0	26	71	50	53	81	53	88	78.5-79.0	0	0	0	0	0	0	0
49.0-49.5	85	80	28	66	74	53	73	79.0-79.5	0	0	0	0	0	0	0
49.5-50.0	44	63	44	65	65	58	64	79.5-80.0	0	0	0	0	0	0	0
50.0-50.5	88	50	36	55	58	32	42	80.0-80.5	0	0	0	0	0	0	0
50.5-51.0	42	71	35	59	73	38	52	80.5-81.0	0	0	0	1	0	0	0
51.0-51.5	82	61	31	41	55	51	52	81.0-81.5	0	0	0	0	0	0	0
51.5-52.0	30	70	28	50	53	49	48	81.5-82.0	0	0	0	0	2	0	0
52.0-52.5	76	66	30	47	55	36	49	82.0-82.5	0	0	0	0	0	0	0
52.5-53.0	65	60	25	47	64	37	31	82.5-83.0	0	0	0	0	0	0	0
53.0-53.5	72	62	21	39	67	34	42	83.0-83.5	0	0	0	0	0	0	0
53.5-54.0	47	63	32	47	39	32	30	83.5-84.0	0	0	0	0	0	0	0
54.0-54.5	48	54	30	33	51	31	33	84.0-84.5	0	0	0	0	0	0	0
54.5-55.0	42	47	26	39	51	33	27	84.5-85.0	0	0	0	0	0	0	0
55.0-55.5	67	50	21	31	39	26	21	85.0-85.5	0	0	0	0	0	0	0
55.5-56.0	24	50	29	29	52	26	19	85.5-86.0	0	0	0	0	0	0	0
56.0-56.5	73	43	18	34	47	25	15	86.0-86.5	0	0	0	0	0	0	0
56.5-57.0	19	36	24	25	36	18	16	86.5-87.0	0	0	0	0	0	0	0
57.0-57.5	51	35	18	24	30	31	15	87.0-87.5	0	0	0	0	0	0	0
57.5-58.0	25	34	19	32	34	25	12	87.5-88.0	0	0	0	0	0	0	0
58.0-58.5	45	32	17	18	34	17	13	88.0-88.5	0	0	0	0	0	0	0
58.5-59.0	21	45	11	22	27	22	10	88.5-89.0	0	0	0	0	0	0	0
59.0-59.5	26	24	12	14	31	13	10	89.0-89.5	0	0	0	0	0	0	0
59.5-60.0	15	22	12	20	34	22	9	89.5-90.0	0	0	0	0	0	0	0

2) Frequency of fork length for Red fish

FL (cm)	2016	2017	2018	2019	2020	2021	FL (cm)	2016	2017	2018	2019	2020	2021
	10.0-10.5	0	0	0	0	0		0	35.0-35.5	102	18	153	170
10.5-11.0	0	0	0	0	0	0	35.5-36.0	80	11	114	114	50	184
11.0-11.5	0	0	0	0	0	0	36.0-36.5	69	14	101	79	53	173
11.5-12.0	0	0	0	0	0	0	36.5-37.0	59	6	68	77	50	192
12.0-12.5	0	0	0	0	0	0	37.0-37.5	50	7	53	42	37	172
12.5-13.0	0	0	0	0	0	0	37.5-38.0	44	9	40	42	39	162
13.0-13.5	0	0	0	0	0	0	38.0-38.5	31	7	41	34	25	153
13.5-14.0	0	0	0	1	0	0	38.5-39.0	23	3	37	45	46	116
14.0-14.5	0	0	0	0	0	0	39.0-39.5	24	3	32	40	34	118
14.5-15.0	0	0	0	0	0	0	39.5-40.0	13	0	27	35	54	77
15.0-15.5	0	0	0	0	0	0	40.0-40.5	8	2	28	38	48	60
15.5-16.0	0	0	0	2	0	0	40.5-41.0	8	0	14	37	40	53
16.0-16.5	0	0	0	0	0	0	41.0-41.5	2	2	16	21	38	45
16.5-17.0	0	0	0	1	0	0	41.5-42.0	2	1	11	31	35	47
17.0-17.5	0	0	0	1	0	0	42.0-42.5	5	0	10	21	23	29
17.5-18.0	0	0	0	0	0	0	42.5-43.0	1	0	8	21	32	24
18.0-18.5	1	0	0	1	0	0	43.0-43.5	0	0	7	11	23	20
18.5-19.0	2	1	0	2	0	0	43.5-44.0	0	0	3	7	16	27
19.0-19.5	5	0	0	2	0	0	44.0-44.5	1	1	3	13	16	15
19.5-20.0	9	2	0	0	0	1	44.5-45.0	0	0	0	12	5	13
20.0-20.5	16	0	0	1	0	0	45.0-45.5	0	0	0	11	18	8
20.5-21.0	43	2	0	0	0	0	45.5-46.0	0	0	1	9	14	12
21.0-21.5	59	18	0	2	0	0	46.0-46.5	0	0	0	17	10	3
21.5-22.0	88	23	3	1	0	0	46.5-47.0	0	0	0	10	9	6
22.0-22.5	103	31	3	3	1	1	47.0-47.5	0	0	0	12	16	5
22.5-23.0	142	32	7	9	1	0	47.5-48.0	0	0	0	11	9	3
23.0-23.5	152	39	8	11	1	0	48.0-48.5	0	0	0	6	10	5
23.5-24.0	151	35	18	23	2	0	48.5-49.0	0	0	0	7	9	5
24.0-24.5	142	66	27	50	3	0	49.0-49.5	0	0	0	4	6	6
24.5-25.0	159	54	22	65	9	0	49.5-50.0	0	0	0	0	6	1
25.0-25.5	121	56	37	84	17	0	50.0-50.5	0	0	0	3	3	3
25.5-26.0	137	53	33	100	16	0	50.5-51.0	0	0	0	1	0	6
26.0-26.5	112	75	36	90	31	1	51.0-51.5	0	0	0	2	1	2
26.5-27.0	96	58	54	122	35	0	51.5-52.0	0	0	0	2	1	4
27.0-27.5	87	80	82	158	20	0	52.0-52.5	0	0	0	1	2	1
27.5-28.0	90	48	59	163	29	0	52.5-53.0	0	0	0	0	1	2
28.0-28.5	91	64	77	176	49	2	53.0-53.5	0	0	0	0	0	0
28.5-29.0	89	50	102	230	43	9	53.5-54.0	0	0	0	0	0	3
29.0-29.5	84	40	115	240	55	8	54.0-54.5	0	0	0	0	0	3
29.5-30.0	86	43	98	283	41	8	54.5-55.0	0	0	0	0	0	1
30.0-30.5	68	50	113	291	63	12							
30.5-31.0	96	44	134	304	68	16							
31.0-31.5	95	41	176	309	72	29							
31.5-32.0	110	32	195	319	77	38							
32.0-32.5	124	42	192	305	67	46							
32.5-33.0	127	36	216	327	82	55							
33.0-33.5	136	37	232	325	76	79							
33.5-34.0	129	28	222	275	77	108							
34.0-34.5	126	21	204	237	61	109							
34.5-35.0	109	15	168	194	65	143							

3) Frequency of total length for Yellowtail flounder

	2016	2017	2018	2019		2016	2017	2018	2019
TL (cm)					TL (cm)				
20.0-20.5	0	0	0	0	40.0-40.5	40	30	14	12
20.5-21.0	1	0	0	0	40.5-41.0	36	22	8	13
21.0-21.5	3	0	0	1	41.0-41.5	27	15	10	8
21.5-22.0	3	0	0	0	41.5-42.0	15	18	5	16
22.0-22.5	6	0	0	0	42.0-42.5	2	11	6	7
22.5-23.0	8	1	0	0	42.5-43.0	12	10	6	11
23.0-23.5	8	3	0	5	43.0-43.5	5	6	8	4
23.5-24.0	9	1	0	0	43.5-44.0	6	4	2	5
24.0-24.5	13	1	0	0	44.0-44.5	4	3	1	2
24.5-25.0	10	2	0	2	44.5-45.0	4	2	1	5
25.0-25.5	10	7	16	6	45.0-45.5	4	3	2	3
25.5-26.0	11	6	8	7	45.5-46.0	0	2	0	2
26.0-26.5	16	7	12	6	46.0-46.5	1	0	0	0
26.5-27.0	13	8	7	7	46.5-47.0	1	2	1	1
27.0-27.5	14	10	6	6	47.0-47.5	2	0	1	2
27.5-28.0	17	16	5	5	47.5-48.0	0	2	1	0
28.0-28.5	26	20	5	17	48.0-48.5	0	0	0	0
28.5-29.0	55	22	6	15	48.5-49.0	0	1	1	0
29.0-29.5	39	35	13	12	49.0-49.5	0	1	0	0
29.5-30.0	94	56	11	22	49.5-50.0	0	0	1	0
30.0-30.5	96	63	18	21	50.0-50.5	0	0	0	1
30.5-31.0	167	77	20	24	50.5-51.0	0	0	0	0
31.0-31.5	170	97	44	17	51.0-51.5	0	0	0	0
31.5-32.0	258	122	58	20	51.5-52.0	0	0	0	0
32.0-32.5	225	127	60	25	52.0-52.5	0	0	0	0
32.5-33.0	292	143	78	26	52.5-53.0	0	0	0	0
33.0-33.5	284	153	73	44	53.0-53.5	0	0	0	0
33.5-34.0	266	148	81	25	53.5-54.0	0	0	0	0
34.0-34.5	229	157	72	29	54.0-54.5	0	0	0	0
34.5-35.0	232	135	67	41	54.5-55.0	0	0	0	0
35.0-35.5	164	138	61	35	55.0-55.5	0	0	0	0
35.5-36.0	182	105	65	27	55.5-56.0	0	0	0	0
36.0-36.5	123	108	52	29	56.0-56.5	0	0	0	0
36.5-37.0	135	86	43	39	56.5-57.0	0	0	0	0
37.0-37.5	117	81	50	27	57.0-57.5	0	0	0	0
37.5-38.0	102	80	39	33	57.5-58.0	0	0	0	0
38.0-38.5	74	68	37	18	58.0-58.5	0	0	0	0
38.5-39.0	68	57	24	29	58.5-59.0	0	0	0	0
39.0-39.5	51	41	23	21	59.0-59.5	0	0	0	0
39.5-40.0	53	37	28	17	59.5-60.0	0	0	0	0

Annex B. Fishing vessel in recent years (2016-2023)

FV No 68 Fukuyoshi maru (stern trawler) (Gross Tonnage:401 t) (Photo 1) started her first fishing operation in the NAFO CA from April 8, 2016 (Division 3L) targeting Greenland halibut after 7 years absence of operations by other Japanese vessels. There are two scientific observers on-board.



Photo 1 FV No 68 Fukuyoshi maru
(St. John's, New Newfoundland and Labrador, Canada)