Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat (CSAS)

Research Document 2015/012

Newfoundland and Labrador Region

Assessing the status of the Haddock (*Melanogrammus aeglefinus*) stock in NAFO Divisions 3LNO in 2014

D.W. Ings, K.S. Dwyer, R.M. Rideout, B.P. Healey, and D. Power

Science Branch
Fisheries and Oceans Canada
PO Box 5667
St. John's, NL, Canada A1C 5X1

December 2015

Canada

Foreword

This series documents the scientific basis for the evaluation of aquatic resources and ecosystems in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Research documents are produced in the official language in which they are provided to the Secretariat.

Published by:

Fisheries and Oceans Canada
Canadian Science Advisory Secretariat
200 Kent Street
Ottawa ON K1A 0E6

http://www.dfo-mpo.gc.ca/csas-sccs/
csas-sccs@dfo-mpo.gc.ca

ISSN 1919-5044

Correct citation for this publication:

Ings, D.W., Dwyer, K.S., Rideout, R.M., Healey, B.P., and D. Power. 2015. Assessing the status of the Haddock (*Melanogrammus aeglefinus*) stock in NAFO Divisions 3LNO in 2014. DFO Can. Sci. Advis. Sec. Res. Doc. 2015/012. v + 38 p.

TABLE OF CONTENTS

ABSTRACT

The status of the Haddock stock in the Northwest Atlantic Fisheries Organization (NAFO) Divisions 3LNO was assessed during a Fisheries and Oceans Canada (DFO) Regional Advisory Process (RAP) held January 29-30, 2014. Stock status was updated based on information available up to spring 2013. The primary sources of information for the assessment were; total commercial landings from all countries (1953-2012) and Canadian landings (2013) in conjunction with information from Canadian spring (1972-2013) and fall (1990-2012) research vessel (RV) surveys of Divisions 3LNO with bottom trawls, plus EU-Spain summer RV trawl surveys (1997-2013) in 3NO, outside the 200 mile limit.

Landings averaged 42,745 t during the period 1953 to 1962. Then, catches were lower averaging 3496 t annually from 1963 to 1992. This stock has been under moratorium since 1993 and from 1993 to 2012 landings from bycatch averaged 136 t annually. During the last five years, Divs. 3LNO haddock were caught mostly as bycatch in the Yellowtail Flounder and skate fisheries.

The fall RV survey provides valuable indices for Haddock because as the water temperatures warm, fish disperse over the banks from the slope waters where they tend to congregate in winter and early spring. Biomass and abundance indices from the fall RV surveys have varied without trend over time, although the last two years have been higher than the 1995-2012 average. These results are generally consistent with those from the spring RV survey. Annual recruitment to the stock is episodic. A recruitment index based on fish less than 20 cm in the fall RV surveys was higher in 2011 and 2012 than the 1995-2012 average. In the absence of a model of population dynamics and the lack of trend in the current RV survey indices at very low catch levels, advice could not be provided on whether to maintain a moratorium on fishing. Despite current levels of removals being low relative to historical values, no significant growth has been observed in this stock.

Évaluation de l'état du stock d'aiglefin (*Melanogrammus aeglefinus*) dans les divisions 3LNO de l'OPANO en 2014

RÉSUMÉ

L'état du stock d'aiglefin dans les divisions 3LNO de l'Organisation des pêches de l'Atlantique Nord-Ouest (OPANO) a fait l'objet d'une évaluation lors d'un processus d'évaluation régionale de Pêches et Océans Canada (MPO) en janvier 2014. L'état du stock a été mis à jour à partir des données disponibles jusqu'au printemps 2013. Les principales sources de renseignements pour l'évaluation ont été : les données sur les débarquements commerciaux totaux de tous les pays (de 1953 à 2012) et les débarquements canadiens (2013), conjointement avec les données des relevés par navire scientifique au Canada au printemps (de 1972 à 2013) et à l'automne (de 1990 à 2012) dans les divisions 3LNO avec des chaluts de fond, plus les données des relevés au chalut par navire scientifique en été dans l'Union européenne et en Espagne (de 1997 à 2013) dans la division 3NO, au-delà de la limite des 200 milles.

La moyenne des débarquements est de 42 745 t au cours de la période de 1953 à 1962. Par la suite, les prises ont été moins importantes et étaient en moyenne de 3 496 t par année de 1963 à 1992. Ce stock fait l'objet d'un moratoire depuis 1993 et de 1993 à 2012, les débarquements de prises accessoires étaient en moyenne de 136 t par année. Au cours des cinq dernières années, les prises accessoires d'aiglefin dans les divisions 3LNO ont principalement eu lieu dans le cadre des pêches à la limande à queue jaune et à la raie.

Le relevé d'automne par navire scientifique fournit des indices utiles pour l'évaluation de l'aiglefin, car à mesure que les températures de l'eau se réchauffent, les poissons se dispersent sur les bancs depuis les eaux du talus où ils ont tendance à se rassembler en hiver et au début du printemps. Les indices de biomasse et d'abondance des relevés d'automne par navire scientifique ont varié, sans afficher de tendance au fil du temps, même si les deux dernières années ont été supérieures à la moyenne de 1995 à 2012. Ces résultats correspondent généralement à ceux du relevé de printemps par navire scientifique. Le recrutement annuel est épisodique pour le stock. Un indice de recrutement fondé sur les poissons de moins de 20 cm des relevés d'automne était plus élevé en 2011 et en 2012 que la moyenne de 1995 à 2012. En l'absence d'un modèle de la dynamique des populations et à cause d'une lacune en matière de tendances dans les indices des relevés par navire de recherche à de très faibles niveaux de prises, il n'a pas été possible de fournir un avis en ce qui concerne le maintien du moratoire sur la pêche. Malgré les faibles niveaux actuels de prélèvement par rapport aux valeurs historiques, aucune croissance importante n'a été observée dans ce stock.

INTRODUCTION

This document provides an account of the 2014 assessment of the Haddock (*Melanogrammus aeglefinus*) stock in the Northwest Atlantic Fisheries Organization (NAFO) Divisions (Divs.) 3LNO located on Grand Bank, off Newfoundland (Figure 1). The history of the Haddock fishery in Divs. 3LNO and the most recent assessment documents are found in Templeman et al. 1978, DFO 2001, and DFO 2005. A regional assessment meeting was held during January 29-30, 2014 that also evaluated Subdivision (Subdiv.) 3Ps Haddock, Pollock and American Plaice. Participants included Fisheries and Cceans Canada (DFO) scientists, DFO fisheries managers, government officials from the province of Newfoundland and Labrador (NL), and representatives from non-government organizations, the fishing industry, and academia.

This assessment considered information from landings reported by all countries (1953-2012) and research vessel (RV) trawl surveys conducted by Canada (spring 1972-2013, autumn 1990-2012) in Divs. 3LNO and EU-Spain (spring-summer 1997-2013) in Divs. 3NO, outside Canada's Exclusive Economic Zone (EEZ) (200 nautical miles). The Canadian multi-species RV bottom-trawl surveys provided distributional data, indices of abundance and biomass, and a pre-recruit index based on fish less than 20 cm in the autumn survey. Indices of biomass and information on the size of fish sampled were available (unpublished data) from an EU-Spain RV survey (1997-2013).

ASSESSMENT

ENVIRONMENTAL OVERVIEW

A key indicator of ocean climate conditions on the NL Shelf, the North Atlantic Oscillation (NAO) index, returned to a negative phase in 2013 and as a result arctic air outflow to the Northwest Atlantic during the winter decreased over the previous year. This appears to have resulted in an increase in winter air temperatures over much of the Labrador Sea area causing a continuation of less sea-ice than normal on the NL Shelf. As a result of these and other factors, local water temperatures remained above normal in most areas in 2013 but show a decrease over 2011-12 values. In general, all environmental indices indicate a continuation of the warmer than normal trend throughout the area since the mid-1990s. During the past 2 years however, temperatures have decreased compared to the record warm conditions of 2011.

Overall fish community abundance in Divs. 3LNO declined during the mid-1980s and early 1990s. This decline was also accompanied by a decrease in the average fish size. Since the mid-1990s the biomass of the fish community has shown a positive trend, although it remains well below the pre-collapse levels. The only exception is shellfish (mainly Shrimp), which peaked around 2007 and declined since then; this increasing pattern is observed in all fish functional groups with plankpiscivores (mainly Redfish) showing the largest increases in recent years. Average fish size has shown high variability, with a clear increase since the lowest levels observed in early 2000s. These changes in biomass/abundance (BA) ratio at the fish community level can be explained by a reduction in the abundance of Shrimp in recent times. Among large benthivores, Haddock biomass levels have fluctuated comparatively little since the mid-1990s. This functional group has been dominated by American Plaice and Thorny Skate.

COMMERCIAL LANDINGS AND TOTAL ALLOWABLE CATCHES

Haddock landings by NAFO Division were first available in 1953, but most of the high landings (> 40,000 t annually) reported for Subarea 3 during the previous years (1948 to 1952) are thought to originate in Divs. 3LNO (Templeman et al. 1978). Landings in Divs. 3LNO were highest during the period from the late 1940s to early 1960s, with peaks of 78,000 metric tons in 1949 (Hodder et al. 1970) and 76,000 metric tons in 1961 (Figure 2). Landings remained low from the mid-1960s to mid-1980s, averaging 1808 t. The fishery was regulated by a total allowable catch (TAC) from 1987 to 1993 and TACs ranged from 4,100 t in 1987 to 10,000 t in 1990. In 1988, landings increased to 8200 metric tons and this is the only year when the TAC (8,100 t) was exceeded. Subsequently, landings declined until the moratorium in 1993. From 1973 to1992, landings averaged 2,378 t annually. During the period 1993 to 2012, landings from bycatch averaged 136 t annually with 30 t reported in 2012. Non-Canadian figures were not available for 2013 at the time of the assessment.

Since 2009, Canadian landings of Haddock were mostly from bycatch in fisheries for Yellowtail Flounder (range: 0.14-42 t), Atlantic Halibut (range: 0.27-5.7 t), skate (range: 0-60 t) and White Hake (range: 0.02-17 t) (Table 1). Haddock landings comprised a small percentage of the catch of Yellowtail Flounder and Atlantic Halibut in directed fisheries for these species, and did not exceed 2.5 % in any year since 2009 (Figure 3). Haddock landings relative to directed catch of skate and White Hake were highly variable; they ranged from zero to over 28 % (2013) for skate and zero to 8 % (2012) for White Hake (Figure 3). Non-Canadian landings of Haddock ranged from 3 t to 63 t annually between 2009 and 2012 (Figure 4).

BIOMASS, ABUNDANCE AND DISTRIBUTION

Research vessel surveys of Divs. 3LNO have been conducted by Canada in the spring since 1972 and in the fall since 1990. Three different bottom trawls have been used in the surveys over time. A Yankee 41.5 trawl was used from 1972 to 1982, then the Engel 145 otter trawl was used during the periods 1984 to 1995 (spring) or 1990 to 1994 (fall). There was no survey in 1983. Catchabilities are thought to be similar between the Yankee and Engel trawls. Beginning in the fall of 1995, the Engel trawl was replaced by the Campelen shrimp trawl in Canadian multi-species surveys. For many species, the Campelen trawl has improved survey catchability for small fish, but there are no conversion factors to convert the pre-Campelen data for Haddock. Therefore, direct comparisons cannot be made between periods with different trawl types. See Tables 2 and 3 for a summary of sets using the Campelen trawl. Analyses were limited to strata with depths of less than 732 m.

Waters in NAFO Divs. 3NO adjacent to the Canadian EEZ on the “tail” of the Grand Bank were also surveyed by EU-Spain (Instituto Español de Oceanografia, Far Fishery Program Communication) from 1997 to 2013. The survey gear was a Pedreira trawl deployed from the research vessel Playa de Menduiña during the period 1997 to 2001. From 2001 to 2013, a Campelen trawl was used on the research vessel Viszconde de Eza. Comparisons between the two time-series are not possible as conversion factors for the different trawls are not available.

Spring surveys

The Canadian biomass index for Haddock was low from 1972 to 1981 compared to the values from 1982 to 1988 (Figure 5). In 1984, the biomass index peaked due to the relatively strong 1981 year-class. The 1982 and 1983 year-classes were moderately successful and supported the fishery up to the late 1980s, but they were caught mostly as immature and maturing fish (< 45 cm) and contributed little to the spawning stock biomass. Subsequently, year-classes were weak until 1998.

In 1997, the survey biomass index increased sharply due to one large catch of pre-spawning fish, accounting for 98 % of the biomass index. Despite this, the 1998 survey located few haddock. The 1998 and 1999 year-classes were relatively strong and most of the fish sampled in 1999 and 2000 were from these year-classes. Low levels of recruitment were observed from 2000 to 2005 and the biomass and abundance (Figure 6) indices generally declined during that period. The biomass index has been relatively high since 2007 with all annual indices near or above the time-series (1996-2013) average. This relative stability is due to frequent annual recruitment events and the progression of year-classes through to mature fish, neither of which was seen in the 1980s or early 1990s. Abundance indices have been less stable than biomass indices since 2007. The abundance index was particularly low in 2011 as little recruitment was observed in 2010 and the 2009 year-class was diminished. In 2013, the abundance index was slightly higher than the 1996 to 2013 average.

During spring, Haddock tend to be concentrated in the warmer slope water (Figure 7; Tables 4-9) and this may increase the variance in the surveys because coverage is minimal in the narrow strata where the warmer water masses typically exist. Concentrations of Haddock were found in the shelf-slope waters during 2013, but they were also found on the bank, more broadly distributed than in most years.

The Yankee (length range: 11 cm to 83 cm) and Engel (length range: 7 cm to 85 cm) trawls sampled a similar length range of Haddock during the spring surveys (Figure 8). Larger Haddock, between 15 cm and 93 cm, were sampled by the Campelen trawl during spring suggesting that catchability in the Campelen trawl differs from the Yankee and Engel trawls. Tracking yearclasses through the timeseries as a progression of size modes is difficult due to the changes in gear over time, but a progression of size modes is apparent during two periods when fishing pressure was reduced. Following the establishment of the 200 nautical mile limit by Canada in 1977, a size mode can be followed from 1977 to 1980 (Figure 8). Similarly, immediately following the 1993 moratorium (1993-95) and subsequently (1998/99-2007, 2004-2011, 2009-12), size modes can be observed to progress through time. During the 1980s, the survey sampled few fish greater than 41 cm, but larger fish made up a higher percentage of the survey catch during most years since 1993, although most Haddock measured on the 2013 survey were less than 41 cm. Based on data on size at maturity collected previously, most Haddock in the 2013 spring survey were immature fish.

Biomass indices from the Canadian spring and EU-Spain surveys were consistently high during the last three years (Figure 9). However, during the period 2006 to 2010, biomass indices were comparatively higher in the Canadian survey. Haddock catches by the Canadian survey on the “tail” of the bank only (Figure 7) were consistent with the biomass index from the Spanish survey of the same area. In both surveys, only low catches were observed from 2002 to 2009 and relatively high catches were observed during 2011 to 2013. Thus, trends in Haddock biomass indices on the “tail” of the bank during spring may not indicate broader scale population trends.

Similar length ranges of Haddock were observed in the Campelen data from the EU-Spain (15 cm to 95 cm) and Canadian (15 cm to 93 cm; Figure 10) spring surveys. Low sample sizes and frequent gaps in the availability of Haddock length data from the EU-Spain survey prevent following the progression of size modes over time. Fish less than 45 cm predominated during most years of the EU-Spain survey. However, from 2011 to 2013 there has been a higher proportion of Haddock measuring more than 70 cm. The two smallest length modes in the 2012 and 2013 data appear at roughly the same size (peaks at 22 cm and 33-34 cm) in both surveys suggesting that recently the population structure for pre-recruits outside of the 200 nautical mile limit may be similar to that of the entire stock.

Fall surveys

The Canadian fall RV survey is valuable for Haddock because fish are dispersed over the bank and in the slope waters during fall (Figure 11, Tables 10-15), when water temperatures are similar in both areas. Haddock tend to congregate in the warmer slope waters during winter and early spring. During the period 1996 to 2002, the fall biomass index increased from low values to the highest on record (Figure 12). However, the high 2002 value was the consequence of two catches of large fish in the western portion of Div. 3O (Table 12).

The 1998 and 1999 year-classes were relatively strong and their distribution expanded during the period 1998 to 2002, when water temperatures were relatively warm. The fall biomass index was highest in 2002 (Figure 12) and the abundance index (Figure 13) was relatively high through the period 1998 to 2002 as the 1998 and 1999 year-classes remained prominent in the survey catch. The biomass index was low in 2003. Few fish from the 1998 or 1999 year-class were sampled by the survey in 2003 and only low levels of recruitment, defined as abundance of fish < 20 cm in the fall survey (Figure 14), were observed from 2000 to 2003. Annual recruitment remained low up to 2005 and this was reflected in low abundance indices (< 2,700) during 2003 to 2005.

Moderate and stronger year-classes were observed more frequently since 2005 than earlier in the Campelen time-series from the fall (Figure 15). The abundance index peaked in 2007 (Figure 13), with most fish sampled in that year from the relatively strong 2006 year-class (Figure 15). A moderately strong 2009 year-class was prominent in the survey catch in 2010, but biomass and abundance indices were quite low in that year because few larger (> 31 cm) fish were sampled. The pre-recruit index for both 2011 and 2012 is higher than the 1995 to 2012 average. Most fish sampled by the survey during the last two years were small (< 41 cm; Figure 15) and during 2012 in particular, they were concentrated on the southeast shoal (Figure 11) where the yellowtail flounder fishery is centred.

The fall biomass and abundance indices have varied without trend over time but the last two years have been above average. Generally, results are consistent between spring and fall surveys.

ACKNOWLEDGMENTS

This assessment is supported by many DFO personnel who collected data during research surveys. D. González is thanked for providing data from the EU-Spain research vessel survey (Instituto Español de Oceanografia, Far Fishery Program Communication).

REFERENCES CITED

DFO. 2001. Divisions 3LNO Haddock. DFO Science Stock Status Report A2-04 (2001).

DFO. 2005. Stock assessment update on groundfish in Newfoundland and Labrador Region. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/051.

Hodder, V. M., Chaulk, R., and Cluett, L. N. 1970. Length and age composition of Haddock landings from the Newfoundland areas by Canadian trawlers, 1953-64. Fish. Res. Brd. Can. Tech. Report no. 170. 69.p.

Templeman, W., Hodder, V. M., and Wells, R. 1978. Age, growth, year-class strength, and mortality of Haddock, *Melanogrammus aeglefinus*, on the Southern Grand Bank and their relation to the Haddock fishery of the area. ICNAF Res. Bull. 13. 65p.

TABLES

Table 1. Haddock landings by gear type from bycatch (kg) in Canadian fisheries in NAFO Divs. 3LNO from 2009 to 2013.

Year	Gear	Witch Flounder	Other	Atlantic Halibut	Monkfish	Redfish	Skate	White Hake	Yellowtail Flounder	Total Haddock landings (kg)
2009	gillnet	-	-	-	-	-	-	5961	-	5961
2009	longline	-	-	1866	-	-	59858	10637	-	72361
2009	Otter trawl	80	-	-	-	2	235	-	26538	26855
2009	**all**	**80**	**-**	**1866**	**-**	**2**	**60093**	**16598**	**26538**	**105177**
2010	gillnet	-	-	-	-	-	-	368	-	368
2010	longline	-	-	2591	-	-	-	535	-	3126
2010	otter trawl	-	-	-	-	-	-	-	24360	24360
2010	**all**	**-**	**-**	**2591**	**-**	**-**	**-**	**903**	**24360**	**27854**
2011	gillnet	-	-	-	-	-	-	22	-	452
2011	longline	-	-	296	-	-	-	-	-	573
2011	otter trawl	-	430	-	-	-	-	-	41493	41516
2011	**all**	**-**	**430**	**296**	**-**	**-**	**-**	**22**	**41493**	**42541**
2012	gillnet	-	-	-	4	-	183	3811	-	3998
2012	longline	-	-	266	-	-	-	-	-	247
2012	otter trawl	-	-	-	-	-	-	-	140	149
2012	**all**	**-**	**-**	**266**	**4**	**-**	**183**	**3811**	**140**	**4394**
2013	gillnet	-	-	-	-	-	2812	163	-	2975
2013	longline	-	-	5686	-	-	-	-	-	5686
2013	otter trawl	-	-	-	-	-	-	-	12601	12601
2013	**all**	**-**	**-**	**5686**	**-**	**-**	**2812**	**163**	**12601**	**21262**

Table 2. Summary of successful sets in the Canadian spring surveys of NAFO Divs. 3LNO during 1996 to 2013.

Year	3L Depth (Number of sets)	3N Depth (Number of sets)	3O Depth (Number of sets)	Total Sets
1996[1]	66-664 (188)	42-665 (82)	65-685 (86)	356
1997	60-681 (158)	35-689 (70)	62-669 (81)	309
1998	53-721 (163)	38-682 (88)	64-657 (93)	344
1999	41-692 (177)	40-659 (82)	62-679 (86)	345
2000	61-681 (134)	45-664 (81)	61-694 (83)	298
2001	34-695 (152)	40-650 (79)	74-699 (79)	310
2002	42-710 (146)	40-641 (79)	63-628 (79)	304
2003	62-698 (154)	39-681 (79)	63-726 (79)	312
2004	47-710 (151)	44-675 (79)	61-636 (79)	309
2005	64-672 (133)	45-691 (78)	66-719 (79)	290
2006[2]	60-701 (141)	46-77 (22)	64-103 (32)	195
2007[3]	61-702 (137)	44-636 (79)	64-719 (79)	295
2008[4]	60-684 (120)	40-623 (70)	64-704 (80)	270
2009[5]	61-694 (142)	44-668 (78)	64-674 (79)	299
2010	59-715 (128)	39-714 (78)	60-673 (80)	286
2011	57-723 (143)	40-673 (79)	63-716 (77)	299
2012	60-723 (132)	38-666 (77)	63-656 (79)	288
2013	62-632 (134)	40-684 (79)	64-650 (79)	292

[1] W. Templeman was the primary vessel for the spring surveys until 2009 when the A. Needler became the primary vessel.

[2] A. Needler conducted 47 sets in Divs. 3NO.

[3] Teleost conducted 40 sets in Div. 3L.

[4] Teleost conducted 43 sets in Div. 3L.

[5] Teleost conducted 81 sets in Div. 3L.

Table 3. Summary of successful sets in the Canadian fall surveys of NAFO Divs. 3LNO during 1995 to 2012. Depth ranges in metres.

Year	Vessel	3L Depth (sets)	3N Depth (sets)	3O Depth (sets)	Total Sets
1995	W. Templeman	63-640 (161)	40-650 (90)	63-730 (81)	-
1995 Sub-totals	-	161	90	81	332
1996	W. Templeman	51-671 (179)	-	65-139 (19)	-
1996	Teleost	-	390-695 (12)	68-690 (24)	-
1996	A. Needler	-	37-309 (54)	63-304 (15)	-
1996 Sub-totals	-	179	66	58	303
1997	W. Templeman	35-714 (134)	41-769 (74)	62-611 (72)	-
1997	Teleost	161-651 (41)	-	-	-
1997 Sub-totals	-	175	74	72	321
1998	W. Templeman	34-675 (172)	42- 665 (70)	61-691 (75)	-
1998	Teleost	691 (2)	-	-	
1998 Sub-totals	-	174	70	75	319
1999	W. Templeman	63-679 (142)	-	-	-
1999	Teleost	-	39-664 (67)	58-692 (74)	-
1999 Sub-totals	-	142	67	74	283
2000	W. Templeman	42-447 (102)	-	-	-
2000	Teleost	152-676 (42)	46-642 (70)	62-654 (76)	-
2000 Sub-totals	-	144	70	76	290
2001	W. Templeman	38-702 (169)	45-660 (70)	67-703 (75)	-
2001	Teleost	146-392 (4)	-	-	-
2001	A. Needler	187-203 (2)	-	-	-
2001 Sub-totals	-	175	70	75	320
2002	W. Templeman	35-670 (176)	44-675 (70)	65-696 (75)	-
2002 Sub-totals	-	176	70	75	321
2003	W. Templeman	32-702 (175)	43-727 (69)	63-650 (75)	-
2003 Sub-totals	-	175	69	75	319
2004	W. Templeman	44-653 (142)	40-659 (69)	63-634 (76)	-
2004	Teleost	151-522 (4)	-	-	-
2004 Sub-totals	-	146	69	76	291
2005	W. Templeman	50-706 (120)	42-633 (69)	69-649 (75)	-
2005	A. Needler	121-667 (57)	-	-	-
2005 Sub-totals	-	177	69	75	321
2006	W. Templeman	61-641 (150)	46-650 (70)	63-674 (73)	-
2006	Teleost	111-304 (8)	-	-	-
2006 Sub-totals	-	158	70	73	301
2007	W. Templeman	61-694 (120)	48-652 (69)	64-632 (75)	-
2007	Teleost	81-174 (18)	-	-	-
2007 Sub-totals	-	138	69	75	282
2008	W. Templeman	62-664 (83)	38-643 (64)	60-661 (66)	-
2008	A. Needler	71-332 (43)	-	-	-
2008 Sub-totals	-	126	64	66	256
2009	Teleost	62-682 (129)	-	-	-
2009	A. Needler	-	42-708 (64)	48-696 (75)	-
2009 Sub-totals	-	129	64	75	268
2010	Teleost	100-520 (25)	-	-	-
2010	A. Needler	58-657 (139)	40-614 (67)	61-667 (75)	-
2010 Sub-totals	-	164	67	75	306
2011	Teleost	201-529 (12)	-	-	-
2011	A. Needler	61-663 (104)	43-673 (70)	64-692 (75)	-
2011 Sub-totals	-	116	70	75	261
2012	A. Needler	65-725 (142)	39-641 (70)	62-631 (75)	-
2012 Sub-totals	-	142	70	75	287

Table 4. Biomass estimates (t) for Haddock by depth stratum from Canadian spring surveys in NAFO Div. 3L during 1996 to 2013.

Depth (m)	Stratum	Area (m^2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<=56	784	268	-	-	0	0	-	0	0	-	0	-	-	-	-	-	-	-	-	-
Sub-total			-	-	0	0	-	0	0	-	0	-	-	-	-	-	-	-	-	-
57-92	350	2071	0	0	0	6	0	0	0	0	0	0	00	0	0	0	0	0	0	0
57-92	363	1780	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	1	232
57-92	371	1121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-92	372	2460	0	0	0	0	30	6	0	0	0	0	0	5	0	0	0	58	252	0
57-92	384	1120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-92	785	465	-	-	0	0	-	0	0	-	0	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	6	30	6	0	0	0	0	0	12	0	0	0	58	253	232
93-183	328	1519	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	-
93-183	341	1574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
93-183	342	585	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	343	525	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
93-183	348	2120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	349	2114	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
93-183	364	2817	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
93-183	365	1041	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	370	1320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
93-183	385	2356	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
93-183	390	1481	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	786	84	-	-	0	0	-	0	-	-	0	-	-	-	-	-	-	0	-	-
93-183	787	613	-	-	0	0	-	0	-	-	0	-	-	-	-	-	-	0	-	-
93-183	788	261	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	790	89	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	793	72	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	794	216	-	-	-	0	-	-	-	0	-	-	-	-		-	-	-	-	-
93-183	797	98	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
93-183	799	72	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-		-	-
Sub-total			0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	0	5	0
184-274	344	1582	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	347	983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	366	1394	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	-	0
184-274	369	961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	386	983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	389	821	0	0	0	0	5	7	0	0	0	0	0	0	0	0	0	0	0	0
184-274	391	282	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	0
184-274	791	227	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
184-274	795	164	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	0	5	7	0	0	0	0	0	3	0	0	0	0	4	0

Table 4. Cont'd.

Depth (m)	Stratum	Area (m^2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
275-366	345	1432	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
275-366	346	865	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	368	334	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	387	718	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	388	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	392	145	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	789	72	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
275-366	796	175	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
275-366	798	100	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
275-366	800	81	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	-
367-549	729	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
367-549	731	216	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	733	468	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	735	272	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	792	50	-	-	-	0	-	0	-	0	-	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	730	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	732	231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	734	228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	736	175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			0	0	0	6	36	13	0	0	0	0	0	21	0	0	2	58	262	232

Table 5. Biomass estimates (t) for Haddock by depth stratum from Canadian spring surveys in NAFO Div. 3N during 1996 to 2013.

Depth (m)	Stratum	Area (m^2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<=56	375	1593	0	0	0	11	0	0	158	0	0	0	0	366	257	0	0	471	0	584
<=56	376	1499	0	0	0	3	0	0	0	0	0	0	0	21	0	226	400	491	0	0
Sub-total			0	0	0	14	0	0	158	0	0	0	0	387	257	226	400	962	0	584
57-92	360	2992	145	0	0	0	0	0	0	0	292	0	0	26	270	0	410	1601	1888	412
57-92	361	1853	0	0	251	2	244	0	0	0	225	0	2156	1450	879	0	0	793	681	650
57-92	362	2520	0	0	0	13	4	0	0	0	0	3	0	14	0	0	6	0	4	224
57-92	373	2520	0	0	0	2	0	0	0	0	0	0	-	0	0	0	0	0	0	17
57-92	374	931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-92	383	674	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	3	0
Sub-total			145	0	251	17	248	0	0	0	517	3	2156	1490	1149	0	416	2394	2576	1303
93-183	359	421	0	100	0	4	0	0	0	0	0	28	-	0	0	4	0	6	0	0
93-183	377	100	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
93-183	382	647	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	2
Sub-total			0	100	0	4	0	0	0	0	0	28	0	0	0	4	0	6	0	2
184-274	358	225	0	0	0	1	0	34	0	0	0	0	-	8	4	8	1	78	0	46
184-274	378	139	0	0	0	1	0	0	0	0	0	0	-	1	0	0	0	0	0	0
184-274	381	182	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	2	0	34	0	0	0	0	0	9	4	8	1	78	0	46
275-366	357	164	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
275-366	379	106	0	0	0	0	2	0	0	0	0	0	-	0	0	0	35	3	0	0
275-366	380	116	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	0	2	0	0	0	0	0	0	0	0	0	35	3	0	0
367-549	723	155	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	725	105	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	727	160	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	724	124	0	0	0	0	0	0	0	0	0	0	-	0	-	0	0	0	-	0
550-731	726	72	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
550-731	728	156	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			145	100	251	37	250	34	158	0	517	31	2156	1886	1410	238	852	3443	2576	1935

Table 6. Biomass estimates (t) for Haddock by depth stratum from Canadian spring surveys in NAFO Div. 3O during 1996 to 2013.

Depth (m)	Stratum	Area (m2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
57-92	330	2089	0	0	0	139	0	0	0	0	0	55	149	3	0	0	0	0	58	2
57-92	331	456	0	0	0	0	9	2244	0	0	0	238	-	0	5934	3580	0	196	157	0
57-92	338	1898	34	0	228	9169	3627	896	4919	2554	733	813	7115	2543	3945	2772	13679	3842	2178	1443
57-92	340	1716	0	0	0	0	30	0	0	0	0	0	0	2	0	0	2	55	0	0
57-92	351	2520	0	0	0	0	217	0	0	0	0	0	0	0	0	0	2	0	2	3
57-92	352	2580	233	0	0	2553	3184	0	639	0	512	404	1560	12101	2737	7653	365	638	3234	201
57-92	353	1282	0	0	139	217	1995	450	0	0	265	0	0	212	0	0	459	9	3912	770
Sub-total			267	0	367	12078	9062	3590	5558	2554	1510	1510	8824	14861	12616	14005	14507	4740	9541	2419
93-183	329	1721	0	0	0	5269	0	0	0	668	0	0	-	0	0	10651	0	2561	0	37
93-183	332	1047	886	0	506	809	5934	3147	1121	53	4461	194	-	1680	810	327	1704	39	1015	2266
93-183	337	948	1532	0	3360	833	616	1919	33	174	663	443	-	752	496	399	776	134	891	9255
93-183	339	585	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
93-183	354	474	0	0	294	24	284	203	0	0	0	650	-	4	0	0	1171	172	152	295
Sub-total			2418	0	4160	6935	6834	5269	1154	895	5124	1287	0	2436	1306	11377	3653	2906	2058	11853
184-274	333	147	0	37	102	28	7	0	59	8	0	0	-	0	0	0	0	4	0	0
184-274	336	121	211	43803	161	0	33	302	186	64	15	30	-	24	0	0	75	0	83	0
184-274	355	103	5	0	0	40	185	409	15	141	9	0	-	47	0	187	26	29	0	10
Sub-total			216	43840	263	68	225	711	260	213	24	30	0	71	0	187	101	33	83	10
275-366	334	96	0	136	0	0	0	0	0	8	0	0	-	0	0	0	0	0	0	0
275-366	335	58	42	724	0	0	2	0	24	41	0	0	-	0	0	0	0	6	27	0
275-366	356	61	0	17	0	0	10	36	0	0	0	0	-	0	0	0	8	9	13	0
Sub-total			42	877	0	0	12	36	24	49	0	0	0	0	0	0	8	15	40	0
367-549	717	166	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	719	76	0	48	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	721	76	0	2	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	718	134	0	0	20	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
550-731	720	105	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0
550-731	722	93	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			2943	44767	4810	19081	16133	9606	6996	3711	6658	2827	8824	17368	13922	25569	18269	7694	11722	14282

Table 7. Abundance estimates (in thousands) for Haddock by depth stratum from Canadian spring surveys in NAFO Div. 3L during 1996 to 2013.

Depth (m)	Stratum	Area (m^2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<=56	784	268	-	-	0	0	-	0	0	-	0	-	-	-	-	-	-	-	-	-
Sub-total			-	-	0	0	-	0	0	-	0	-	-	-	-	-	-	-	-	-
57-92	350	2071	0	0	0	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-92	363	1780	0	0	0	0	0	0	0	0	0	0	0	163	0	0	0	0	36	82
57-92	371	1121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-92	372	2460	0	0	0	0	263	42	0	0	0	0	0	85	0	0	0	42	42	0
57-92	384	1120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-92	785	465	-	-	0	0	-	0	0	-	0	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	47	263	42	0	0	0	0	0	248	0	0	0	42	78	82
93-183	328	1519	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0
93-183	341	1574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0
93-183	342	585	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	343	525	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
93-183	348	2120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	349	2114	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	37	0
93-183	364	2817	0	0	0	0	0	0	0	0	0	0	0	43	0	0	0	0	0	0
93-183	365	1041	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	370	1320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0
93-183	385	2356	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0
93-183	390	1481	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	786	84	-	-	0	0	-	0	-	-	0	-	-	-	-	-	-	0	-	-
93-183	787	613	-	-	0	0	-	0	-	-	0	-	-	-	-	-	-	0	-	-
93-183	788	261	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	790	89	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	793	72	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	794	216	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
93-183	797	98	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
93-183	799	72	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	0	0	0	0	0	0	0	0	85	0	0	40	0	136	0
184-274	344	1582	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	347	983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	366	1394	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	-	0
184-274	369	961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	386	983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184-274	389	821	0	0	0	0	56	38	0	0	0	0	0	0	0	0	0	0	0	0
184-274	391	282	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	19	0
184-274	791	227	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
184-274	795	164	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	0	56	38	0	0	0	0	0	65	0	0	0	0	19	0

Table 7. Cont'd.

Depth (m)	Stratum	Area (m^2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
275-366	345	1432	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0
275-366	346	865	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	368	334	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	387	718	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	388	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	392	145	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	789	72	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
275-366	796	175	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
275-366	798	100	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-
275-366	800	81	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	0	9	0	0	0	0	0	0	44	0	0	0	0	0	0
367-549	729	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
367-549	731	216	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	733	468	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	735	272	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	792	50	-	-	-	0	-	0	-	0	-	-	-	-	-	-	-	-	-	-
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	730	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	732	231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
550-731	734	228	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0
550-731	736	175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			0	0	0	47	328	80	0	0	0	0	0	442	0	0	40	42	233	82

Table 8. Abundance estimates (in thousands) for Haddock by depth stratum from Canadian spring surveys in NAFO Div. 3N during 1996 to 2013.

Depth (m)	Stratum	Area (m^2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<=56	375	1593	0	0	0	175	0	0	44	0	0	0	0	319	55	0	0	175	0	175
<=56	376	1499	0	0	0	34	0	0	0	0	0	0	0	330	0	41	124	78	0	0
Sub-total			0	0	0	209	0	0	44	0	0	0	0	649	55	41	124	253	0	175
57-92	360	2992	33	0	0	0	0	0	0	0	47	0	0	288	51	0	165	343	412	206
57-92	361	1853	0	0	65	36	127	0	0	0	85	0	574	425	255	0	0	123	176	85
57-92	362	2520	0	0	0	236	39	0	0	0	0	43	0	300	0	0	87	0	77	205
57-92	373	2520	0	0	0	39	0	0	0	0	0	0	-	0	0	0	0	0	0	347
57-92	374	931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-92	383	674	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	46	0
Sub-total			33	0	65	311	166	0	0	0	132	43	574	1013	306	0	252	466	711	843
93-183	359	421	0	26	0	58	0	0	0	0	0	-	-	0	0	58	0	26	0	0
93-183	377	100	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
93-183	382	647	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	40
Sub-total			0	26	0	58	0	0	0	0	0	29	0	0	0	58	0	26	0	40
184-274	358	225	0	0	0	15	0	93	0	0	0	0	-	31	14	15	14	18	0	206
184-274	378	139	0	0	0	10	0	0	0	0	0	0	-	10	0	0	0	0	0	0
184-274	381	182	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	25	0	93	0	0	0	0	0	41	14	15	14	18	0	206
275-366	357	164	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
275-366	379	106	0	0	0	0	7	0	0	0	0	0	-	0	0	0	6	6	0	0
275-366	380	116	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	0	7	0	0	0	0	0	0	0	0	0	6	6	0	0
367-549	723	155	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	725	105	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	727	160	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	724	124	0	0	0	0	0	0	0	0	0	0	-	0	-	0	0	0	-	0
550-731	726	72	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
550-731	728	156	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			33	26	65	603	173	93	44	0	132	72	574	1703	375	114	396	769	711	1264

Table 9. Abundance estimates (in thousands) for Haddock by depth stratum from Canadian spring surveys in NAFO Div. 3O during 1996 to 2013.

Depth (m)	Stratum	Area (m^2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
57-92	330	2089	0	0	0	73	0	0	0	0	0	41	28	82	0	0	0	0	41	41
57-92	331	456	0	0	0	0	31	2164	0	0	0	94	-	0	2635	1223	0	94	157	0
57-92	338	1898	37	0	37	17932	12663	305	4352	522	336	827	3075	1218	2176	1218	4308	1291	2219	435
57-92	340	1716	0	0	0	0	283	0	0	0	0	0	0	47	0	0	47	42	0	0
57-92	351	2520	0	0	0	0	130	0	0	0	0	0	0	0	0	0	43	0	43	43
57-92	352	2580	39	0	0	11155	1262	0	311	0	133	89	568	6033	799	2548	222	128	1688	399
57-92	353	1282	0	0	35	176	529	88	0	0	44	0	0	88	0	0	132	44	1543	372
Sub-total			76	0	72	29336	14898	2557	4663	522	513	1051	3671	7468	5610	4989	4752	1599	5691	1290
93-183	329	1721	0	0	0	33223	0	0	0	1089	0	0	-	0	0	13778	0	2441	0	142
93-183	332	1047	288	0	149	8602	30642	7009	2304	48	2119	528	-	1152	2592	1094	2347	128	1328	4801
93-183	337	948	565	0	1630	2087	3488	4825	43	261	261	236	-	522	696	217	1652	309	1056	6694
93-183	339	585	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0
93-183	354	474	0	0	335	196	2152	70	0	0	0	344	-	65	0	0	4506	43	489	652
Sub-total			853	0	2114	44108	36282	11904	2347	1398	2380	1108	0	1739	3288	15089	8545	2921	2873	12289
184-274	333	147	0	19	40	138	30	0	10	9	0	0	-	0	0	0	0	18	0	0
184-274	336	121	108	13482	67	0	38	441	200	50	8	17	-	7	0	0	75	0	117	0
184-274	355	103	20	0	0	57	668	1197	16	189	8	0	-	28	0	271	19	76	0	7
Sub-total			128	13501	107	195	736	1638	226	248	16	17	0	35	0	271	94	94	117	7
275-366	334	96	0	59	0	0	0	0	0	7	0	0	-	0	0	0	0	0	0	0
275-366	335	58	32	289	0	0	4	0	25	28	0	0	-	0	0	0	0	8	4	0
275-366	356	61	0	13	0	0	25	45	0	0	0	0	-	0	0	0	4	11	17	0
Sub-total			32	361	0	0	29	45	25	35	0	0	0	0	0	0	4	19	21	0
367-549	717	166	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	719	76	0	21	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
367-549	721	76	0	5	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	718	134	0	0	5	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
550-731	720	105	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0
550-731	722	93	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
Sub-total			0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			1089	13888	2298	73639	51945	16144	7261	2203	2909	2176	3671	9242	8898	20349	13395	4633	8702	13586

Table 10. Biomass estimates (t) for Haddock by depth stratum from Canadian fall surveys in NAFO Div. 3L during 1995 to 2012.

Depth (m)	Stratum	Area (m^2)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<=56	784	268	-	0	2	0	-	7	0	0	0	0
Sub-total			-	0	2	0	-	7	0	0	0	0
57-92	350	2071	0	0	0	1	0	0	0	0	0	1
57-92	363	1780	0	0	0	1	46	0	0	1	0	1
57-92	371	1121	0	0	0	0	0	0	0	0	0	0
57-92	372	2460	0	0	0	74	2	0	0	0	0	0
57-92	384	1120	0	0	0	0	0	0	0	0	0	0
57-92	785	2356	-	0	0	2	-	0	0	0	0	13
Sub-total			0	0	0	78	48	0	0	1	0	15
93-183	328	1519	0	0	0	0	0	0	0	0	0	0
93-183	341	1574	0	0	0	0	0	0	0	0	0	0
93-183	342	585	0	0	0	0	0	0	0	0	0	0
93-183	343	525	0	0	0	0	0	0	0	0	0	0
93-183	348	2120	0	0	0	0	0	0	0	0	0	0
93-183	349	2114	0	0	0	0	0	0	0	0	0	0
93-183	364	2817	0	0	0	0	0	0	0	0	0	0
93-183	365	1041	0	0	0	0	0	-	0	0	0	-
93-183	370	1320	0	0	0	0	0	0	0	0	0	-
93-183	385	2356	0	0	0	0	0	0	0	0	0	0
93-183	390	1481	0	0	0	0	0	0	0	0	0	0
93-183	786	84	-	0	0	0	-	0	0	0	0	0
93-183	787	613	-	0	0	0	-	0	0	0	0	0
93-183	788	261	-	0	0	0	-	0	0	0	0	0
93-183	790	89	-	0	0	0	-	0	0	0	0	0
93-183	793	72	-	0	0	0	-	0	0	0	0	0
93-183	794	216	-	0	0	0	-	-	0	0	0	0
93-183	797	98	-	0	0	0	-	0	0	0	0	0
93-183	799	72	-	0	0	0	-	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0
184-274	344	1582	0	0	0	0	0	0	0	0	0	0
184-274	347	983	0	0	0	0	0	0	0	0	0	0
184-274	366	1394	0	0	0	0	0	0	0	0	0	-
184-274	369	961	0	0	0	0	0	0	0	0	0	-
184-274	386	983	0	0	0	0	0	0	0	0	0	-
184-274	389	821	0	0	0	0	0	0	0	0	0	0
184-274	391	282	0	0	0	0	0	0	0	0	0	0
184-274	791	227	-	-	0	0	-	0	0	0	0	0
184-274	795	164	-	0	0	0	-	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0
275-366	345	1432	0	0	0	0	0	0	0	0	0	0
275-366	346	865	0	0	0	0	0	0	0	0	0	0
275-366	368	334	0	0	0	0	0	0	0	0	0	-
275-366	387	718	0	0	0	0	0	0	0	0	0	-
275-366	388	361	0	0	0	0	0	0	0	0	0	0
275-366	392	145	0	0	0	0	0	0	0	0	0	0
275-366	789	72	-	0	0	0	-	0	0	0	0	0
275-366	791	227	-	0	-	-	-	-	-	-	-	-
275-366	796	175	-	0	0	0	-	0	0	0	0	0
275-366	798	100	-	0	0	0	-	0	0	0	0	0
275-366	800	81	-	-	0	0	-	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0
367-549	729	186	0	0	0	0	0	0	0	0	0	0
367-549	731	216	0	-	0	0	0	0	0	0	0	0
367-549	733	468	0	0	0	0	0	0	0	0	0	0
367-549	735	272	0	0	0	0	0	0	0	0	0	-
367-549	792	50	-	0	0	0	-	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0
550-731	730	170	0	0	0	0	0	0	0	0	0	0
550-731	732	231	0	0	0	0	0	0	0	0	0	0
550-731	734	228	0	0	0	0	0	0	0	0	0	-
550-731	736	175	0	0	0	0	0	0	0	0	0	-
Sub-total			0	0	0	0	0	0	0	0	0	0
TOTAL			0	0	2	78	48	7	0	1	0	15

Table 10. Cont'd.

Depth (m)	Stratum	Area (m^2)	2005	2006	2007	2008	2009	2010	2011	2012
<=56	784	268	0	-	-	-	-	-	-	-
Sub-total			0	-	-	-	-	-	-	-
57-92	350	2071	0	1	0	0	0	0	0	0
57-92	363	1780	0	1	3	0	0	0	3	0
57-92	371	1121	0	0	0	0	0	0	0	1
57-92	372	2460	0	1	2	9	0	0	1	15
57-92	384	1120	0	0	0	0	0	0	0	0
57-92	785	2356	0	-	-	-	-	-	-	-
Sub-total			0	3	5	9	0	0	4	16
93-183	328	1519	0	0	3	0	0	0	0	0
93-183	341	1574	0	2	0	0	0	0	0	0
93-183	342	585	0	0	0	0	0	0	0	0
93-183	343	525	0	0	0	0	0	0	0	0
93-183	348	2120	0	0	3	0	0	0	0	0
93-183	349	2114	0	0	0	0	0	0	0	0
93-183	364	2817	0	0	0	0	0	0	1	0
93-183	365	1041	0	0	0	0	0	0	0	0
93-183	370	1320	0	0	2	0	0	0	0	0
93-183	385	2356	0	1	0	0	0	0	0	0
93-183	390	1481	0	0	0	0	0	0	0	0
93-183	786	84	0	-	-	-	-	-	-	-
93-183	787	613	0	0	-	-	-	-	-	-
93-183	788	261	0	0	-	-	-	0	-	-
93-183	790	89	0	-	-	-	-	0	-	-
93-183	793	72	0	-	-	-	-	0	-	-
93-183	794	216	0	0	-	-	-	0	-	-
93-183	797	98	0	0	-	-	-	0	-	-
93-183	799	72	0	0	-	-	-	0	-	-
Sub-total			0	3	8	0	0	0	1	0
184-274	344	1582	0	0	0	0	0	0	0	0
184-274	347	983	0	0	0	0	0	0	0	0
184-274	366	1394	0	0	0	0	0	0	0	0
184-274	369	961	0	0	0	0	0	0	0	0
184-274	386	983	0	0	0	0	0	0	0	0
184-274	389	821	0	1	0	0	0	0	0	0
184-274	391	282	0	0	1	0	0	0	0	0
184-274	791	227	0	-	-	-	-	0	-	-
184-274	795	164	0	0	-	-	-	0	-	-
Sub-total			0	1	1	0	0	0	0	0
275-366	345	1432	0	0	0	0	0	0	0	0
275-366	346	865	0	0	0	0	0	0	0	0
275-366	368	334	0	0	0	0	0	0	0	0
275-366	387	718	0	1	0	0	0	0	0	0
275-366	388	361	0	5	0	0	0	0	0	0
275-366	392	145	0	0	0	0	0	0	0	1
275-366	789	72	0	0	-	-	-	-	-	-
275-366	791	227	-	-	-	-	-	-	-	-
275-366	796	175	0	0	-	-	-	0	-	-
275-366	798	100	0	-	-	-	-	0	-	-
275-366	800	81	0	-	-	-	0	0	-	-
Sub-total			0	6	0	0	0	0	0	1
367-549	729	186	0	0	0	0	0	0	0	0
367-549	731	216	0	0	0	0	0	0	-	0
367-549	733	468	0	0	0	0	0	0	0	0
367-549	735	272	0	0	0	0	0	0	0	0
367-549	792	50	0	-	-	-	-	0	-	-
Sub-total			0	0	0	0	0	0	0	0
550-731	730	170	0	0	0	0	0	0	0	0
550-731	732	231	0	0	0	0	0	0	0	0
550-731	734	228	0	0	0	0	0	0	0	0
550-731	736	175	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0
TOTAL			0	13	14	9	0	0	5	17

Table 11. Biomass estimates (t) for Haddock by depth stratum from Canadian fall surveys in NAFO Div. 3N during 1995 to 2012.

Depth (m)	Stratum	Area (m^2)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<=56	375	1593	7	0	0	2	76	162	125	0	0	0	0	751	0	0	0	345	347	1574
<=56	376	1499	0	0	0	18	0	0	0	0	1	3	0	52	13	4	15	292	19	121
Sub-total			7	0	0	20	76	162	125	0	1	3	0	803	13	4	15	637	366	1695
57-92	360	2992	0	0	0	1	222	0	0	0	0	4	0	787	0	0	5	0	333	0
57-92	361	1853	0	0	0	62	847	642	0	4660	364	2189	3966	1436	44	6682	3948	243	296	5602
57-92	362	2520	0	0	0	0	95	0	0	0	0	0	0	1	0	0	0	0	1	5
57-92	373	2520	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	0	8
57-92	374	931	0	0	0	0	0	0	68	0	0	0	0	0	0	0	0	0	0	0
57-92	383	674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	64	1164	642	68	4660	364	2193	3966	2224	44	6682	3953	248	630	5615
93-183	359	421	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
93-183	377	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	382	647	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
184-274	358	225	6	0	0	0	20	0	54	0	0	0	3	6	0	0	0	0	88	95
184-274	378	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
184-274	381	182	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			6	0	0	0	20	0	54	0	0	0	3	6	0	0	0	0	88	95
275-366	357	164	0	0	0	0	-	42	5	0	0	29	0	0	0	9	7	0	0	353
275-366	379	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275-366	380	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	42	5	0	0	29	0	0	0	9	7	0	0	353
367-549	723	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	725	105	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0
367-549	727	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	724	124	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0
550-731	726	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	728	156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			13	0	0	84	1260	846	252	4660	365	2225	3969	3033	57	6695	3975	885	1085	7758

Table 12. Biomass estimates (t) for Haddock by depth stratum from Canadian fall surveys in NAFO Div. 3O during 1995 to 2012.

Depth (m)	Stratum	Area (m^2)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
57-92	330	2089	0	0	0	6	1312	0	4615	4917	0	0	0	0	0	0	0	0	0	0
57-92	331	456	0	0	0	20	5	0	30	0	0	0	0	0	0	0	0	209	76	0
57-92	338	1898	0	0	50	46	54	945	0	1042	0	292	11	127	36	329	323	707	1238	364
57-92	340	1716	0	0	0	5	273	0	0	0	0	0	0	1	0	0	0	0	122	0
57-92	351	2520	0	0	0	2	17	0	0	0	0	0	0	2	0	0	0	0	1	0
57-92	352	2580	71	0	0	6	258	510	86	0	0	535	677	272	815	385	28	278	670	2493
57-92	353	1282	0	0	0	8	1	0	0	0	44	0	0	1	8	0	0	0	3	8
Sub-total			71	0	50	93	1920	1455	4731	5959	44	827	688	403	859	714	351	1194	2110	2865
93-183	329	1721	6503	0	80	8	0	0	1259	9290	0	0	0	1416	0	116	0	0	1182	1445
93-183	332	1047	859	0	158	285	322	545	2512	169	883	0	15	233	179	763	693	189	1604	492
93-183	337	948	177	0	113	2115	333	927	1543	357	204	11	522	326	6049	0	353	304	946	321
93-183	339	585	0	0	0	0	-	0	0	0	0	0	0	0	2	0	1	0	0	0
93-183	354	474	152	0	26	98	3	0	325	0	0	0	0	0	197	78	47	67	741	0
Sub-total			7691	0	377	2506	658	1472	5639	9816	1087	11	537	1975	6427	957	1094	560	4473	2258
184-274	333	147	0	-	0	0	1463	265	14	34	43	0	47	0	0	3	0	14	10	89
184-274	336	121	12	136	38	29	103	1161	36	75	21	0	0	0	70	4	-	13	34	78
184-274	355	103	32	34	0	44	98	608	72	19	0	0	15	13	330	11	16	76	105	45
Sub-total			44	170	38	73	1664	2034	122	128	64	0	62	13	400	18	16	103	149	212
275-366	334	96	0	-	13	0	0	6	13	0	0	0	0	0	0	0	0	0	0	0
275-366	335	58	55	10	0	0	52	7	0	8	0	0	0	0	0	76	26	2	0	35
275-366	356	61	6	0	0	0	2	254	167	12	0	0	45	20	0	29	82	10	10	24
Sub-total			61	10	13	0	54	267	180	20	0	0	45	20	0	105	108	12	10	59
367-549	717	166	0	-	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	0
367-549	719	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
367-549	721	76	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	15	0	0	0	0	0	0	0	4	0	0	0	6
550-731	718	134	0	-	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
550-731	720	105	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	722	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			7867	180	478	2672	4296	5243	10672	15923	1195	838	1332	2411	7686	1798	1569	1869	6742	5400

Table 13. Abundance estimates (in thousands) for Haddock by depth stratum from Canadian fall surveys in NAFO Div. 3L during 1995 to 2012.

Depth (m)	Stratum	Area (m^2)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<=56	784	268	-	0	92	0	-	18	0	0	0	0
Sub-total			-	0	92	0	-	18	0	0	0	0
57-92	350	2071	0	0	0	41	0	0	0	0	0	41
57-92	363	1780	0	0	0	41	1224	0	0	41	0	47
57-92	371	1121	0	0	0	0	0	0	0	0	0	0
57-92	372	2460	0	0	0	2905	42	0	0	0	0	0
57-92	384	1120	0	0	0	0	0	0	0	0	0	0
57-92	785	2356	-	0	0	32	-	0	0	0	0	352
Sub-total			0	0	0	3019	1266	0	0	41	0	440
93-183	328	1519	0	0	0	0	0	0	0	0	0	0
93-183	341	1574	0	0	0	0	0	0	0	0	0	0
93-183	342	585	0	0	0	0	0	0	0	0	0	0
93-183	343	525	0	0	0	0	0	0	0	0	0	0
93-183	348	2120	0	0	0	0	0	0	0	0	0	0
93-183	349	2114	0	0	0	0	0	0	0	0	0	0
93-183	364	2817	0	0	0	0	0	0	0	0	0	0
93-183	365	1041	0	0	0	0	0	-	0	0	0	-
93-183	370	1320	0	0	0	0	0	0	0	0	0	-
93-183	385	2356	0	0	0	0	0	0	0	0	0	0
93-183	390	1481	0	0	0	0	0	0	0	0	0	0
93-183	786	84	-	0	0	0	-	0	0	0	0	0
93-183	787	613	-	0	0	0	-	0	0	0	0	0
93-183	788	261	-	0	0	0	-	0	0	0	0	0
93-183	790	89	-	0	0	0	-	0	0	0	0	0
93-183	793	72	-	0	0	0	-	0	0	0	0	0
93-183	794	216	-	0	0	0	-	-	0	0	0	0
93-183	797	98	-	0	0	0	-	0	0	0	0	0
93-183	799	72	-	0	0	0	-	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0
184-274	344	1582	0	0	0	0	0	0	0	0	0	0
184-274	347	983	0	0	0	0	0	0	0	0	0	0
184-274	366	1394	0	0	0	0	0	0	0	0	0	-
184-274	369	961	0	0	0	0	0	0	0	0	0	-
184-274	386	983	0	0	0	0	0	0	0	0	0	-
184-274	389	821	0	0	0	38	0	0	0	0	0	0
184-274	391	282	0	0	0	0	0	0	0	0	0	0
184-274	791	227	-	-	0	0	-	0	0	0	0	0
184-274	795	164	-	0	0	0	-	0	0	0	0	0
Sub-total			0	0	0	38	0	0	0	0	0	0
275-366	345	1432	0	0	0	0	0	0	0	0	0	0
275-366	346	865	0	0	0	0	0	0	0	0	0	0
275-366	368	334	0	0	0	0	0	0	0	0	0	-
275-366	387	718	0	0	0	0	0	0	0	0	0	-
275-366	388	361	0	0	0	0	0	0	0	0	0	0
275-366	392	145	0	0	0	0	0	0	0	0	0	0
275-366	789	72	-	0	0	0	-	0	0	0	0	0
275-366	791	227	-	0	-	-	-	-	-	-	-	-
275-366	796	175	-	0	0	0	-	0	0	0	0	0
275-366	798	100	-	0	0	0	-	0	0	0	0	0
275-366	800	81	-	-	0	0	-	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0
367-549	729	186	0	0	0	0	0	0	0	0	0	0
367-549	731	216	0	-	0	0	0	0	0	0	0	0
367-549	733	468	0	0	0	0	0	0	0	0	0	0
367-549	735	272	0	0	0	0	0	0	0	0	0	-
367-549	792	50	-	0	0	0	-	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0
550-731	730	170	0	0	0	0	0	0	0	0	0	0
550-731	732	231	0	0	0	0	0	0	0	0	0	0
550-731	734	228	0	0	0	0	0	0	0	0	0	-
550-731	736	175	0	0	0	0	0	0	0	0	0	-
Sub-total			0	0	0	0	0	0	0	0	0	0
TOTAL			0	0	92	3057	1266	18	0	41	0	440

Table 13. Cont'd.

Depth (m)	Stratum	Area (m^2)	2005	2006	2007	2008	2009	2010	2011	2012
<=56	784	268	0	-	-	-	-	-	-	-
Sub-total			0	-	-	-	-	-	-	-
57-92	350	2071	0	41	0	0	0	0	0	0
57-92	363	1780	0	41	41	0	0	0	196	0
57-92	371	1121	0	0	0	0	0	0	0	44
57-92	372	2460	0	85	85	85	0	0	50	550
57-92	384	1120	0	0	0	0	0	0	0	0
57-92	785	2356	0	-	-	-	-	-	-	-
Sub-total			0	167	126	85	0	0	246	594
93-183	328	1519	0	0	42	0	0	0	0	0
93-183	341	1574	0	87	0	0	0	0	0	0
93-183	342	585	0	0	0	0	0	0	0	0
93-183	343	525	0	0	0	0	0	0	0	0
93-183	348	2120	0	0	42	0	0	0	0	0
93-183	349	2114	0	0	0	0	0	0	0	0
93-183	364	2817	0	0	0	0	0	0	55	0
93-183	365	1041	0	0	0	0	0	0	0	0
93-183	370	1320	0	0	45	0	0	0	0	0
93-183	385	2356	0	41	0	0	0	0	0	0
93-183	390	1481	0	0	0	0	0	0	0	0
93-183	786	84	0	-	-	-	-	-	-	-
93-183	787	613	0	0	-	-	-	-	-	-
93-183	788	261	0	0	-	-	-	0	-	-
93-183	790	89	0	-	-	-	-	0	-	-
93-183	793	72	0	-	-	-	-	0	-	-
93-183	794	216	0	0	-	-	-	0	-	-
93-183	797	98	0	0	-	-	-	0	-	-
93-183	799	72	0	0	-	-	-	0	-	-
Sub-total			0	128	129	0	0	0	55	0
184-274	344	1582	0	0	0	0	0	0	0	0
184-274	347	983	0	0	0	0	0	0	0	0
184-274	366	1394	0	0	0	0	0	0	0	0
184-274	369	961	0	0	0	0	0	0	0	0
184-274	386	983	0	0	0	0	0	0	0	0
184-274	389	821	0	33	0	0	0	0	0	0
184-274	391	282	0	0	19	0	0	0	0	0
184-274	791	227	0	-	-	-	-	0	-	-
184-274	795	164	0	0	-	-	-	0	-	-
Sub-total			0	33	19	0	0	0	0	0
275-366	345	1432	0	0	0	0	0	0	0	0
275-366	346	865	0	0	0	0	0	0	0	0
275-366	368	334	0	0	0	0	0	0	0	0
275-366	387	718	0	44	0	0	0	0	0	0
275-366	388	361	0	22	0	0	0	0	0	0
275-366	392	145	0	0	0	0	0	0	0	9
275-366	789	72	0	0	-	-	-	-	-	-
275-366	791	227	-	-	-	-	-	-	-	-
275-366	796	175	0	0	-	-	-	0	-	-
275-366	798	100	0	-	-	-	-	0	-	-
275-366	800	81	0	-	-	-	0	0	-	-
Sub-total			0	66	0	0	0	0	0	9
367-549	729	186	0	0	0	0	0	0	0	0
367-549	731	216	0	0	0	0	0	0	-	0
367-549	733	468	0	0	0	0	0	0	0	0
367-549	735	272	0	0	0	0	0	0	0	0
367-549	792	50	0	-	-	-	-	0	-	-
Sub-total			0	0	0	0	0	0	0	0
550-731	730	170	0	0	0	0	0	0	0	0
550-731	732	231	0	0	0	0	0	0	0	0
550-731	734	228	0	0	0	0	0	0	0	0
550-731	736	175	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0
TOTAL			0	394	274	85	0	0	301	603

Table 14. Abundance estimates (in thousands) for Haddock by depth stratum from Canadian fall surveys in NAFO Div. 3N during 1995 to 2012.

Depth (m)	Stratum	Area (m^2)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<=56	375	1593	43	0	0	55	1863	493	329	0	0	0	0	219	0	0	0	219	3123	1088
<=56	376	1499	0	0	0	516	0	0	0	0	103	155	0	4124	103	687	550	103	1237	8042
Sub-total			43	0	0	571	1863	493	329	0	103	155	0	4343	103	687	550	322	4360	9130
57-92	360	2992	0	0	0	51	103	0	0	0	0	257	0	823	0	0	176	0	235	0
57-92	361	1853	0	0	0	2090	765	357	0	1275	160	1173	714	1580	306	1657	1529	459	1240	1464
57-92	362	2520	0	0	0	0	446	0	0	0	0	0	0	99	0	0	0	0	50	297
57-92	373	2520	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	50	0	297
57-92	374	931	0	0	0	0	0	0	128	0	0	0	0	0	0	0	0	0	0	0
57-92	383	674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	2191	1314	357	128	1275	160	1430	714	2502	306	1657	1705	509	1525	2058
93-183	359	421	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87	0
93-183	377	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93-183	382	647	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87	0
184-274	358	225	14	0	0	0	108	0	83	0	0	0	31	53	0	0	0	0	124	371
184-274	378	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
184-274	381	182	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	11	0
Sub-total			14	0	0	0	108	0	83	0	0	0	31	66	0	0	0	0	135	371
275-366	357	164	0	0	0	0	-	158	11	0	0	23	0	0	0	23	9	0	0	267
275-366	379	106	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
275-366	380	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	158	11	0	0	23	0	6	0	23	9	0	0	267
367-549	723	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-549	725	105	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0
367-549	727	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	724	124	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0
550-731	726	72	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0
550-731	728	156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0
TOTAL			57	0	0	2762	3285	1008	551	1275	263	1608	745	6927	409	2367	2264	831	6107	11826

Table 15. Abundance estimates (in thousands) for Haddock by depth stratum from Canadian fall surveys in NAFO Div. 3O during 1995 to 2012.

Depth (m)	Stratum	Area (m^2)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
57-92	330	2089	0	0	0	287	5604	0	10058	5474	0	0	0	0	0	0	0	0	0	0
57-92	331	456	0	0	0	3262	31	0	31	0	0	0	0	0	31	0	0	56	94	0
57-92	338	1898	0	0	52	2768	418	1625	0	209	0	112	52	587	209	835	309	458	2976	574
57-92	340	1716	0	0	0	236	1315	0	0	0	0	0	0	47	0	0	0	0	94	0
57-92	351	2520	0	0	0	99	58	0	0	0	0	0	0	149	50	0	0	0	99	0
57-92	352	2580	19	0	0	254	659	456	96	0	0	406	507	2307	913	112	1065	146	1115	1065
57-92	353	1282	0	0	0	617	44	0	0	0	44	0	0	139	44	0	44	0	265	44
Sub-total			19	0	52	7523	8129	2081	10185	5683	44	518	559	3229	1247	947	1418	660	4643	1683
93-183	329	1721	2273	0	95	473	0	0	1894	5540	0	0	0	1726	0	316	0	0	1847	3409
93-183	332	1047	768	0	48	5089	4081	1280	1392	43	247	0	48	514	1195	720	3286	1391	6804	1760
93-183	337	948	130	0	87	1570	739	1135	2695	664	217	99	497	8477	33297	0	749	1773	2521	1285
93-183	339	585	0	0	0	0	-	0	0	0	0	0	0	0	40	0	40	0	0	0
93-183	354	474	65	0	33	3782	33	0	518	0	0	0	0	0	873	261	29	406	1532	0
Sub-total			3236	0	263	10914	4853	2415	6499	6247	464	99	545	10717	35405	1297	4104	3570	12704	6454
184-274	333	147	0	-	0	0	8584	1046	37	81	51	0	20	0	0	9	0	9	18	144
184-274	336	121	8	67	17	8	458	4735	92	117	33	0	0	0	429	7	-	7	50	181
184-274	355	103	94	78	0	21	588	1757	163	21	0	0	7	7	1820	31	31	156	248	76
Sub-total			102	145	17	29	9630	7538	292	219	84	0	27	7	2249	47	31	172	316	401
275-366	334	96	0	-	13	0	0	20	20	0	0	0	0	0	0	0	0	0	0	0
275-366	335	58	108	4	0	0	223	18	0	8	0	0	0	0	0	142	39	8	0	59
275-366	356	61	11	0	0	0	7	545	241	8	0	0	38	13	0	37	81	9	4	21
Sub-total			119	4	13	0	230	583	261	16	0	0	38	13	0	179	120	17	4	80
367-549	717	166	0	-	0	0	0	11	0	0	0	0	0	0	0	13	0	0	0	0
367-549	719	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
367-549	721	76	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	44	0	0	0	0	0	0	0	13	0	0	0	10
550-731	718	134	0	-	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
550-731	720	105	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550-731	722	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL			3476	149	345	18466	22842	12661	17237	12165	592	617	1169	13966	38901	2483	5673	4419	17667	8628

FIGURES

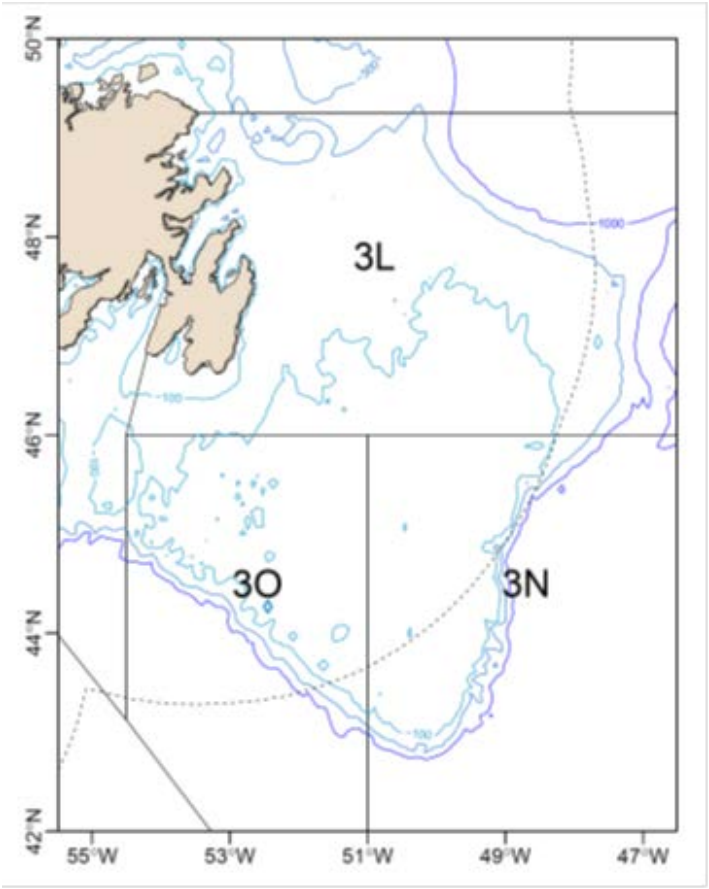

Figure 1. Map of NAFO Divs. 3LNO showing Canada's 200 nautical mile Exclusive Economic Zone (dashed line) and the 100 m, 300 m and 1000 m depth contours.

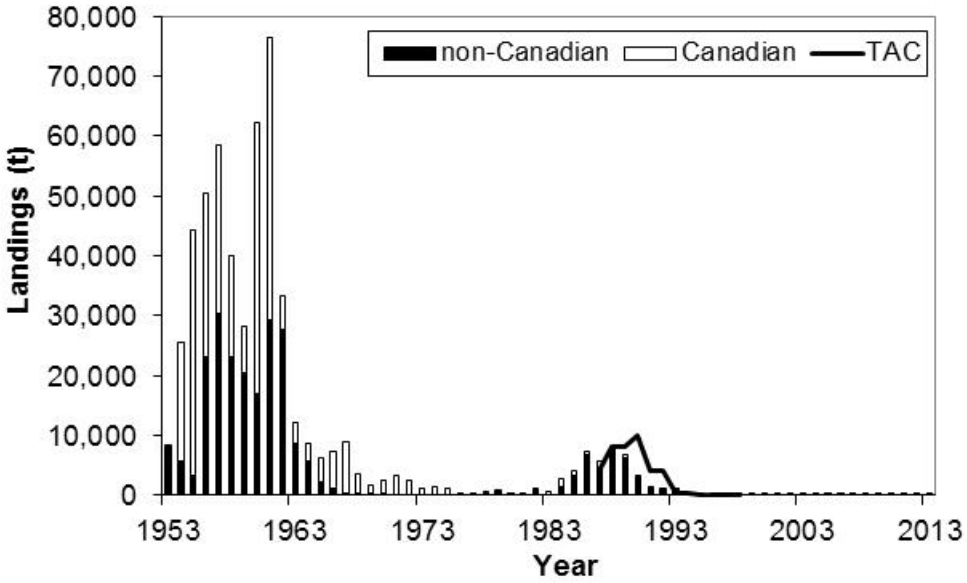

Figure 2. NAFO Divs. 3LNO Haddock landings and TACs from 1953 to 2013.

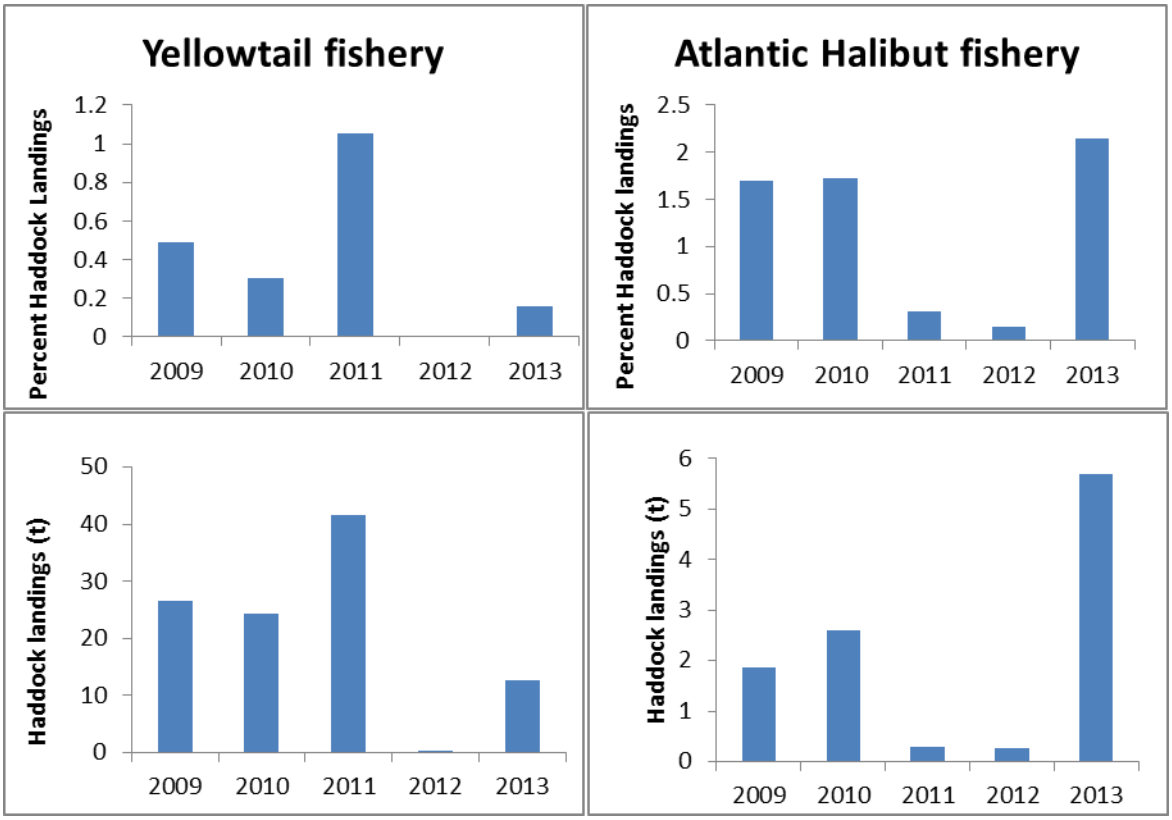

Figure 3a. Haddock landings from bycatch in the Yellowtail Flounder and Atlantic Halibut fisheries during 2009 to 2013 expressed as landings by fishery (lower panels) and as percent of the targeted species landings (upper panels).

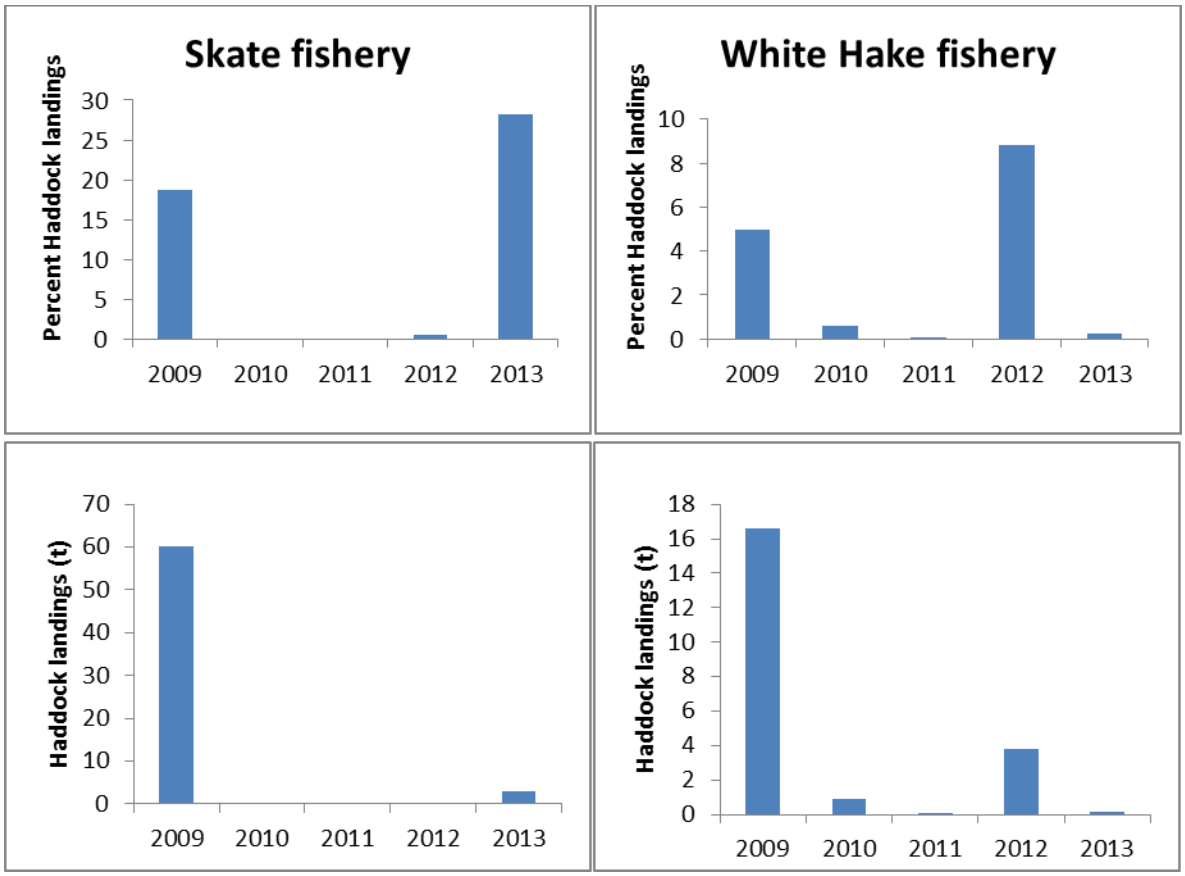

Figure 3b. Haddock landings from bycatch in the skate and White Hake fisheries during 2009 to 2013 expressed as landings by fishery (lower panels) and as percent of the targeted species landings (upper panels).

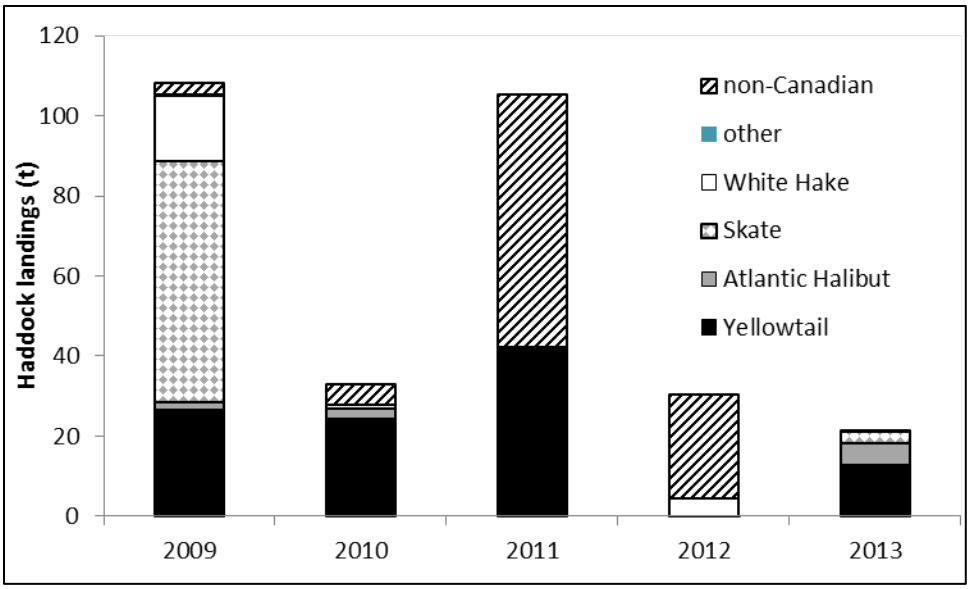

Figure 4. Haddock landings by all non-Canadian (2009-12) and various Canadian (2009-13) fisheries in NAFO Divs. 3LNO.

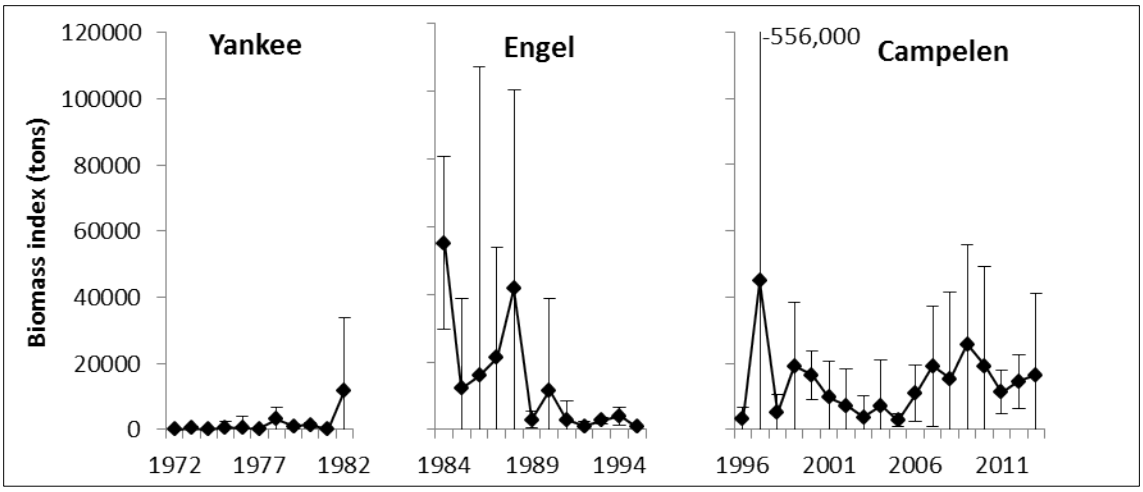

Figure 5. Biomass index for Divs. 3LNO Haddock in the Canadian spring research vessel survey from 1972 to 2013. Data are not converted between gear types. 95% confidence intervals are shown.

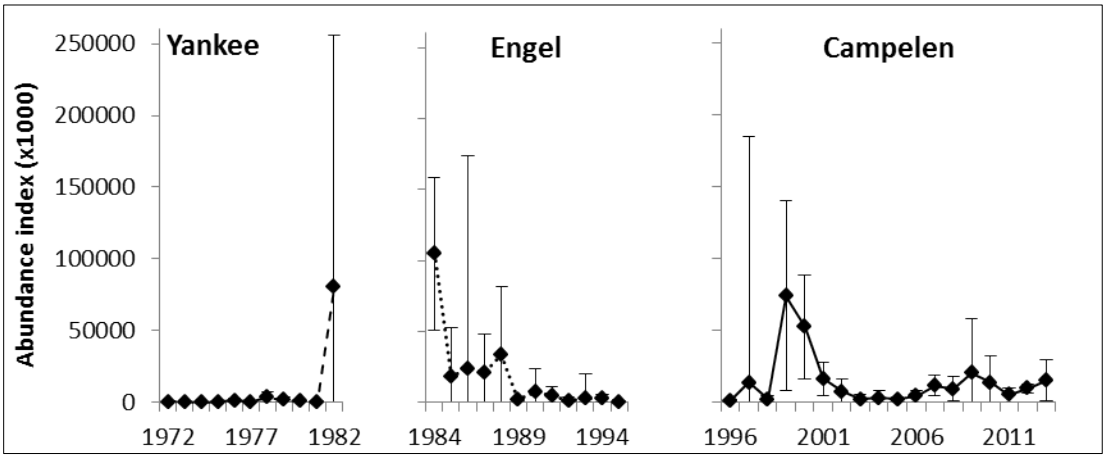

Figure 6. Abundance index for 3LNO Haddock in the Canadian spring research vessel survey from 1972 to 2013. Data are not converted between gear types. 95% confidence intervals are shown.

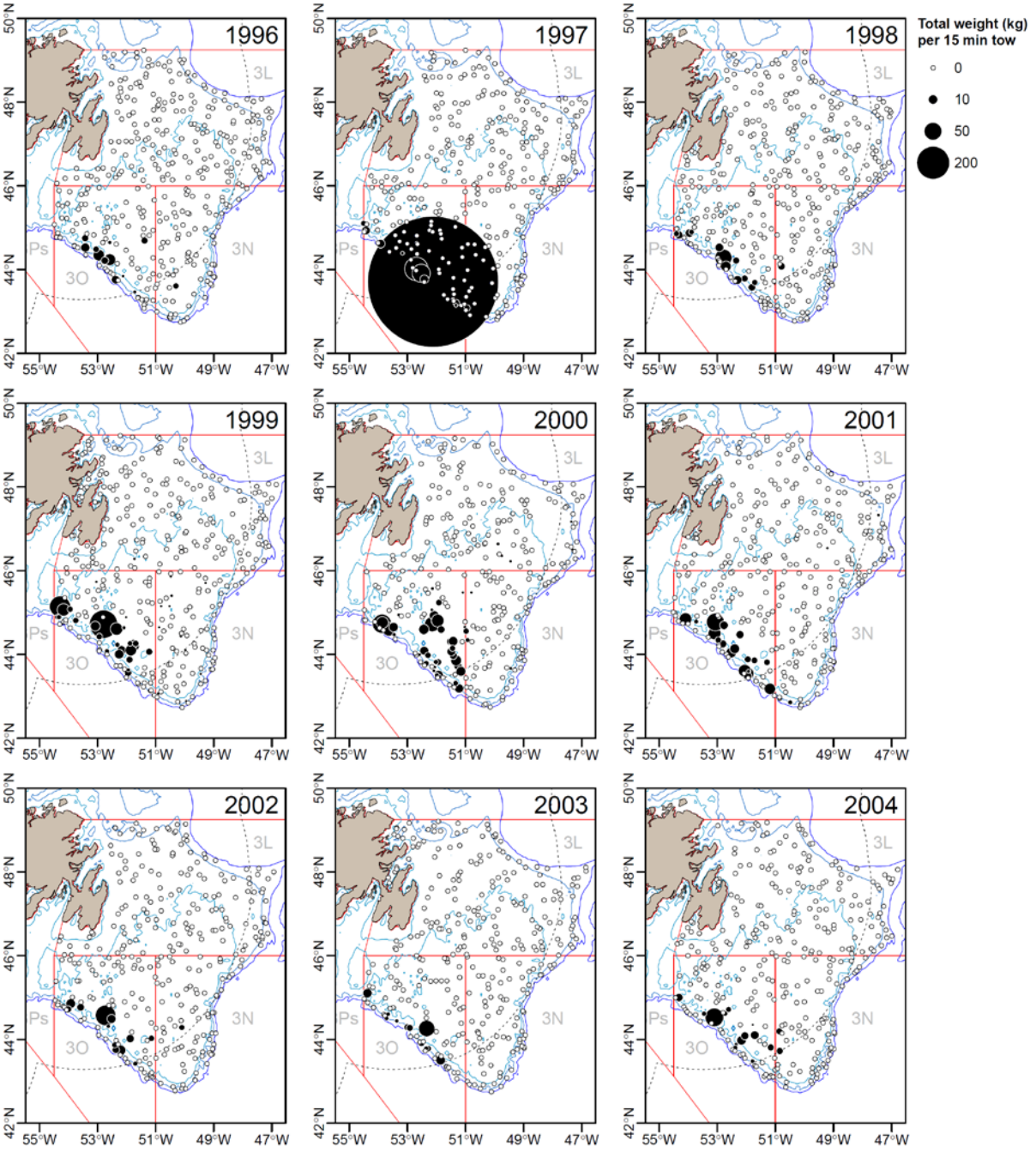

Figure 7. Distribution of Divs. 3LNO Haddock biomass in the Canadian spring research vessel survey from 1996 to 2013.

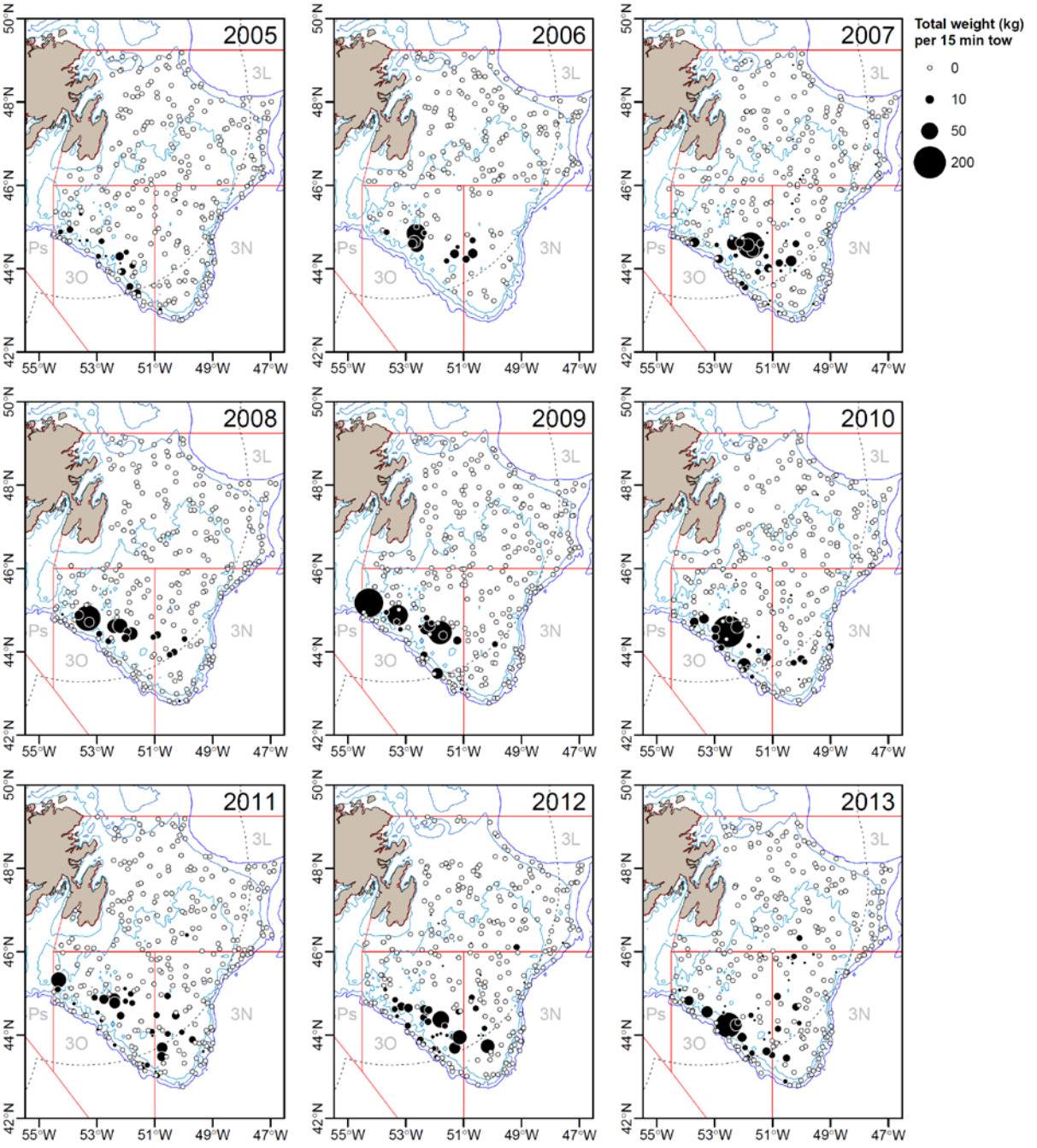

Figure 7. Cont'd.

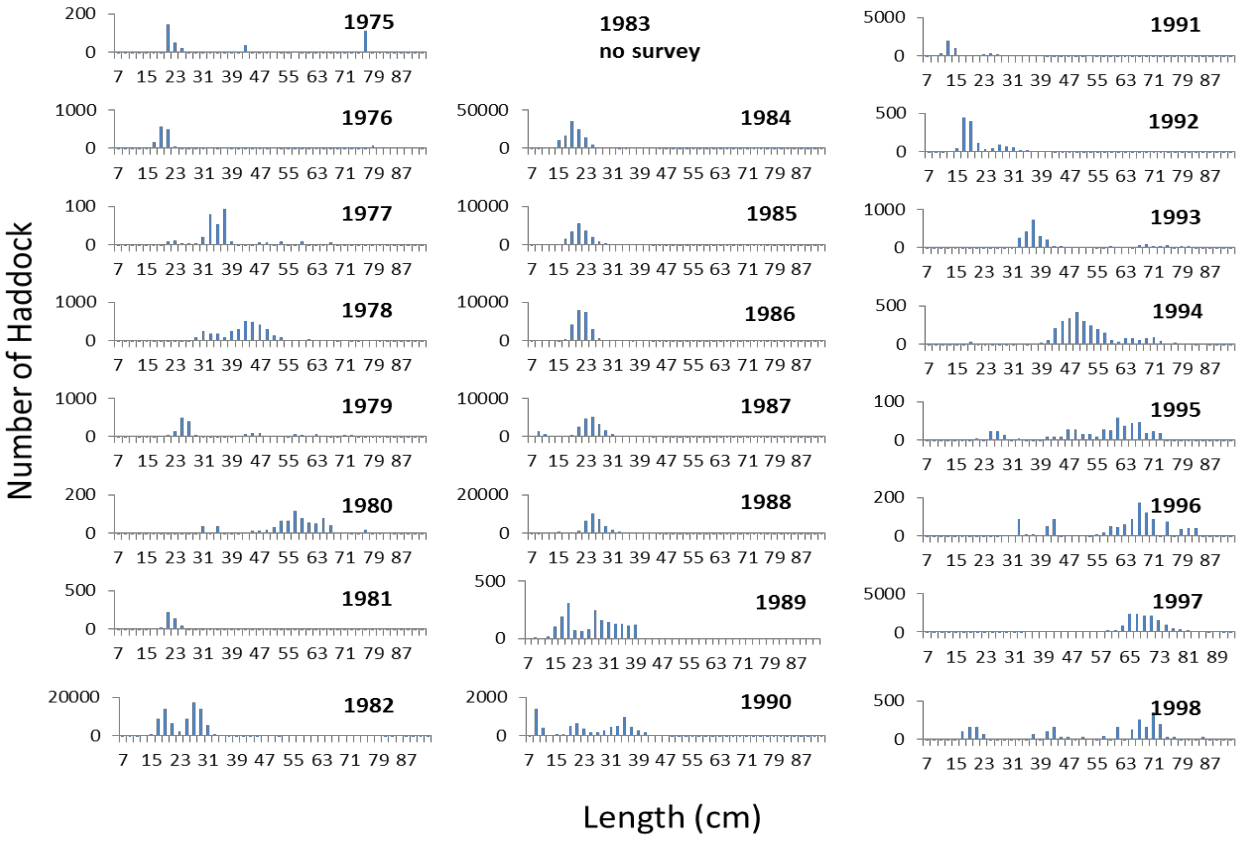

Figure 8. Length frequency distributions for Divs. 3LNO Haddock in the Canadian spring research vessel survey from 1975 to 2013. Data are not converted between gear types.

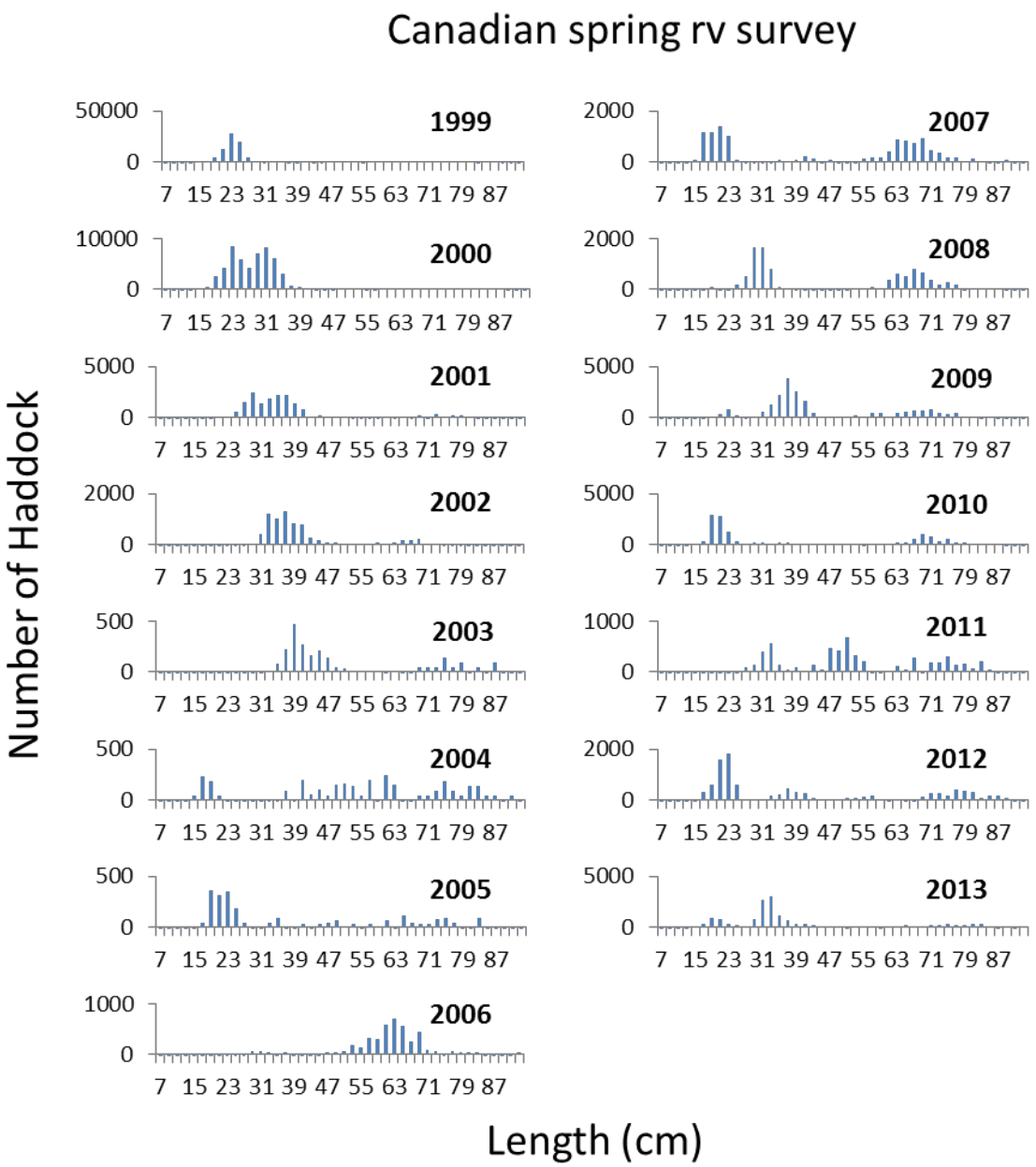

Figure 8. Cont'd.

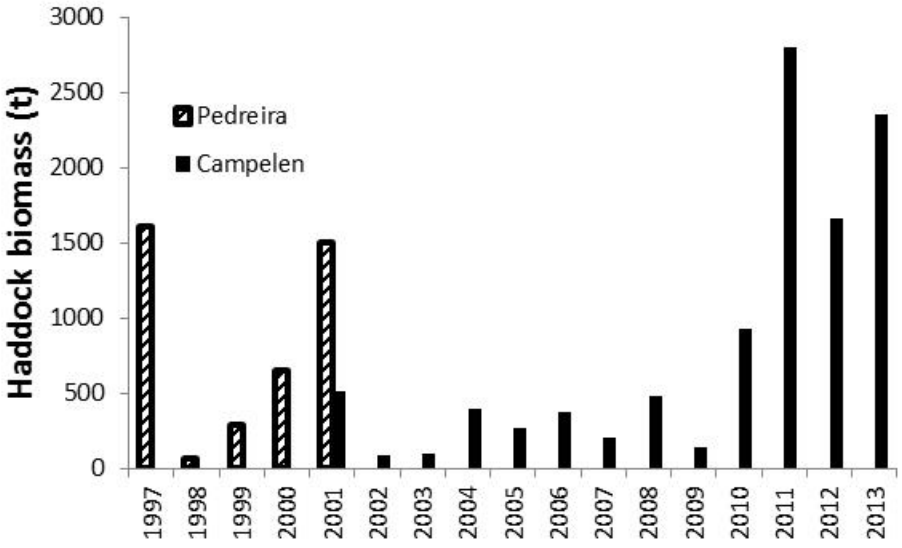

Figure 9. Biomass index from the EU Spain RV survey of NAFO Divs. 3NO, outside Canada's EEZ, during 1997 to 2013. Data were not converted between trawl types. Unpublished data courtesy of D. González (IEO; Vigo, Spain).

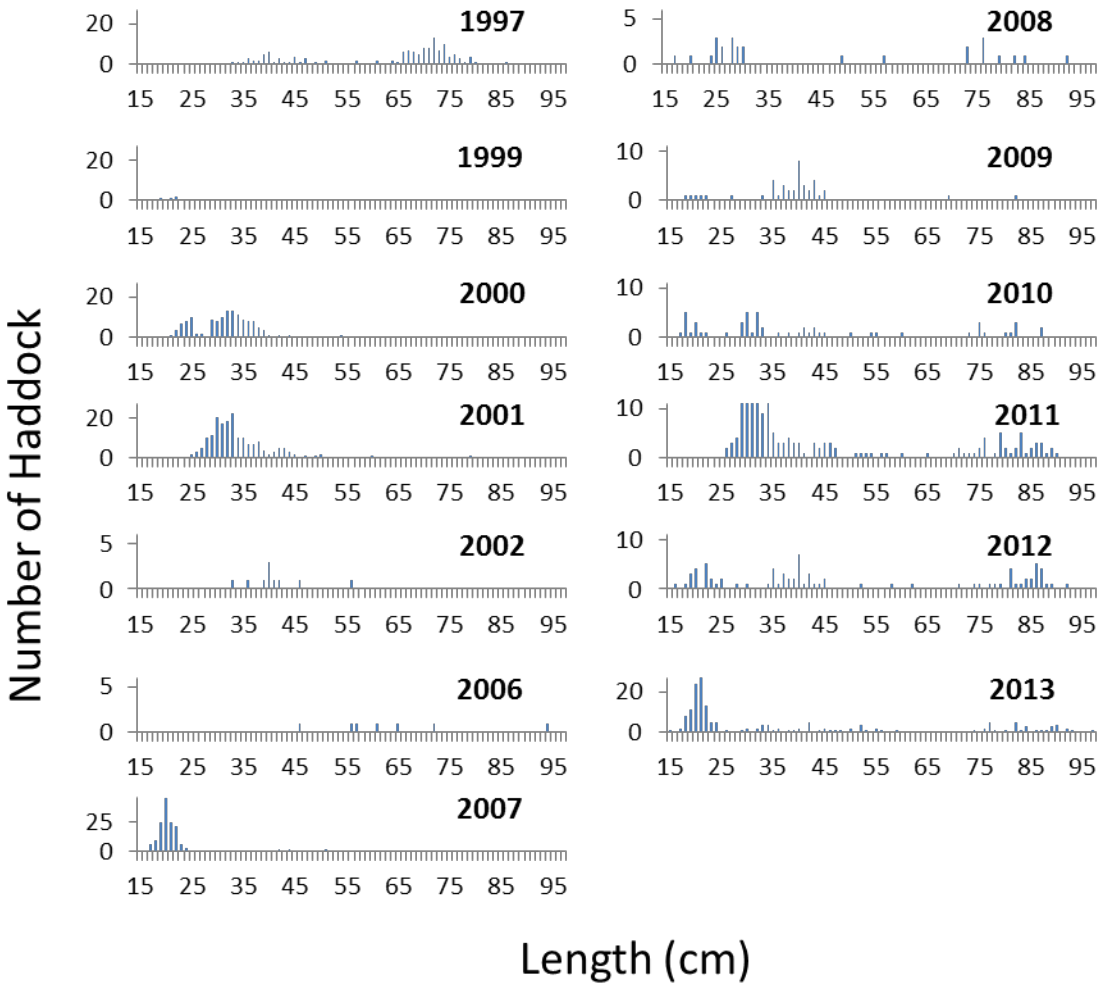

Figure 10. Length frequency distributions for Haddock from the EU Spain RV survey of NAFO Divisions 3NO, outside Canada's EEZ, during 1997 to 2013. Data were not converted between trawl types; pre 2001 is Pedriera trawl data and 2001 onward is Campelen data. Unpublished data courtesy of D. González.

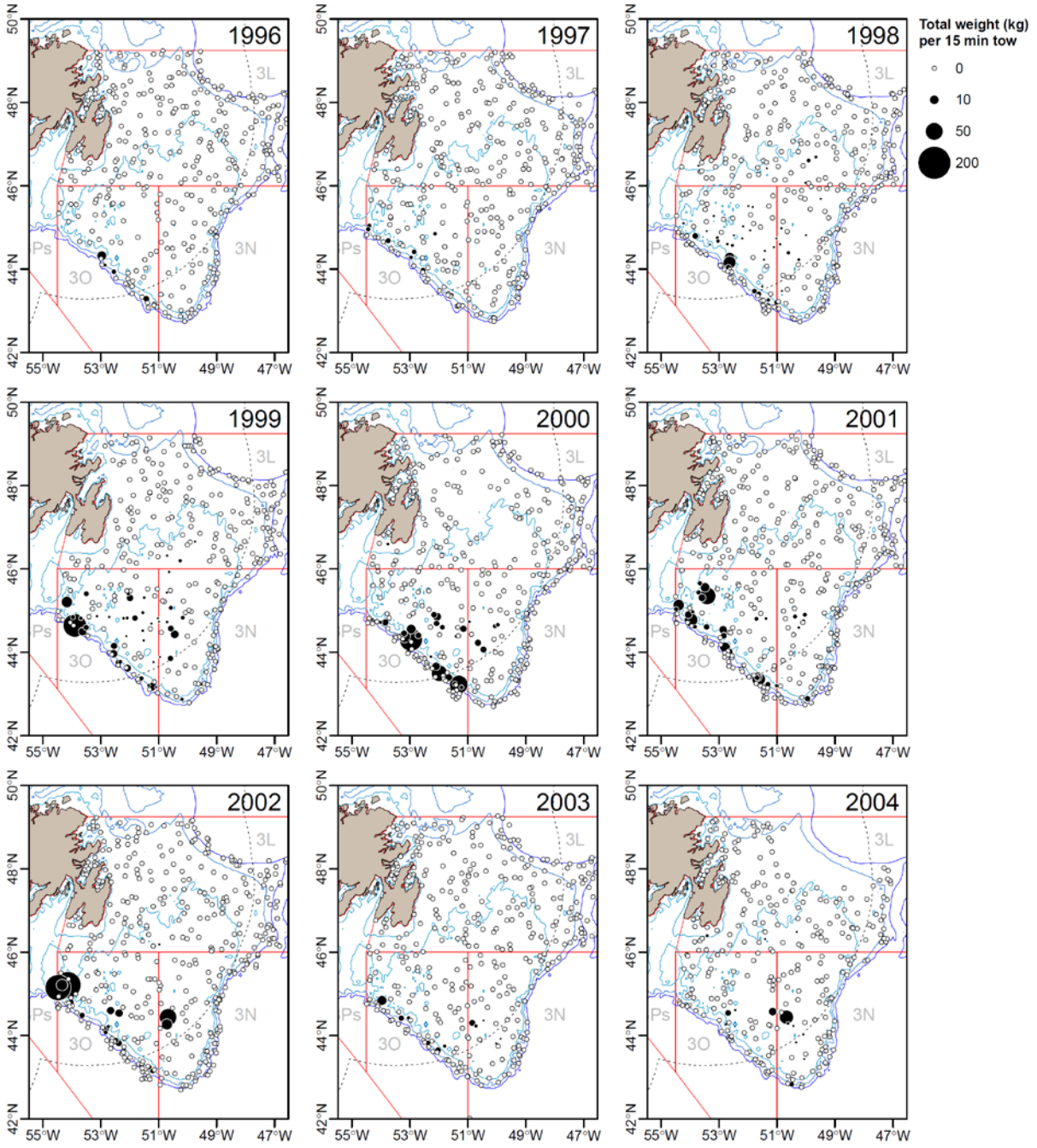

Figure 11. Distribution of Divs. 3LNO Haddock biomass in the Canadian fall research vessel survey from 1996 to 2013.

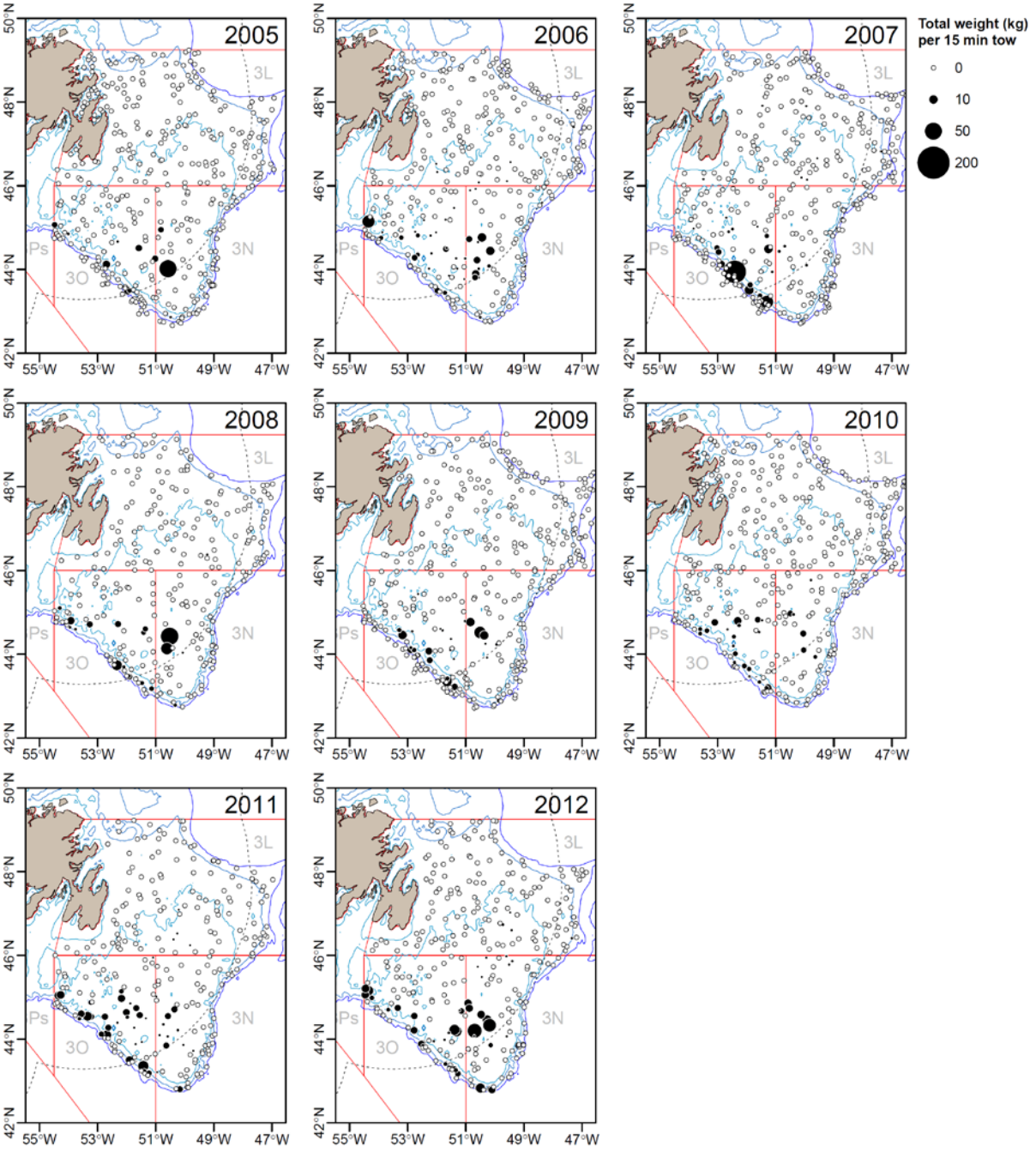

Figure 11. Cont'd.

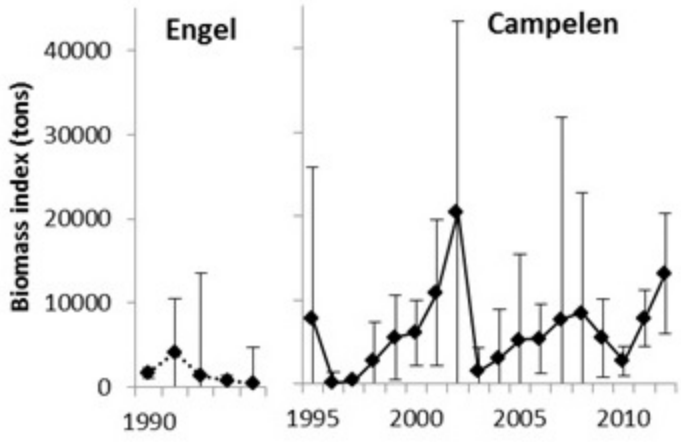

Figure 12. Biomass index for Divs. 3LNO Haddock in the Canadian fall research vessel survey from 1990 to 2012. Data are not converted between gear types. 95% confidence intervals are shown.

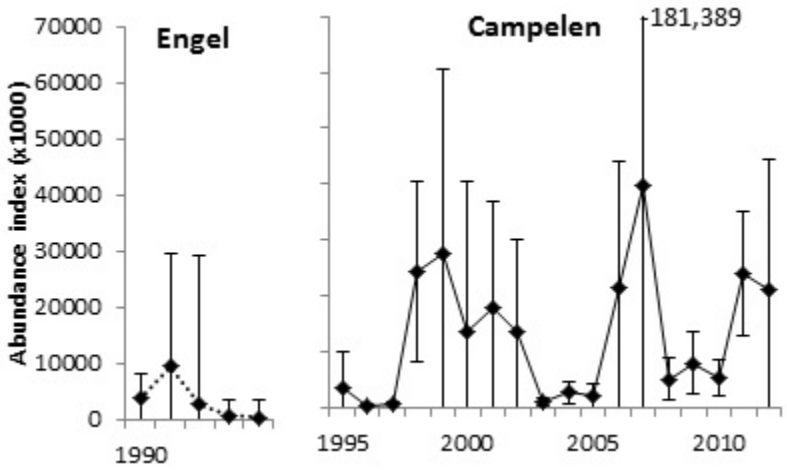

Figure 13. Abundance index for Divs. 3LNO Haddock in the Canadian fall research vessel survey from 1990 to 2012. Data are not converted between gear types. 95% confidence intervals are shown.

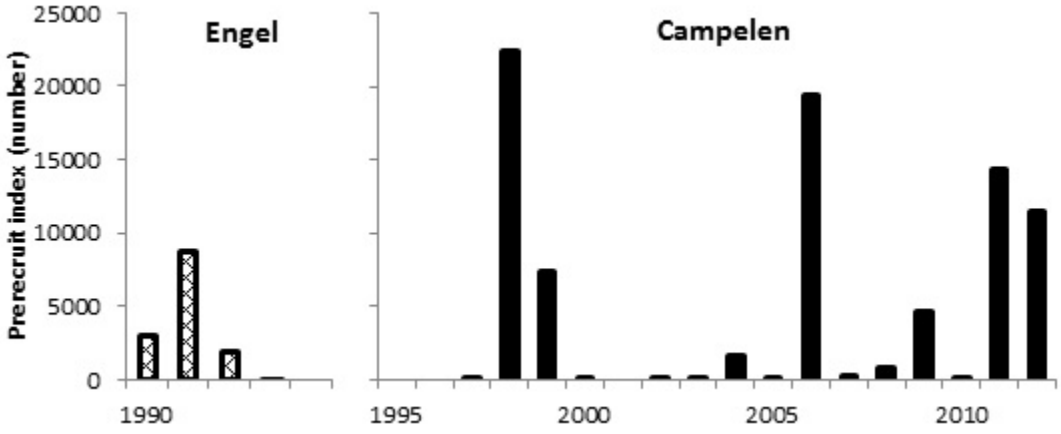

Figure 14. Prerecruit index for 3LNO Haddock from the Canadian fall research vessel survey during 1990 to 2012. Data are not converted between gear types.

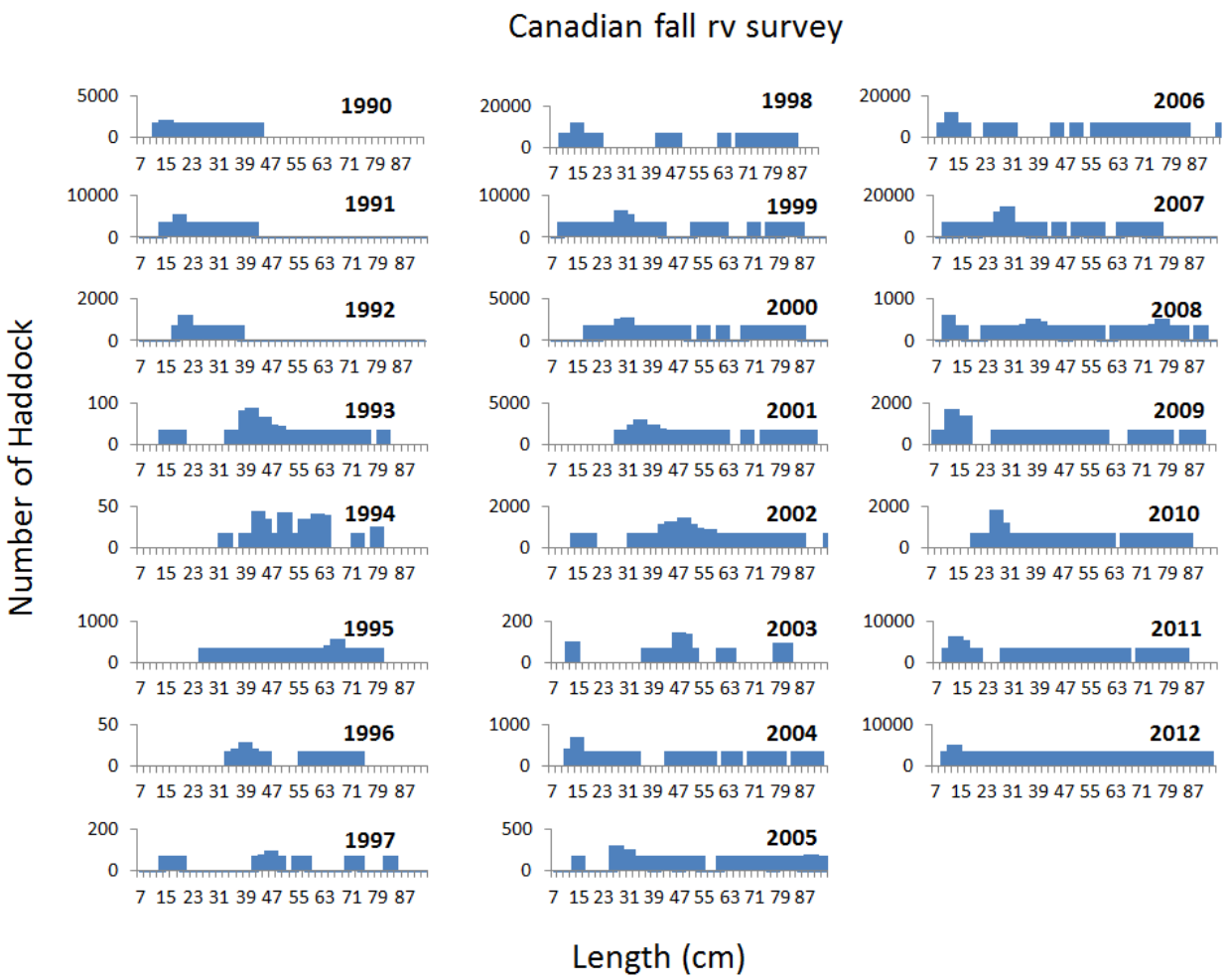

Figure 15. Length frequency distributions for 3LNO Haddock in the Canadian fall research vessel survey from 1990 to 2013. Data are not converted between gear types (Engel trawl pre-1995).