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# Total Removals of Northwest Atlantic Harp Seals (*Pagophilus groenlandicus*) 1952-2009

# Total des captures de phoques du Groenland de l'Atlantique Nord-Ouest (*Pagophilus groenlandicus*) de 1952 à 2009

G.B. Stenson

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



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## ABSTRACT

The Northwest Atlantic harp seal (*Pagophilus groenlandicus*) is hunted for subsistence purposes in Greenland and the Canadian Arctic, and as part of a commercial catch in southern Canadian waters. In addition to reported catches, animals are killed but not landed or reported ('struck and lost'), and are taken as bycatch in commercial fishing gear. Information on catch levels and age structure of removals are necessary for accurate population estimation and responsible management. The objective of this report is to summarize available estimates of removals for the period 1952-2009. Commercial and subsistence hunts account for the majority of the removals. Canadian commercial catches averaged around 288,000 harp seals prior to the introduction of quotas in 1972. Between 1972 and the demise of the large vessel hunt in 1982, an average of 165,000 seals was taken annually. Catches decreased after 1982 and remained low, averaging approximately 52,000, until 1995. Annual catches, consisting primarily of young of the year, increased to an average of 272,600 between 1996 and 2006. Beginning in 2007, catches declined due to ice conditions and poor markets, reaching a low of approximately 72,000 in 2009. Over the past decade, the vast majority of seals taken were between 1 and 3 months of age with over 98 % of the seals taken in the past five years being one year of age or less. Since 1980 Greenland catches increased relatively steadily to a peak of approximately 100,000 in 2000. Since then catches have varied slightly but averaged a little over 80,000. There are no recent estimates of the age structure of seals taken in Greenland but the available data indicate that a significant proportion of seals taken are adults. Catches in the Canadian Arctic are not well documented but appear to be low with likely fewer than 1,000 harp seals taken annually in recent years. Estimates of harp seal bycatch in the Newfoundland lumpfish fishery increased from less than 1,000 in the early 1970s to a peak of 46,400 in 1994. Since then, estimates of this type of bycatch declined to approximately 5,000 by 2003. Low numbers of harp seals (<100) are also caught in U.S.-based fisheries. In the absence of more recent data, we have assumed that the average level of bycatch observed in the previous five years is still occurring. Combining the various sources of mortality, the average total removals from 1952 to 1982 was approximately 388,000, but declined to 178,000 per year between 1983 and 1995. From 1996 to 2004, higher catches in Canada and Greenland resulted in average annual removals of 465,500. However total removals in 2009 was estimated to have declined to slightly over 250,000, due to the lower catches in Canada.

## RÉSUMÉ

Le phoque du Groenland de l'Atlantique Nord-Ouest (*Pagophilus groenlandicus*) est chassé aux fins de subsistance au Groenland et dans l'Arctique canadien, ainsi que comme prise commerciale dans les eaux du sud du Canada. En plus des prises recensées, des animaux sont tués, mais ne sont pas débarqués ou consignés (« abattus et perdus ») ou sont pris comme prises accidentelles dans les engins de pêche commerciaux. Il est nécessaire d'avoir de l'information sur la quantité de prises et la structure par âge des captures afin de faire une estimation exacte de la population et une gestion responsable. Le but de ce rapport est de résumer les estimations de captures disponibles pour la période entre 1952 et 2009. La majorité des captures sont liées à la pêche commerciale ou de subsistance. Les prises commerciales canadiennes étaient en moyenne de 288 000 phoques du Groenland avant la mise en place des quotas en 1972. De 1972 jusqu'à la fin de la pêche par les navires en 1982, 165 000 phoques ont été capturés en moyenne chaque année. Le nombre de prises a diminué après 1982 et est resté faible, étant en moyenne d'environ 52 000 animaux jusqu'à 1995. Les prises annuelles, consistant principalement en des jeunes de l'année, ont augmenté jusqu'à une moyenne de 272 600 animaux entre 1996 et 2006. À compter de 2007, les prises ont diminué en raison des conditions de la glace et du marché peu favorable, atteignant un creux d'environ 72 000 phoques en 2009. Au cours de la dernière décennie, la grande majorité des phoques capturés étaient âgés de 1 à 3 mois, plus de 98 % des phoques capturés au cours des cinq dernières années étant âgés d'un an ou moins. Depuis 1980, les captures au Groenland ont augmenté de façon relativement stable, atteignant une crête de 100 000 animaux en 2000. Depuis, le nombre de prises a légèrement varié, mais a été en moyenne de 80 000 phoques. Il n'y a pas d'estimations récentes sur la structure par âge des phoques capturés au Groenland, mais les données disponibles indiquent qu'une proportion importante des animaux capturés consistait en des adultes. Les prises dans l'Arctique canadien ne sont pas bien documentées, mais le nombre semble bas, étant probablement inférieur à 1 000 phoques du Groenland capturés chaque année au cours des dernières années. Les estimations pour les prises accidentelles de phoques du Groenland lors de la pêche à la lompe à Terre-Neuve ont augmenté, passant de moins de 1 000 animaux au début des années 1970 à une crête de 46 400 phoques en 1994. Depuis, les estimations pour ce type de prises accidentelles ont diminué à environ 5 000 animaux en 2003. Un nombre peu élevé de phoques du Groenland (<100) sont aussi capturés par les pêches américaines. Faute de données plus récentes, nous avons supposé que le niveau moyen de prises accidentelles constaté au cours des cinq années précédentes est encore le même. En combinant les diverses sources de mortalité, le nombre moyen de captures totales entre 1952 et 1982 a été d'environ 388 000 animaux, mais a diminué à 178 000 par année entre 1983 et 1995. De 1996 à 2004, un nombre plus élevé de prises au Canada et au Groenland a donné une moyenne de 465 500 captures annuelles de phoques. Toutefois, on a estimé que le total des captures en 2009 a diminué, étant légèrement supérieur à 250 000, et ce, en raison du plus faible nombre de prises au Canada.

# INTRODUCTION

Along with independent estimates of pup production and age specific reproductive rates, accurate information on the current and historical levels of human induced mortality is required in order to estimate total abundance of Northwest Atlantic harp seal (*Pagophilus groenlandicus*) population (e.g., Shelton et al. 1996, 1999b; Healey and Stenson 2000;, Hammill and Stenson 2003, 2005). Harp seals are killed as part of the Canadian commercial seal hunt, subsistence harvests in Greenland and the Canadian Arctic, animals that are killed but not landed and therefore are not accounted for in the catch statistics, and as bycatch in commercial fishing gear. Data on the levels of various components of this mortality have been compiled previously (e.g., Lavigne 1999;Stenson et al 2000; Walsh et al 2000; Sjare and Stenson 2002; Stenson 2005) and summarized by Stenson (2008).

The objective of this study is to compile and update available estimates of Canadian and Greenland catches, bycatch, and stuck and lost to produce an estimate of human-induced removals in northwest Atlantic harp seals up to 2009.

# DATA AND DISCUSSION

## COMMERCIAL AND SUBSISTENCE CATCHES

Northwest Atlantic harp seals are taken in the commercial hunt in southern Canadian waters (i.e., off southern Labrador and/or the Northeast coast of Newfoundland ('the Front'-NAFO Divisions 2J and 3KL), and in the Gulf of St. Lawrence ('the Gulf'-NAFO Division 4RST), and in subsistence hunts off western and southeastern Greenland (NAFO Division 1A-F; ICES Area XIVb), and the eastern Canadian Arctic (primarily along the east coast of Baffin Island). Reported catches for each of these areas are summarized in Table 1 and illustrated in Fig. 1.

### *Front and Gulf*

Harp seals have been harvested commercially in Atlantic Canada since the 1700s. Although most the seals were taken on the whelping patch, little was known about the exact catch levels or age structure of the harvest since the available records provide information on the number of skins (unclassified) and amount of oil exported. Using these data Ryan (1994) estimated that the highest level of catches occurred in the early to mid 1800s with an average of over 470,000 seal skins exported annually from Newfoundland between 1840 and 1850. Lett and Benjaminsen (1977) presented the first comprehensive age structure of the harvest for the period from 1952 to 1975. Subsequently, inconsistencies in the data were corrected and updated estimates of Canadian and Greenland catch were provided in Bowen (1982), Sjare et al. (1996), Stenson et al. (1999a, 2000) and Stenson (2005, 2008).

In this study, I used the same approach described in Stenson (2005, 2008). Total catch at the Front and in the Gulf for the years 1952-78 were compiled from values reported in the Statistical Bulletin of the International Commission for Northwest Atlantic Fisheries (ICNAF 1970-77). Subsequent corrections were noted (ICNAF Statistical Bulletins 1985a, b). Total catches for the years 1979-89 were compiled from values reported in the Statistical Bulletin of the Northwest Atlantic Fisheries Organization (NAFO 1984-94). Total catches at the Front and in the Gulf for the years 1989-2009 were provided by DFO Statistics Branch. DFO research catches from both Newfoundland and the Gulf were added to the reported catches. As a result, the catches reported here may differ slightly from those reported by DFO Statistics Branch or summarized

by the Joint ICES/NAFO Working Group on Harp and Hooded Seals (Anon. 1998, 1999, 2004, 2006, 2008, 2009).

Prior to the imposition of quotas in 1972, catches at the Front and in the Gulf were highly variable, ranging from 188,000--389,000 (average 288,000; SD=52,700; Table 1). Between 1972 and 1982, the varying total allowable catch (TAC) (Anon. 2004) resulted in an average catch of 166,000 (SD=21,300; range 124,000--202,000). From 1983 through 1995, catches were reduced (average 52,000; SD=21,300; range 19,000--94,000). In 1996, however, catches increased significantly (243,000) and, with the exception of 2000, continued to increase, reaching a maximum of almost 366,000 in 2004. An average of 272,671 (SD=73,016) seals were taken annually from 1996 to 2006. Catches were significantly reduced in 2007 (224,745, 83 % of TAC) due to the lack of ice in the southern Gulf and heavy ice off Newfoundland. Poor ice, offshore distribution, and low prices also resulted in lower catches in 2008 with only 79 % (217,850) of the TAC taken. Catches in 2009 were extremely low, with preliminary estimates of only 72,407 seals (26 % of the TAC). This was primarily due to reduced effort as a result of the low pelt prices offered (~$15 Can).

The age structures of catches during the 1952-83 period were taken from Bowen (1982) and Roff and Bowen (1986). For the period 1984-2008, the age structure of seals harvested was estimated in the same manner as Bowen (1982), Roff and Bowen (1986), Sjare et al. (1996) Stenson et al. (1999a, 2000) and Stenson (2005). The catch statistics provided by ICNAF, NAFO and DFO Statistical Branch are reported according to pelage type. Based upon these reports, Front and Gulf catches can be split into young of the year (age class 0) and seals one year of age and greater (1 +) (see Table 1). The numbers of 0 age-class seals taken annually were obtained directly from these data.

The only exceptions occurred in 1998 and 1999 when a portion of the catch was not identified according to pelage. The age of 7 % of the catch was not identified in 1998. It was assumed that the proportion of age class 0 in this catch was the same as for the remainder of the catch for which ages were available. In 1999, approximately 22 % of the catch did not have assigned ages. As these animals were all from the Gulf of St. Lawrence, the age structure of seals taken by the small boats in the Gulf (which were reported by age) was used. Young of the year accounted for 98 % of these seals which was consistent with reports from the area.

The proportion of 1+ animals (1 year of age and older) in the catch was estimated on an annual basis based upon biological samples collected primarily in Newfoundland and the northern Gulf. Most of these samples were obtained from commercial sealers distributed throughout Newfoundland and Labrador who were requested to retain some or all of their harvest for sampling. Additional samples were obtained from research sampling programs conducted by DFO personnel during which seals were collected for biological samples. In the later case, animals were taken during the late winter or spring moult in a manner similar to the commercial hunt. Samples obtained as by-catch and seals taken during the month of March (whelping period) have been excluded due to potential biases in the age ratios. Samples obtained by collectors who exceeded their quotas and sub-sampled their catch were also excluded.

The majority of samples obtained from sealers came from hunters operating small boats. In recent years a greater proportion of samples have been obtained during the longliner hunt, reflecting the increasing importance of this component of the harvest.

Using these data, the proportions-at-age for 1+ animals in the catch was estimated for the period 1984-2000 (Table 2). The average proportion of 1+ animals harvested during the recent

period of increased hunting (1996-2000) as used to estimate the proportion of 1+ animals taken for 2001-08. No 1+ seals were reported taken in 2009. The estimated number of seals in each age class caught in the Front and Gulf region from 1952 to 2009 are presented in Table 3.

During the 1950s and early 1960s the proportion of young (age class 0) in the catch ranged from 47 % to 89 %, although in most years young made up 60-80 % of the catch (Fig. 2). From 1963 to 1983 young accounted for over 78% of the catch in practically every year. The majority of these young were whitecoats taken during the large vessel hunt on the whelping concentrations.

With a prohibition in the taking of whitecoat harp seals, the hunt shifted towards older seals and young that had completed their first moult ('beaters'). The proportion of young in the catch remained relatively high (70-80 %) during the mid to late 80s but was reduced to 40-60 % during the first half of the 1990s (Table 2, Fig 2). Young of the year accounted for less than 52 % of the catch in 1994 and 1995. The increased catches in recent years however, have been directed towards young of the year harp seals. The proportion of young in the catch jumped to over 75 % of the total in 1996 and has continued to rise. Over 95 % of the reported harvest since 2000 belonged to age class 0 (YOY); between 2004 and 2008 YOY averaged 98.2 %. YOY accounted for 100 % of the seals reported taken in 2009.

***Greenland***

Greenland catches for the years 1952 and 1953 were taken from Bowen (1982) and for 1954-2000 from Anon. (2004). Revised catches from 1993-2000 and catches for 2001-08 were taken from Anon (2009). The Joint ICES/NAFO Working Group on Harp and Hooded Seals (Anon. 1998) examined the issue of stock identity of the Greenland harvest and concluded that all catches from west Greenland, and half of the catch from south-east Greenland should be considered to have come from the Northwest Atlantic harp seal stock. The Greenland catches presented in Table 1 reflect this allocation.

Since the late 19$^{th}$ century catch statistics for Greenland were obtained through a reporting system known as the "Hunters' List-of-Game" (Kapel and Rosing-Asvid 1996). However, in 1987 this reporting system was discontinued. In 1993 a new reporting system (known as "Pininarneq") began and has provided estimates of catches from 1993-98. No catch statistics are available in the time period for which there was no reporting system (1988-92). Kapel and Rosing-Asvid (1996) and Rosing-Asvid (1997) compared the two systems of reporting and concluded that they provided comparable data on catches. The latter study corrected reported catches from 1975-95 due to under-reporting in some communities and among part-time hunters. Adjustments to catches prior to 1975 were not applied since under-reporting was considered to be insignificant for this time period (Rosing-Asvid 1997). Corrected estimates of Greenland catches were summarized by the Joint ICES/NAFO Working Group on Harp and Hooded Seals (Anon. 1998, Table 9b). Previously (Stenson 2005), a small correction factor (4.7 %) was applied to the reported catches from 1996-2004 based upon the level of under-reporting observed in 1994 and 1995. Further examination has suggested that this correction factor could not be supported and therefore is not included here.

Prior to 1975 reported catches varied from 4,000 to 19,000 (average 10,000; SD=4,000) with generally slightly higher catches in the 1950s than in the 1960s and early 1970s (Table 1). From the mid 1970s up to 1996, catches increased relatively consistently from approximately 7,000 in 1975 to approximately 100,000 in 2000. From 2002 through 2004, catches declined to between 66,000 and 70,000. In 2005 and 2006 reported catches increased to over 91,000

seals per year, while in 2007 they were slightly reduced to 82,788 which is close to the average catch over the previous 10 years. In order to estimate total removals in 2008 and 2009, catches were assumed to be the same as the average (82,843).

As noted, no catch statistics are available for 1988-92. Catches were estimated by linear interpolation using the corrected catch totals in 1987 and 1993 as 'endpoints'. The predicted corrected catch values are presented in Table 1.

Prior to 1982, Greenland catches accounted for less than 10 % of the total harvest in the Northwest Atlantic. However, with the increased catches in Greenland and decreased Canadian catches, Greenland accounted for almost half of the total reported annual catch in most years between 1984 and 1995. With the increased Canadian catches since 1996 and the decline in Greenland catches after 2000, they accounted for approximately 16-18 % of the reported catch between 2002 and 2004. With recent declines in the Canadian catches and the increases observed in the Greenland catches, the Greenland hunt comprised over 25 % of the total reported catches. If Greenland catches remained in the same range, they may equal those of the Canadian catch in 2009.

Previous catch-at-age estimates of harp seals taken in Greenland were given in Bowen (1982) and Roff and Bowen (1986). Because there was no additional data, Sjare et al. (1996) calculated a weighted average for each age class, based on catch-at-age frequencies reported for 1978-80 in Roff and Bowen (1986) to the total catch statistics for the years 1984-94, inclusive.

More recently, Kapel (1999) summarized the age structure of harp seals sampled in west Greenland between 1970 and 1993. With the exception of 1981, annual estimates of the age composition of catches are available between 1970 and 1983. Although data were also available for most years from 1984 to 1993, sample sizes were small and often collected for purposes other than age composition (Kapel 1999).

Stenson et al. (1999a, Table 4) estimated the age structure of seals caught in Greenland from 1952 to 1998 using the data presented in Bowen (1982) and Kapel (1999). The age composition of catches presented in Bowen (1982) were used for the 1952-62 and 1963-69 periods while the annual age structures presented in Kapel (1999) were applied to the annual catches for the period 1970-83. The 1981 age structure was assumed to be the same as 1980. Because of the difficulties identified in using the 1984-93 samples on an annual basis, they combined all samples from central and northwest Greenland over the 1984-91 to estimate an average age composition. Similarly, they combined samples from southwest Greenland between 1986 and 1993. The same approach was used here and an average of these two samples was applied to the total catches from 1984 to 2008 (Table 4).

The estimated numbers of seals taken in each age class by Greenland hunters from 1952 to 2009 are given in Table 5. Catches in Greenland have traditionally consisted mostly of young of the year although a greater proportion of older animals were taken than in Front and Gulf waters (Fig. 3). Prior to the late 1970s, young of the year seals accounted for 50-60% of the total catches. Since then the proportion of young of the year has gradually decreased and based on samples collected between 1984-93 (Kapel 1999), less than 15% of the harvest consisted of young of the year.

Hunters in Greenland report the proportion of their catches that they consider to be 'adults' (Anon. 2009). The harvest reports indicate that the proportion of adults in the catch increased

from less than 25 % prior to the change in reporting in 1987 to approximately 50 % in the 1990s. Although these estimates cannot be used to determine the exact ages of seals taken in Greenland due to uncertainty about the definition of 'adult' and variations in the ages of seals with different pelages, they do suggest that a large proportion of the Greenland catch consists of older animals. In recent years however, there is an indication that the proportion of adults in the Greenland catch may have declined slightly (Anon. 2009). Unfortunately, there are no new age samples available for recent catches to compare with.

### *Canadian Arctic*

Catches of harp seals in the Canadian Arctic have not been well documented and there are no new data to estimate current catches. The values used for the period 1952-82 are based upon estimates provided in Bowen (1982) and Roff and Bowen (1986) (Table 1). Bowen (1982) estimated an average annual catch (1,784) for the period 1952-77 by averaging a reported catch of 1,768 seals per year during 1962-71 (Smith and Taylor 1977) and annual estimates for 1974-77 provided by D. Sergeant (pers. comm., DFO Ste. Anne de Bellevue, PQ, Canada). Roff and Bowen (1986) reported annual catches for the period 1978-82 provided by D. Goodman (pers. comm., DFO Science Branch, Ottawa, ON Canada). The magnitude of the Arctic harp seal harvest from 1983 through 1996 is unknown. Therefore, the estimated catch in 1982 was assumed to apply to all these years (Table 1).

More recently, the Nunavut Wildlife Board published a five year study of marine mammal harvests in Nunavut (June 1996-May 2001) based upon interviews in each community (Anon. 2005). The largest catches occurred in the communities of Panqnirtung and Iqaluit, both of which are along the south east coast of Baffin Island. This is consistent with previous reports indicating that these communities account for the majority of harp seals taken in the Canadian Arctic (Stewart et al. 1986). In two instances (Iqaluit and Cape Dorset in Year 1), data were not available and the four-year average was used. The total catches during this five year study were lower than previously assumed for the 1983-96 period. However, annual catches vary greatly among years in the Arctic and therefore, in order to remain conservative I did not change the estimates for the earlier time period. The average catch during the harvest study was 715 per year (Stenson 2005). Although there are some reports suggesting that catches of harp seals have declined further in recent years, the average catch was rounded to 1,000 and assumed to represent the level of catch for 2002-09.

Harp seals may also be taken in northern Quebec. There are no estimates of the total harvest although it is thought to be extremely small (M. Hammill, DFO, Quebec Region, pers. com.) and therefore likely included in the assumed catch of 1,000 for the Canadian Arctic.

As there are no recent reports of Arctic harp seal catch-at-age frequencies, I assumed that recent catches have remained at the proportions reported by Roff and Bowen (1986) (Table 6). The estimated numbers of Northwest Atlantic harp seals in each age class are presented in Table 7.

## STRUCK AND LOST (S&L)

The proportion of seals that are killed but not recovered (i.e., 'struck and lost') (S&L) can vary greatly depending upon the hunting method, skill of the hunter, location (e.g., on ice or in the water), weather conditions, age and condition of the seal, and the time of year (which is correlated with the thickness of the blubber layer in seals that lay down seasonal energy reserves) (Sergeant 1991; Lavigne 1999; NAMMCO 2006). Unfortunately, few data are

available on the level of S&L in pelagic seals and most of it was collected before 1980. Lavigne (1999) reviewed available data on loss rates in older seals while Rowsell (1977) provided some data on loss rates for young harp seals (beaters) taken on the ice. Sjare and Stenson (2002) estimated S&L rates in the Canadian commercial harp seal hunt between 1998 and 1999.

In 1999 the National Marine Mammal Peer Review Committee reviewed the available information the proportion of seals that are killed but not recovered (DFO 1999). They concluded that specifically accounting for mortalities associated with S&L is more informative than including them as part of an aggregate natural mortality. The following year the same committee reviewed additional data and agreed that the level recommended previously be retained (DFO 2000). Based on their recommendations, I have assumed that recovery (and reporting) rates were 99 % for young of the year seals killed in southern Canadian waters prior to the end of the large vessel hunt in 1982 and 95 % for first year animals after this whitecoat hunt ended. The recovery rate for seals one year of age and older taken in southern Canadian waters and all seals taken in Greenland or the Canadian Arctic was assumed to be 50 % (Table 8).

The level of S&L assumed for the Greenland hunt may be an overestimate. Ugarte and Jackobsen (2006) report preliminary results of a questionnaire survey of hunters to estimate the level of stuck and lost in the Greenland They found that approximately 1/3 of the hunters reported that they included S&L seals as part of their catches. Also, the average level of S&L reported was 0.26 and 0.21 for leisure and professional hunts, respectively. The average monthly levels of S&L varies from 0.13 in October when seals where putting on weight to 0.35 in June when seals were lean following the moult. Once the final results of this study are available, we may be able to adjust the S&L rates for the northern areas.

## BYCATCH IN COMMERCIAL FISHING GEAR

Harp seals are caught in commercial fishing gear, particularly bottom set gillnets, in many parts of their range (Woodley and Lavigne 1991; Lien et al. 1994; Read 1994). With the imposition of moratoria and reduced effort in a number of groundfish fisheries, the primary source of mortality in Atlantic Canada is the spring Newfoundland lumpfish fishery (Sjare et al. 2005). The Newfoundland lumpfish fishery began in 1968 and expanded quickly. Although bycatch of harp seals likely occurred earlier, reports of large numbers of bycatch were not received until 1985 (Sjare et al. 2005). Following these reports, a study of bycatch in this fishery using logbooks was initiated. Initial estimates of bycatch in this fishery were provided by Walsh et al. (2000). Sjare et al. (2005) revised and updated these estimates to 2003 (Table 9) and provided estimates of variance associated with the bycatch levels. They also provided a breakdown of catches into young of the year (beaters) and seals one year of age and older. Prior to 1976, catches were generally below 1,000 seals. Between the late 1970s and early 1990s catches increased, reaching a peak of 46,000 in 1994. By 2003 catches had declined to a little over 5,000 seals. The average catch and proportion young for the previous five years (1999-2003) was applied to 2004-09.

Data on incidental catches of harp seals in U.S. fisheries were summarized by Waring et al. (2005, 2007). Catch data were obtained by independent fisheries observers in the Northeast Multispecies Sink Gillnet, Mid-Atlantic Coastal Gillnet and North Atlantic Bottom Trawl fisheries. The majority of catches observed were in the sink gillnet fishery while only occasional catches occurred the other fisheries. However, Waring et al. (2005) noted that estimates in the bottom trawl fishery should be treated with caution due to low observer coverage. Between 1994 and 1997, an average of 478 seals were caught per year. Catches declined after 1997, although

large catches occurred occasionally (Waring et al. 2007) and the average bycatch was 81 harp seals taken annually from 2000 to 2004. Catches in 2005-09 were assumed to be equal to the average catches for the past five years (2000-04).

The proportion of young seals in the U.S. catches was assumed to be the same as that observed in the Newfoundland lumpfish fishery. The age structure of seals one year of age and older was assumed to be the same as observed among the commercial catches in Canada (Table 2). The estimated numbers of Northwest Atlantic harp seals in each age class taken as bycatch in commercial fisheries are presented in Table 10.

*Total removals*

Combining the estimates of reported Canadian and Greenland catches, S&L, and incidental catches in commercial fisheries provides an estimate of human-induced mortality for Norwest Atlantic harp seals (Table 11, Fig. 4).

Between 1952 and 1971, removals averaged 388,000 seals, primarily due to commercial catches in southern Canada. Removals fell with the imposition of Canadian quotas in 1971, averaging just over 226,000 for the 1972-82 period. The decline of Canadian catches between 1983 and 1995 resulted in fewer annual removals (average 178,000) although the contribution of struck and lost to the total increased due to the high level assumed for the Greenland hunt. With higher levels of catches in both Canada and Greenland, total removals increased significantly after 1996 (averaging 465,500 between 1996 and 2004) reaching levels similar, or slightly higher than that estimated for the 1950s and 1960s. The single largest removal in the time series (580,000) occurred in 2006 due to a combination of high catches in both Canada and Greenland. However, total removals in 2007 and 2008 declined to slightly over 400,000 due to the lower catches in Canada. The extremely low catch in Canada in 2009 resulted in an estimated total removal of a little over 250,000.

The proportion of young of the year in the removals varied among year (Table 11, Fig. 5). During the period when the whitecoat hunt (1952-83) dominated, an average of 62 % of the total annual removals was estimated to be age class 0. From 1982-96 the average proportion of young declined to 34 %, reflecting, in part, the greater importance of the Greenland harvest. The proportion of age class 0 subsequently increased, averaging 67 % for the years 2001-08. In 2009, however, the proportion of age class 0 declined to approximately 42 % due to the low Canadian commercial catch.

The reported catch in the Canadian commercial hunt is considered to be accurate; it is based upon initial reports from sealers that are confirmed by dock-side monitoring and purchase sales slips. The approximate age structure of 1 + seals in the catch could be improved although any differences are unlikely to have much effect due to the low numbers. Unfortunately, independent checks are not available for catches in the Canadian Arctic and Greenland. Also, Greenland catches are usually a year or two out of date due to the way in which reports are obtained. Moat importantly, there is also a lack of recent age structure data on northern, particularly Greenland, catches. As a result, current catches in the Arctic and Greenland are uncertain. There is also uncertainty in the level of bycatch, and struck and loss, but both estimates are thought to be conservative. Because Canadian Arctic catches are small, errors are not significant. However, given the number of seals taken in Greenland and the higher proportion of older seals in the catch, errors can have a significant impact. Thus, improving our understanding of both the level and age structure of catches in Greenland is required in order to improve our understanding of the population dynamics of northwest Atlantic harp seals.

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*Table 1. Summary of harp seal catches in the Northwest Atlantic, 1952-2009. Estimated values are shaded.*

| | Front and Gulf | | | Canadian Arctic | | | Greenland | | | Total Northwest Atlantic | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 0 | 1+ | All | 0 | 1+ | All | 0 | 1+ | All | 0 | 1+ | All |
| 1952 | 198,063 | 109,045 | 307,108 | 60 | 1724 | 1,784 | 9,676 | 6,724 | 16,400 | 207,799 | 117,493 | 325,292 |
| 1953 | 197,975 | 74,911 | 272,886 | 60 | 1724 | 1,784 | 9,676 | 6,724 | 16,400 | 207,711 | 83,359 | 291,070 |
| 1954 | 175,034 | 89,382 | 264,416 | 60 | 1724 | 1,784 | 11,299 | 7,852 | 19,150 | 186,393 | 98,958 | 285,350 |
| 1955 | 252,297 | 81,072 | 333,369 | 60 | 1724 | 1,784 | 9,165 | 6,369 | 15,534 | 261,522 | 89,165 | 350,687 |
| 1956 | 341,397 | 48,013 | 389,410 | 60 | 1724 | 1,784 | 6,474 | 4,499 | 10,973 | 347,931 | 54,236 | 402,167 |
| 1957 | 165,438 | 80,042 | 245,480 | 60 | 1724 | 1,784 | 7,602 | 5,282 | 12,884 | 173,100 | 87,048 | 260,148 |
| 1958 | 140,996 | 156,790 | 297,786 | 60 | 1724 | 1,784 | 9,962 | 6,923 | 16,885 | 151,018 | 165,437 | 316,455 |
| 1959 | 238,832 | 81,302 | 320,134 | 60 | 1724 | 1,784 | 5,268 | 3,660 | 8,928 | 244,160 | 86,686 | 330,846 |
| 1960 | 156,168 | 121,182 | 277,350 | 60 | 1724 | 1,784 | 9,531 | 6,623 | 16,154 | 165,759 | 129,529 | 295,288 |
| 1961 | 168,819 | 19,047 | 187,866 | 60 | 1724 | 1,784 | 7,078 | 4,918 | 11,996 | 175,957 | 25,689 | 201,646 |
| 1962 | 207,088 | 112,901 | 319,989 | 60 | 1724 | 1,784 | 5,015 | 3,485 | 8,500 | 212,163 | 118,110 | 330,273 |
| 1963 | 270,419 | 71,623 | 342,042 | 60 | 1724 | 1,784 | 5,864 | 4,247 | 10,111 | 276,343 | 77,594 | 353,937 |
| 1964 | 266,382 | 75,281 | 341,663 | 60 | 1724 | 1,784 | 5,338 | 3,865 | 9,203 | 271,780 | 80,870 | 352,650 |
| 1965 | 182,758 | 51,495 | 234,253 | 60 | 1724 | 1,784 | 5,388 | 3,901 | 9,289 | 188,206 | 57,120 | 245,326 |
| 1966 | 251,135 | 72,004 | 323,139 | 60 | 1724 | 1,784 | 4,093 | 2,964 | 7,057 | 255,288 | 76,692 | 331,980 |
| 1967 | 277,750 | 56,606 | 334,356 | 60 | 1724 | 1,784 | 2,460 | 1,782 | 4,242 | 280,270 | 60,112 | 340,382 |
| 1968 | 156,458 | 36,238 | 192,696 | 60 | 1724 | 1,784 | 4,127 | 2,989 | 7,116 | 160,645 | 40,951 | 201,596 |
| 1969 | 233,340 | 55,472 | 288,812 | 60 | 1724 | 1,784 | 3,734 | 2,704 | 6,438 | 237,134 | 59,900 | 297,034 |
| 1970 | 217,431 | 40,064 | 257,495 | 60 | 1724 | 1,784 | 3,310 | 2,959 | 6,269 | 220,801 | 44,747 | 265,548 |
| 1971 | 210,579 | 20,387 | 230,966 | 60 | 1724 | 1,784 | 3,502 | 2,070 | 5,572 | 214,141 | 24,181 | 238,322 |
| 1972 | 116,810 | 13,073 | 129,883 | 60 | 1724 | 1,784 | 3,431 | 2,563 | 5,994 | 120,301 | 17,360 | 137,661 |
| 1973 | 98,335 | 25,497 | 123,832 | 60 | 1724 | 1,784 | 5,091 | 4,121 | 9,212 | 103,486 | 31,342 | 134,828 |
| 1974 | 114,825 | 32,810 | 147,635 | 60 | 1724 | 1,784 | 4,597 | 2,548 | 7,145 | 119,482 | 37,082 | 156,564 |
| 1975 | 140,638 | 33,725 | 174,363 | 60 | 1724 | 1,784 | 4,165 | 2,587 | 6,752 | 144,863 | 38,036 | 182,899 |
| 1976 | 132,085 | 32,917 | 165,002 | 60 | 1724 | 1,784 | 7,209 | 4,747 | 11,956 | 139,354 | 39,388 | 178,742 |
| 1977 | 126,982 | 28,161 | 155,143 | 60 | 1724 | 1,784 | 9,899 | 2,967 | 12,866 | 136,941 | 32,852 | 169,793 |
| 1978 | 116,190 | 45,533 | 161,723 | 72 | 2057 | 2,129 | 6,981 | 9,657 | 16,638 | 123,242 | 57,248 | 180,490 |
| 1979 | 132,458 | 28,083 | 160,541 | 122 | 3498 | 3,620 | 8,841 | 8,703 | 17,545 | 141,421 | 40,284 | 181,706 |
| 1980 | 132,421 | 37,105 | 169,526 | 214 | 6136 | 6,350 | 4,022 | 11,233 | 15,255 | 136,657 | 54,474 | 191,131 |
| 1981 | 178,394 | 23,775 | 202,169 | 157 | 4515 | 4,672 | 6,057 | 16,916 | 22,974 | 184,608 | 45,206 | 229,815 |
| 1982 | 145,274 | 21,465 | 166,739 | 164 | 4717 | 4,881 | 8,280 | 18,647 | 26,927 | 153,718 | 44,828 | 198,547 |
| 1983 | 50,058 | 7,831 | 57,889 | 164 | 4717 | 4,881 | 6,759 | 18,025 | 24,785 | 56,982 | 30,573 | 87,555 |
| 1984 | 23,922 | 7,622 | 31,544 | 164 | 4717 | 4,881 | 3,686 | 22,142 | 25,829 | 27,772 | 34,481 | 62,254 |
| 1985 | 13,334 | 5,701 | 19,035 | 164 | 4717 | 4,881 | 2,966 | 17,819 | 20,785 | 16,465 | 28,236 | 44,701 |
| 1986 | 21,888 | 4,046 | 25,934 | 164 | 4717 | 4,881 | 3,725 | 22,374 | 26,099 | 25,777 | 31,137 | 56,914 |
| 1987 | 36,350 | 10,446 | 46,796 | 164 | 4717 | 4,881 | 5,403 | 32,456 | 37,859 | 41,917 | 47,619 | 89,536 |
| 1988 | 66,972 | 27,074 | 94,046 | 164 | 4717 | 4,881 | 5,768 | 34,647 | 40,415 | 72,904 | 66,438 | 139,342 |
| 1989 | 56,346 | 8,958 | 65,304 | 164 | 4717 | 4,881 | 6,133 | 36,838 | 42,971 | 62,643 | 50,513 | 113,156 |
| 1990 | 34,402 | 25,760 | 60,162 | 164 | 4717 | 4,881 | 6,498 | 39,029 | 45,526 | 41,064 | 69,506 | 110,569 |
| 1991 | 42,382 | 10,206 | 52,588 | 164 | 4717 | 4,881 | 6,862 | 41,220 | 48,082 | 49,408 | 56,143 | 105,551 |
| 1992 | 43,866 | 24,802 | 68,668 | 164 | 4717 | 4,881 | 7,227 | 43,411 | 50,638 | 51,257 | 72,930 | 124,187 |
| 1993 | 16,401 | 10,602 | 27,003 | 164 | 4717 | 4,881 | 8,038 | 48,281 | 56,319 | 24,603 | 63,600 | 88,203 |
| 1994 | 25,223 | 36,156 | 61,379 | 164 | 4717 | 4,881 | 8,188 | 49,185 | 57,373 | 33,575 | 90,058 | 123,633 |
| 1995 | 34,106 | 31,661 | 65,767 | 164 | 4717 | 4,881 | 8,956 | 53,793 | 62,749 | 43,226 | 90,171 | 133,397 |
| 1996 | 184,856 | 58,050 | 242,906 | 164 | 4717 | 4,881 | 10,554 | 63,393 | 73,947 | 195,574 | 126,160 | 321,734 |

| | Front and Gulf | | | Canadian Arctic | | | Greenland | | | Total Northwest Atlantic | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 0 | 1+ | All | 0 | 1+ | All | 0 | 1+ | All | 0 | 1+ | All |
| 1997 | 220,476 | 43,734 | 264,210 | 61 | 1743 | 1,804 | 9,821 | 58,994 | 68,816 | 230,381 | 105,144 | 335,526 |
| 1998 | 251,403 | 31,221 | 282,624 | 24 | 695 | 719 | 11,599 | 69,673 | 81,272 | 263,036 | 101,860 | 364,896 |
| 1999 | 237,644 | 6,908 | 244,552 | 12 | 356 | 368 | 13,290 | 79,827 | 93,117 | 250,951 | 87,218 | 338,169 |
| 2000 | 85,035 | 7,020 | 92,055 | 9 | 271 | 280 | 14,052 | 84,406 | 98,459 | 99,101 | 91,813 | 190,914 |
| 2001 | 214,754 | 11,739 | 226,493 | 14 | 391 | 405 | 12,192 | 73,235 | 85,428 | 226,966 | 85,554 | 312,521 |
| 2002 | 297,764 | 14,603 | 312,367 | 34 | 966 | 1,000 | 9,524 | 57,210 | 66,735 | 307,322 | 72,779 | 380,102 |
| 2003 | 280,174 | 9,338 | 289,512 | 34 | 966 | 1,000 | 9,441 | 56,708 | 66,149 | 289,648 | 67,013 | 356,661 |
| 2004 | 353,553 | 12,418 | 365,971 | 34 | 966 | 1,000 | 10,074 | 60,511 | 70,586 | 363,661 | 73,896 | 437,557 |
| 2005 | 319,127 | 4,699 | 323,826 | 34 | 966 | 1,000 | 13,087 | 78,609 | 91,696 | 332,247 | 84,274 | 416,522 |
| 2006 | 346,426 | 8,441 | 354,867 | 34 | 966 | 1,000 | 13,160 | 79,050 | 92,210 | 359,620 | 88,457 | 448,077 |
| 2007 | 221,488 | 3,257 | 224,745 | 34 | 966 | 1,000 | 11,814 | 70,964 | 82,778 | 233,336 | 75,187 | 308,523 |
| 2008 | 217,565 | 285 | 217,850 | 34 | 966 | 1,000 | 11,823 | 71,019 | 82,843 | 229,422 | 72,271 | 301,693 |
| 2009 | 72,407 | 0 | 72,407 | 34 | 966 | 1,000 | 11,823 | 71,019 | 82,843 | 84,264 | 71,986 | 156,250 |

*Table 2. Proportion age composition of 1+ harp seal catches at the Front and Gulf 1984-2009. N indicates the number of samples used to estimate proportions. Proportions at age used for 2001-2009 are the average for the period 1996-2000.*

| | n | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1984** | 222 | 0.1622 | 0.3198 | 0.1486 | 0.0991 | 0.0541 | 0.036 | 0.0315 | 0.0135 | 0.009 | 0.009 | 0.018 | 0.0135 |
| **1985** | 311 | 0.2508 | 0.2797 | 0.1801 | 0.0836 | 0.045 | 0.0322 | 0.0225 | 0.0225 | 0.0096 | 0.0129 | 0 | 0 |
| **1986** | 747 | 0.2664 | 0.2182 | 0.1981 | 0.0776 | 0.0361 | 0.0281 | 0.0174 | 0.012 | 0.0134 | 0.0067 | 0.012 | 0.0107 |
| **1987** | 923 | 0.1809 | 0.1679 | 0.1766 | 0.1192 | 0.0585 | 0.0455 | 0.026 | 0.0249 | 0.0217 | 0.0173 | 0.0195 | 0.0054 |
| **1988** | 591 | 0.242 | 0.2386 | 0.1692 | 0.1032 | 0.0508 | 0.0305 | 0.0169 | 0.0186 | 0.0085 | 0.0051 | 0.0034 | 0.0068 |
| **1989** | 375 | 0.1627 | 0.184 | 0.1467 | 0.1467 | 0.1013 | 0.0533 | 0.016 | 0.0107 | 0.016 | 0.0053 | 0.0053 | 0.0053 |
| **1990** | 278 | 0.1835 | 0.1655 | 0.2086 | 0.1367 | 0.0863 | 0.0432 | 0.018 | 0.0036 | 0.0108 | 0.0108 | 0.0144 | 0.0108 |
| **1991** | 245 | 0.1796 | 0.0531 | 0.102 | 0.1592 | 0.151 | 0.0776 | 0.0286 | 0.0163 | 0.0163 | 0.0163 | 0.0327 | 0.0286 |
| **1992** | 333 | 0.2673 | 0.1772 | 0.0961 | 0.0931 | 0.0691 | 0.0631 | 0.048 | 0.018 | 0.033 | 0.015 | 0.012 | 0.006 |
| **1993** | 684 | 0.2865 | 0.1711 | 0.1155 | 0.0775 | 0.0687 | 0.057 | 0.038 | 0.0249 | 0.0263 | 0.0132 | 0.0132 | 0.0088 |
| **1994** | 607 | 0.1598 | 0.1104 | 0.1318 | 0.1301 | 0.0873 | 0.0675 | 0.0412 | 0.0428 | 0.0297 | 0.0198 | 0.0231 | 0.0115 |
| **1995** | 666 | 0.2132 | 0.1547 | 0.1276 | 0.0946 | 0.0991 | 0.0616 | 0.0616 | 0.0255 | 0.018 | 0.0105 | 0.015 | 0.0105 |
| **1996** | 590 | 0.2593 | 0.1881 | 0.0712 | 0.0542 | 0.0475 | 0.0373 | 0.0356 | 0.0237 | 0.0169 | 0.0237 | 0.022 | 0.0136 |
| **1997** | 592 | 0.4054 | 0.1858 | 0.0625 | 0.0439 | 0.0355 | 0.0287 | 0.0253 | 0.0169 | 0.0118 | 0.0304 | 0.022 | 0.0118 |
| **1998** | 967 | 0.1944 | 0.061 | 0.0641 | 0.0383 | 0.0889 | 0.0765 | 0.0641 | 0.0755 | 0.0527 | 0.03 | 0.0445 | 0.0321 |
| **1999** | 115 | 0.5304 | 0.2609 | 0.0348 | 0.0087 | 0.0174 | 0.0174 | 0.0087 | 0.0174 | 0.0087 | 0.0174 | 0.0000 | 0.0000 |
| **2000** | 498 | 0.2309 | 0.1627 | 0.0241 | 0.0321 | 0.0402 | 0.0522 | 0.0622 | 0.0482 | 0.0482 | 0.0402 | 0.0341 | 0.0281 |
| **2001-09** | | 0.3403 | 0.1676 | 0.0464 | 0.0308 | 0.0455 | 0.0437 | 0.0401 | 0.0395 | 0.0303 | 0.0295 | 0.0252 | 0.0180 |

| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1984** | 0 | 0.009 | 0.009 | 0.0045 | 0.0045 | 0 | 0 | 0.0045 | 0.0135 | 0 | 0.0135 | 0.009 | 0.018 |
| **1985** | 0.0032 | 0.0161 | 0.0096 | 0.0032 | 0 | 0.0032 | 0.0064 | 0.0064 | 0 | 0 | 0 | 0 | 0.0129 |
| **1986** | 0.004 | 0.008 | 0.008 | 0.0067 | 0.0013 | 0.0107 | 0.0054 | 0.0094 | 0.008 | 0.0054 | 0.0067 | 0.0067 | 0.0228 |
| **1987** | 0.0076 | 0.0098 | 0.0119 | 0.0087 | 0.0065 | 0.0054 | 0.0076 | 0.0098 | 0.0054 | 0.0022 | 0.0076 | 0.0065 | 0.0477 |
| **1988** | 0.0102 | 0.0051 | 0.0102 | 0.0085 | 0.0068 | 0.0068 | 0.0102 | 0.0118 | 0 | 0 | 0.0017 | 0.0085 | 0.0271 |
| **1989** | 0.016 | 0.008 | 0.0107 | 0.0107 | 0.008 | 0.0133 | 0.0053 | 0.0133 | 0.0107 | 0.0187 | 0.0107 | 0.008 | 0.0133 |
| **1990** | 0.0144 | 0.0036 | 0.0036 | 0.0072 | 0.0036 | 0.0108 | 0 | 0.0144 | 0 | 0.0072 | 0.0108 | 0 | 0.0324 |
| **1991** | 0.0286 | 0.0122 | 0.0204 | 0.0041 | 0.0122 | 0.0122 | 0.0082 | 0.0041 | 0 | 0.0041 | 0 | 0.0041 | 0.0286 |
| **1992** | 0.006 | 0.006 | 0.003 | 0.012 | 0.015 | 0.009 | 0.018 | 0.003 | 0.003 | 0 | 0.006 | 0.003 | 0.018 |
| **1993** | 0.0161 | 0.0044 | 0.0029 | 0.0044 | 0.0058 | 0.0044 | 0.0058 | 0 | 0.0102 | 0.0044 | 0.0029 | 0.0044 | 0.0336 |
| **1994** | 0.0165 | 0.0165 | 0.0181 | 0.0082 | 0.0148 | 0.0132 | 0.0082 | 0.0033 | 0.0082 | 0.0066 | 0.0049 | 0.0082 | 0.0181 |
| **1995** | 0.006 | 0.015 | 0.015 | 0.0075 | 0.009 | 0.012 | 0.006 | 0.009 | 0.009 | 0.0015 | 0.006 | 0.0015 | 0.0105 |
| **1996** | 0.0136 | 0.0169 | 0.0169 | 0.0254 | 0.0254 | 0.0153 | 0.0102 | 0.0102 | 0.0102 | 0.0136 | 0.0085 | 0.0102 | 0.0305 |
| **1997** | 0.0186 | 0.0068 | 0.0084 | 0.0118 | 0.0135 | 0.0101 | 0.0068 | 0.0118 | 0.0068 | 0.0051 | 0.0034 | 0.0051 | 0.0118 |
| **1998** | 0.0207 | 0.0217 | 0.0155 | 0.0259 | 0.0134 | 0.0165 | 0.0083 | 0.0124 | 0.0114 | 0.0062 | 0.0041 | 0.0062 | 0.0155 |
| **1999** | 0.0261 | 0.0000 | 0.0174 | 0.0000 | 0.0174 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0087 | 0.0087 | 0.0000 |
| **2000** | 0.0321 | 0.0241 | 0.0161 | 0.0301 | 0.0141 | 0.0161 | 0.0080 | 0.0201 | 0.0060 | 0.0000 | 0.0020 | 0.0080 | 0.0201 |
| **2001-09** | 0.0244 | 0.0131 | 0.0143 | 0.0170 | 0.0146 | 0.0107 | 0.0058 | 0.0111 | 0.0061 | 0.0028 | 0.0046 | 0.0070 | 0.0118 |

*Table 3. Estimated age compositions of harp seal catches at the Front and Gulf, 1952-2009.*

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1952** | 198,063 | 5,340 | 11,758 | 7,779 | 5,994 | 6,856 | 11,645 | 8,088 | 7,914 | 5,754 | 6,578 | 5,618 | 1,785 | 1,478 | 2,182 | 4,091 | 1,421 | 2,233 | 1,798 | 984 | 5,391 | 873 | 1 | 435 | 1,306 | 1,743 | 307,108 |
| **1953** | 197,975 | 20,602 | 6,330 | 5,753 | 3,744 | 4,037 | 3,223 | 2,825 | 2,882 | 2,777 | 2,330 | 2,851 | 1,743 | 1,370 | 1,022 | 1,823 | 1,989 | 1,408 | 906 | 673 | 2,541 | 1,664 | 937 | 624 | 453 | 404 | 272,886 |
| **1954** | 175,034 | 31,645 | 12,587 | 3,949 | 5,625 | 2,934 | 3,709 | 3,329 | 3,036 | 2,011 | 2,908 | 1,250 | 2,623 | 2,533 | 1,316 | 1,832 | 2,196 | 1,017 | 337 | 1,121 | 831 | 307 | 284 | 718 | 142 | 1,142 | 264,416 |
| **1955** | 252,297 | 21,800 | 8,498 | 6,001 | 4,321 | 3,989 | 3,652 | 3,113 | 3,271 | 2,598 | 2,942 | 2,618 | 2,035 | 1,555 | 1,163 | 2,222 | 2,080 | 1,364 | 739 | 768 | 2,374 | 1,303 | 779 | 616 | 515 | 756 | 333,369 |
| **1956** | 341,397 | 12,068 | 4,795 | 3,299 | 2,629 | 2,194 | 2,127 | 1,909 | 2,041 | 1,748 | 1,838 | 1,587 | 1,315 | 998 | 848 | 1,331 | 1,321 | 870 | 578 | 571 | 1,505 | 739 | 459 | 389 | 346 | 508 | 389,410 |
| **1957** | 165,438 | 21,656 | 7,982 | 5,330 | 4,275 | 3,586 | 3,464 | 3,068 | 3,128 | 2,684 | 2,990 | 2,762 | 2,080 | 1,713 | 1,316 | 2,309 | 2,171 | 1,422 | 780 | 826 | 2,418 | 1,300 | 795 | 611 | 535 | 841 | 245,480 |
| **1958** | 140,996 | 24,328 | 9,817 | 11,311 | 11,855 | 10,092 | 6,589 | 6,063 | 5,092 | 4,813 | 9,670 | 5,745 | 7,088 | 4,169 | 3,148 | 8,813 | 5,846 | 2,987 | 560 | 1,498 | 5,374 | 2,899 | 2,426 | 1,007 | 1,966 | 3,634 | 297,786 |
| **1959** | 238,832 | 21,882 | 8,185 | 5,458 | 4,239 | 3,788 | 3,741 | 3,232 | 3,247 | 2,830 | 3,110 | 2,695 | 2,054 | 1,653 | 1,280 | 2,347 | 2,149 | 1,422 | 741 | 819 | 2,411 | 1,299 | 773 | 633 | 526 | 788 | 320,134 |
| **1960** | 156,168 | 32,554 | 12,672 | 9,520 | 6,539 | 5,561 | 5,571 | 4,631 | 4,505 | 3,860 | 4,404 | 3,896 | 3,005 | 2,395 | 1,784 | 3,339 | 3,164 | 2,046 | 1,084 | 1,145 | 3,568 | 1,924 | 1,155 | 916 | 779 | 1,165 | 277,350 |
| **1961** | 168,819 | 5,035 | 1,977 | 1,951 | 2,399 | 810 | 1,014 | 1,009 | 617 | 586 | 909 | 542 | 310 | 313 | 306 | 154 | 248 | 189 | 99 | 120 | 146 | 0 | 80 | 59 | 9 | 165 | 187,866 |
| **1962** | 207,088 | 29,503 | 33,876 | 9,411 | 8,724 | 6,173 | 2,677 | 2,488 | 2,568 | 2,534 | 1,083 | 1,242 | 1,872 | 966 | 1,349 | 1,911 | 660 | 1,663 | 763 | 578 | 1,291 | 159 | 604 | 29 | 152 | 625 | 319,989 |
| **1963** | 270,419 | 9,018 | 8,102 | 6,615 | 3,842 | 3,014 | 3,441 | 3,410 | 3,360 | 3,096 | 3,587 | 3,450 | 2,546 | 2,751 | 2,770 | 2,145 | 2,625 | 1,794 | 1,176 | 924 | 944 | 848 | 628 | 493 | 412 | 632 | 342,042 |
| **1964** | 266,382 | 5,685 | 5,253 | 5,699 | 6,561 | 4,333 | 6,511 | 3,375 | 2,789 | 2,635 | 4,106 | 2,142 | 2,132 | 1,643 | 1,629 | 2,491 | 2,014 | 2,502 | 3,857 | 2,010 | 62 | 1,953 | 987 | 983 | 1,438 | 2,491 | 341,663 |
| **1965** | 182,758 | 11,710 | 5,382 | 4,621 | 4,901 | 5,968 | 5,537 | 2,094 | 969 | 642 | 1,231 | 389 | 1,644 | 263 | 1,195 | 1,029 | 546 | 310 | 671 | 715 | 246 | 464 | 228 | 20 | 29 | 691 | 234,253 |
| **1966** | 251,135 | 13,528 | 10,652 | 4,901 | 4,791 | 4,987 | 5,020 | 4,564 | 3,091 | 1,630 | 1,706 | 2,224 | 1,606 | 1,455 | 1,631 | 1,370 | 1,376 | 967 | 1,511 | 933 | 1,000 | 724 | 299 | 631 | 351 | 1,056 | 323,139 |
| **1967** | 277,750 | 14,120 | 6,348 | 2,552 | 2,204 | 3,117 | 3,956 | 3,422 | 2,406 | 1,567 | 1,401 | 1,790 | 1,245 | 984 | 1,472 | 1,487 | 965 | 1,230 | 1,344 | 1,385 | 898 | 584 | 426 | 482 | 291 | 930 | 334,356 |
| **1968** | 156,458 | 5,747 | 4,194 | 2,800 | 1,653 | 1,471 | 1,504 | 2,130 | 2,231 | 1,524 | 1,529 | 1,149 | 913 | 854 | 1,115 | 950 | 885 | 756 | 1,100 | 950 | 677 | 417 | 573 | 299 | 219 | 598 | 192,696 |
| **1969** | 233,340 | 21,117 | 2,815 | 2,859 | 2,353 | 2,660 | 1,963 | 2,261 | 2,816 | 2,056 | 1,732 | 1,532 | 1,013 | 1,162 | 1,183 | 1,229 | 784 | 1,265 | 809 | 913 | 757 | 548 | 336 | 411 | 191 | 707 | 288,812 |
| **1970** | 217,431 | 8,766 | 7,386 | 2,580 | 2,429 | 2,363 | 1,363 | 1,326 | 1,601 | 1,437 | 1,813 | 1,183 | 1,129 | 830 | 723 | 866 | 937 | 541 | 538 | 549 | 484 | 350 | 263 | 202 | 133 | 272 | 257,495 |
| **1971** | 210,579 | 7,692 | 2,568 | 2,092 | 1,055 | 1,047 | 644 | 515 | 446 | 672 | 728 | 464 | 491 | 375 | 168 | 226 | 198 | 139 | 151 | 138 | 90 | 60 | 74 | 46 | 9 | 299 | 230,966 |
| **1972** | 116,810 | 4,100 | 2,269 | 1,319 | 1,276 | 601 | 531 | 377 | 309 | 159 | 216 | 248 | 251 | 133 | 211 | 172 | 100 | 121 | 139 | 64 | 195 | 108 | 72 | 45 | 33 | 24 | 129,883 |
| **1973** | 98,335 | 4,918 | 3,918 | 2,755 | 2,284 | 3,159 | 1,051 | 908 | 1,023 | 636 | 603 | 725 | 582 | 564 | 415 | 439 | 347 | 211 | 159 | 175 | 180 | 40 | 145 | 18 | 18 | 224 | 123,832 |
| **1974** | 114,825 | 10,412 | 5,762 | 2,137 | 1,725 | 1,800 | 2,671 | 797 | 914 | 1,047 | 706 | 492 | 639 | 641 | 445 | 395 | 427 | 371 | 254 | 198 | 103 | 113 | 140 | 76 | 114 | 431 | 147,635 |
| **1975** | 140,638 | 12,776 | 6,170 | 3,106 | 1,661 | 1,574 | 1,437 | 1,379 | 787 | 573 | 804 | 505 | 509 | 486 | 346 | 251 | 297 | 215 | 214 | 190 | 86 | 105 | 63 | 68 | 71 | 52 | 174,363 |
| **1976** | 132,085 | 14,575 | 7,084 | 3,923 | 2,598 | 888 | 593 | 530 | 544 | 227 | 324 | 315 | 258 | 142 | 179 | 219 | 93 | 105 | 67 | 59 | 64 | 18 | 25 | 41 | 23 | 23 | 165,002 |
| **1977** | 126,982 | 7,451 | 5,581 | 5,131 | 3,746 | 1,906 | 1,062 | 727 | 455 | 192 | 219 | 219 | 154 | 186 | 360 | 385 | 166 | 27 | 38 | 12 | 30 | 15 | 20 | 37 | 22 | 20 | 155,143 |
| **1978** | 116,190 | 15,853 | 10,031 | 6,051 | 4,438 | 2,963 | 1,967 | 647 | 859 | 337 | 578 | 198 | 206 | 222 | 137 | 205 | 109 | 104 | 138 | 70 | 111 | 91 | 79 | 33 | 21 | 85 | 161,723 |
| **1979** | 132,458 | 13,686 | 5,814 | 2,700 | 1,668 | 1,272 | 789 | 425 | 231 | 217 | 73 | 73 | 79 | 75 | 148 | 153 | 34 | 56 | 55 | 40 | 21 | 21 | 30 | 10 | 11 | 402 | 160,541 |
| **1980** | 132,421 | 14,132 | 6,565 | 4,378 | 2,573 | 1,994 | 1,597 | 1,104 | 790 | 555 | 269 | 432 | 413 | 299 | 380 | 345 | 321 | 262 | 27 | 97 | 147 | 81 | 73 | 16 | 10 | 245 | 169,526 |
| **1981** | 178,394 | 5,633 | 3,077 | 2,906 | 2,745 | 2,421 | 1,700 | 1,028 | 706 | 295 | 428 | 440 | 310 | 228 | 218 | 221 | 206 | 272 | 183 | 147 | 51 | 166 | 169 | 63 | 29 | 133 | 202,169 |
| **1982** | 145,274 | 7,832 | 4,229 | 2,263 | 1,285 | 1,428 | 626 | 901 | 363 | 439 | 176 | 297 | 110 | 154 | 99 | 154 | 66 | 198 | 55 | 121 | 121 | 154 | 22 | 77 | 44 | 253 | 166,739 |

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1983** | 50,058 | 2,754 | 1,430 | 839 | 447 | 545 | 437 | 275 | 216 | 99 | 135 | 64 | 69 | 33 | 56 | 100 | 48 | 36 | 69 | 40 | 33 | 13 | 3 | 25 | 14 | 51 | 57,889 |
| **1984** | 23,922 | 1,236 | 2,438 | 1,133 | 755 | 412 | 274 | 240 | 103 | 69 | 69 | 137 | 103 | 0 | 69 | 69 | 34 | 34 | 0 | 0 | 34 | 103 | 0 | 103 | 69 | 137 | 31,542 |
| **1985** | 13,334 | 1,430 | 1,595 | 1,027 | 477 | 257 | 184 | 128 | 128 | 55 | 74 | 0 | 0 | 18 | 92 | 55 | 18 | 0 | 18 | 36 | 36 | 0 | 0 | 0 | 0 | 74 | 19,034 |
| **1986** | 21,888 | 1,078 | 883 | 802 | 314 | 146 | 114 | 70 | 49 | 54 | 27 | 49 | 43 | 16 | 32 | 32 | 27 | 5 | 43 | 22 | 38 | 32 | 22 | 27 | 27 | 92 | 25,934 |
| **1987** | 36,350 | 1,889 | 1,754 | 1,845 | 1,245 | 611 | 475 | 272 | 260 | 227 | 181 | 204 | 56 | 79 | 102 | 124 | 91 | 68 | 56 | 79 | 102 | 56 | 23 | 79 | 68 | 498 | 46,796 |
| **1988** | 66,972 | 6,549 | 6,457 | 4,579 | 2,793 | 1,375 | 825 | 457 | 503 | 230 | 138 | 92 | 184 | 276 | 138 | 276 | 230 | 184 | 184 | 276 | 319 | 0 | 0 | 46 | 230 | 733 | 94,046 |
| **1989** | 56,346 | 1,457 | 1,648 | 1,314 | 1,314 | 907 | 477 | 143 | 96 | 143 | 47 | 47 | 47 | 143 | 72 | 96 | 96 | 72 | 119 | 47 | 119 | 96 | 168 | 96 | 72 | 119 | 65,304 |
| **1990** | 34,402 | 4,726 | 4,262 | 5,372 | 3,521 | 2,223 | 1,113 | 464 | 93 | 278 | 278 | 371 | 278 | 371 | 93 | 93 | 185 | 93 | 278 | 0 | 371 | 0 | 185 | 278 | 0 | 834 | 60,162 |
| **1991** | 42,382 | 1,833 | 542 | 1,041 | 1,625 | 1,541 | 792 | 292 | 166 | 166 | 166 | 334 | 292 | 292 | 125 | 208 | 42 | 125 | 125 | 84 | 42 | 0 | 42 | 0 | 42 | 292 | 52,589 |
| **1992** | 43,866 | 6,630 | 4,395 | 2,383 | 2,309 | 1,714 | 1,565 | 1,190 | 446 | 818 | 372 | 298 | 149 | 149 | 149 | 74 | 298 | 372 | 223 | 446 | 74 | 74 | 0 | 149 | 74 | 446 | 68,666 |
| **1993** | 16,401 | 3,037 | 1,814 | 1,225 | 822 | 728 | 604 | 403 | 264 | 279 | 140 | 140 | 93 | 171 | 47 | 31 | 47 | 61 | 47 | 61 | 0 | 108 | 47 | 31 | 47 | 356 | 27,003 |
| **1994** | 25,223 | 5,779 | 3,992 | 4,766 | 4,705 | 3,157 | 2,441 | 1,490 | 1,548 | 1,074 | 716 | 835 | 416 | 597 | 597 | 655 | 297 | 535 | 477 | 297 | 119 | 297 | 239 | 177 | 297 | 655 | 61,379 |
| **1995** | 34,106 | 6,751 | 4,898 | 4,040 | 2,995 | 3,138 | 1,951 | 1,951 | 807 | 570 | 332 | 475 | 332 | 190 | 475 | 475 | 237 | 285 | 380 | 190 | 285 | 285 | 47 | 190 | 47 | 332 | 65,767 |
| **1996** | 184,856 | 15,052 | 10,919 | 4,133 | 3,146 | 2,757 | 2,165 | 2,067 | 1,376 | 981 | 1,376 | 1,277 | 789 | 789 | 981 | 981 | 1,474 | 1,474 | 888 | 592 | 592 | 592 | 789 | 493 | 592 | 1,771 | 242,906 |
| **1997** | 220,476 | 17,730 | 8,126 | 2,733 | 1,920 | 1,553 | 1,255 | 1,106 | 739 | 516 | 1,330 | 962 | 516 | 813 | 297 | 367 | 516 | 590 | 442 | 297 | 516 | 297 | 223 | 149 | 223 | 516 | 264,210 |
| **1998** | 251,403 | 6,070 | 1,905 | 2,001 | 1,196 | 2,776 | 2,389 | 2,001 | 2,357 | 1,646 | 937 | 1,389 | 1,002 | 646 | 678 | 484 | 809 | 418 | 515 | 259 | 387 | 356 | 194 | 128 | 194 | 484 | 282,624 |
| **1999** | 237,644 | 3,664 | 1,802 | 240 | 60 | 120 | 120 | 60 | 120 | 60 | 120 | 0 | 0 | 180 | 0 | 120 | 0 | 120 | 0 | 0 | 0 | 0 | 0 | 60 | 60 | 0 | 244,552 |
| **2000** | 85,035 | 1,621 | 1,142 | 169 | 226 | 282 | 367 | 437 | 338 | 338 | 282 | 240 | 197 | 226 | 169 | 113 | 211 | 99 | 113 | 56 | 141 | 42 | 0 | 14 | 56 | 141 | 92,055 |
| **2001** | 214,754 | 3,995 | 1,967 | 544 | 361 | 534 | 513 | 471 | 464 | 356 | 346 | 295 | 211 | 286 | 154 | 168 | 199 | 171 | 125 | 68 | 130 | 71 | 33 | 53 | 82 | 139 | 226,493 |
| **2002** | 297,764 | 4,969 | 2,447 | 677 | 449 | 664 | 638 | 585 | 577 | 443 | 431 | 367 | 263 | 356 | 192 | 209 | 248 | 213 | 156 | 84 | 162 | 88 | 41 | 66 | 102 | 173 | 312,367 |
| **2003** | 280,174 | 3,178 | 1,565 | 433 | 287 | 425 | 408 | 374 | 369 | 283 | 275 | 235 | 168 | 228 | 123 | 134 | 158 | 136 | 100 | 54 | 103 | 57 | 26 | 42 | 65 | 111 | 289,512 |
| **2004** | 353,553 | 4,226 | 2,081 | 576 | 382 | 565 | 543 | 498 | 490 | 377 | 366 | 312 | 224 | 303 | 163 | 178 | 211 | 181 | 132 | 72 | 137 | 75 | 35 | 57 | 87 | 147 | 365,971 |
| **2005** | 319,127 | 1,599 | 787 | 218 | 145 | 214 | 205 | 188 | 186 | 143 | 139 | 118 | 85 | 115 | 62 | 67 | 80 | 69 | 50 | 27 | 52 | 28 | 13 | 21 | 33 | 56 | 323,826 |
| **2006** | 346,426 | 2,872 | 1,415 | 391 | 260 | 384 | 369 | 338 | 333 | 256 | 249 | 212 | 152 | 206 | 111 | 121 | 143 | 123 | 90 | 49 | 93 | 51 | 24 | 38 | 59 | 100 | 354,867 |
| **2007** | 221,488 | 1,108 | 546 | 151 | 100 | 148 | 142 | 131 | 129 | 99 | 96 | 82 | 59 | 79 | 43 | 47 | 55 | 48 | 35 | 19 | 36 | 20 | 9 | 15 | 23 | 39 | 224,745 |
| **2008** | 217,565 | 97 | 48 | 13 | 9 | 13 | 12 | 11 | 11 | 9 | 8 | 7 | 5 | 7 | 4 | 4 | 5 | 4 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 217,850 |
| **2009** | 72,407 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72,407 |

*Table 4. Proportional age composition of harp seal catches in Greenland (from Bowen 1982 and Kapel 1999).*

| | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **54-62** | 0.590 | 0.160 | 0.050 | 0.040 | 0.030 | 0.020 | 0.020 | 0.010 | 0.010 | 0.010 | 0.010 | 0.005 | 0.005 |
| **63-69** | 0.580 | 0.110 | 0.070 | 0.040 | 0.030 | 0.030 | 0.020 | 0.020 | 0.010 | 0.010 | 0.010 | 0.007 | 0.008 |
| **1970** | 0.528 | 0.064 | 0.040 | 0.056 | 0.032 | 0.040 | 0.024 | 0.032 | 0.016 | 0.024 | 0.024 | 0.024 | 0.008 |
| **1971** | 0.629 | 0.097 | 0.046 | 0.069 | 0.023 | 0.011 | 0.011 | 0.006 | 0.006 | 0.017 | 0.006 | 0.017 | 0.011 |
| **1972** | 0.572 | 0.123 | 0.080 | 0.038 | 0.050 | 0.024 | 0.018 | 0.021 | 0.004 | 0.000 | 0.004 | 0.003 | 0.007 |
| **1973** | 0.553 | 0.216 | 0.079 | 0.038 | 0.011 | 0.020 | 0.006 | 0.005 | 0.007 | 0.001 | 0.005 | 0.004 | 0.006 |
| **1974** | 0.643 | 0.189 | 0.073 | 0.007 | 0.017 | 0.005 | 0.010 | 0.003 | 0.003 | 0.002 | 0.000 | 0.005 | 0.007 |
| **1975** | 0.617 | 0.231 | 0.071 | 0.023 | 0.016 | 0.003 | 0.000 | 0.003 | 0.003 | 0.006 | 0.003 | 0.003 | 0.006 |
| **1976** | 0.603 | 0.223 | 0.092 | 0.037 | 0.017 | 0.002 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 | 0.000 | 0.002 |
| **1977** | 0.769 | 0.118 | 0.049 | 0.019 | 0.013 | 0.004 | 0.001 | 0.004 | 0.002 | 0.001 | 0.002 | 0.003 | 0.003 |
| **1978** | 0.420 | 0.297 | 0.109 | 0.065 | 0.022 | 0.018 | 0.020 | 0.002 | 0.008 | 0.003 | 0.003 | 0.003 | 0.004 |
| **1979** | 0.504 | 0.201 | 0.123 | 0.058 | 0.024 | 0.012 | 0.014 | 0.009 | 0.007 | 0.005 | 0.003 | 0.001 | 0.002 |
| **1980** | 0.264 | 0.345 | 0.152 | 0.095 | 0.041 | 0.022 | 0.013 | 0.007 | 0.009 | 0.005 | 0.003 | 0.005 | 0.003 |
| **1981** | 0.264 | 0.345 | 0.152 | 0.095 | 0.041 | 0.022 | 0.013 | 0.007 | 0.009 | 0.005 | 0.003 | 0.005 | 0.003 |
| **1982** | 0.308 | 0.275 | 0.160 | 0.093 | 0.043 | 0.023 | 0.015 | 0.008 | 0.010 | 0.018 | 0.013 | 0.008 | 0.003 |
| **1983** | 0.273 | 0.292 | 0.127 | 0.094 | 0.073 | 0.025 | 0.025 | 0.022 | 0.006 | 0.013 | 0.009 | 0.007 | 0.006 |
| **1984-09** | 0.143 | 0.177 | 0.150 | 0.146 | 0.083 | 0.058 | 0.044 | 0.033 | 0.028 | 0.012 | 0.011 | 0.011 | 0.004 |

| | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25+** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **54-62** | 0.003 | 0.004 | 0.007 | 0.003 | 0.004 | 0.003 | 0.003 | 0.004 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| **63-69** | 0.004 | 0.005 | 0.010 | 0.004 | 0.005 | 0.004 | 0.004 | 0.006 | 0.003 | 0.002 | 0.002 | 0.002 | 0.003 |
| **1970** | 0.016 | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.016 | 0.008 | 0.008 | 0.008 | 0.008 | 0.016 |
| **1971** | 0.000 | 0.017 | 0.006 | 0.000 | 0.006 | 0.006 | 0.000 | 0.000 | 0.006 | 0.006 | 0.000 | 0.000 | 0.006 |
| **1972** | 0.003 | 0.001 | 0.004 | 0.003 | 0.001 | 0.006 | 0.004 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.016 |
| **1973** | 0.006 | 0.002 | 0.000 | 0.007 | 0.005 | 0.004 | 0.004 | 0.005 | 0.002 | 0.002 | 0.002 | 0.002 | 0.005 |
| **1974** | 0.003 | 0.007 | 0.002 | 0.005 | 0.003 | 0.000 | 0.005 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| **1975** | 0.000 | 0.003 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 |
| **1976** | 0.002 | 0.002 | 0.002 | 0.005 | 0.002 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 |
| **1977** | 0.001 | 0.000 | 0.000 | 0.002 | 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.002 |
| **1978** | 0.003 | 0.003 | 0.002 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.008 |
| **1979** | 0.001 | 0.003 | 0.001 | 0.004 | 0.004 | 0.001 | 0.003 | 0.002 | 0.004 | 0.003 | 0.003 | 0.002 | 0.005 |
| **1980** | 0.003 | 0.001 | 0.003 | 0.002 | 0.000 | 0.001 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.011 |
| **1981** | 0.003 | 0.001 | 0.003 | 0.002 | 0.000 | 0.001 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.011 |
| **1982** | 0.005 | 0.000 | 0.003 | 0.003 | 0.000 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.000 | 0.003 |
| **1983** | 0.003 | 0.001 | 0.003 | 0.004 | 0.004 | 0.001 | 0.003 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.003 |
| **1984-09** | 0.009 | 0.005 | 0.010 | 0.009 | 0.008 | 0.009 | 0.007 | 0.009 | 0.007 | 0.007 | 0.006 | 0.005 | 0.007 |

*Table 5. Estimated age compositions of harp seal catches in Greenland, 1952-2009.*

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1952** | 9,676 | 2,624 | 820 | 656 | 492 | 328 | 328 | 164 | 164 | 164 | 164 | 85 | 88 | 53 | 62 | 113 | 53 | 59 | 43 | 47 | 71 | 34 | 28 | 25 | 28 | 31 | 16,400 |
| **1953** | 9,676 | 2,624 | 820 | 656 | 492 | 328 | 328 | 164 | 164 | 164 | 164 | 85 | 88 | 53 | 62 | 113 | 53 | 59 | 43 | 47 | 71 | 34 | 28 | 25 | 28 | 31 | 16,400 |
| **1954** | 11,299 | 3,064 | 958 | 766 | 575 | 383 | 383 | 192 | 192 | 192 | 192 | 100 | 103 | 62 | 72 | 132 | 62 | 69 | 51 | 54 | 83 | 40 | 33 | 29 | 33 | 36 | 19,150 |
| **1955** | 9,165 | 2,485 | 777 | 621 | 466 | 311 | 311 | 155 | 155 | 155 | 155 | 81 | 84 | 50 | 59 | 107 | 50 | 56 | 41 | 44 | 68 | 32 | 26 | 23 | 26 | 29 | 15,534 |
| **1956** | 6,474 | 1,756 | 549 | 439 | 329 | 219 | 219 | 110 | 110 | 110 | 110 | 57 | 59 | 35 | 41 | 76 | 35 | 39 | 29 | 31 | 48 | 23 | 19 | 17 | 19 | 21 | 10,973 |
| **1957** | 7,602 | 2,061 | 644 | 515 | 387 | 258 | 258 | 129 | 129 | 129 | 129 | 67 | 69 | 41 | 49 | 89 | 41 | 46 | 34 | 37 | 56 | 27 | 22 | 19 | 22 | 24 | 12,884 |
| **1958** | 9,962 | 2,702 | 844 | 675 | 507 | 338 | 338 | 169 | 169 | 169 | 169 | 88 | 91 | 54 | 64 | 117 | 54 | 61 | 45 | 48 | 73 | 35 | 29 | 26 | 29 | 32 | 16,885 |
| **1959** | 5,268 | 1,428 | 446 | 357 | 268 | 179 | 179 | 89 | 89 | 89 | 89 | 46 | 48 | 29 | 34 | 62 | 29 | 32 | 24 | 25 | 39 | 19 | 15 | 14 | 15 | 17 | 8,928 |
| **1960** | 9,531 | 2,585 | 808 | 646 | 485 | 323 | 323 | 162 | 162 | 162 | 162 | 84 | 87 | 52 | 61 | 111 | 52 | 58 | 43 | 46 | 70 | 34 | 27 | 24 | 27 | 31 | 16,154 |
| **1961** | 7,078 | 1,919 | 600 | 480 | 360 | 240 | 240 | 120 | 120 | 120 | 120 | 62 | 65 | 39 | 45 | 83 | 39 | 43 | 32 | 34 | 52 | 25 | 20 | 18 | 20 | 23 | 11,996 |
| **1962** | 5,015 | 1,360 | 425 | 340 | 255 | 170 | 170 | 85 | 85 | 85 | 85 | 44 | 46 | 27 | 32 | 59 | 27 | 31 | 22 | 24 | 37 | 18 | 14 | 13 | 14 | 16 | 8,500 |
| **1963** | 5,864 | 1,112 | 708 | 404 | 303 | 303 | 202 | 202 | 101 | 101 | 101 | 74 | 76 | 45 | 54 | 98 | 45 | 51 | 37 | 40 | 62 | 29 | 24 | 21 | 24 | 27 | 10,111 |
| **1964** | 5,338 | 1,012 | 644 | 368 | 276 | 276 | 184 | 184 | 92 | 92 | 92 | 67 | 69 | 41 | 49 | 89 | 41 | 46 | 34 | 37 | 56 | 27 | 22 | 19 | 22 | 24 | 9,203 |
| **1965** | 5,388 | 1,022 | 650 | 372 | 279 | 279 | 186 | 186 | 93 | 93 | 93 | 68 | 70 | 42 | 49 | 90 | 42 | 47 | 34 | 37 | 57 | 27 | 22 | 20 | 22 | 25 | 9,289 |
| **1966** | 4,093 | 776 | 494 | 282 | 212 | 212 | 141 | 141 | 71 | 71 | 71 | 51 | 53 | 32 | 37 | 68 | 32 | 35 | 26 | 28 | 43 | 21 | 17 | 15 | 17 | 19 | 7,057 |
| **1967** | 2,460 | 467 | 297 | 170 | 127 | 127 | 85 | 85 | 42 | 42 | 42 | 31 | 32 | 19 | 22 | 41 | 19 | 21 | 16 | 17 | 26 | 12 | 10 | 9 | 10 | 11 | 4,242 |
| **1968** | 4,127 | 783 | 498 | 285 | 213 | 213 | 142 | 142 | 71 | 71 | 71 | 52 | 54 | 32 | 38 | 69 | 32 | 36 | 26 | 28 | 43 | 21 | 17 | 15 | 17 | 19 | 7,116 |
| **1969** | 3,734 | 708 | 451 | 258 | 193 | 193 | 129 | 129 | 64 | 64 | 64 | 47 | 49 | 29 | 34 | 62 | 29 | 32 | 24 | 26 | 39 | 19 | 15 | 14 | 15 | 17 | 6,438 |
| **1970** | 3,310 | 401 | 251 | 351 | 201 | 251 | 150 | 201 | 100 | 150 | 150 | 150 | 50 | 100 | 50 | 0 | 0 | 0 | 0 | 0 | 100 | 50 | 50 | 50 | 50 | 100 | 6,269 |
| **1971** | 3,502 | 541 | 255 | 382 | 127 | 64 | 64 | 32 | 32 | 96 | 32 | 96 | 64 | 0 | 96 | 32 | 0 | 32 | 32 | 0 | 0 | 32 | 32 | 0 | 0 | 32 | 5,572 |
| **1972** | 3,431 | 736 | 479 | 231 | 301 | 142 | 106 | 124 | 27 | 0 | 27 | 18 | 44 | 18 | 9 | 27 | 18 | 9 | 35 | 27 | 18 | 18 | 18 | 18 | 18 | 98 | 5,994 |
| **1973** | 5,091 | 1,986 | 731 | 354 | 103 | 183 | 57 | 46 | 68 | 11 | 46 | 34 | 57 | 57 | 23 | 0 | 68 | 46 | 34 | 34 | 46 | 23 | 23 | 23 | 23 | 46 | 9,212 |
| **1974** | 4,597 | 1,351 | 521 | 47 | 118 | 36 | 71 | 24 | 24 | 12 | 0 | 36 | 47 | 24 | 47 | 12 | 36 | 24 | 0 | 36 | 24 | 12 | 12 | 12 | 12 | 12 | 7,145 |
| **1975** | 4,165 | 1,556 | 482 | 153 | 110 | 22 | 0 | 22 | 22 | 44 | 22 | 22 | 44 | 0 | 22 | 22 | 0 | 0 | 0 | 0 | 22 | 22 | 0 | 0 | 0 | 0 | 6,752 |
| **1976** | 7,209 | 2,670 | 1,098 | 445 | 208 | 30 | 0 | 0 | 30 | 0 | 30 | 0 | 30 | 30 | 30 | 30 | 59 | 30 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 11,956 |
| **1977** | 9,899 | 1,512 | 628 | 242 | 171 | 57 | 14 | 57 | 29 | 14 | 29 | 43 | 43 | 14 | 0 | 0 | 29 | 29 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 29 | 12,866 |
| **1978** | 6,981 | 4,941 | 1,815 | 1,085 | 374 | 299 | 337 | 37 | 131 | 56 | 56 | 56 | 75 | 56 | 56 | 37 | 37 | 19 | 0 | 0 | 0 | 19 | 19 | 19 | 0 | 131 | 16,638 |
| **1979** | 8,842 | 3,534 | 2,163 | 1,019 | 428 | 214 | 239 | 151 | 126 | 88 | 50 | 25 | 38 | 25 | 50 | 25 | 63 | 63 | 25 | 50 | 38 | 63 | 50 | 50 | 38 | 88 | 17,545 |
| **1980** | 4,022 | 5,256 | 2,324 | 1,442 | 625 | 337 | 192 | 112 | 144 | 80 | 48 | 80 | 48 | 48 | 16 | 48 | 32 | 0 | 16 | 48 | 48 | 32 | 32 | 32 | 32 | 160 | 15,255 |
| **1981** | 6,057 | 7,915 | 3,499 | 2,172 | 941 | 507 | 290 | 169 | 217 | 121 | 72 | 121 | 72 | 72 | 24 | 72 | 48 | 0 | 24 | 72 | 72 | 48 | 48 | 48 | 48 | 241 | 22,974 |
| **1982** | 8,280 | 7,405 | 4,308 | 2,491 | 1,144 | 606 | 404 | 202 | 269 | 471 | 337 | 202 | 67 | 135 | 0 | 67 | 67 | 0 | 67 | 67 | 67 | 67 | 67 | 67 | 0 | 67 | 26,927 |

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1983** | 6,760 | 7,240 | 3,140 | 2,327 | 1,810 | 628 | 628 | 554 | 148 | 332 | 222 | 185 | 148 | 74 | 37 | 74 | 111 | 111 | 37 | 74 | 37 | 37 | 0 | 0 | 0 | 74 | 24,785 |
| **1984** | 3,686 | 4,578 | 3,869 | 3,780 | 2,150 | 1,487 | 1,125 | 850 | 732 | 308 | 293 | 291 | 115 | 228 | 128 | 261 | 242 | 211 | 227 | 193 | 224 | 193 | 177 | 160 | 128 | 192 | 25,829 |
| **1985** | 2,966 | 3,684 | 3,113 | 3,042 | 1,730 | 1,197 | 905 | 684 | 589 | 248 | 236 | 235 | 92 | 183 | 103 | 210 | 194 | 170 | 182 | 156 | 180 | 156 | 142 | 129 | 103 | 154 | 20,785 |
| **1986** | 3,725 | 4,626 | 3,909 | 3,819 | 2,173 | 1,503 | 1,137 | 859 | 740 | 311 | 296 | 294 | 116 | 230 | 130 | 264 | 244 | 214 | 229 | 195 | 226 | 195 | 179 | 162 | 130 | 194 | 26,099 |
| **1987** | 5,403 | 6,711 | 5,671 | 5,540 | 3,151 | 2,180 | 1,649 | 1,246 | 1,073 | 452 | 429 | 427 | 168 | 334 | 188 | 383 | 354 | 310 | 332 | 283 | 328 | 283 | 259 | 235 | 188 | 281 | 37,859 |
| **1988** | 5,768 | 7,164 | 6,054 | 5,914 | 3,364 | 2,327 | 1,760 | 1,330 | 1,146 | 482 | 458 | 456 | 180 | 357 | 201 | 409 | 378 | 331 | 354 | 302 | 350 | 302 | 277 | 251 | 201 | 300 | 40,415 |
| **1989** | 6,133 | 7,617 | 6,437 | 6,288 | 3,577 | 2,474 | 1,871 | 1,414 | 1,218 | 512 | 487 | 485 | 191 | 379 | 214 | 435 | 402 | 352 | 377 | 322 | 372 | 322 | 294 | 266 | 214 | 319 | 42,971 |
| **1990** | 6,498 | 8,070 | 6,819 | 6,662 | 3,790 | 2,621 | 1,983 | 1,498 | 1,291 | 543 | 516 | 514 | 202 | 402 | 226 | 460 | 426 | 373 | 399 | 341 | 394 | 341 | 311 | 282 | 226 | 338 | 45,526 |
| **1991** | 6,862 | 8,523 | 7,202 | 7,036 | 4,002 | 2,768 | 2,094 | 1,582 | 1,363 | 573 | 545 | 543 | 214 | 424 | 239 | 486 | 450 | 394 | 422 | 360 | 416 | 360 | 329 | 298 | 239 | 357 | 48,082 |
| **1992** | 7,227 | 8,976 | 7,585 | 7,410 | 4,215 | 2,915 | 2,205 | 1,666 | 1,436 | 604 | 574 | 571 | 225 | 447 | 252 | 512 | 474 | 414 | 444 | 379 | 438 | 379 | 346 | 314 | 252 | 376 | 50,638 |
| **1993** | 8,038 | 9,983 | 8,436 | 8,241 | 4,688 | 3,242 | 2,453 | 1,853 | 1,597 | 672 | 639 | 635 | 250 | 497 | 280 | 570 | 527 | 461 | 494 | 422 | 488 | 422 | 385 | 349 | 280 | 418 | 56,319 |
| **1994** | 8,188 | 10,170 | 8,594 | 8,396 | 4,776 | 3,303 | 2,499 | 1,888 | 1,627 | 684 | 651 | 647 | 255 | 506 | 285 | 580 | 537 | 470 | 503 | 429 | 497 | 429 | 393 | 356 | 285 | 426 | 57,373 |
| **1995** | 8,956 | 11,123 | 9,399 | 9,182 | 5,223 | 3,613 | 2,733 | 2,065 | 1,779 | 748 | 712 | 708 | 279 | 554 | 312 | 635 | 587 | 514 | 550 | 470 | 543 | 470 | 429 | 389 | 312 | 466 | 62,749 |
| **1996** | 10,554 | 13,107 | 11,077 | 10,821 | 6,155 | 4,257 | 3,220 | 2,433 | 2,097 | 882 | 839 | 834 | 328 | 653 | 368 | 748 | 692 | 605 | 649 | 553 | 640 | 553 | 506 | 458 | 368 | 549 | 73,947 |
| **1997** | 9,821 | 12,198 | 10,308 | 10,070 | 5,728 | 3,962 | 2,997 | 2,265 | 1,951 | 821 | 780 | 777 | 306 | 607 | 342 | 696 | 644 | 563 | 604 | 515 | 596 | 515 | 471 | 427 | 342 | 511 | 68,816 |
| **1998** | 11,599 | 14,406 | 12,174 | 11,893 | 6,765 | 4,679 | 3,539 | 2,674 | 2,304 | 969 | 922 | 917 | 361 | 717 | 404 | 822 | 760 | 665 | 713 | 608 | 704 | 608 | 556 | 504 | 404 | 604 | 81,272 |
| **1999** | 13,290 | 16,505 | 13,948 | 13,626 | 7,751 | 5,361 | 4,055 | 3,064 | 2,640 | 1,111 | 1,056 | 1,051 | 414 | 822 | 463 | 942 | 871 | 762 | 817 | 697 | 806 | 697 | 637 | 577 | 463 | 692 | 93,117 |
| **2000** | 14,052 | 17,452 | 14,748 | 14,408 | 8,196 | 5,669 | 4,288 | 3,240 | 2,791 | 1,174 | 1,117 | 1,111 | 437 | 869 | 489 | 996 | 921 | 806 | 863 | 737 | 852 | 737 | 674 | 610 | 489 | 731 | 98,459 |
| **2001** | 12,192 | 15,142 | 12,796 | 12,501 | 7,111 | 4,918 | 3,720 | 2,811 | 2,422 | 1,019 | 969 | 964 | 379 | 754 | 425 | 864 | 799 | 699 | 749 | 639 | 739 | 639 | 584 | 530 | 425 | 635 | 85,428 |
| **2002** | 9,524 | 11,829 | 9,996 | 9,765 | 5,555 | 3,842 | 2,906 | 2,196 | 1,892 | 796 | 757 | 753 | 296 | 589 | 332 | 675 | 624 | 546 | 585 | 499 | 578 | 499 | 457 | 414 | 332 | 496 | 66,735 |
| **2003** | 9,441 | 11,725 | 9,908 | 9,680 | 5,506 | 3,808 | 2,881 | 2,177 | 1,875 | 789 | 750 | 746 | 294 | 584 | 329 | 669 | 619 | 541 | 580 | 495 | 573 | 495 | 453 | 410 | 329 | 491 | 66,149 |
| **2004** | 10,074 | 12,512 | 10,573 | 10,329 | 5,876 | 4,064 | 3,074 | 2,323 | 2,001 | 842 | 800 | 796 | 314 | 623 | 351 | 714 | 660 | 578 | 619 | 528 | 611 | 528 | 483 | 438 | 351 | 524 | 70,586 |
| **2005** | 13,087 | 16,253 | 13,735 | 13,418 | 7,633 | 5,279 | 3,993 | 3,017 | 2,600 | 1,094 | 1,040 | 1,035 | 407 | 809 | 456 | 927 | 858 | 750 | 804 | 686 | 794 | 686 | 627 | 568 | 456 | 681 | 91,696 |
| **2006** | 13,160 | 16,345 | 13,812 | 13,493 | 7,676 | 5,309 | 4,016 | 3,034 | 2,614 | 1,100 | 1,046 | 1,040 | 410 | 814 | 458 | 932 | 863 | 755 | 809 | 690 | 798 | 690 | 631 | 572 | 458 | 685 | 92,210 |
| **2007** | 11,814 | 14,673 | 12,399 | 12,113 | 6,891 | 4,766 | 3,605 | 2,724 | 2,347 | 987 | 939 | 934 | 368 | 731 | 411 | 837 | 774 | 677 | 726 | 620 | 717 | 620 | 566 | 513 | 411 | 615 | 82,778 |
| **2008** | 11,823 | 14,684 | 12,409 | 12,123 | 6,896 | 4,770 | 3,608 | 2,726 | 2,349 | 988 | 939 | 935 | 368 | 731 | 412 | 838 | 775 | 678 | 727 | 620 | 717 | 620 | 567 | 514 | 412 | 615 | 82,843 |
| **2009** | 11,823 | 14,684 | 12,409 | 12,123 | 6,896 | 4,770 | 3,608 | 2,726 | 2,349 | 988 | 939 | 935 | 368 | 731 | 412 | 838 | 775 | 678 | 727 | 620 | 717 | 620 | 567 | 514 | 412 | 615 | 82,843 |

*Table 6. Proportional age composition of harp seal catches in the Canadian Arctic (from Bowen 1982).*

| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.034 | 0.066 | 0.119 | 0.132 | 0.090 | 0.053 | 0.049 | 0.052 | 0.038 | 0.027 | 0.044 | 0.031 | 0.032 |

| **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25+** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.019 | 0.022 | 0.041 | 0.019 | 0.021 | 0.016 | 0.017 | 0.026 | 0.012 | 0.010 | 0.009 | 0.010 | 0.011 |

*Table 7. Estimated age compositions of harp seal catches in the Canadian Arctic, 1952-2009.*

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1952** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1953** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1954** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1955** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1956** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1957** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1958** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1959** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1960** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1961** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1962** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1963** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1964** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1965** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1966** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1967** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1968** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1969** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1970** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1971** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1972** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1973** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1974** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1975** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1976** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1977** | 60 | 117 | 212 | 236 | 160 | 95 | 87 | 93 | 67 | 49 | 79 | 55 | 57 | 34 | 40 | 73 | 34 | 38 | 28 | 30 | 46 | 22 | 18 | 16 | 18 | 20 | 1,784 |
| **1978** | 72 | 140 | 253 | 282 | 191 | 113 | 104 | 111 | 80 | 58 | 94 | 66 | 68 | 41 | 48 | 87 | 41 | 45 | 33 | 36 | 55 | 26 | 21 | 19 | 21 | 24 | 2,129 |
| **1979** | 122 | 237 | 430 | 479 | 325 | 193 | 177 | 189 | 136 | 99 | 160 | 112 | 116 | 69 | 81 | 148 | 69 | 77 | 57 | 61 | 93 | 45 | 37 | 32 | 37 | 41 | 3,620 |
| **1980** | 214 | 416 | 755 | 840 | 570 | 338 | 310 | 331 | 238 | 174 | 281 | 196 | 203 | 121 | 142 | 260 | 121 | 135 | 100 | 107 | 164 | 78 | 64 | 57 | 64 | 71 | 6,350 |
| **1981** | 157 | 306 | 555 | 618 | 419 | 249 | 228 | 244 | 175 | 128 | 207 | 144 | 149 | 89 | 105 | 191 | 89 | 100 | 73 | 79 | 120 | 58 | 47 | 42 | 47 | 52 | 4,672 |
| **1982** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1983** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1984** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1985** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1986** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1987** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1988** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1989** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1990** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1991** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1992** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1993** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1994** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1995** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1996** | 164 | 320 | 580 | 646 | 438 | 260 | 238 | 255 | 183 | 134 | 216 | 150 | 156 | 93 | 109 | 200 | 93 | 104 | 77 | 82 | 126 | 60 | 49 | 44 | 49 | 55 | 4,881 |
| **1997** | 61 | 118 | 214 | 239 | 162 | 96 | 88 | 94 | 68 | 50 | 80 | 56 | 58 | 34 | 40 | 74 | 34 | 38 | 28 | 30 | 47 | 22 | 18 | 16 | 18 | 20 | 1,804 |
| **1998** | 24 | 47 | 85 | 95 | 64 | 38 | 35 | 37 | 27 | 20 | 32 | 22 | 23 | 14 | 16 | 29 | 14 | 15 | 11 | 12 | 19 | 9 | 7 | 6 | 7 | 8 | 719 |
| **1999** | 12 | 24 | 44 | 49 | 33 | 20 | 18 | 19 | 14 | 10 | 16 | 11 | 12 | 7 | 8 | 15 | 7 | 8 | 6 | 6 | 9 | 5 | 4 | 3 | 4 | 4 | 368 |
| **2000** | 9 | 18 | 33 | 37 | 25 | 15 | 14 | 15 | 11 | 8 | 12 | 9 | 9 | 5 | 6 | 11 | 5 | 6 | 4 | 5 | 7 | 3 | 3 | 3 | 3 | 3 | 280 |
| **2001** | 14 | 27 | 48 | 54 | 36 | 22 | 20 | 21 | 15 | 11 | 18 | 12 | 13 | 8 | 9 | 17 | 8 | 9 | 6 | 7 | 10 | 5 | 4 | 4 | 4 | 5 | 405 |
| **2002-9** | 34 | 66 | 119 | 132 | 90 | 53 | 49 | 52 | 38 | 27 | 44 | 31 | 32 | 19 | 22 | 41 | 19 | 21 | 16 | 17 | 26 | 12 | 10 | 9 | 10 | 11 | 1,000 |

*Table 8: Proportion of seals recovered (and reported) for young of the year (0) and older (1+) animals.*

| | Harvest Area | | | |
|---|---|---|---|---|
| | Front & Gulf | | Canadian Arctic & Greenland | |
| | 0 | 1+ | 0 | 1+ |
| 1952-1982 | 0.99 | 0.50 | 0.50 | 0.50 |
| 1983-2009 | 0.95 | 0.50 | 0.50 | 0.50 |

*Table 9. Estimated bycatch of harp seals in commercial fisheries. Catches in the Newfoundland lumpfish fishery are from Sjare et al. (2005) while catches in the United States waters are from Waring et al. (2005). In 2004-09 catches were assumed to be equal to the average of the previous 5 years.*

| | Lumpfish Bycatch | | | U.S. Bycatch | Totals |
|---|---|---|---|---|---|
| | 0 | 1+ | Total | | |
| 1970 | 53 | 15 | 68 | | 68 |
| 1971 | 391 | 99 | 490 | | 490 |
| 1972 | 480 | 141 | 621 | | 621 |
| 1973 | 358 | 107 | 465 | | 465 |
| 1974 | 141 | 41 | 182 | | 182 |
| 1975 | 219 | 66 | 285 | | 285 |
| 1976 | 923 | 169 | 1,092 | | 1,092 |
| 1977 | 1,281 | 296 | 1,577 | | 1,577 |
| 1978 | 2,381 | 538 | 2,919 | | 2,919 |
| 1979 | 2,799 | 511 | 3,310 | | 3,310 |
| 1980 | 2,454 | 263 | 2,717 | | 2,717 |
| 1981 | 3,539 | 382 | 3,921 | | 3,921 |
| 1982 | 3,442 | 343 | 3,785 | | 3,785 |
| 1983 | 4,504 | 458 | 4,962 | | 4,962 |
| 1984 | 3,683 | 425 | 4,108 | | 4,108 |
| 1985 | 4,225 | 632 | 4,857 | | 4,857 |
| 1986 | 7,136 | 1,042 | 8,178 | | 8,178 |
| 1987 | 11,118 | 1,978 | 13,096 | | 13,096 |
| 1988 | 7,154 | 1,391 | 8,545 | | 8,545 |
| 1989 | 9,457 | 799 | 10,256 | | 10,256 |
| 1990 | 2,700 | 921 | 3,621 | | 3,621 |
| 1991 | 9,074 | 615 | 9,689 | | 9,689 |
| 1992 | 18,969 | 6,507 | 25,476 | | 25,476 |
| 1993 | 18,876 | 7,596 | 26,472 | | 26,472 |
| 1994 | 35,881 | 10,513 | 46,394 | 861 | 47,255 |
| 1995 | 13,641 | 6,060 | 19,701 | 694 | 20,395 |
| 1996 | 10,765 | 18,347 | 29,112 | 89 | 29,201 |
| 1997 | 13,541 | 5,059 | 18,600 | 269 | 18,869 |
| 1998 | 3,571 | 975 | 4,546 | 95 | 4,641 |
| 1999 | 9,750 | 6,280 | 16,030 | 81 | 16,111 |
| 2000 | 9,715 | 1,608 | 11,323 | 24 | 11,347 |
| 2001 | 14,572 | 4,828 | 19,400 | 75 | 19,475 |
| 2002 | 5,492 | 3,837 | 9,329 | 0 | 9,329 |
| 2003 | 3,486 | 1,881 | 5,367 | 0 | 5,367 |
| 2004 | 8,494 | 3,796 | 12,290 | 303 | 12,593 |
| 2005-09[1] | 8,494 | 3,796 | 12,290 | 81 | 12,371 |

[1]Based on average of previous 5 years of data

*Table 10. Estimated age compositions of harp seals taken as incidental catches in Canadian and U.S. commercial fisheries 1952-2004.*

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1970** | 53 | 3 | 3 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 |
| **1971** | 391 | 37 | 12 | 10 | 5 | 5 | 3 | 3 | 2 | 3 | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 490 |
| **1972** | 480 | 44 | 24 | 14 | 14 | 6 | 6 | 4 | 3 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 621 |
| **1973** | 358 | 21 | 16 | 12 | 10 | 13 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 465 |
| **1974** | 141 | 13 | 7 | 3 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 182 |
| **1975** | 219 | 25 | 12 | 6 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 285 |
| **1976** | 923 | 75 | 36 | 20 | 13 | 5 | 3 | 3 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,092 |
| **1977** | 1,281 | 78 | 59 | 54 | 39 | 20 | 11 | 8 | 5 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,577 |
| **1978** | 2,381 | 187 | 119 | 71 | 52 | 35 | 23 | 8 | 10 | 4 | 7 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 2,919 |
| **1979** | 2,799 | 249 | 106 | 49 | 30 | 23 | 14 | 8 | 4 | 4 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 7 | 3,310 |
| **1980** | 2,454 | 100 | 47 | 31 | 18 | 14 | 11 | 8 | 6 | 4 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 2,717 |
| **1981** | 3,539 | 91 | 49 | 47 | 44 | 39 | 27 | 17 | 11 | 5 | 7 | 7 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 1 | 3 | 3 | 1 | 0 | 2 | 3,921 |
| **1982** | 3,442 | 125 | 68 | 36 | 21 | 23 | 10 | 14 | 6 | 7 | 3 | 5 | 2 | 2 | 2 | 2 | 1 | 3 | 1 | 2 | 2 | 2 | 0 | 1 | 1 | 4 | 3,785 |
| **1983** | 4,504 | 161 | 84 | 49 | 26 | 32 | 26 | 16 | 13 | 6 | 8 | 4 | 4 | 2 | 3 | 6 | 3 | 2 | 4 | 2 | 2 | 1 | 0 | 1 | 1 | 3 | 4,962 |
| **1984** | 3,683 | 69 | 136 | 63 | 42 | 23 | 15 | 13 | 6 | 4 | 4 | 8 | 6 | 0 | 4 | 4 | 2 | 2 | 0 | 0 | 2 | 6 | 0 | 6 | 4 | 8 | 4,108 |
| **1985** | 4,225 | 159 | 177 | 114 | 53 | 28 | 20 | 14 | 14 | 6 | 8 | 0 | 0 | 2 | 10 | 6 | 2 | 0 | 2 | 4 | 4 | 0 | 0 | 0 | 0 | 8 | 4,857 |
| **1986** | 7,136 | 278 | 227 | 206 | 81 | 38 | 29 | 18 | 13 | 14 | 7 | 13 | 11 | 4 | 8 | 8 | 7 | 1 | 11 | 6 | 10 | 8 | 6 | 7 | 7 | 24 | 8,178 |
| **1987** | 11,118 | 358 | 332 | 349 | 236 | 116 | 90 | 51 | 49 | 43 | 34 | 39 | 11 | 15 | 19 | 24 | 17 | 13 | 11 | 15 | 19 | 11 | 4 | 15 | 13 | 94 | 13,096 |
| **1988** | 7,154 | 336 | 332 | 235 | 143 | 71 | 42 | 23 | 26 | 12 | 7 | 5 | 9 | 14 | 7 | 14 | 12 | 9 | 9 | 14 | 16 | 0 | 0 | 2 | 12 | 38 | 8,545 |
| **1989** | 9,457 | 130 | 147 | 117 | 117 | 81 | 43 | 13 | 9 | 13 | 4 | 4 | 4 | 13 | 6 | 9 | 9 | 6 | 11 | 4 | 11 | 9 | 15 | 9 | 6 | 11 | 10,256 |
| **1990** | 2,700 | 169 | 152 | 192 | 126 | 79 | 40 | 17 | 3 | 10 | 10 | 13 | 10 | 13 | 3 | 3 | 7 | 3 | 10 | 0 | 13 | 0 | 7 | 10 | 0 | 30 | 3,621 |
| **1991** | 9,074 | 110 | 33 | 63 | 98 | 93 | 48 | 18 | 10 | 10 | 10 | 20 | 18 | 18 | 8 | 13 | 3 | 8 | 8 | 5 | 3 | 0 | 3 | 0 | 3 | 18 | 9,689 |
| **1992** | 18,969 | 1,739 | 1,153 | 625 | 606 | 450 | 411 | 312 | 117 | 215 | 98 | 78 | 39 | 39 | 39 | 20 | 78 | 98 | 59 | 117 | 20 | 20 | 0 | 39 | 20 | 117 | 25,476 |
| **1993** | 18,876 | 2,176 | 1,300 | 877 | 589 | 522 | 433 | 289 | 189 | 200 | 100 | 100 | 67 | 122 | 33 | 22 | 33 | 44 | 33 | 44 | 0 | 77 | 33 | 22 | 33 | 255 | 26,472 |
| **1994** | 36,547 | 1,711 | 1,182 | 1,412 | 1,393 | 935 | 723 | 441 | 458 | 318 | 212 | 247 | 123 | 177 | 17 | 194 | 88 | 159 | 141 | 88 | 35 | 88 | 71 | 52 | 88 | 194 | 47,255 |
| **1995** | 14,122 | 1,338 | 971 | 801 | 594 | 622 | 386 | 386 | 160 | 113 | 66 | 94 | 66 | 38 | 94 | 94 | 47 | 56 | 75 | 38 | 56 | 56 | 9 | 38 | 9 | 66 | 20,395 |
| **1996** | 10,798 | 4,772 | 3,462 | 1,310 | 997 | 874 | 686 | 655 | 436 | 311 | 436 | 405 | 250 | 250 | 31 | 31 | 467 | 467 | 282 | 188 | 188 | 188 | 250 | 156 | 188 | 561 | 29,201 |
| **1997** | 13,737 | 2,081 | 954 | 321 | 225 | 182 | 147 | 130 | 87 | 61 | 156 | 113 | 61 | 95 | 35 | 43 | 61 | 69 | 52 | 35 | 61 | 35 | 26 | 17 | 26 | 61 | 18,869 |
| **1998** | 3,646 | 194 | 61 | 64 | 38 | 88 | 76 | 64 | 75 | 52 | 30 | 44 | 32 | 21 | 22 | 15 | 26 | 13 | 16 | 8 | 12 | 11 | 6 | 4 | 6 | 15 | 4,641 |

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1999** | 9,799 | 3,348 | 1,647 | 220 | 55 | 110 | 110 | 55 | 110 | 55 | 110 | 0 | 0 | 165 | 0 | 110 | 0 | 110 | 0 | 0 | 0 | 0 | 0 | 55 | 55 | 0 | 16,111 |
| **2000** | 9,736 | 372 | 262 | 39 | 52 | 65 | 84 | 100 | 78 | 78 | 65 | 55 | 45 | 52 | 39 | 26 | 49 | 23 | 26 | 13 | 32 | 10 | 0 | 3 | 13 | 32 | 11,347 |
| **2001** | 14,628 | 1,649 | 812 | 225 | 149 | 220 | 212 | 194 | 191 | 147 | 143 | 122 | 87 | 118 | 64 | 69 | 82 | 71 | 52 | 28 | 54 | 29 | 14 | 22 | 34 | 57 | 19,475 |
| **2002** | 5,492 | 1,306 | 643 | 178 | 118 | 175 | 168 | 154 | 152 | 116 | 113 | 97 | 69 | 94 | 50 | 55 | 65 | 56 | 41 | 22 | 42 | 23 | 11 | 17 | 27 | 45 | 9,329 |
| **2003** | 3,486 | 640 | 315 | 87 | 58 | 86 | 82 | 75 | 74 | 57 | 55 | 47 | 34 | 46 | 25 | 27 | 32 | 27 | 20 | 11 | 21 | 11 | 5 | 9 | 13 | 22 | 5,367 |
| **2004** | 8,703 | 1,324 | 652 | 180 | 120 | 177 | 170 | 156 | 154 | 118 | 115 | 98 | 70 | 95 | 51 | 56 | 66 | 57 | 41 | 22 | 43 | 24 | 11 | 18 | 27 | 46 | 12,593 |
| **2005-9[1]** | 8,550 | 1,300 | 640 | 177 | 118 | 174 | 167 | 153 | 151 | 116 | 113 | 96 | 69 | 93 | 50 | 55 | 65 | 56 | 41 | 22 | 42 | 23 | 11 | 17 | 27 | 45 | 12,371 |

[1] Based on average catch in previous 5 years.

*Table 11. Estimated total removals of Norwest Atlantic harp seals, 1952-2009.*

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1952** | 219,536 | 16,162 | 25,580 | 17,342 | 13,292 | 14,558 | 24,120 | 16,690 | 16,290 | 11,934 | 13,642 | 11,517 | 3,861 | 3,129 | 4,568 | 8,554 | 3,015 | 4,660 | 3,739 | 2,121 | 11,017 | 1,858 | 94 | 952 | 2,704 | 3,588 | 454,522 |
| **1953** | 219,447 | 46,686 | 14,724 | 13,290 | 8,792 | 8,920 | 7,276 | 6,164 | 6,226 | 5,980 | 5,146 | 5,983 | 3,777 | 2,913 | 2,248 | 4,018 | 4,151 | 3,010 | 1,955 | 1,499 | 5,317 | 3,440 | 1,966 | 1,330 | 998 | 910 | 386,165 |
| **1954** | 199,519 | 69,652 | 27,513 | 9,902 | 12,719 | 6,824 | 8,358 | 7,227 | 6,589 | 4,503 | 6,357 | 2,809 | 5,566 | 5,257 | 2,857 | 4,074 | 4,583 | 2,248 | 831 | 2,411 | 1,921 | 738 | 669 | 1,526 | 385 | 2,396 | 397,434 |
| **1955** | 273,296 | 48,805 | 18,973 | 13,717 | 9,894 | 8,789 | 8,099 | 6,723 | 6,987 | 5,605 | 6,353 | 5,508 | 4,351 | 3,278 | 2,523 | 4,804 | 4,328 | 2,916 | 1,616 | 1,684 | 4,975 | 2,715 | 1,647 | 1,311 | 1,119 | 1,611 | 451,625 |
| **1956** | 357,914 | 27,881 | 11,111 | 7,948 | 6,236 | 5,017 | 4,867 | 4,223 | 4,435 | 3,813 | 4,053 | 3,398 | 2,862 | 2,135 | 1,859 | 2,959 | 2,781 | 1,895 | 1,270 | 1,264 | 3,197 | 1,568 | 991 | 843 | 765 | 1,097 | 466,385 |
| **1957** | 182,432 | 47,669 | 17,676 | 12,163 | 9,643 | 7,877 | 7,617 | 6,580 | 6,648 | 5,724 | 6,396 | 5,768 | 4,413 | 3,577 | 2,809 | 4,942 | 4,493 | 3,013 | 1,684 | 1,785 | 5,040 | 2,698 | 1,670 | 1,293 | 1,150 | 1,771 | 356,529 |
| **1958** | 162,465 | 54,293 | 21,747 | 24,445 | 25,043 | 21,049 | 14,027 | 12,650 | 10,656 | 10,062 | 19,836 | 11,776 | 14,472 | 8,515 | 6,504 | 18,005 | 11,869 | 6,171 | 1,265 | 3,152 | 10,987 | 5,912 | 4,945 | 2,097 | 4,025 | 7,372 | 493,338 |
| **1959** | 251,899 | 46,855 | 17,687 | 12,102 | 9,334 | 8,123 | 8,013 | 6,829 | 6,807 | 5,937 | 6,557 | 5,593 | 4,318 | 3,431 | 2,708 | 4,963 | 4,423 | 2,984 | 1,585 | 1,749 | 4,992 | 2,679 | 1,612 | 1,325 | 1,118 | 1,650 | 425,272 |
| **1960** | 176,927 | 70,511 | 27,383 | 20,804 | 14,367 | 11,958 | 11,962 | 9,771 | 9,467 | 8,141 | 9,289 | 8,070 | 6,298 | 4,962 | 3,770 | 7,047 | 6,500 | 4,284 | 2,310 | 2,442 | 7,368 | 3,959 | 2,401 | 1,913 | 1,649 | 2,431 | 435,985 |
| **1961** | 184,800 | 14,143 | 5,578 | 5,334 | 5,838 | 2,290 | 2,682 | 2,444 | 1,608 | 1,510 | 2,216 | 1,319 | 863 | 771 | 783 | 620 | 641 | 540 | 317 | 368 | 488 | 94 | 237 | 186 | 95 | 415 | 236,178 |
| **1962** | 219,330 | 61,960 | 69,026 | 19,974 | 18,278 | 12,876 | 5,868 | 5,332 | 5,440 | 5,336 | 2,494 | 2,682 | 3,950 | 2,055 | 2,842 | 4,085 | 1,443 | 3,463 | 1,627 | 1,264 | 2,748 | 397 | 1,273 | 116 | 369 | 1,322 | 455,550 |
| **1963** | 284,999 | 20,494 | 18,044 | 14,511 | 8,611 | 6,825 | 7,460 | 7,410 | 7,056 | 6,492 | 7,534 | 7,157 | 5,359 | 5,661 | 5,727 | 4,631 | 5,409 | 3,766 | 2,483 | 1,988 | 2,103 | 1,799 | 1,340 | 1,061 | 908 | 1,358 | 440,187 |
| **1964** | 279,868 | 13,629 | 12,218 | 12,606 | 13,994 | 9,408 | 13,564 | 7,304 | 5,896 | 5,552 | 8,554 | 4,528 | 4,517 | 3,437 | 3,435 | 5,306 | 4,179 | 5,173 | 7,838 | 4,153 | 328 | 4,004 | 2,054 | 2,037 | 2,956 | 5,071 | 441,609 |
| **1965** | 195,499 | 25,698 | 12,488 | 10,457 | 10,679 | 12,683 | 11,620 | 4,746 | 2,258 | 1,568 | 2,806 | 1,023 | 3,542 | 678 | 2,568 | 2,383 | 1,244 | 789 | 1,467 | 1,564 | 697 | 1,026 | 536 | 111 | 138 | 1,471 | 309,740 |
| **1966** | 261,978 | 28,843 | 22,716 | 10,839 | 10,325 | 10,587 | 10,496 | 9,596 | 6,457 | 3,499 | 3,711 | 4,661 | 3,432 | 3,041 | 3,417 | 3,022 | 2,883 | 2,081 | 3,130 | 1,982 | 2,178 | 1,533 | 668 | 1,324 | 772 | 2,189 | 415,362 |
| **1967** | 285,596 | 29,407 | 13,714 | 5,915 | 4,983 | 6,679 | 8,256 | 7,200 | 5,031 | 3,317 | 3,045 | 3,752 | 2,668 | 2,074 | 3,069 | 3,202 | 2,036 | 2,579 | 2,775 | 2,864 | 1,940 | 1,237 | 908 | 1,014 | 638 | 1,922 | 405,820 |
| **1968** | 166,413 | 13,294 | 9,808 | 6,641 | 4,053 | 3,559 | 3,467 | 4,731 | 4,738 | 3,288 | 3,358 | 2,512 | 2,047 | 1,840 | 2,385 | 2,183 | 1,902 | 1,660 | 2,309 | 2,016 | 1,533 | 919 | 1,216 | 660 | 508 | 1,274 | 248,314 |
| **1969** | 243,285 | 43,884 | 6,955 | 6,705 | 5,412 | 5,896 | 4,358 | 4,966 | 5,895 | 4,339 | 3,751 | 3,268 | 2,237 | 2,450 | 2,514 | 2,728 | 1,694 | 2,671 | 1,722 | 1,937 | 1,684 | 1,177 | 739 | 881 | 449 | 1,488 | 363,085 |
| **1970** | 226,420 | 18,572 | 15,700 | 6,335 | 5,580 | 5,418 | 3,201 | 3,240 | 3,537 | 3,273 | 4,086 | 2,777 | 2,473 | 1,929 | 1,627 | 1,878 | 1,942 | 1,158 | 1,132 | 1,158 | 1,261 | 844 | 662 | 536 | 402 | 785 | 315,929 |
| **1971** | 220,222 | 16,738 | 6,082 | 5,430 | 2,690 | 2,416 | 1,592 | 1,282 | 1,092 | 1,636 | 1,681 | 1,231 | 1,226 | 820 | 608 | 663 | 465 | 418 | 422 | 337 | 272 | 228 | 248 | 124 | 54 | 703 | 268,682 |
| **1972** | 125,453 | 9,950 | 5,944 | 3,585 | 3,489 | 1,682 | 1,455 | 1,192 | 809 | 418 | 646 | 644 | 707 | 371 | 522 | 545 | 305 | 337 | 406 | 242 | 520 | 297 | 216 | 158 | 138 | 283 | 160,313 |
| **1973** | 109,989 | 14,063 | 9,738 | 6,701 | 5,103 | 6,887 | 2,395 | 2,097 | 2,321 | 1,395 | 1,458 | 1,632 | 1,395 | 1,313 | 957 | 1,026 | 900 | 590 | 443 | 479 | 544 | 170 | 372 | 114 | 118 | 580 | 172,779 |
| **1974** | 125,441 | 23,773 | 12,998 | 4,843 | 4,009 | 3,863 | 5,662 | 1,828 | 2,011 | 2,217 | 1,571 | 1,166 | 1,488 | 1,398 | 1,065 | 960 | 994 | 866 | 564 | 527 | 346 | 294 | 340 | 208 | 288 | 926 | 199,645 |
| **1975** | 150,727 | 28,924 | 13,741 | 6,997 | 3,864 | 3,385 | 3,051 | 2,991 | 1,753 | 1,333 | 1,811 | 1,165 | 1,221 | 1,041 | 817 | 692 | 663 | 506 | 484 | 440 | 308 | 298 | 162 | 168 | 178 | 144 | 226,865 |
| **1976** | 148,881 | 34,799 | 16,824 | 9,228 | 5,945 | 2,030 | 1,363 | 1,249 | 1,284 | 553 | 867 | 742 | 691 | 412 | 498 | 644 | 373 | 346 | 190 | 178 | 220 | 139 | 86 | 114 | 82 | 86 | 227,825 |
| **1977** | 149,464 | 18,238 | 12,900 | 11,273 | 8,194 | 4,136 | 2,338 | 1,762 | 1,106 | 513 | 655 | 636 | 509 | 470 | 804 | 920 | 459 | 187 | 132 | 84 | 152 | 103 | 105 | 106 | 80 | 137 | 215,464 |
| **1978** | 133,850 | 42,054 | 24,317 | 14,908 | 10,059 | 6,787 | 4,839 | 1,598 | 2,150 | 907 | 1,464 | 642 | 700 | 640 | 483 | 662 | 375 | 337 | 344 | 212 | 333 | 273 | 239 | 142 | 85 | 481 | 248,883 |
| **1979** | 154,521 | 35,164 | 16,921 | 8,444 | 4,871 | 3,380 | 2,423 | 1,537 | 990 | 813 | 569 | 421 | 466 | 340 | 562 | 655 | 332 | 393 | 275 | 303 | 305 | 257 | 234 | 186 | 171 | 1,069 | 235,601 |
| **1980** | 144,684 | 39,709 | 19,333 | 13,351 | 7,553 | 5,351 | 4,209 | 3,102 | 2,351 | 1,623 | 1,198 | 1,419 | 1,331 | 938 | 1,079 | 1,308 | 950 | 796 | 286 | 504 | 719 | 383 | 339 | 210 | 212 | 955 | 253,896 |
| **1981** | 196,163 | 27,800 | 14,312 | 11,439 | 8,254 | 6,392 | 4,462 | 2,897 | 2,209 | 1,093 | 1,421 | 1,416 | 1,068 | 783 | 697 | 973 | 690 | 747 | 564 | 598 | 489 | 546 | 532 | 307 | 249 | 856 | 286,958 |
| **1982** | 167,072 | 31,240 | 18,303 | 10,835 | 5,755 | 4,610 | 2,546 | 2,729 | 1,636 | 2,096 | 1,460 | 1,303 | 668 | 765 | 418 | 844 | 454 | 607 | 399 | 542 | 630 | 565 | 277 | 377 | 187 | 753 | 257,071 |
| **1983** | 71,044 | 20,788 | 10,383 | 7,673 | 5,414 | 2,898 | 2,632 | 2,184 | 1,106 | 1,136 | 1,153 | 802 | 749 | 401 | 408 | 754 | 507 | 504 | 369 | 394 | 395 | 221 | 104 | 139 | 127 | 363 | 132,648 |

| YEAR | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25+ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1984** | 36,565 | 12,339 | 13,910 | 11,179 | 6,729 | 4,342 | 3,290 | 2,702 | 2,043 | 1,025 | 1,159 | 1,166 | 753 | 642 | 617 | 1,063 | 740 | 701 | 606 | 551 | 769 | 719 | 452 | 619 | 496 | 775 | 105,952 |
| **1985** | 24,522 | 11,027 | 10,753 | 9,542 | 5,342 | 3,455 | 2,674 | 2,148 | 1,816 | 879 | 1,059 | 770 | 497 | 591 | 619 | 935 | 613 | 548 | 556 | 552 | 689 | 432 | 383 | 345 | 305 | 573 | 81,627 |
| **1986** | 37,954 | 12,326 | 10,972 | 10,739 | 5,929 | 3,855 | 3,006 | 2,386 | 1,956 | 1,013 | 1,085 | 1,000 | 642 | 683 | 551 | 1,000 | 736 | 647 | 709 | 604 | 789 | 584 | 505 | 472 | 419 | 705 | 101,269 |
| **1987** | 60,516 | 18,198 | 16,341 | 16,410 | 9,904 | 6,217 | 4,814 | 3,595 | 3,083 | 1,667 | 1,687 | 1,601 | 772 | 1,028 | 819 | 1,437 | 1,093 | 976 | 941 | 905 | 1,131 | 811 | 667 | 731 | 624 | 1,763 | 157,731 |
| **1988** | 89,515 | 28,401 | 26,513 | 22,512 | 13,333 | 7,993 | 5,689 | 4,107 | 3,691 | 1,704 | 1,632 | 1,402 | 1,048 | 1,466 | 904 | 1,783 | 1,414 | 1,247 | 1,240 | 1,335 | 1,606 | 725 | 652 | 683 | 972 | 2,214 | 223,781 |
| **1989** | 81,362 | 18,919 | 17,477 | 16,613 | 10,775 | 7,364 | 5,216 | 3,636 | 3,003 | 1,593 | 1,506 | 1,370 | 793 | 1,244 | 796 | 1,469 | 1,190 | 1,061 | 1,156 | 907 | 1,245 | 964 | 1,036 | 821 | 675 | 997 | 183,187 |
| **1990** | 52,236 | 26,401 | 23,476 | 25,552 | 15,622 | 10,287 | 6,706 | 4,449 | 3,137 | 1,920 | 2,031 | 2,083 | 1,283 | 1,745 | 860 | 1,509 | 1,415 | 1,142 | 1,518 | 846 | 1,795 | 802 | 1,099 | 1,218 | 551 | 2,485 | 192,168 |
| **1991** | 67,740 | 21,462 | 16,681 | 17,508 | 12,227 | 9,231 | 6,295 | 4,275 | 3,436 | 1,758 | 1,866 | 2,074 | 1,340 | 1,636 | 953 | 1,801 | 1,172 | 1,251 | 1,253 | 1,056 | 1,170 | 840 | 843 | 684 | 663 | 1,425 | 180,640 |
| **1992** | 79,926 | 33,592 | 26,274 | 21,504 | 14,530 | 10,228 | 8,427 | 6,535 | 4,248 | 3,328 | 2,423 | 2,117 | 1,098 | 1,417 | 1,059 | 1,592 | 1,807 | 1,879 | 1,546 | 1,932 | 1,297 | 1,047 | 791 | 1,052 | 770 | 1,872 | 232,292 |
| **1993** | 79,802 | 34,249 | 27,515 | 29,027 | 21,230 | 14,375 | 11,078 | 7,706 | 7,174 | 4,103 | 3,378 | 3,514 | 1,777 | 2,569 | 2,159 | 3,063 | 1,940 | 2,376 | 2,256 | 1,704 | 1,519 | 1,660 | 1,432 | 1,206 | 1,350 | 2,465 | 270,626 |
| **1994** | 68,262 | 37,725 | 30,726 | 28,537 | 17,907 | 14,643 | 10,229 | 8,926 | 5,700 | 3,018 | 2,586 | 2,761 | 1,600 | 1,711 | 1,887 | 2,713 | 1,882 | 1,861 | 2,089 | 1,521 | 1,964 | 1,686 | 1,062 | 1,283 | 827 | 1,772 | 254,878 |
| **1995** | 226,819 | 61,732 | 48,613 | 32,510 | 20,476 | 15,424 | 11,934 | 10,164 | 7,747 | 4,305 | 5,297 | 4,929 | 2,798 | 3,321 | 3,227 | 4,168 | 4,986 | 4,835 | 3,508 | 2,643 | 2,904 | 2,599 | 2,940 | 2,148 | 2,206 | 5,310 | 497,542 |
| **1996** | 265,628 | 62,264 | 38,415 | 26,589 | 15,970 | 11,477 | 8,895 | 7,133 | 5,655 | 2,871 | 4,597 | 3,744 | 1,864 | 3,033 | 1,426 | 2,374 | 2,476 | 2,483 | 2,221 | 1,744 | 2,413 | 1,721 | 1,464 | 1,213 | 1,207 | 2,171 | 481,048 |
| **1997** | 291,546 | 41,276 | 28,455 | 28,117 | 16,140 | 15,105 | 12,030 | 9,520 | 9,474 | 5,337 | 3,835 | 4,719 | 2,822 | 2,786 | 2,230 | 2,709 | 3,202 | 2,223 | 2,504 | 1,777 | 2,245 | 1,965 | 1,526 | 1,286 | 1,222 | 2,213 | 496,262 |
| **1998** | 286,564 | 43,753 | 33,266 | 28,084 | 15,767 | 11,125 | 8,509 | 6,356 | 5,668 | 2,424 | 2,506 | 2,132 | 859 | 2,188 | 948 | 2,274 | 1,761 | 1,896 | 1,649 | 1,411 | 1,638 | 1,406 | 1,284 | 1,339 | 1,111 | 1,395 | 467,313 |
| **1999** | 127,377 | 38,571 | 32,137 | 29,298 | 16,966 | 12,008 | 9,432 | 7,496 | 6,367 | 3,125 | 2,897 | 2,781 | 1,340 | 2,256 | 1,374 | 2,275 | 2,329 | 1,849 | 1,991 | 1,613 | 2,039 | 1,578 | 1,355 | 1,259 | 1,113 | 1,786 | 312,615 |
| **2000** | 265,110 | 40,002 | 30,482 | 26,474 | 15,201 | 11,189 | 8,737 | 6,820 | 6,008 | 2,930 | 2,826 | 2,678 | 1,307 | 2,222 | 1,249 | 2,183 | 2,102 | 1,837 | 1,819 | 1,463 | 1,823 | 1,465 | 1,261 | 1,199 | 1,060 | 1,618 | 441,065 |
| **2001** | 338,044 | 35,034 | 25,767 | 21,328 | 12,306 | 9,294 | 7,354 | 5,821 | 5,164 | 2,650 | 2,577 | 2,399 | 1,252 | 2,022 | 1,143 | 1,905 | 1,847 | 1,617 | 1,554 | 1,224 | 1,573 | 1,224 | 1,027 | 996 | 915 | 1,405 | 487,440 |
| **2002** | 317,355 | 30,577 | 23,500 | 20,577 | 11,824 | 8,659 | 6,757 | 5,282 | 4,638 | 2,257 | 2,195 | 2,072 | 1,022 | 1,707 | 973 | 1,714 | 1,624 | 1,425 | 1,411 | 1,143 | 1,424 | 1,139 | 983 | 932 | 822 | 1,249 | 453,261 |
| **2003** | 401,079 | 34,930 | 26,198 | 22,254 | 12,814 | 9,541 | 7,501 | 5,901 | 5,212 | 2,610 | 2,537 | 2,377 | 1,208 | 1,985 | 1,124 | 1,921 | 1,846 | 1,617 | 1,576 | 1,256 | 1,592 | 1,255 | 1,067 | 1,024 | 923 | 1,411 | 552,761 |
| **2004** | 370,714 | 37,136 | 29,923 | 27,714 | 15,852 | 11,266 | 8,662 | 6,669 | 5,797 | 2,643 | 2,558 | 2,464 | 1,116 | 1,979 | 1,130 | 2,126 | 1,978 | 1,736 | 1,781 | 1,483 | 1,785 | 1,477 | 1,312 | 1,215 | 1,024 | 1,541 | 543,083 |
| **2005** | 399,596 | 39,866 | 31,331 | 28,211 | 16,167 | 11,666 | 9,034 | 7,003 | 6,121 | 2,883 | 2,791 | 2,664 | 1,256 | 2,171 | 1,234 | 2,244 | 2,115 | 1,854 | 1,870 | 1,534 | 1,877 | 1,530 | 1,340 | 1,255 | 1,082 | 1,638 | 580,332 |
| **2006** | 265,390 | 32,994 | 26,768 | 24,970 | 14,278 | 10,108 | 7,759 | 5,967 | 5,177 | 2,343 | 2,271 | 2,190 | 985 | 1,751 | 1,004 | 1,904 | 1,762 | 1,548 | 1,594 | 1,333 | 1,599 | 1,326 | 1,182 | 1,091 | 916 | 1,375 | 419,586 |
| **2007** | 261,280 | 30,994 | 25,792 | 24,713 | 14,106 | 9,845 | 7,505 | 5,733 | 4,946 | 2,164 | 2,097 | 2,042 | 879 | 1,608 | 926 | 1,820 | 1,663 | 1,463 | 1,531 | 1,299 | 1,534 | 1,291 | 1,166 | 1,065 | 875 | 1,305 | 409,642 |
| **2008** | 108,482 | 30,800 | 25,696 | 24,687 | 14,089 | 9,819 | 7,480 | 5,710 | 4,924 | 2,147 | 2,080 | 2,027 | 869 | 1,594 | 919 | 1,812 | 1,653 | 1,454 | 1,525 | 1,296 | 1,528 | 1,288 | 1,165 | 1,062 | 871 | 1,298 | 256,274 |
| **2009** | 79,802 | 34,249 | 27,515 | 29,027 | 21,230 | 14,375 | 11,078 | 7,706 | 7,174 | 4,103 | 3,378 | 3,514 | 1,777 | 2,569 | 2,159 | 3,063 | 1,940 | 2,376 | 2,256 | 1,704 | 1,519 | 1,660 | 1,432 | 1,206 | 1,350 | 2,465 | 270,626 |

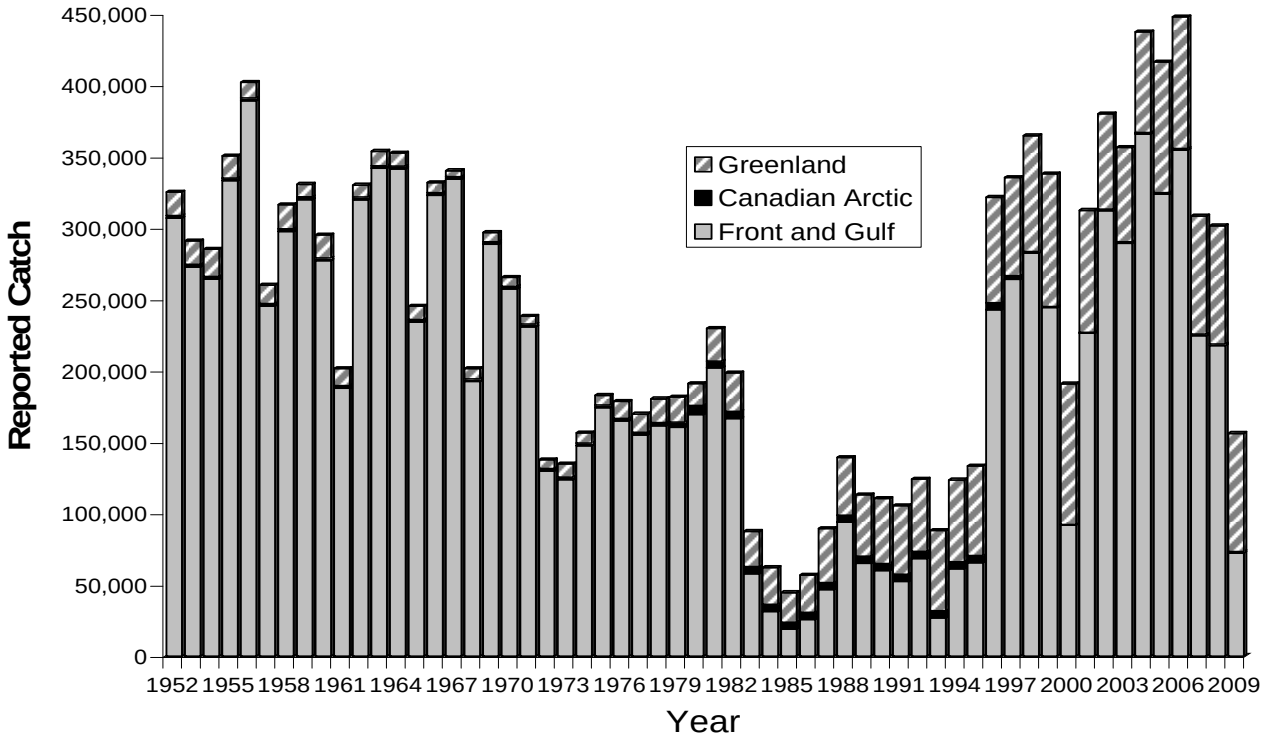


*Figure 1. Total reported catches of harp seals in the Northwest Atlantic 1952-2009.*

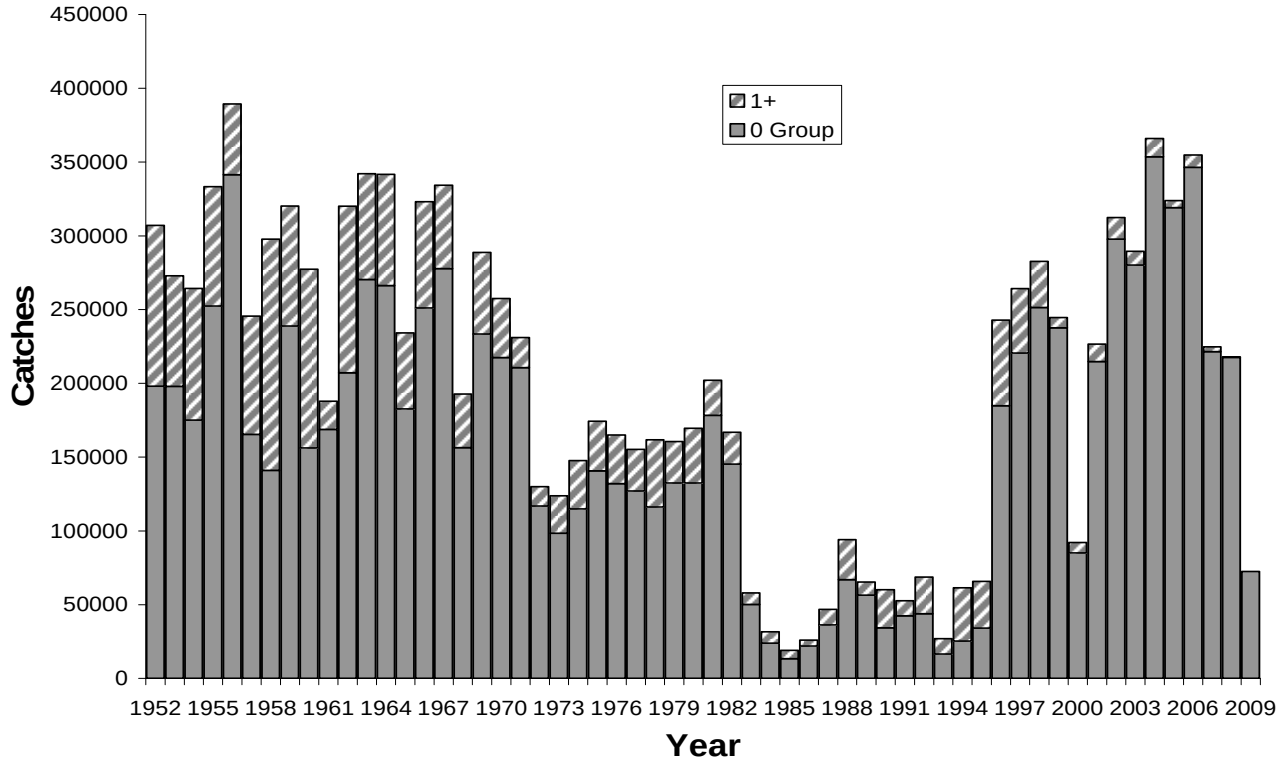


*Figure 2. Catches of harp seals in southern Canadian (Front and Gulf) areas 1952-2009.*

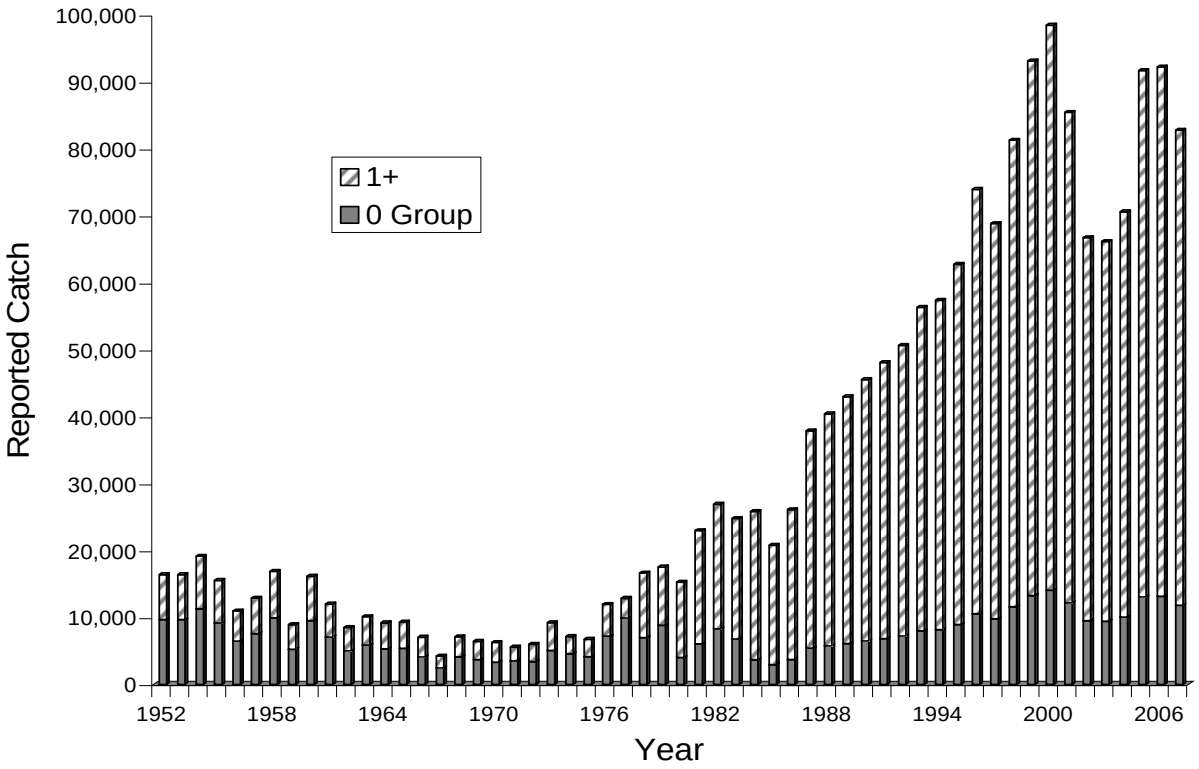


*Figure 3. Reported catches of Northwest Atlantic harp seals in Greenland waters 1952-2009. Values for 1952-53, 1988-92 and 2008-09 are estimated (see text).*

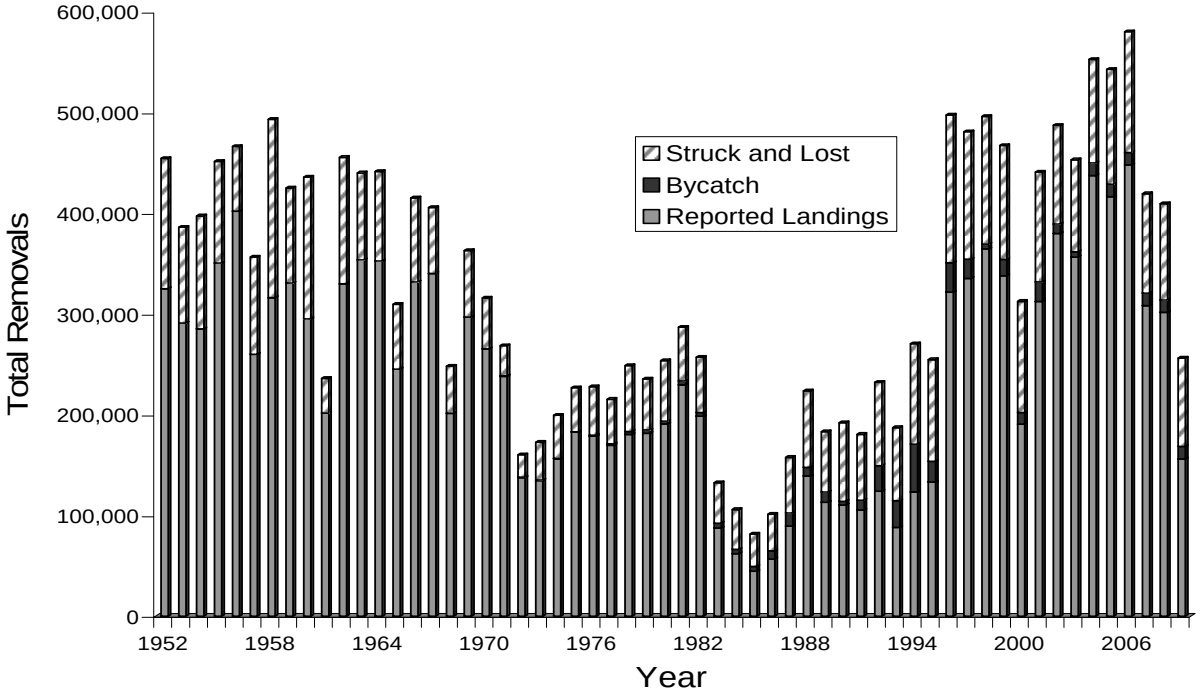


*Figure 4. Total removals of Northwest Atlantic harp seals, 1952-2009.*

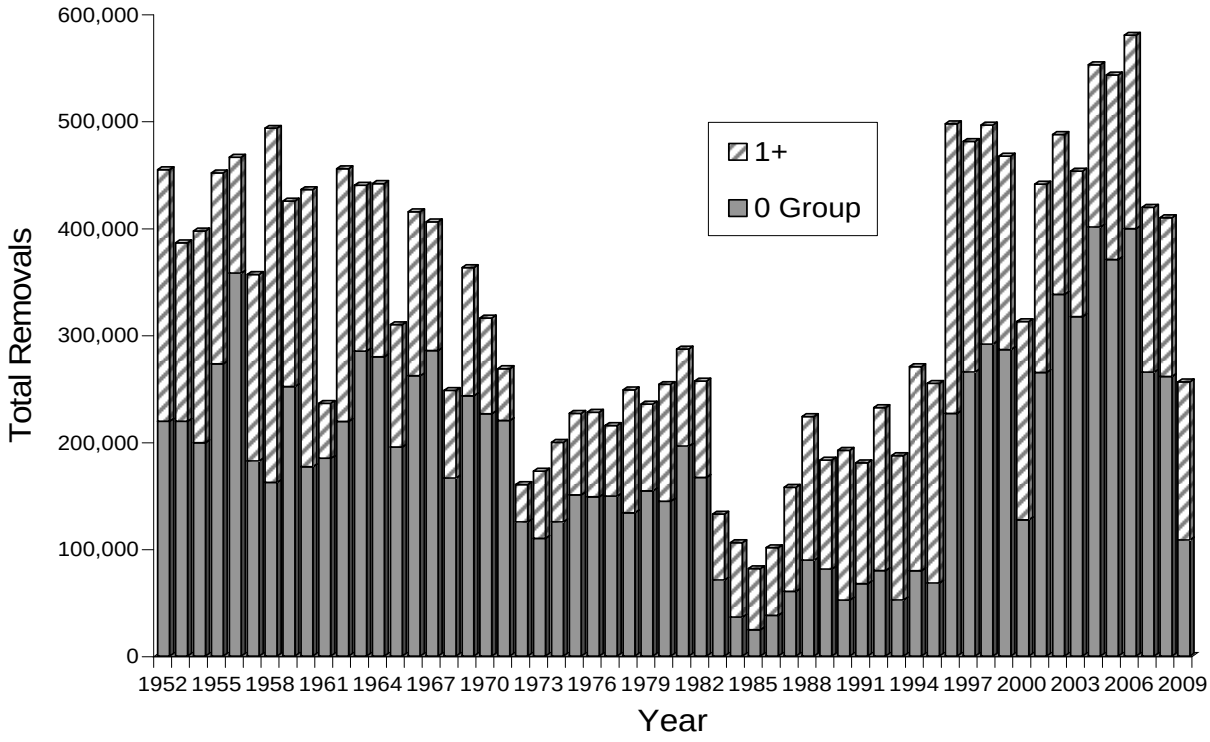


*Figure 5. Total removals of Northwest Atlantic harp seals, 1952-2009, separated by age class.*