



ASSESSMENT OF CUMBERLAND SOUND GREENLAND HALIBUT (*REINHARDTIUS HIPPOGLOSSOIDES*) IN 2019



Photo of Greenland Halibut (Reinhardtius hippoglossoides)

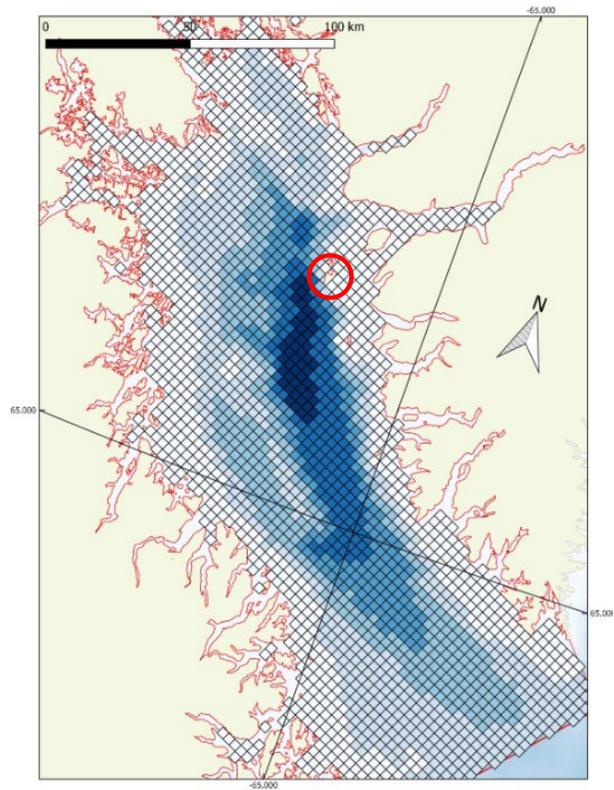


Figure 1. Map of survey for Cumberland Sound showing a 3 km square survey grid. Depth strata are indicated by colour, ranging from 200–400 m for light blue to 1000+ m for dark blue. White cells are shallower than 200 m and are not used for survey station selection. The red circle highlights the location of Kekerten Island.

CONTEXT

This Science Advisory Report is from the regional peer review November 25 to 27, 2019, on the Stock Assessment of the Cumberland Sound Greenland Halibut in 2019. Additional publications from this meeting will be posted on the [Fisheries and Oceans Canada \(DFO\) Science Advisory Schedule](#) as they become available.

SUMMARY

- Using catch composition data from the commercial fishery, data from the fishery independent survey, and recruitment parameter values from other Canadian Greenland Halibut stocks a generic Greenland Halibut population model was developed. Given the lack of local reproduction and the fact that population models attempt to replicate the dynamics of a population from recruitment through growth to maturity and reproduction, the validity of the population model was discussed. By consensus the model was not used to provide science advice. (Terms of Reference [ToR] objectives 1 and 2)
- In the absence of an accepted stock model the sustainability of specific TAH levels could not be assessed. (ToR objective 2)
- Fishery and survey data, along with local knowledge and Traditional Knowledge indicate the stock has been relatively stable since 2005. (ToR objective 1)
- Recent length-frequency, mean weight and growth (length-weight relationship) data from fishery-independent sampling and plant sampling programs are still broad in range when compared to historical information.
- Catch-per-unit-effort in the commercial fishery has been stable throughout most of the time series.
- Community fishers have experienced good catch rates in both shallow and deep water, from Kekerten Island to north of Pangnirtung Fiord, suggesting Greenland Halibut are still abundant in the stock area.
- The DFO Precautionary Approach framework typically uses reference points related to stock biomass to assess the current status of a stock. When biomass estimates are not available, abundance or biomass indices or population characteristics such as mean size or age structure can be used. For this fishery, the abundance index from the fishery-independent survey and the length-frequency in the commercial catch during 1997 to 2005 should be explored as potential interim reference points until data allow the development of biomass-based reference points. (ToR objective 1)
- Data from acoustic and floy tagging programs were presented that showed seasonal movement of tagged Greenland Halibut across the previous Cumberland Sound Turbot Management Area boundary near Kekerten Island. Given the consistency of the movement pattern among three years of tracking, there is no biological rationale to return the boundary to its original position. (ToR objective 3)
- Tagging data demonstrated movement of individual Greenland Halibut out of Cumberland Sound, counter to the previous assumption that Greenland Halibut enter Cumberland Sound but never leave and demonstrating connectivity with the offshore areas. (ToR objective 3)
- The potential of a carry-forward provision was discussed. It was suggested that the Department's *Quota Carry-Forward Guidelines for Atlantic Canada* could apply, in which case up to 15% of the TAC could be carried forward. (ToR objective 4)
- Any harvest level increase or implementation of a carry-forward provision should be supported by a Traditional Knowledge and scientific monitoring plan. (ToR objectives 3 and 4)

INTRODUCTION

The commercial Greenland Halibut fishery in Cumberland Sound was established in 1986 and has undergone considerable changes over time. The history of the fishery is well described in DFO 2008. Briefly, fishing originally took place close to Kekerten Island (Figure 1) in the winter, with fishers setting longlines through holes cut in the sea ice. Sea ice extent declined through the mid-1990s and 2000s (Figure 2) forcing fishing to occur progressively further north and closer to shore (Figure 3); since 2012 the winter fishery moved north of Pangnirtung Fiord. The winter fishery currently focuses on three areas within Cumberland Sound near the mouth of Pangnirtung Fiord where Greenland Halibut are known to congregate. With the decline in winter sea ice extent, there has been increasing interest since the early 2000s in developing a summer fishery for Greenland Halibut in Cumberland Sound. In 2009 and 2010 exploratory summer fisheries using longline vessels were conducted in an effort to develop an open water fishery that could harvest from deeper waters south of Kekerten Island (GN 2009, GN 2010).

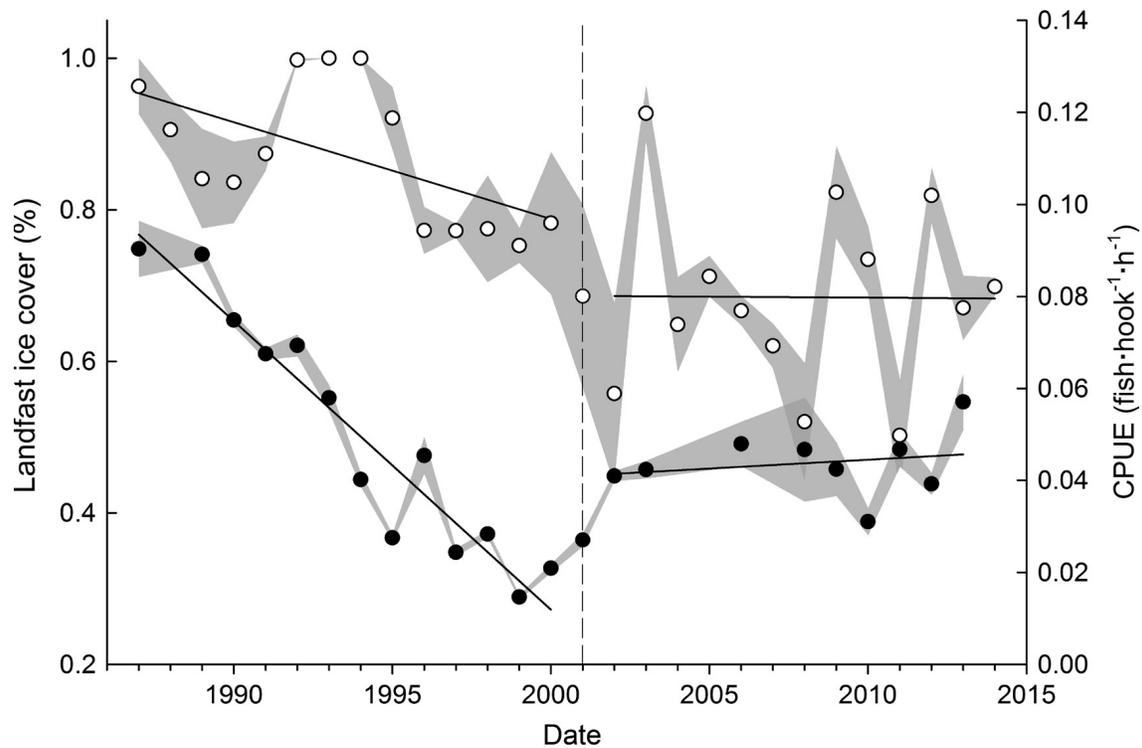


Figure 1. Piecewise regression of percent landfast ice cover (open circles) for the area north of the Cumberland Sound Management Boundary (CSMB) and catch per unit effort (CPUE, filled circles) of the community-based winter fishery that takes place in the same region. (Reproduced from Hussey et al. 2017.)

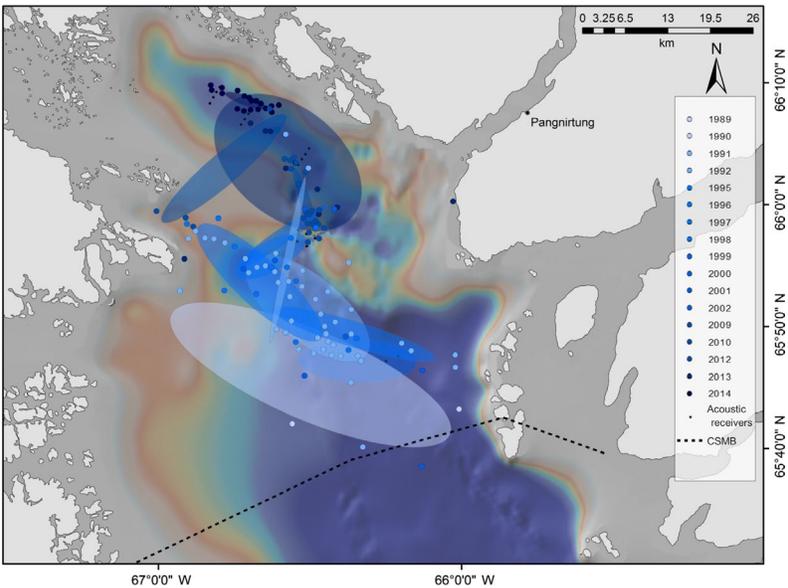


Figure 2. Map showing fishers' locations in Cumberland Sound over the lifespan of the fishery (1987–2013). (Reproduced from Hussey et al. 2017.)

In 2011 the Government of Nunavut, Fisheries and Sealing Division commissioned the *M.V. Nuliajuk* to facilitate inshore fisheries research in Nunavut. During the 2011 season the *M.V. Nuliajuk* identified previously uncharted deeper water areas (500–600 m depth) north of Pangnirtung Fiord, north of and closer to shore than contemporary winter fishing locations. In winter 2012, fishers set lines in these deeper areas and realized higher catch rates of larger-bodied Greenland Halibut (Figure 4). These improved catches resulted in renewed fishing effort (the number of active fishers increased from 7 in 2010 to 61 in 2012; the number of fishers in 2011 is not available). In subsequent years, fishing effort further increased and the total landings increased until the entire Total Allowable Harvest (TAH) was taken in winter 2018.

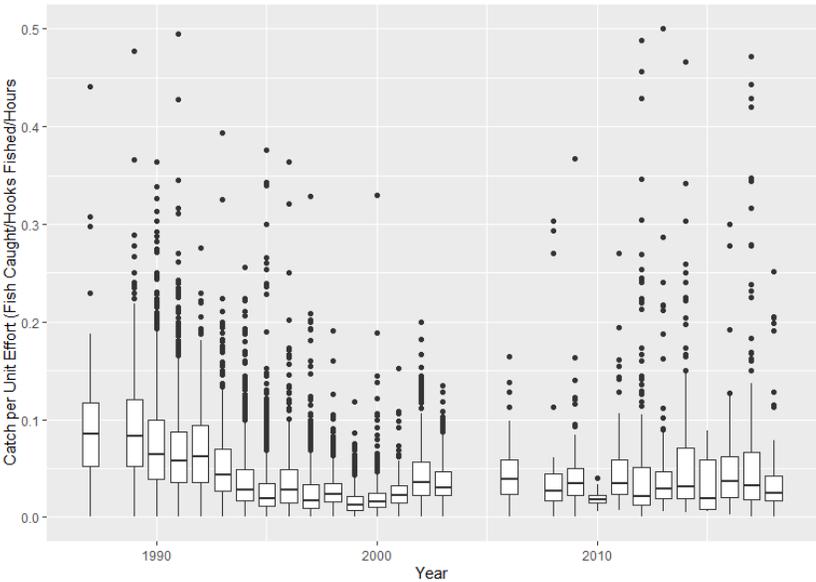


Figure 3. Catch-per-unit-effort (number of fish caught/number of hooks fished/set duration) in the winter longline fishery.

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When the Cumberland Sound Turbot Management Area (CSTMA) was established as a separate fishing area from NAFO Subarea 0, one operating assumption was that the stock in the CSTMA was a sink population. The assumption was that juvenile fish entered Cumberland Sound, but after transformation and settling, their subsequent exit was prohibited by a shallow sill at the mouth of Cumberland Sound. The fishing boundary between the CSTMA and NAFO Subarea 0 was established under this assumption and to encapsulate the historic maximum extent of the winter longline fishery. A telemetry study conducted between 2011 and 2012 showed clear seasonal movement between the CSTMA and the NAFO Division 0B portion of Cumberland Sound on a seasonal basis (Hussey et al. 2017), counter to the operating assumption regarding Greenland Halibut movement. Greenland Halibut were observed to move between the deep waters south of Kekerten Island during the open water season to waters north of the mouth of Pangiirtung Fiord after the sea ice formed, and then back south when the sea ice broke up. At the request of the Pangiirtung Hunters and Trappers Association, the Minister of Fisheries and Oceans Canada moved the boundary of the CSTMA out to the limit of the Nunavut Land Claim Area, encompassing all of the Cumberland Sound, on a temporary basis.

Commercial catch of Greenland Halibut in Cumberland Sound has followed a U-shaped trajectory, declining from around 400 t in the early 1990s to an average of 70 t from 1996 to 2011 and then increasing to 450, 550, and 390 t in 2017, 2018, and 2019, respectively (Figure 5). These changes in catch appear to have been driven by changes in fishing locations. As the winter sea ice extent declined, fishing was forced into progressively shallower waters until localized deeper waters were found near the mouth of Pangiirtung Fiord in 2011. Discovery of these fishing locations led to a resurgence in the number of fishers and fishing effort since 2011.

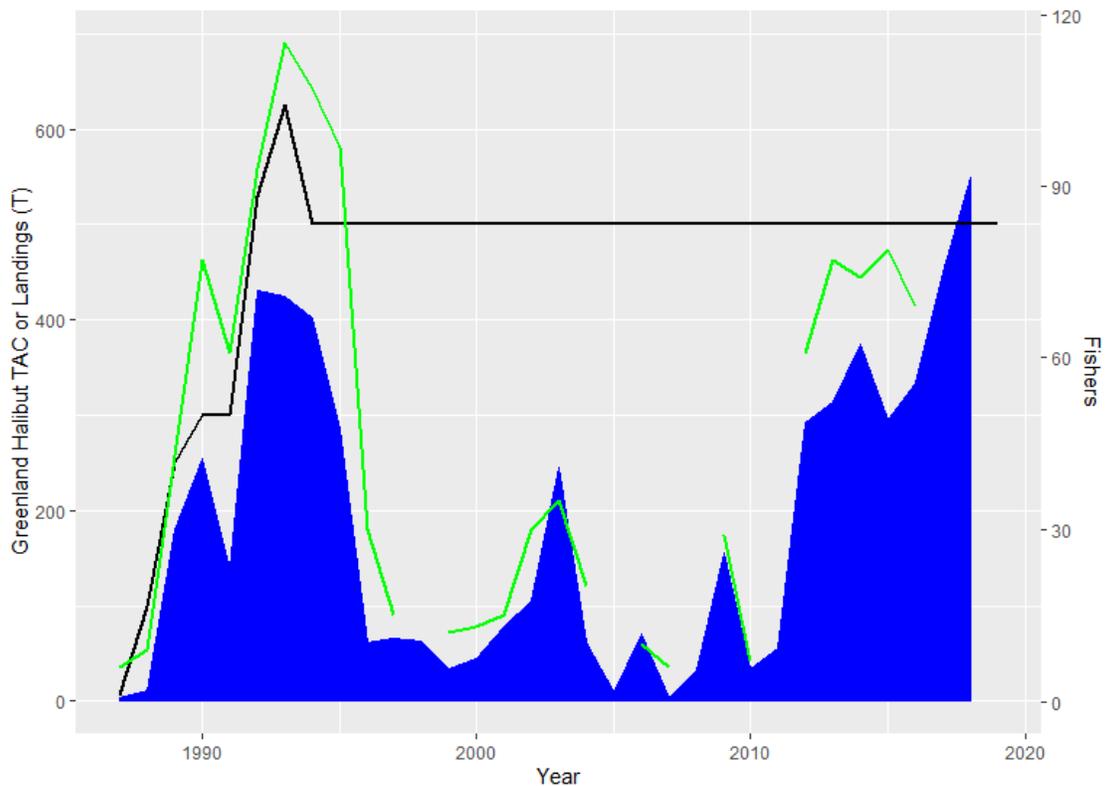


Figure 4. Total Allowable Catch (black line), total harvest (blue) and number of fishers (green line) for the Cumberland Sound Greenland Halibut fishery.

The Cumberland Sound Greenland Halibut fishery has never undergone a numerical stock assessment. This meeting undertook the first stock assessment for this fishery and together presented telemetry results relevant to the location of the CSTMA boundary and connectivity between the CSTMA and NAFO Subarea 0.

ASSESSMENT

Data Available

Several sources of fishery-dependent and fishery-independent data are available for the Cumberland Sound Turbot Management Area.

Inuit Qaujimagatuqangit

Inuit Qaujimagatuqangit (IQ) is growing as fishers have learned new techniques and used new fishing gear. IQ was provided by members of the Pangnirtung Hunters and Trappers Association during the stock assessment.

Logbooks

Logbooks are provided to fishers in Cumberland Sound to record their fishing dates, times, locations, effort and catch (of both target and bycatch species). Fishers return logbooks to DFO, the Pangnirtung Fisheries Ltd. fish plant, or the Pangnirtung Hunters and Trappers Association. Not all fishers return logbooks each year; however, fishers that do return logbooks tend to do so every year, providing a relatively consistent subsample. Longlines are highly selective, with low impact to the ocean floor; reported bycatch is less than 5% of the commercial catch and is dominated by a few species, primarily Greenland Shark (*Somniosus microcephalus*) and Arctic Skate (*Amblyraja hyperborea*).

Landings

Landings are reported weekly to DFO Resource Management throughout the Cumberland Sound Greenland Halibut fishery each year. The resulting data are used for in-season quota management and to calculate total landings, fishery duration, and the number of active fishers.

Plant sampling

DFO has conducted a plant sampling program since the start of the fishery in 1987. During each fishing season, demographic data (fork length, round weight, dressed weight, sex, maturity, and otolith extraction for subsequent ageing) are collected from a subsample of approximately 200 fish per month.

Fishery-independent survey

DFO started an annual fishery-independent longline survey in 2011. The survey was designed using a depth-stratified random design with 5 depth strata: 201–400, 401–600, 601–800, 801–1000, 1001+ m (Figure 1). Fishing effort is allocated equally to the strata each year and a minimum sample of 3 sets per strata is required to calculate abundance and biomass indices. Fishing is conducted using bottom set longlines with #14 circle hooks spaced 1.82 m apart attached using 1 m braided nylon gangions. Longlines are baited with frozen squid and set for 12 hours overnight (e.g., set at 8 pm and retrieved at 8 am). Environmental data are collected during the survey using StarOddi mini-CTD tags attached to the longlines. Gear saturation is not

observed; bait remains attached to approximately 50% of hooks when retrieved. Hook competition is not a concern; typically fewer than 5% of hooks bear bycatch species and bycatch is dominated by Greenland Shark and Arctic Skate.

Mark-recapture study

During the longline survey, all live Greenland Halibut are marked with external inert uniquely numbered floy tags and released at the capture site. A reward is paid for the return of floy tags and the tags are marked with a phone number to facilitate reporting of tag recaptures. Tags can be returned directly to DFO, the Pangnirtung fish plant, or the Pangnirtung Hunters and Trappers Association. Tag return data can be used to examine movement patterns, habitat use, emigration (if tagged fish are caught outside Cumberland Sound), and, if recapture rates are high, estimate population size.

Telemetry

A collaborative project by the Ocean Tracking Network, University of Windsor, and Fisheries and Oceans Canada used acoustic and satellite telemetry tags to examine movement and habitat use patterns of Greenland Halibut in Cumberland Sound during 2011–2012 and 2014–2016. Greenland Halibut captured during the fishery-independent longline survey were tagged with satellite and/or acoustic telemetry tags and released at the capture location. All fish tagged with an electronic tag were also tagged with floy tags as a secondary tag.

Data Analyses

Commercial catch demographics

Patterns through time in Greenland Halibut demographic data collected through the fish plant sampling program were examined to detect effects of harvest on stock composition. The overall length-frequency distribution (Figure 6) showed an initial increase in mean length during the first few years of the fishery (1987–1991), followed by a gradual decline in mean length during 1991–1997, general stability during 1997–2005, and an increasing trend from 2005–2018.

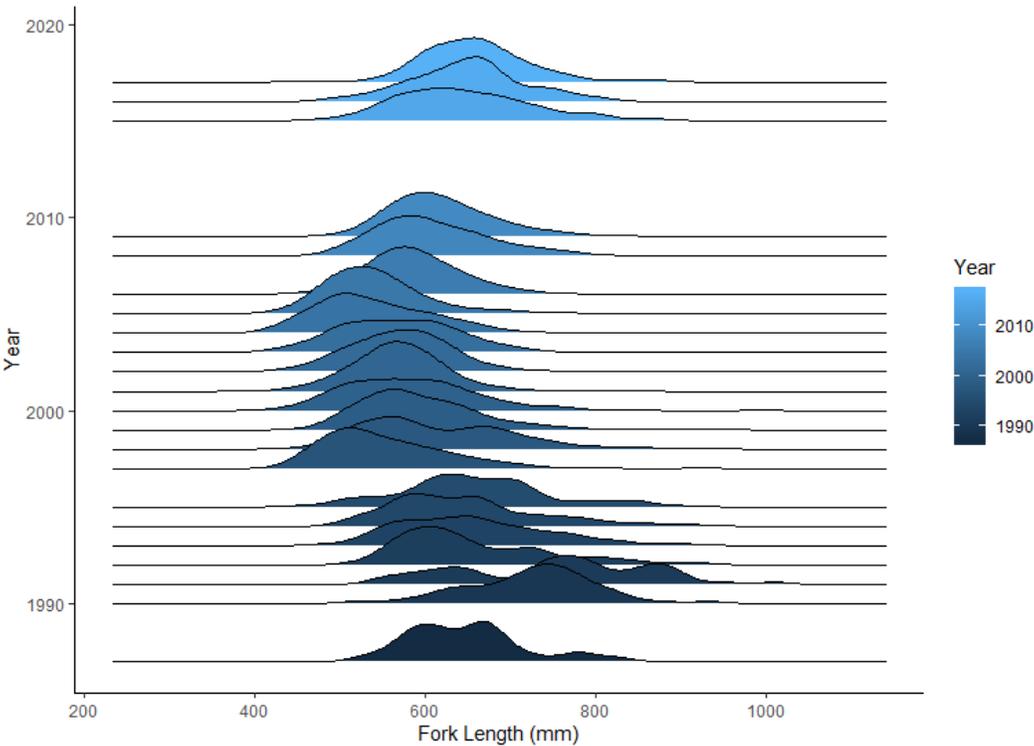


Figure 5. Length frequency per year for Greenland Halibut sampled through a fish plant sampling program.

Overall temporal patterns in length frequency were similar between female and male fish (Figure 7), matching observations for the entire catch. The fishery consistently harvests individuals that are larger (in length) than the size at which 50% of the fish are expected to be mature (L50; Dwyer et al. 2016), suggesting the stock has the capacity for reproduction. However, none of the female or male fish sampled during the fish plant sampling program have been in spawning condition, despite the fishery occurring in the winter, during the spawning period of Greenland Halibut (January to March; Fedorov 1971). This suggests that there is no local reproduction of Greenland Halibut in Cumberland Sound.

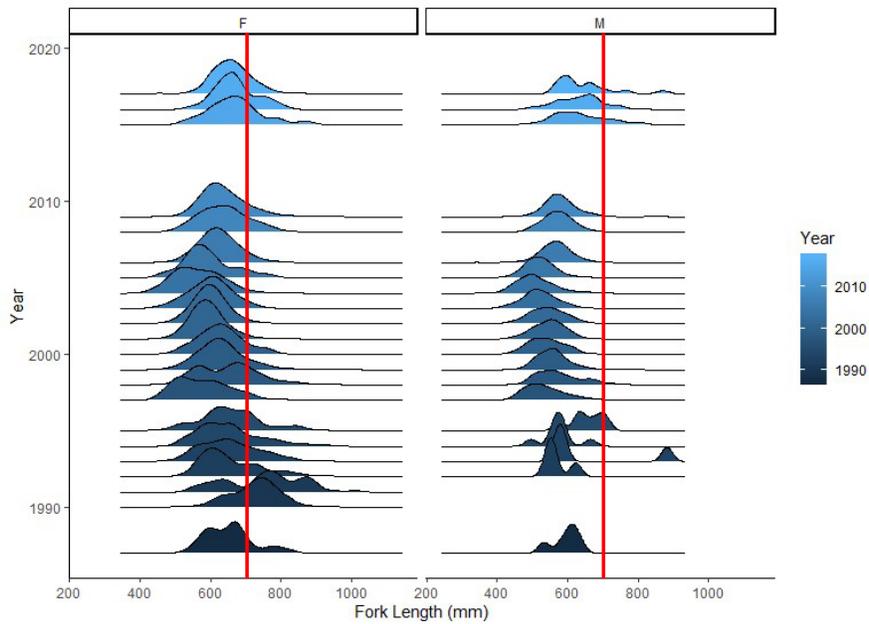


Figure 6. Length frequencies per year for female (left panel) and male (right panel) Greenland Halibut sampled through a fish plant sampling program. Red vertical lines indicate L50 values for females and males.

Mean fish weight declined gradually from 1991 to 2007 (Figure 8), coinciding with progressive movement of the effective fishing area from deep waters (< 1000 m) near Kekerten Island to shallower (~ 400 m) more northern areas in Cumberland Sound (Figure 3). Mean fish size increased after 2011 when fishing moved to deeper areas (~ 600 m) north of the mouth of Pangiirtung Fiord (Figure 8).

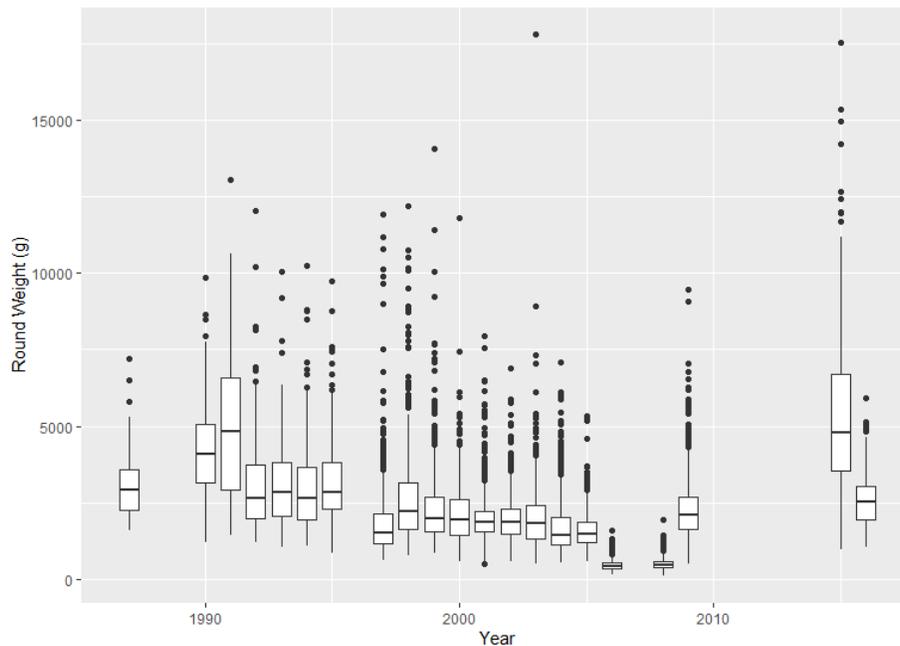


Figure 7. Box plot of Greenland Halibut weight (g) per year; fish were sampled through a fish plant sampling program.

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Mean weight was larger for female Greenland Halibut than males, but the same pattern of a decrease in the mean size of captured fish from 1991 to 2007, followed by an increase after 2011, was observed in both sexes (Figure 9). A calibration issue was identified with the scale used to weigh fish in 2017. The mis-calibration cannot be corrected for; therefore, the 2017 fish weight values need to be considered unreliable and omitted from any trend analyses.

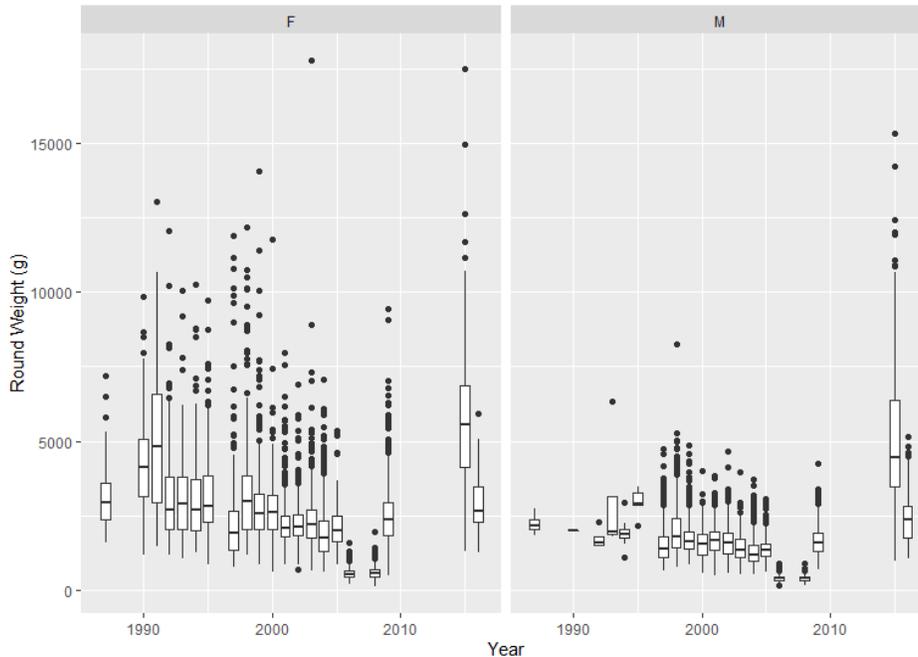


Figure 8. Box plot of Greenland Halibut weight per year for females (left panel) and males (right panel); fish were sampled through a fish plant sampling program.

The relationship between Greenland Halibut length and weight has varied among years (Figures 10 and 11), possibly as a result of the changes in the effective fishing area, coincident changes in mean fish weight and the range of fish lengths measured each year. No trend was observed in the differences in the length-weight relationship among years.

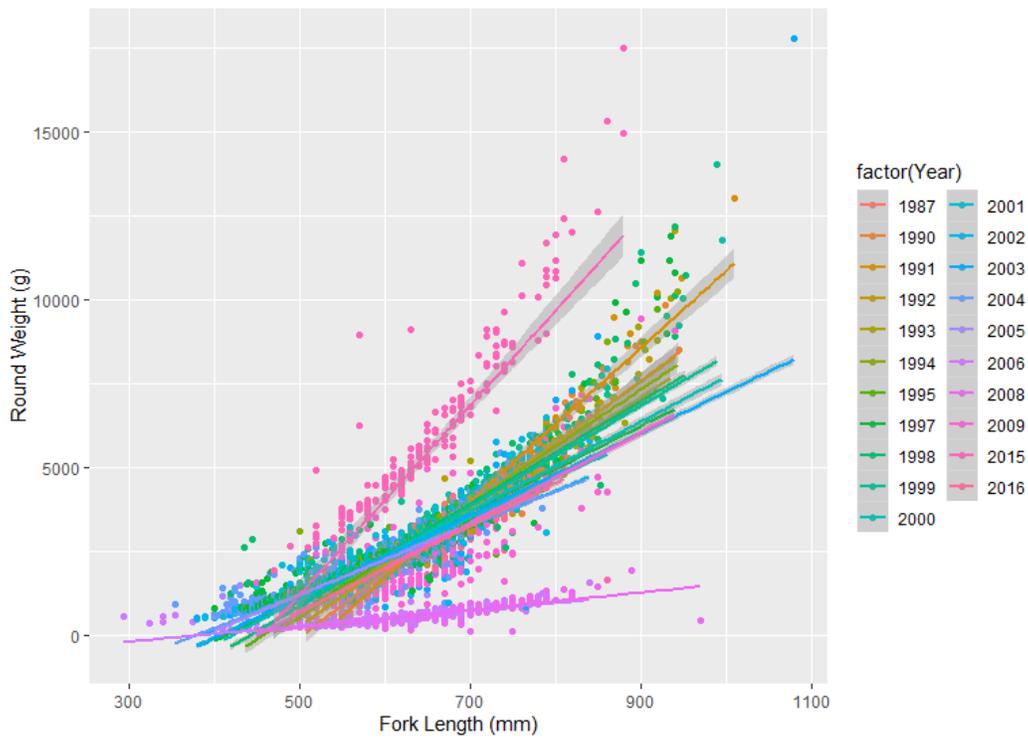


Figure 9. Relationship between Greenland Halibut round weight (g) and fork length (mm) by year with erroneous data from 2017 omitted.

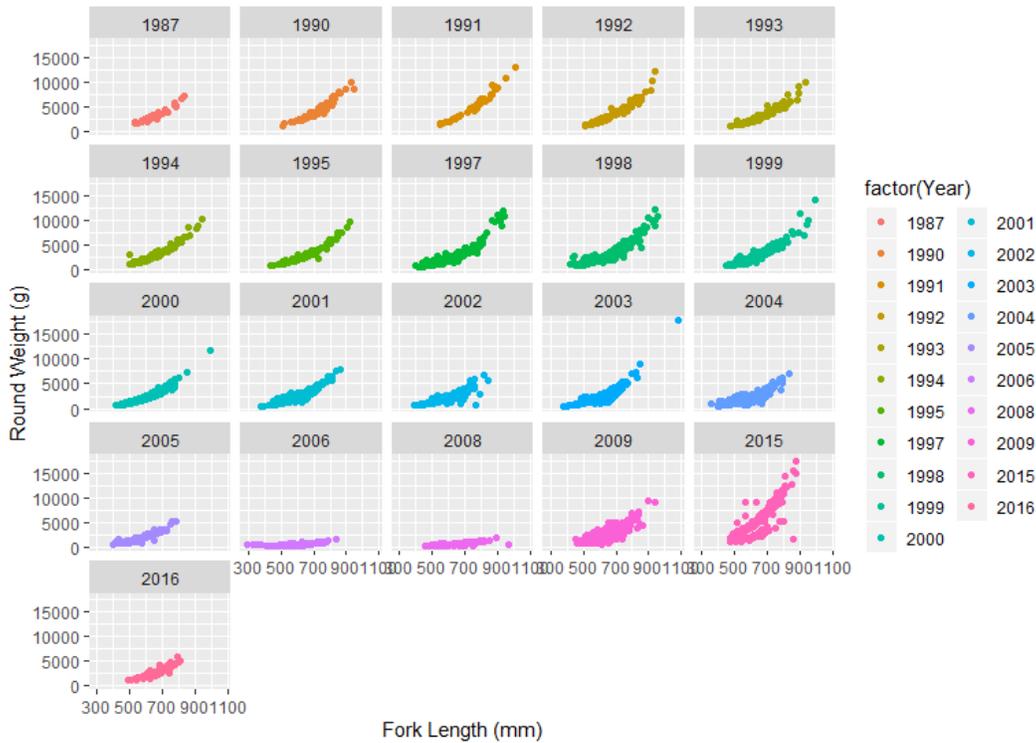


Figure 10. Annual plots of Greenland Halibut round weight (g) vs. fork length (mm) with erroneous data from 2017 omitted.

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The length-weight relationship differed between females and males and across years (Figure 12), with males typically having slower increases in growth with length (i.e., flatter slope in the length-weight relationship) and smaller ranges of values (i.e., the largest females measured were longer than the largest males).

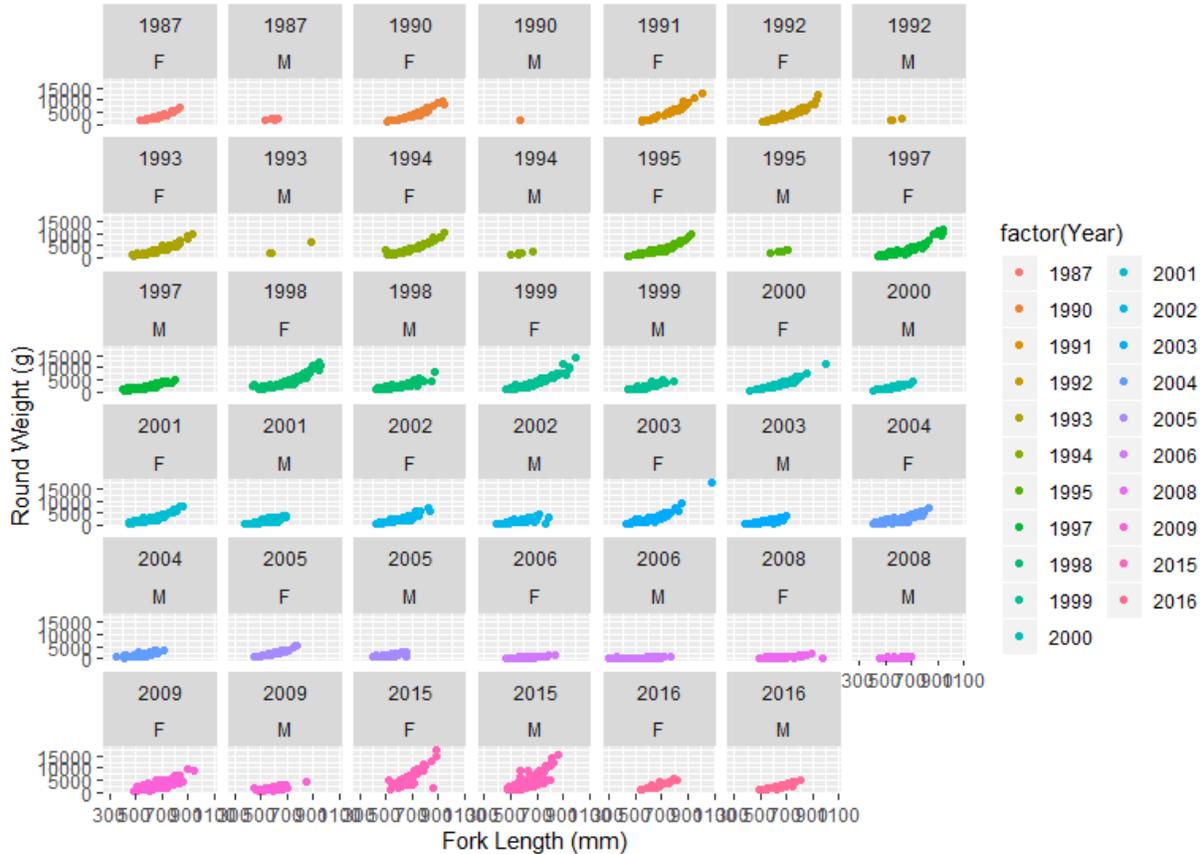


Figure 11. Annual plots of Greenland Halibut round weight (g) vs. fork length (mm) by sex (F and M denote female and male, respectively) with erroneous data from 2017 omitted.

Demographic data from the fish plant sampling program do not demonstrate significant negative impacts of harvest on the Greenland Halibut stock.

The history of exploitation shows a U-shaped pattern, with higher exploitation at the start of the fishery and in recent years, and lower harvest during 1996–2010 (Figure 5). In heavily fished stocks, this type of pattern can indicate a stock was reduced to an overfished state because of overfishing, followed by subsequent rebuilding and recovery. In the CSTMA, the U-shaped pattern results from the reduction in sea ice extent (Figure 2), which drove changes in the effective fishing area (Figure 3), resulting in reduced catch rates and consequent reductions in fishing effort. Because of the level of fishing effort, the full 500 t TAC was only taken in 2018. Therefore, the available data do not allow an assessment of the sustainability of the current 500 t TAC, let alone the sustainability of higher TAC levels.

Fishery-independent survey demographics

The fishery-independent longline survey has sampled Greenland Halibut from waters of 200–1400 m throughout the majority of Cumberland Sound. Catch rates (number and total weight for fish per standard 12 h longline set) have shown consistent spatial patterns, with catches increasing with water depth and being highest in the deep waters (> 800 m) near and south of Kekerten Island (Figures 13 and 14).

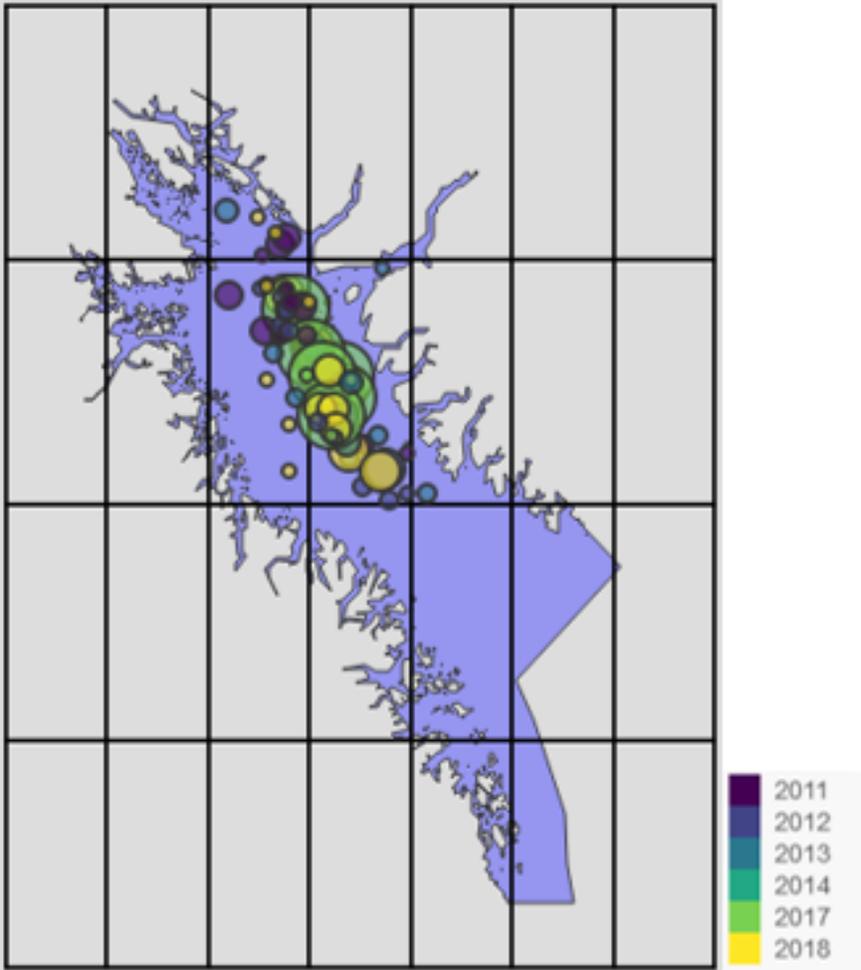


Figure 12. Fishing sets in the fishery-independent survey by year. Circle size is proportional to Greenland Halibut catch, with larger circles indicating larger catches. Colour indicates the year of sampling.

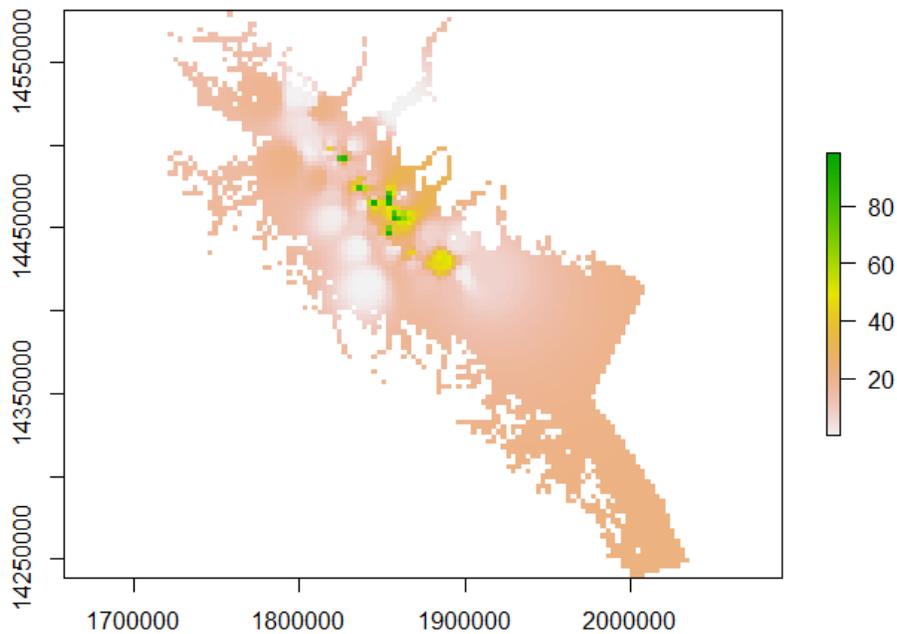


Figure 13. Inverse weighted distance plot of Greenland Halibut catch-per-unit-effort in the fishery-independent survey. Data are aggregated across years. Green areas indicate higher CPUE values.

The length-frequency distribution of Greenland Halibut caught during the fishery-independent survey (Figure 15) was similar to the distribution observed from the commercial catch (Figure 6), with the majority of fish having a fork length larger than 50 cm, which is larger than the L50 for female Greenland Halibut. Length-frequency could not be determined separately for each sex because the majority of fish were tagged and released, not dissected. Dead Greenland Halibut were dissected to determine their sex and assess maturity. None of the fish examined were entering or in spawning condition; all fish were either immature or resting between spawning events.

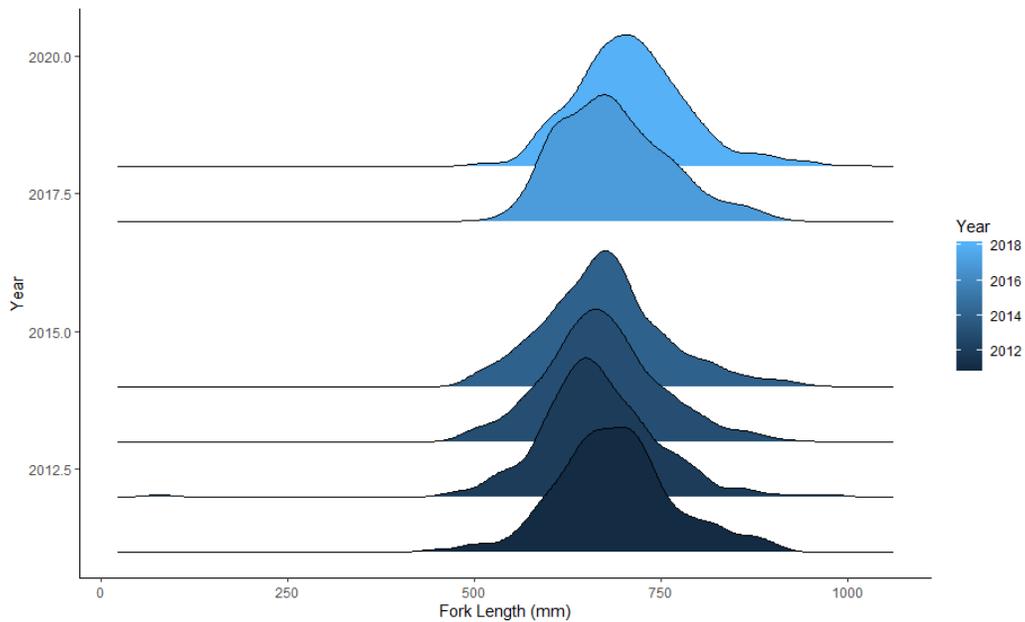


Figure 14. Annual length-frequency distributions for Greenland Halibut caught during the fishery-independent survey.

The length-weight relation for Greenland Halibut caught during the fishery-independent survey was consistent across years (Figure 16). Sexes could not be analysed separately because sex was not determined for the majority of fish. Mean weight of Greenland Halibut caught during the fishery-independent survey did not differ significantly among years (Figure 17).

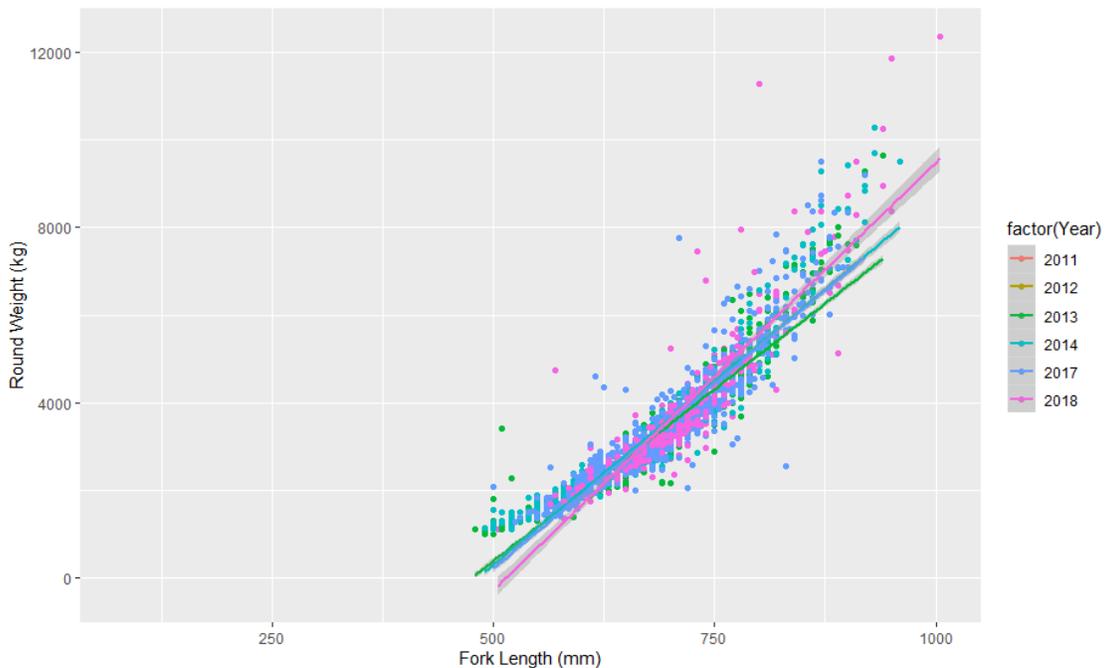


Figure 15. Annual length-weight relationships for Greenland Halibut caught during the fishery-independent survey. Fitted lines indicate linear relationships between fish fork length and round weight. Grey shading indicates 95% confidence intervals around the linear relationships.

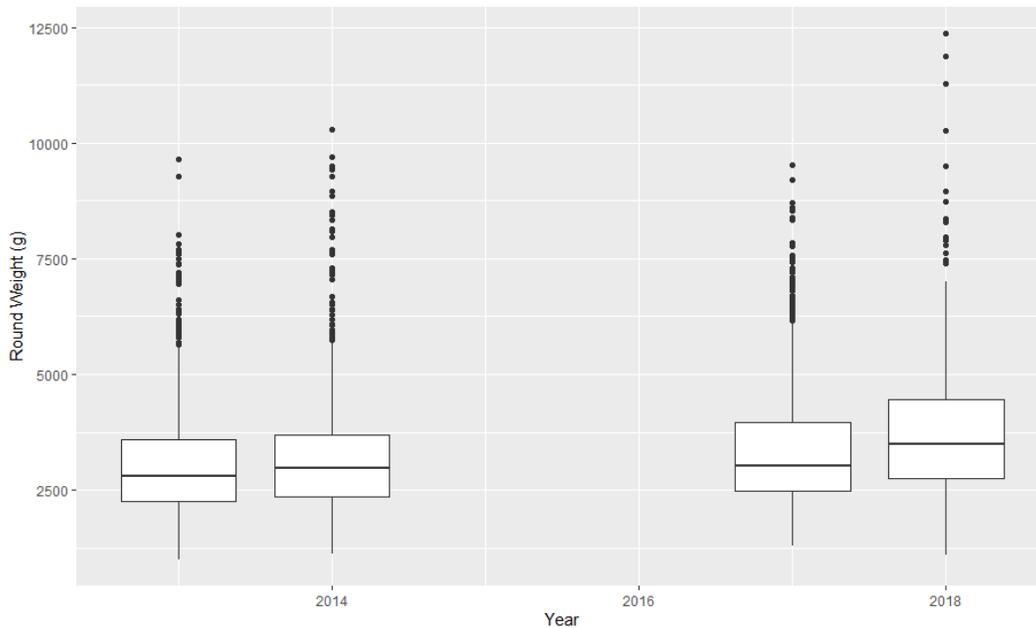


Figure 16. Boxplot of round weight for Greenland Halibut caught during the fishery-independent survey by year.

Abundance and biomass indices

Abundance and biomass indices were calculated annually based on data from the fishery-independent survey. Catch numbers and weights from longline sets were converted to density values, numbers and weights per km², by dividing the number and total weight of Greenland Halibut caught during each longline set by the area fished by the longline (equations 1 and 2).

$$\text{eq1 } Nkm = N/LLA$$

$$\text{eq2 } Mkm = M/LLA$$

Where Nkm and Mkm are the number and biomass of Greenland Halibut per km², respectively, N is the number of Greenland Halibut caught during a longline set, M is the mass of Greenland Halibut caught during the set, and LLA is area fished during the longline set (i.e., the length of the longline in km multiplied by 2 m as the maximum distance between hooks stretched out to either side of the longline). Mean density values were then calculated for each depth stratum. The total number and biomass of Greenland Halibut in each depth stratum were estimated by multiplying the density values by the total area of the stratum, and the values were summed across depth strata to produce overall abundance and biomass indices (equations 3 and 4).

$$\text{eq3 } AI = \sum_{i=1}^n Nkm_i \times SA_i$$

$$\text{eq4 } MI = \sum_{i=1}^n Mkm_i \times SA_i$$

Where AI and MI are abundance and biomass indices, respectively, SA_i is the area of depth stratum i in km², and n is the number of depth strata.

No significant trends were observed in either the abundance or biomass indices during the survey time series (2011–2018; Figures 18 and 19). The survey time series is not long, but it was sufficient to test for trends across years. The biomass index was not calculated for 2011 or 2012 because of performance issues with the scale on the vessel (the scale would not hold a calibration and values fluctuated significantly with ship movement).

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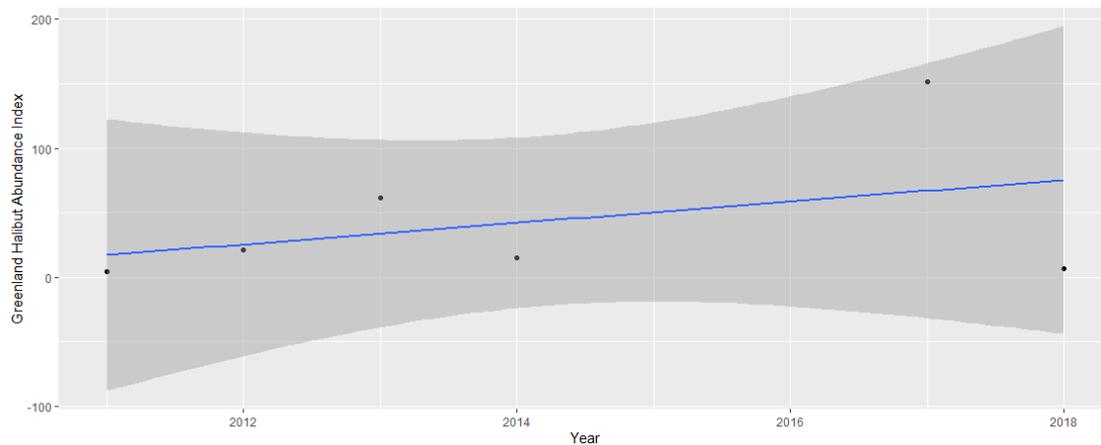


Figure 17. Greenland Halibut abundance index from the fishery-independent survey.

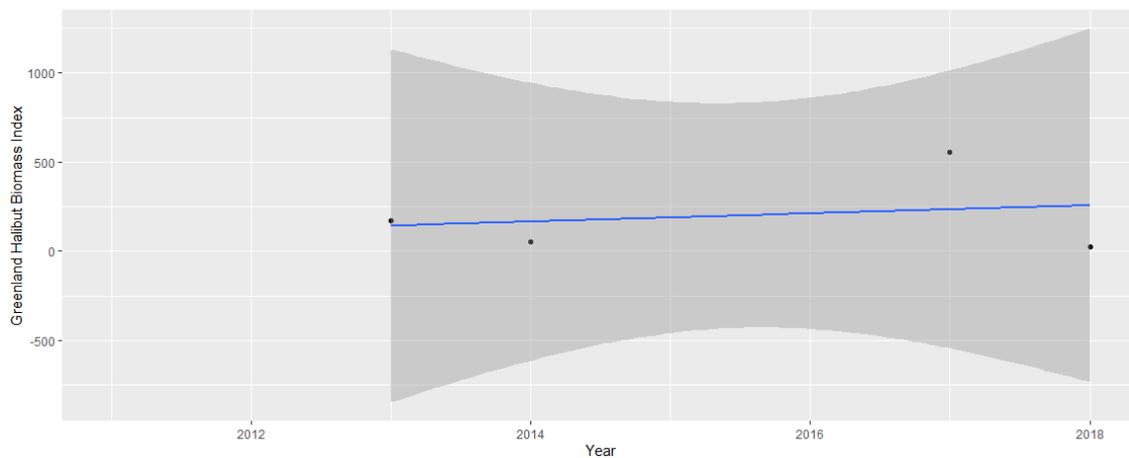


Figure 18. Greenland Halibut biomass index from the fishery-independent survey.

Population model

A population model was created using the DLMTtools package in R. The model showed poor convergence. Additionally, the lack of evidence of local reproduction in the CSTMA suggests that the Greenland Halibut in Cumberland Sound do not represent a discrete population and are reliant on immigration from Davis Strait. The population model was therefore attempting to model a component of a much larger population and the reproduction estimated by the model represented immigration, not reproduction; this likely contributed to the poor convergence. The validity of the model was therefore questioned and the model was not used to provide science advice.

Greenland Halibut movement patterns

Data from the collaborative Ocean Tracking Network, University of Windsor, and Fisheries and Oceans Canada fish tracking project were used to determine how Greenland Halibut move within Cumberland Sound, and whether the original location of the CSTMA boundary was supported by any biological rationale. Results showed consistent seasonal movement of tagged Greenland Halibut across the previous CSTMA boundary near Kekerten Island, and emigration of individuals out of Cumberland Sound to Davis Strait. These results are counter to the

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previous assumption that the CSTMA represents a sink population where juvenile Greenland Halibut immigrate from Davis Strait, transform, settle and remain within the CSTMA. The level of connectivity with Davis Strait needs to be assessed further to understand how changes in stocks within different fishing areas will affect each other (e.g., to what extent the CSTMA indices are affected by changes in the offshore stock in Baffin Bay and Davis Strait).

Sources of Uncertainty

Several sources of uncertainty were identified during the CSAS meeting:

1. Lack of local reproduction makes it impossible to generate a population model for the CSTMA. No small Greenland Halibut have been observed in Cumberland Sound and all of the fish captured in the fishery or fishery-independent survey have contained gonads that were immature or resting (these two states cannot be visually distinguished).
2. No direct estimates of abundance are available.
3. The fishery recruitment process needs to be better understood.
4. Four Greenland Halibut caught and tagged in Cumberland Sound were recaptured in the offshore; however, the amount of movement from Cumberland Sound to the offshore and vice versa is still poorly understood.
5. Log books are not returned by all fishers. Logbooks are the sole source of information on fishing locations, fishing effort, catch-per-unit effort and bycatch.
6. There is some uncertainty about tag return success. Tag loss and return rates should be estimated.

CONCLUSIONS AND ADVICE

Recommendations for future work:

- Natural and fishing mortality rates should be estimated using tagging data.
- Resume and expand the plant sampling program to collect data on a larger subsample of the catch, calculate age-length relationships by sex that are regularly updated, and add histological analyses of gonads to determine if individuals are immature or resting.
- Conduct plant sampling whenever summer commercial fishing occurs.
- Bottom mapping should be conducted throughout the Greenland Halibut winter fishing grounds in Cumberland Sound.
- Rates of immigration and emigration should be estimated to understand connectivity between the CSTMA and NAFO Division 0B.
- A working group should be formed with co-management partners, fishers, and DFO to help guide future research using science and traditional knowledge.
- Improve logbook returns.

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SOURCES OF INFORMATION

- Courchesne, S., Lester B., Burns A., and Swerdfager, T. 2016. Quota carry forward guidelines for Atlantic Canada. 2016-045-00261.3 pp.
- Dwyer, K.S., Treble, M.A. and Campana, S.E. 2016. Age and growth of Greenland Halibut (*Reinhardtius hippoglossoides*) in the Northwest Atlantic: A changing perception based on bomb radiocarbon analyses. Fish. Res. 179: 342–350.
- Fedorov, K.Y. 1971. The state of the gonads of the Barents Sea Greenland halibut (*Reinhardtius hippoglossoides* (Walb.)) in connection with failure to spawn. J. Ichthyol. Vopr. Ikhtiol. 11: 673–682.

Government of Nunavut, 2009. Development of the Cumberland Sound Inshore Summer Turbot Fishery. Department of Environment, Fisheries and Sealing Division report. 46 pp.

Government of Nunavut, 2010. Development of the Cumberland Sound Inshore Summer Turbot Fishery. Department of Environment, Fisheries and Sealing Division report. 34 pp.

Hussey, N.E., Hedges, K.J., Barkley, A.N., Treble, M.A., Peklova, I., Webber, D.M., Ferguson, S.H., Yurkowski, D.J., Kessel, S.T., Bedard, J.M., and Fisk, A.T. 2017. Movements of a deep-water fish: establishing marine fisheries management boundaries in coastal Arctic waters. *Ecol. Appl.* 27(3): 687–704.

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ISSN 1919-5087

ISBN 978-0-660-97877-2 Cat. No. Fs70-6/2026-007E-PDF

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Correct Citation for this Publication:

DFO. 2026. Assessment of Cumberland Sound Greenland Halibut (*Reinhardtius hippoglossoides*) in 2019. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2026/007.

Aussi disponible en français :

MPO. 2026. Évaluation du flétan du Groenland (*Reinhardtius hippoglossoides*) de la baie Cumberland en 2019. Secr. can. des avis sci. du MPO. Avis sci. 2026/007.

Inuktitut Atuinnaummijuq:

DFO. 2026. ᖃᐃᐱᐱ ᖃᓄᓂᓂ ᐸᓂᓄᓂᓂᓂᓂ ᐃᓄᓂᓂᓂᓂ ᐸᓂᓄᓂᓂᓂᓂ (Reinhardtius hippoglossoides) 2019-ᓂᓂ. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2026/007.