Fisheries and Oceans Canada | Pêches et Océans Canada
Science | Sciences

C S A S | ***S C C S***

Canadian Science Advisory Secretariat | **Secrétariat canadien de consultation scientifique**

Research Document 2011/103 | **Document de recherche 2011/103**

Gulf Region | **Région du Golfe**

Possible disappearance of a white hake (*Urophycis tenuis*) spawning component in Baie Verte (Northumberland Strait): Evidence from fixed station sampling in July 1985, July 1986, June 1994 and July 2001

La possibilité qu'une composante génitrice de la merluche blanche (*Urophycis tenuis*) soit disparue de la région Baie Verte du Détroit Northumberland : évidences basées sur des relevés de stations fixes entrepris en juillet 1985 et 1986, en juin 1994 et en juillet 2001

T.R. Hurlbut

Fisheries and Oceans Canada
Aquatic Resources Division, Gulf Region
Gulf Fisheries Centre
343 University Avenue, P.O. Box 5030
Moncton, NB E1C 9B6

ISSN 1499-3848 (Printed / Imprimé)
ISSN 1919-5044 (Online / En ligne)

Canada

Correct citation for this publication:
La présente publication doit être citée comme suit :

Hurlbut, T.R. 2012. Possible disappearance of a white hake (*Urophycis tenuis*) spawning component in Baie Verte (Northumberland Strait): Evidence from fixed station sampling in July 1985, July 1986, June 1994 and July 2001. DFO Can. Sci. Advis. Sec. Res. Doc. 2011/103. iv + 10 p.

ABSTRACT

Throughout the 1980s, there was a seasonal fishery that targeted spawning concentrations of white hake in Baie Verte (Northumberland Strait). Repeated sampling at eight fixed stations in Baie Verte in July 1985, July 1986 and June 1994 yielded similar catch rates of predominately commercial sized white hake. However, repeated sampling of the same fixed stations in July 2001 revealed that white hake had virtually disappeared from the area. There is additional evidence in support of the conclusion that white hake had disappeared from Baie Verte in 2001, and for the remainder of the decade, in the absence of catches in this area during the July-August 2001-2009 bottom-trawl survey of the Northumberland Strait.

RÉSUMÉ

Durant les années 80s, une pêche saisonnière ciblait des concentrations de merluche blanche reproductrices dans la région de Baie Verte dans le détroit de Northumberland. Des campagnes d'échantillonnage à huit stations fixes dans la région de Baie Verte en juillet 1985 et 1986 et en juin 1994 ont capturé à des taux similaires de la merluche blanche prédominant de taille commerciale. Cependant, une dernière campagne d'échantillonnage aux mêmes huit stations en juillet 2001 a révélé la quasi disparition de la merluche blanche de cette région. L'absence de captures de merluche blanche dans les relevés au chalut de fond du détroit Northumberland effectués en juillet et août depuis 2001 à 2009 confirme que la merluche blanche est absente de la région de Baie Verte depuis 2001 et durant la dernière décennie.

INTRODUCTION

Baie Verte is a small (~150 km^2 high water), shallow (<18 m maximum depth) embayment of the Northumberland Strait that straddles the NB/NS border, and is situated approximately 15 km southwest of the Confederation Bridge connecting the provinces of NB and PEI (Gregory et al. 1993; Fig. 1).

In the context of the white hake fishery in the southern Gulf of St. Lawrence, Baie Verte is of interest because it supported a locally important, seasonal fishery that targeted spawning concentrations of white hake throughout most of the 1980s. Landings in this fishery, which was mainly prosecuted by a local fleet of small (<14 m length overall) bottom trawlers, were as high as 42 t in July 1985 (i.e. the total landings of white hake by bottom trawl gears in fishery statistical districts 145 and 280 that represent Baie Verte). The white hake fishery in the southern Gulf (NAFO division 4T) collapsed in the early 1990s, and has remained under a continuous moratorium since 1995 (DFO 2005). Annual resource monitoring surveys conducted by DFO (Department of Fisheries and Oceans) since the declaration of the moratorium have documented further declines in the abundance and biomass of white hake, and culminated in an upcoming review of the conservation status of white hake in Atlantic Canada by COSEWIC (Committee on the Status of Endangered Wildlife in Canada). This work was undertaken as a contribution to the November 2011 Zonal Advisory Process Pre-COSEWIC peer review of white hake.

Baie Verte is also of interest in the context of the white hake fishery in the southern Gulf because it is not within the area covered by the annual (Sept.) bottom-trawl survey of the southern Gulf, and hence, may provide unique information on the distribution, abundance and biology of white hake in this area.

METHODS

In 1985 and 1986, science staff from the Gulf Fisheries Centre (based in Moncton, NB) chartered a commercial side trawler from the Cape Tormentine fleet to make a series of standardized fishing sets at eight (8) fixed stations in Baie Verte (Fig. 2), with the primary purpose of describing seasonal changes in the local distribution and abundance of white hake, and to obtain biological samples for studies of age and growth. The owner of the fishing vessel had fished for white hake for many years and was still active in the fishery. A standard “fifty-foot flounder trawl” similar to the ones used by local commercial trawlers was used with a ¼” (0.635 cm) liner in the codend and lengthening piece. Aluminum trawl doors (105 cm wide x 180 cm long), similar to those in use by local commercial trawlers, were employed. The target fishing procedure was a 30-min tow at a speed of 2.5 knots.

In 1985, trips were made to sample the fixed stations on five occasions: June 18, July 2, July 18, July 25 and August 1 (Table 1). This project was effectively concluded in 1986 when four trips were made on the following dates: June 19, July 7, July 22 and July 30 (Table 1).

Following the collapse of the white hake fishery, two exploratory trips were made to sample the same fixed stations on June 29, 1994 and July 5, 2001, 8 and 15 years respectively after the last trips made in 1986 (Table 1). The same captain, charter vessel, fishing gear and survey procedures as in 1985 and 1986 were used for the two exploratory trips.

All eight of the fixed stations were not successfully sampled on every trip. Sampling was incomplete on seven of the eleven trips when only 5-7 of the fixed stations were sampled (Table 1). Fishing tows with durations less than 20 minutes or greater than 40 minutes were regarded as invalid. All catches were adjusted to a standard tow distance of 1.3 nautical miles.

For comparisons across the four years when the fixed stations were sampled, analyses were restricted to trips that occurred within the same "two week window" (June 29 - July 12) in each of the four years (i.e. trips A002, A011, A021 and A031; Table 1). Mean catch rates (number and weight) were calculated as the simple arithmetic mean of the catches from all valid tows made during each trip.

Maps of the geographic distribution of white hake catches were created for each trip using the ACON software package (http://www.mar.dfo-mpo.gc.ca/science/acon). Catches (numbers) were plotted as expanding circles representing the 10 th, 25 th, 50 th, 75 th and 90th percentiles of non-zero catches, with null catches indicated by a plus (+) sign.

RESULTS AND DISCUSSION

The mean catch rates (numbers and weight) were not significantly different in 1985 and 1986 (Fig. 3). When the fixed stations were re-sampled on June 29, 1994, following the collapse of the white hake fishery, the catch rates were not significantly different from those observed in 1985 and 1986 (Fig. 3). However, when the same stations were re-sampled on July 5, 2001, sixteen years after they were first sampled in 1985, no white hake were caught in the eight tows that were made (Fig. 3). Furthermore, only two white hake were caught at the same eight fixed stations two weeks earlier (June 22-23, 2001) in standardized fishing tows made by the CCGS *Opilio* to catch and tag winter flounder (data provided by R. Morin, DFO, Moncton).

The geographic distribution of the white hake catches is shown in Figure 4. In 1985, 1986 and 1994, the largest catches were recorded at the deepest stations (10-15 m) situated near the southern entrance to the bay. The absence of white hake in the July 2001 trip was also consistent with the distribution of catches of white hake in the July-August 2001-2009 bottom-trawl survey of the Northumberland Strait, in which few or no white hake were ever caught in this area (Fig. 5; S. LeBlanc and T. Surette, DFO unpublished data)

The vast majority (>95%) of white hake caught in 1985, 1986 and 1994 were larger than the minimum commercial size of 45 cm (Fig. 6). All of the fish caught in 1985, 1986 and 1994 were sexually mature except for two (one each in 1985 and 1986), and the proportion of actively spawning fish (i.e. maturity visually assessed as running ripe or spent) ranged from 2% in 1985 to 49% in 1994.

CONCLUSIONS

Throughout the 1980s, there was a locally important seasonal fishery that targeted spawning concentrations of white hake in Baie Verte (Northumberland Strait). Repeated sampling at a series of fixed stations in Baie Verte in July 1985, July 1986 and June 1994 yielded similar catch rates of predominately commercial sized white hake. However, repeated sampling of the same fixed stations in July 2001 revealed that white hake had virtually disappeared from the area. There is additional evidence in support of the conclusion that white hake had disappeared

from Baie Verte in 2001, and for the remainder of the decade, in the absence of catches in this area during the July-August 2001-2009 bottom-trawl survey of the Northumberland Strait.

ACKNOWLEDGEMENTS

Thanks are extended to Éliane Aubry and Sophie LeBlanc for their constructive reviews of a previous draft of this document.

REFERENCES

DFO, 2005. White Hake in the Southern Gulf of St. Lawrence (Div. 4T). DFO Can. Sci. Advis. Sec. Stock Status Rep. 2005/009.

Gregory, D., B. Petrie, F. Jordan, and P. Langille. 1993. Oceanographic, geographic and hydrological parameters of Scotia-Fundy and southern Gulf of St. Lawrence inlets. Can. Tech. Rep. Hydrogr. Ocean Sci. No. 143: viii + 248 pp.

*Table 1. Dates of trips on which standardized fishing sets were made at fixed stations in Baie Verte. Shaded cells designate fixed stations that were successfully sampled on a trip. * - Designates trips that occurred within the same "two week window" (June 29 - July 12) in a given year, and which were chosen for inter-annual comparisons.*

		Fixed Station #							
Trip #	**Date**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
A001	June 18, 1985								
A002*	July 2, 1985								
A003	July 18, 1985								
A004	July 25, 1985								
A005	August 1, 1985								
A010	June 19, 1986								
A011*	July 7, 1986								
A012	July 22, 1986								
A013	July 30, 1986								
A021*	June 29, 1994								
A031*	July 5, 2001								

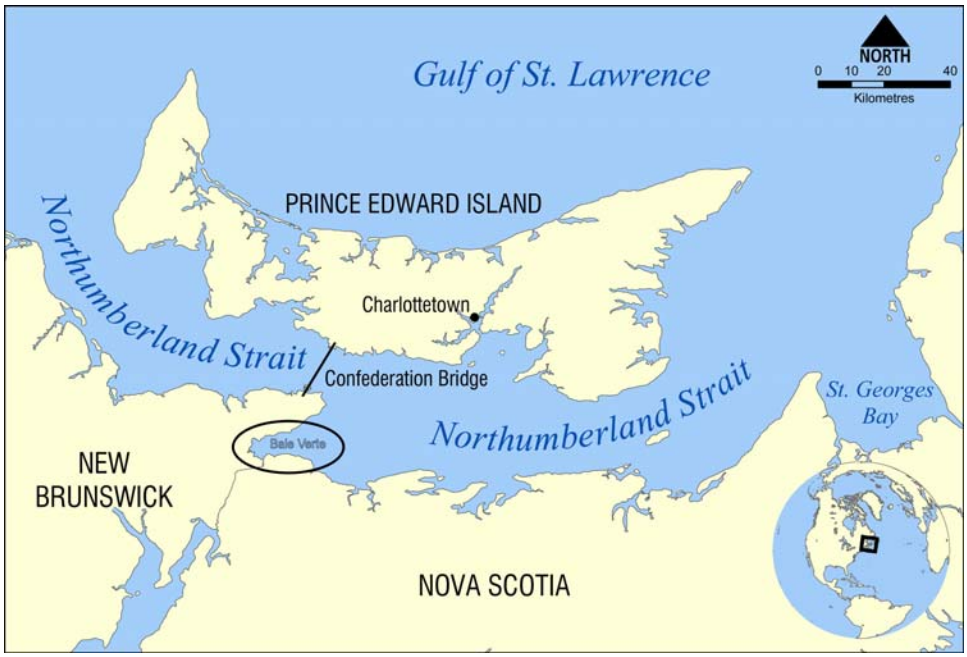

Figure 1. Location of the Baie Verte study area (indicated by ellipse) in the southern Gulf of St. Lawrence.

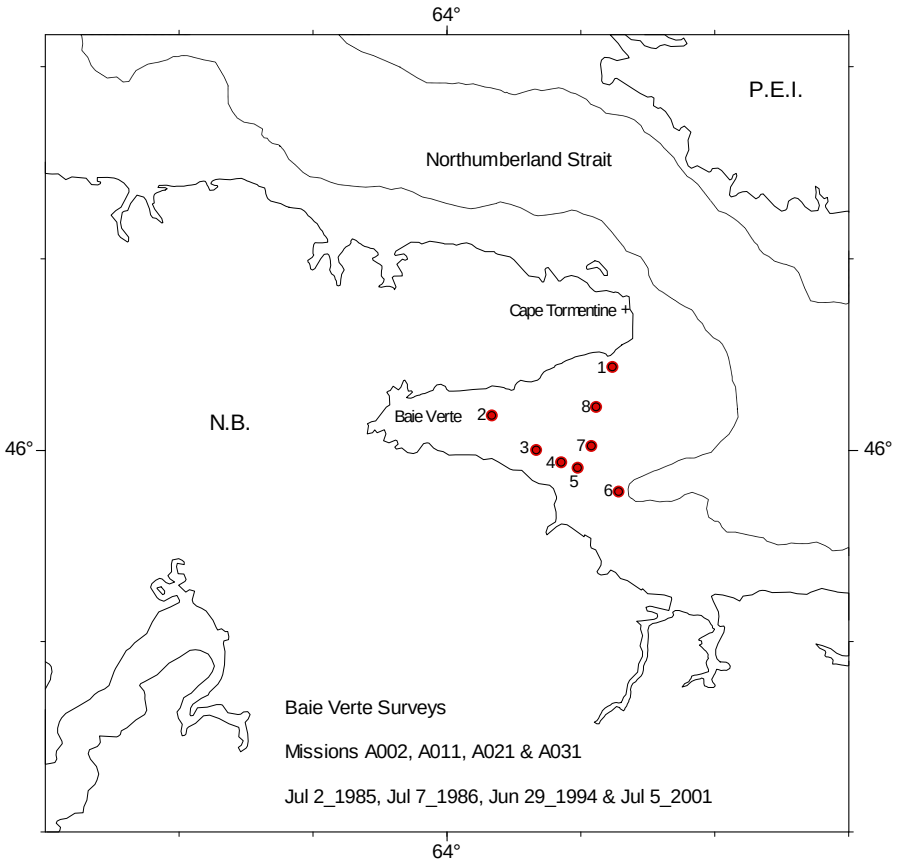

Figure 2. Location of fixed stations in Baie Verte where standardized fishing sets were made by a chartered bottom trawler in July 1985, July 1986, June 1994 and July 2001.

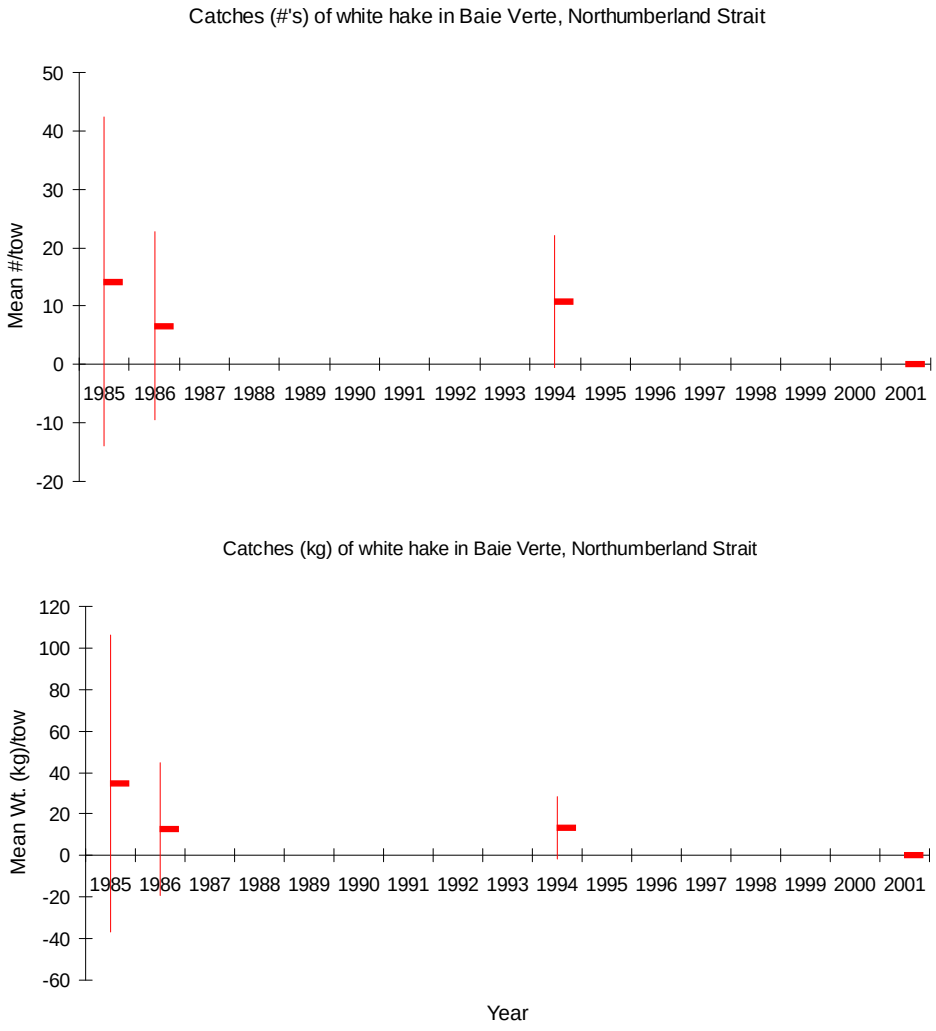

Figure 3. Mean number per tow (top) and mean weight per tow in kg (bottom) (ages 0+) of white hake caught at fixed stations in Baie Verte by a chartered bottom trawler in July 1985, July 1986, June 1994 and July 2001. Error bars indicate approximate 95% confidence intervals.

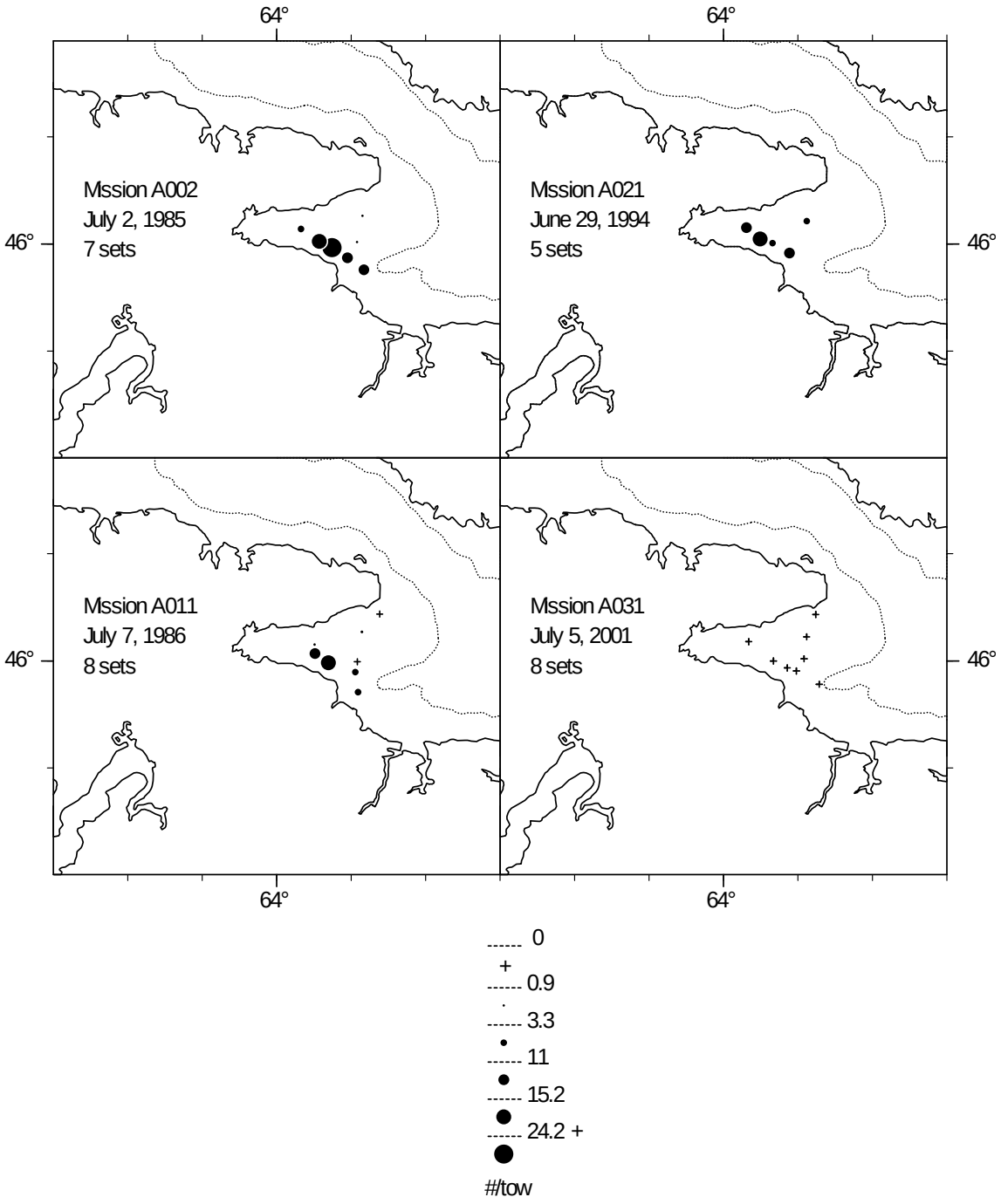

Figure 4. Distribution of catches (#'s) of white hake (all sizes) at fixed stations in Baie Verte by a chartered bottom trawler in July 1985, July 1986, June 1994 and July 2001.

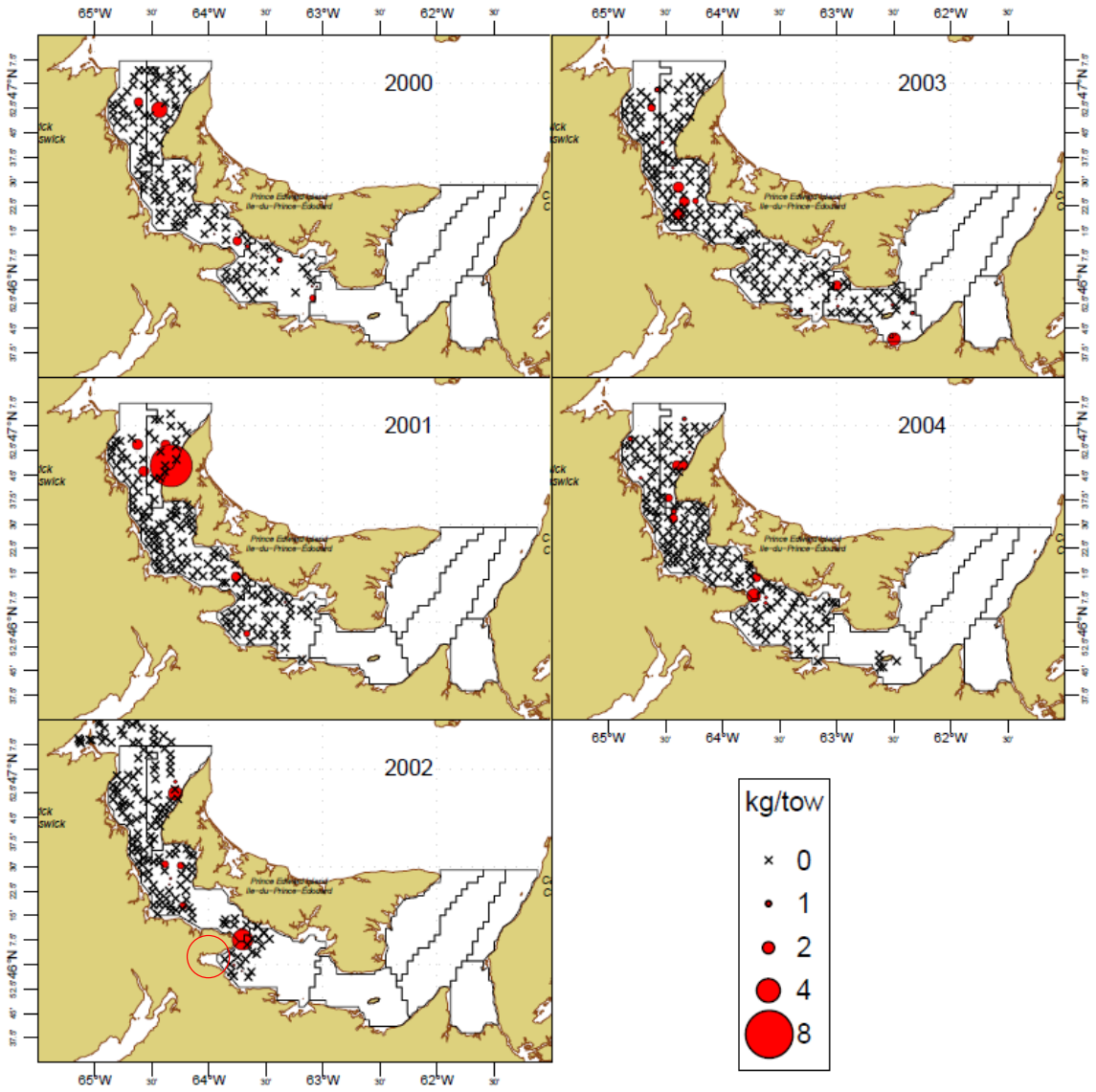

Figure 5. Distribution of white hake catches (kg) during the July-August bottom-trawl survey of the Northumberland Strait (2000-2009). All sampling sites are shown. Data are from S. LeBlanc and T. Surette (DFO, unpublished data). Location of the Baie Verte study area is indicated by an open red circle in map for 2002.

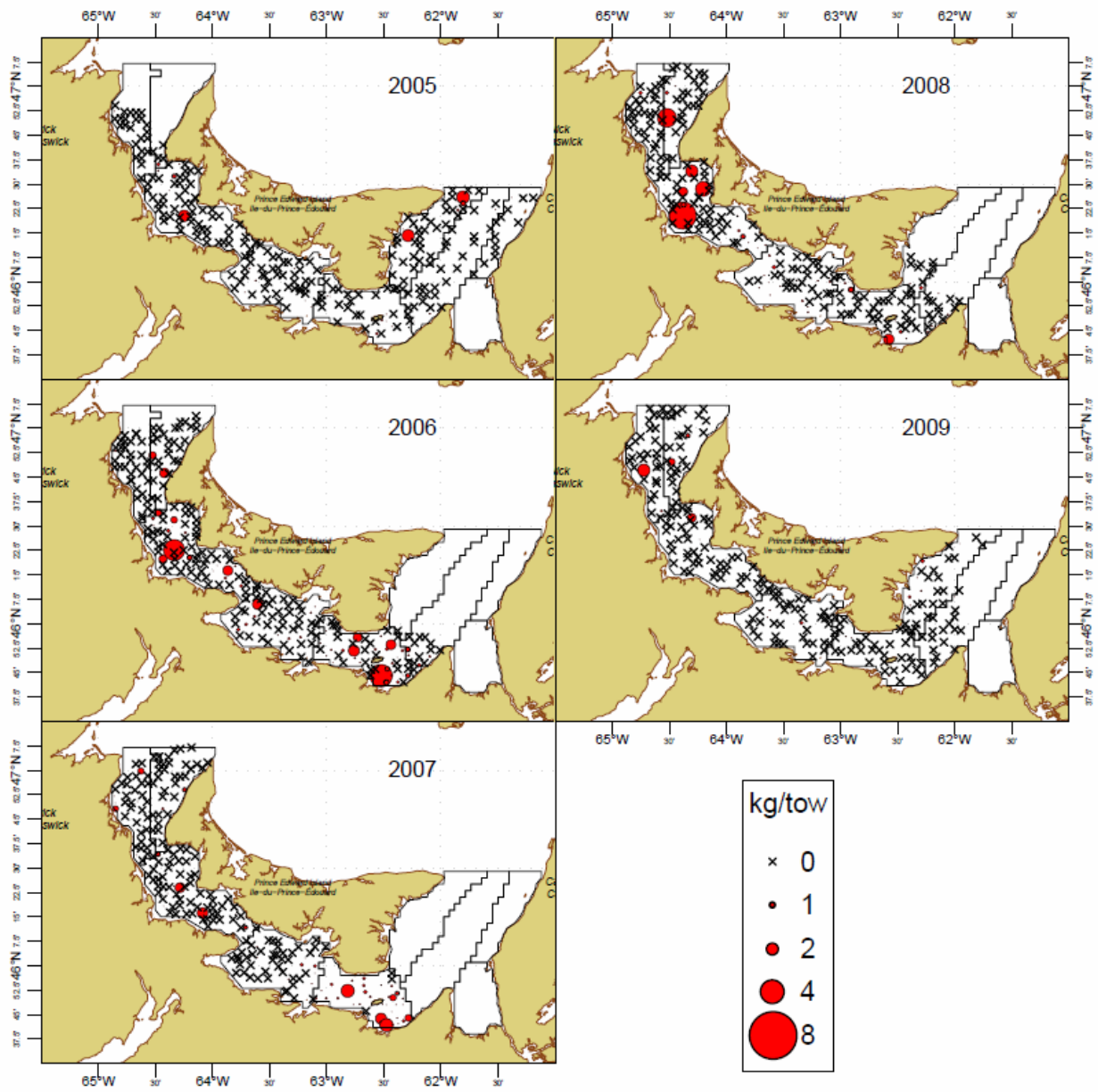

Figure 5 (continued). White hake catches (kg) during the July-August bottom-trawl survey of the Northumberland Strait (2000-2009). All sampling sites are shown. Data are from S. LeBlanc and T. Surette (DFO, unpublished data). Location of the Baie Verte study area is indicated by circle in map for 2002.

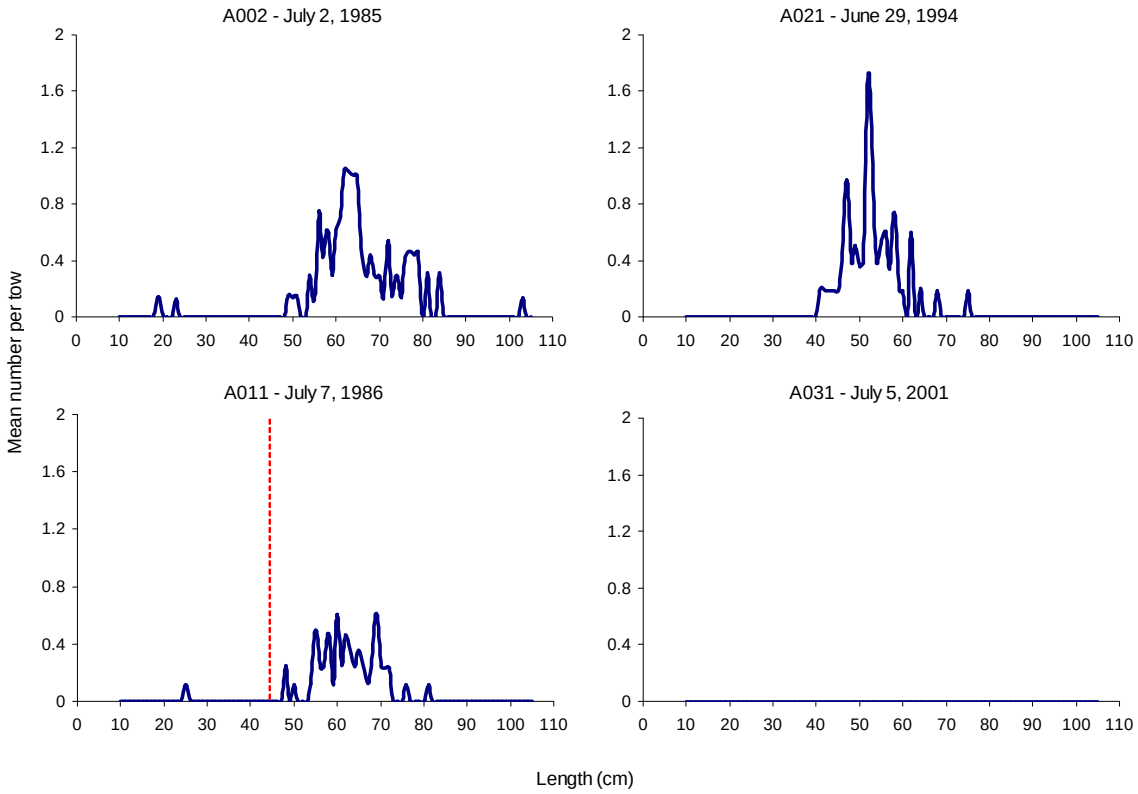

Figure 6. Length frequencies of white hake caught at fixed stations in Baie Verte by a chartered bottom trawler in July 1985, July 1986, June 1994 and July 2001. The dashed line indicates the regulated minimum size in the commercial fishery (45 cm).