SEA SCALLOP STATUS ON ST. PIERRE BANK (SUBDIVISION 3Ps)

Context

There had been little or no sea scallop fishing by the offshore sector on St. Pierre Bank from 1997 to 2003. During that time the inshore NL fleet had no directed sea scallop fishery but was allowed a 10% by-catch of sea scallops from its directed Iceland scallop fishery. This by-catch restriction was removed in 2004. The Offshore Scallop Advisory Committee (OSAC) increased the TAC for sea scallops on St. Pierre Bank in 2004 from 50 tonnes of meats to 250 tonnes (2075t round). The 2004 TAC of 250 t of meats for the offshore fleet was carried over for 2005, and the NL inshore fleet was allocated a 50 t TAC. Prior to this, the inshore NL sector operated without a TAC.

Following the release of the Hooley report (Hooley 2005) in 2006, the Minister assigned fishing areas based on known fishing beds on St. Pierre Bank. The offshore sector was allocated a quota of 195 t south of 46º 12' N while the inshore NL sector was allocated a 105 t quota to the north.

In order to advise the Minister on management measures for the 2007 fishery it was essential to review the data pertaining to the sea scallop resource on St. Pierre Bank. Fisheries and Aquaculture Management (FAM), National Capital Region, requested that the NL Region analyze data from survey cruises carried out by the offshore industry over the past 3 years. The following, more specific questions were posed by Fisheries and Aquaculture Management (FAM), NL Region:

- What is the status of the Sea scallop resource on St. Pierre Bank (subdivision 3Ps)?
- What is the size of the biomass?
- What is the biomass distribution among the 3 identified beds?
- What is the recommended exploitation rate?
- What is the level of overlap between the Iceland and sea scallop distributions in this area?

This resource has not been assessed under the Regional Advisory Process (RAP) in the past because advice has not been requested. The 2007 request for science information and/or advice was not received in advance of the Feb. 27 - Mar. 09, 2007 Shellfish RAP. Therefore the request initiated on March 5, 2007 with a deadline of March 31, was addressed by the Science Special Response Process.

Background

Three localized aggregations of sea scallop exist on St. Pierre Bank (Fig. 1); a large aggregation north of 46º 12' N and two aggregations in the south that include a large aggregation in the extreme south and a smaller aggregation ('middle bed'). Until the early

1990's this resource was prosecuted primarily by offshore vessels (>65') based in Nova Scotia. There was an increase in scallop fishing effort by inshore vessels (<65') based in Newfoundland following the groundfish moratorium. Prior to 2006 the fishery was managed by TAC and meat count regulations applied to the offshore fleet, but not to the inshore fleet. In 2006, following recommendations of the Hooley Report, specific fishing areas and TACs were applied to each fleet. The offshore fleet was restricted to areas south of 46º 12' N, (including the middle and south beds) whereas the inshore fleet was restricted to more northern areas.

Annual landings of sea scallops from St. Pierre Bank have been highly variable (Fig. 2), as is typical of 'pulse'-type fisheries. Recruitment in these fisheries is generally intermittent, with each 'pulse' supporting high landings for only a few years. Landings peaked twice in the 1980's (~6,000 and 10,000 t round), declined sharply from 1988 to less than 500 t by the mid 1990's, and remained low until 2003. They increased from about 650 t in 2003 to 4,500 t in 2004 and decreased to 550 t in 2006.

Fishery independent data were available from one DFO survey in 2003 and three industry sponsored surveys in subsequent years conducted using the FV Cape Keltic.

Analysis and Response

Biomass

Total biomass (t round) declined steadily from about 17,600 t in 2004 to 9,100 t in 2006 (Table 1). The biomass in the northern bed declined from 7,330 t in 2004 to 3,850 t in 2006 (Fig. 3). In the middle bed the biomass decreased from 5,700 t in 2004 to 4,370 t in 2005 and dropped precipitously to only 280 t in 2006. In the southern bed there was no detectable change in biomass over the past 3 years, estimated at 4,940 t in 2006. Biomass estimates were inflated by inclusion of epibionts and scallop shells ('cluckers') in the catch weight. However, this bias did not affect trends in biomass.

The sharp decrease in biomass in the middle bed cannot be explained by the reported landings of sea scallops in 2005. The decrease was associated with a very high level of fishing effort directed for Iceland scallops, by the NL inshore fleet, in 2005. This likely resulted in high fishery-induced mortality on sea scallops. It is believed that a large portion of the fishery removals of sea scallops in 2005 was misreported as Iceland scallops by the NL inshore fleet.

Recommended exploitation rate

Exploitation rates are unknown due to uncertainty regarding species composition of landings. The resource has been depleted in the middle bed such that insufficient data were available from the 2006 survey to describe the size frequency (Fig. 4). The fishery should be closed in this bed until a new recruitment pulse appears and contributes to the exploitable biomass.

In the northern and southern beds there was only a single mode of large (>100 mm) sea scallops evident from the 2006 survey (Fig. 4). There was no sign of incoming recruitment at smaller sizes. There is high uncertainty as to the relative contributions of recruitment from outside versus within areas fished (Naidu and Anderson 1984). At the current large sizes and old ages (mostly 10+ years) and with no foreseeable recruitment prospects, sustainability is not achievable. Given the current size and age structure there is little potential for further growth. Also meat quality will deteriorate and natural mortality will increase. Under this scenario the

available exploitable biomass in the northern and southern beds could be harvested in the short term.

Overlap of scallop species

Iceland scallops require a hard substrate for attachment whereas sea scallops tend to be distributed on softer substrates. The sea and Iceland scallop distributions overlap to a high degree. There is complete overlap in the middle bed and a high degree of overlap in the northern bed. A large area in the southern portion of the southern bed, with a sandy substrate, is inhabited only by sea scallops (Fig. 5).

Conclusions

The most recent recruitment pulse that has supported a modest increase in landings during the past four years has likely been the largest since that of the late 1980s. This recent recruitment pulse has been mostly harvested as it has progressed through the exploitable biomass to large body size. There is no sign of a new recruitment pulse based on recent survey data. There is high uncertainty as to the relative contributions of recruitment from outside versus within local areas fished.

The resource has been depleted in the middle bed. The fishery should be closed on this bed until a new recruitment pulse appears and contributes to the exploitable biomass. There is high uncertainty regarding the accuracy of reporting of landings by scallop species. Also the two scallop species fully overlap in this bed such that there is concern regarding sea scallop mortality induced by the Iceland scallop fishery. It would be precautionary to close this bed to all scallop fishing.

In the northern and southern beds there is only a single mode of large (>100 mm) sea scallops. At the current large sizes and with no foreseeable recruitment prospects, sustainability is not achievable. Meat quality is expected to deteriorate and natural mortality to increase. Under this scenario the remaining exploitable biomass in the northern and southern beds could be harvested in the short term. Subsequent reduction in fishing effort should reduce fishery-induced mortality on pre-recruits and promote future recruitment. The sea scallop fishery has historically ceased for economic reasons after a recruitment pulse was harvested with some residual biomass remaining. However, there is now high uncertainty regarding the effects of an ongoing Iceland scallop fishery on sea scallop mortality.

Contributors

This response was written by Don Stansbury and Earl Dawe with contributions by Frank Cahill, Elaine Hynick and Darrell Mullowney. Data were provided by Amy Chisholm (DFO Science, Maritimes Region). Science staff from the Maritimes Region reviewed this document.

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Sources of information

Hooley, D.W. 2005. Independent Process to Examine the Allocation of Sea Scallop Quota on St. Pierre Bank (3Ps) by David W. Hooley Commissioned at the direction of the Minister of Fisheries and Oceans, the Honourable Geoff Regan.

Naidu, K. S. and J. T. Anderson. 1984. Aspects of scallop recruitment on St. Pierre Bank in relation to oceanography and implications for resource management. CAFSAC Res. Doc. 84/29, 15 p.

Appendice

Table 1. Sea Scallop biomass (t round) estimates for each bed.

	Year		
Biomass	2004	2005	2006
North Bed	7330	4431	3845
Middle Bed	5693	4374	284
South Bed	4568	4712	4939
Total	17591	13517	9068

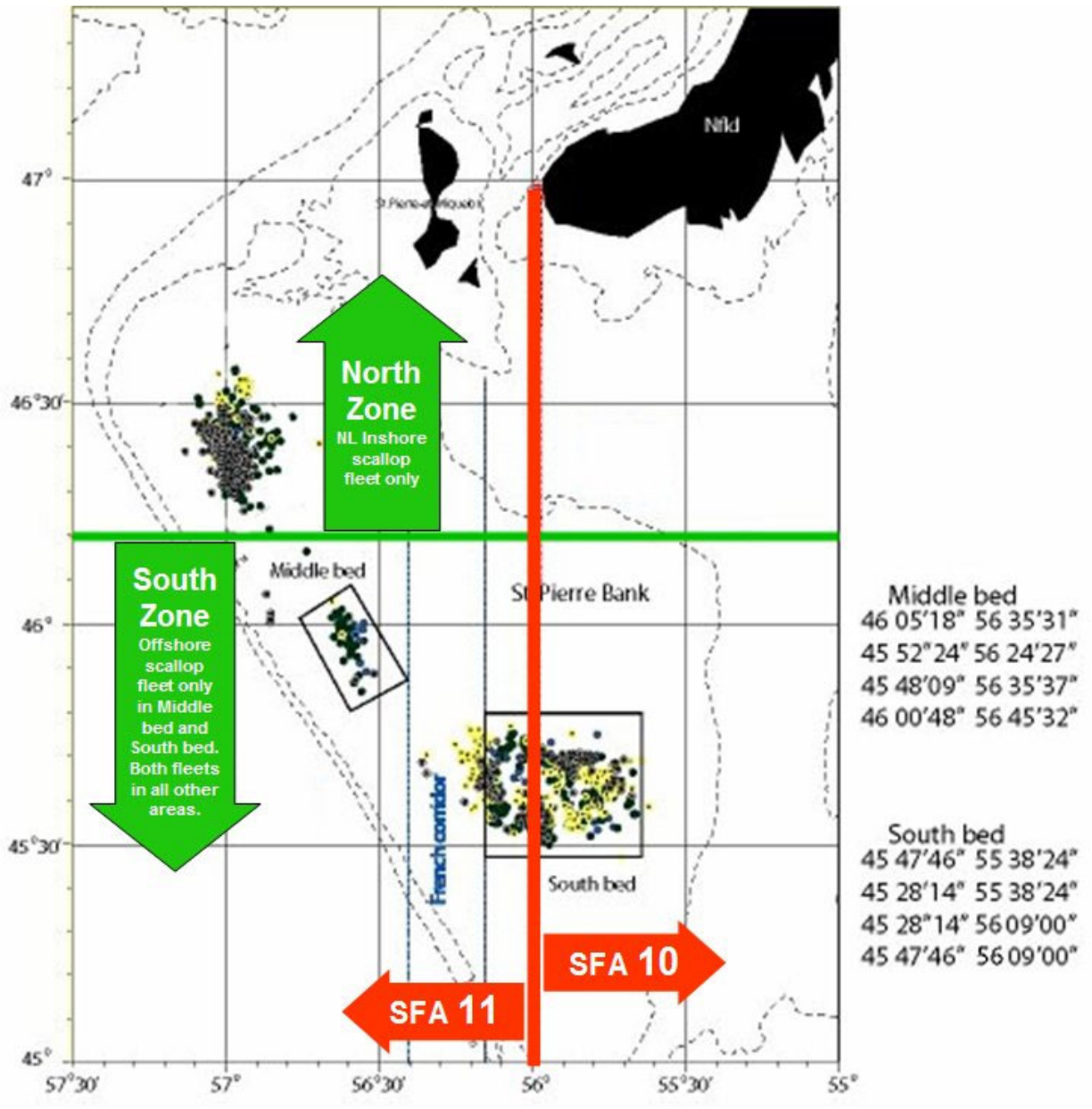

Figure 1. Map indicating the Hooley recommended fleet separation Areas for the 2006 scallop fishery. (SFA = Scallop fishing area).

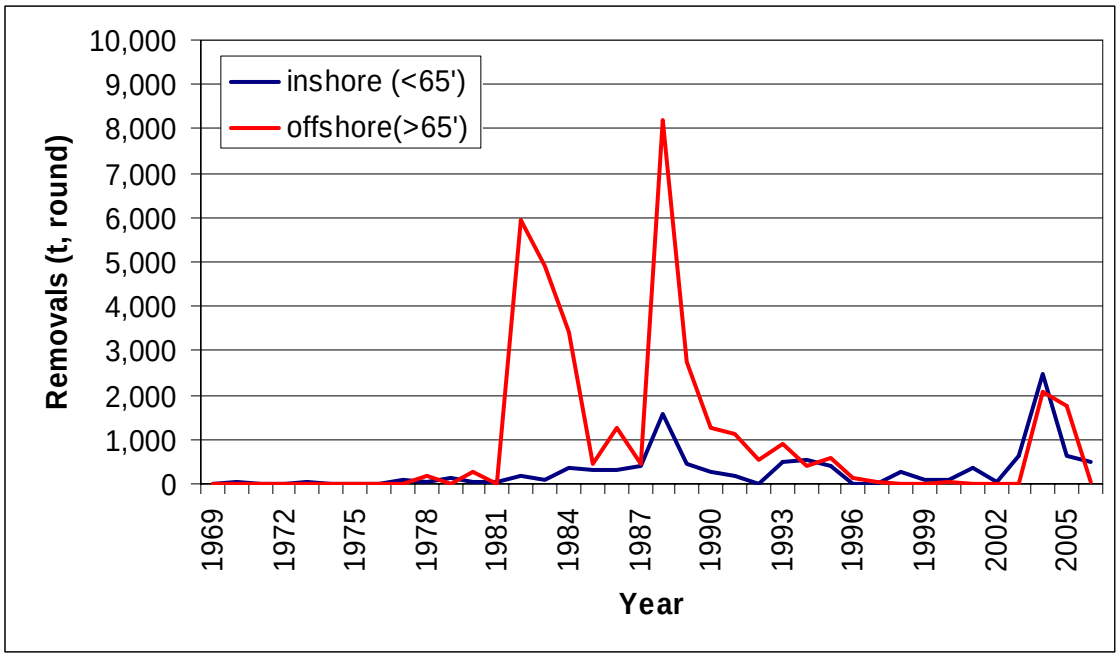

Figure 2. Sea scallop removals (t round) from St. Pierre Bank by fleet sector.

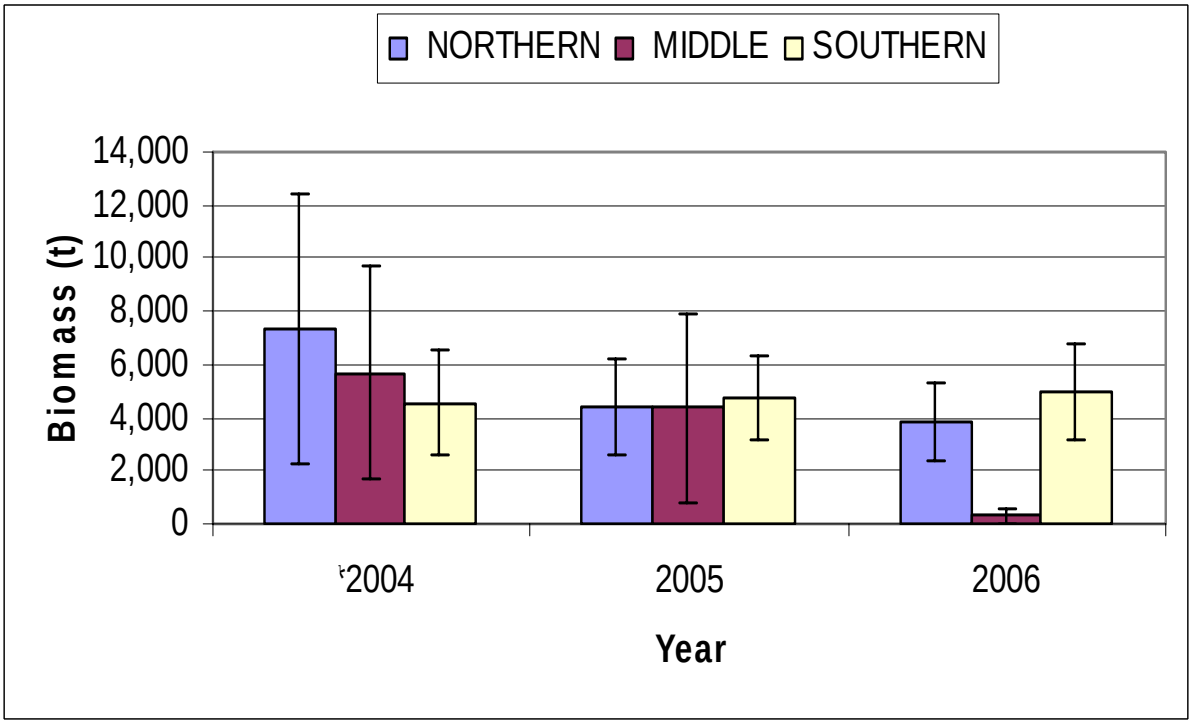

Figure 3. Sea Scallop biomass (t round) estimates by individual beds from the 3 surveys conducted by the Cape Keltic in 2004 to 2006 (error bars are 95% CI).

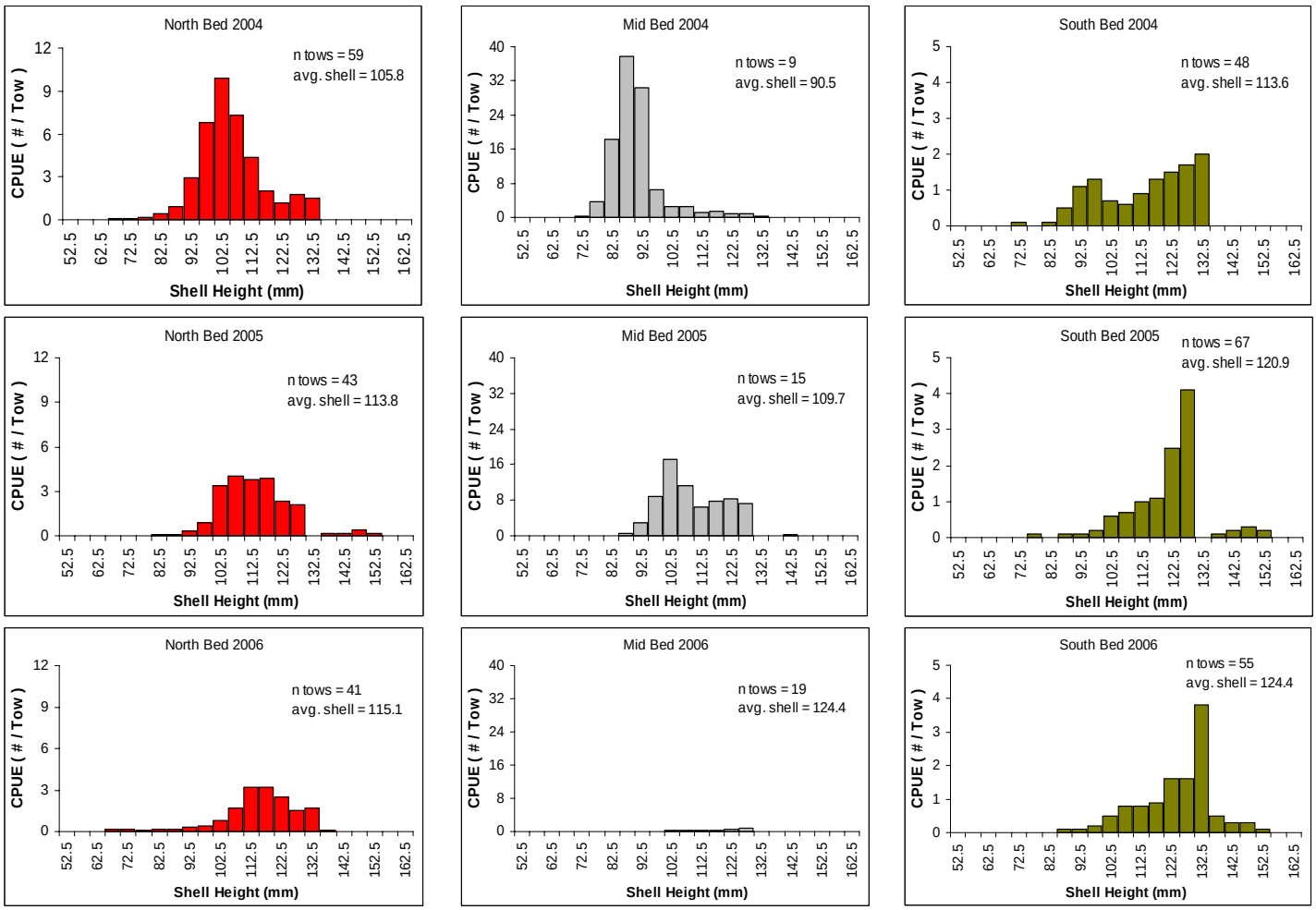

Figure 4. Sea scallop shell height frequency (numbers/tow) by bed and year.

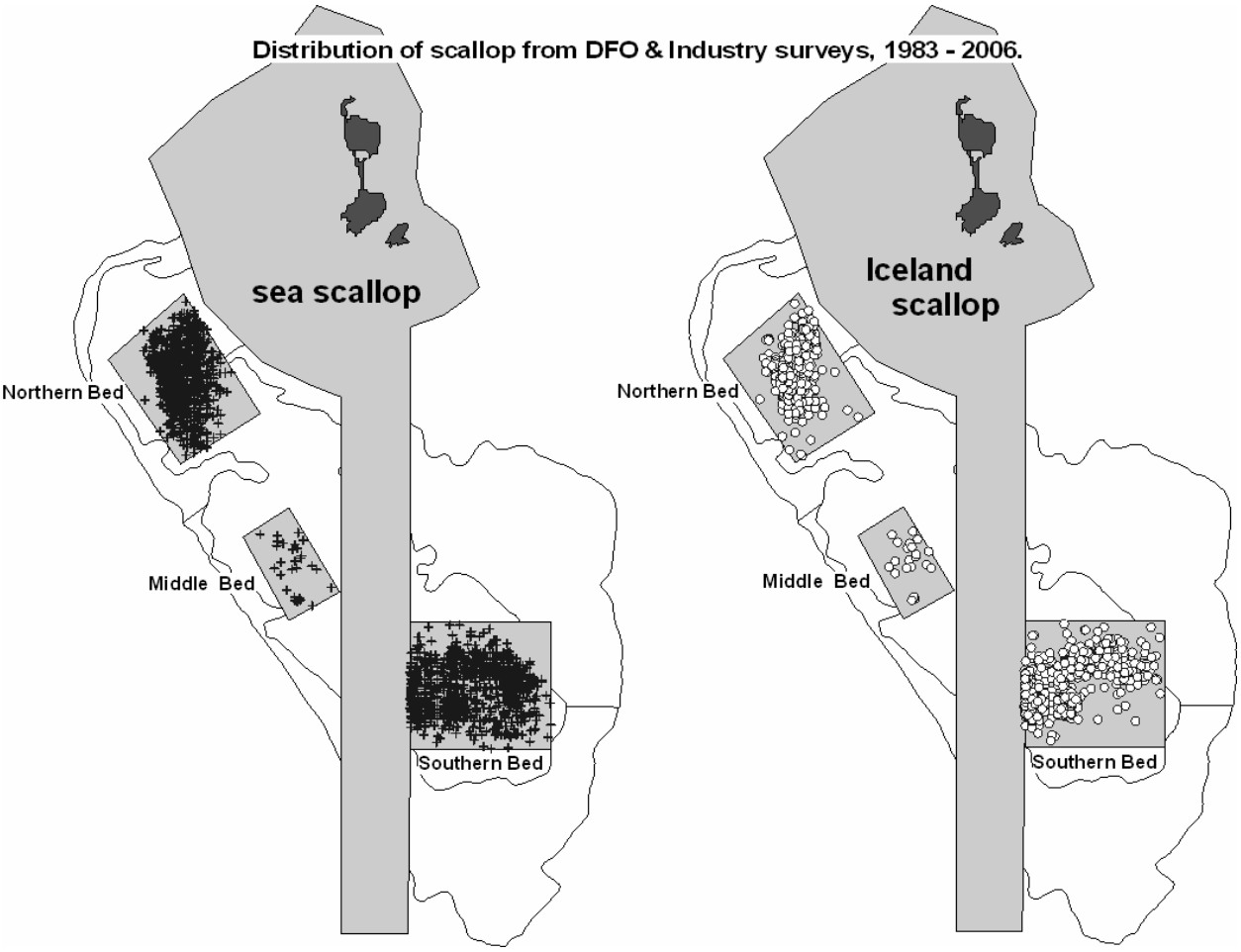

Figure 5. Sea and Iceland scallop distribution from DFO and Industry surveys, 1983 – 2006 combined. Points indicate presence of sea or Iceland scallop.

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