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**Are there potential resources of Iceland scallops (Chlamys islandica) in the Barents Sea ?**

by

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**Abstract**

During 1984 the scallop resources in the Barents Sea have been in focus by norwegian and foreign fishermen. Several norwegian vessels have lately been equiped with gears, processing facilities and machines for scallop fishery in this area.

At present there are very scarce informations about the supposed scallop quantities in the Barents Sea, and only a few reports from surveys around the Bear Island. In addition capelin purse seiners have reported catches of scallop in their nets when fishing southwest of Hopen Island.

Several investigations on this scallop have been carried out on beds along the coast of northern Norway, and a fairly good knowledge about growth, densities and recruitment from these areas have been published during the last 10 years.

In this report preliminary calculations of the amount of scallop resources are presented for the areas between Bear Island and Hopen Island. The calculations are based on estimates of the bottom areas containing the adequate surface sediment, the depth preference for scallop growth and an estimate on the maximum

sustainable yield (MSY). The level of the MSY is made assuming that scallops are present in the proposed areas, that scallops larger than 65 mm shell height are caught and that there is a yearly net production of scallop meat at a certain level. Provided that the MSY is at an acceptable level, the possible amount of scallop meat to be harvested each year may be of a magnitude of 50.000 tonns.

High percentage of "non-scallop" material (stones, dead scallops etc.) in the catches may, however, reduce these numbers.

### Résumé.

En 1984, les ressources de Chlamys islandica ont fait l'objet des études effectuées par des pêcheurs norvégiens et étrangers.

On a fourni plusieurs embarcations d'instruments de transformation' et de machines utilisées pour la pêche de chlamys islandica.

A présent, il y a fort peu d'information sur la quantité éventuelle de Chlamys islandica dans la mer de Barents. Il existe, pourtant, quelques rapports des études faites autour de l'île de Bjørnøya. De plus, des chaluts de capelan ont rapporté des prises de Chlamys islandica dans leur filets à sud ouest de Hopen.

Une série de recherches sur chlamys islandica ont été exécutées dans quelques parties de la côte de la Norvège septentrionale, et nous avons obtenu des connaissances assez profondes sur la croissance, la densité et le renouvellement dans ces mers grâce aux publications parues ces derniers dix ans.

Ce rapport présente des calculations provisoires de la quantité de Chlamys islandica dans les mers entre les îles Bjørnøya et Hopen. Ces calculations se fondent sur des estimations du fond des mers contenant des débris adéquats de la surface, la préférence de la profondeur pour la croissance de Chlamys islandica et une estimation de la récolte maximale, MSY (maximum sustainable yield). On a calculé le niveau de MSY en supposant que le Chlamys islandica se trouve dans les mers mentionnées, que l'on puisse prendre des Chlamys islandica plus grands que 65 cm et qu'il y ait une production annuelle de viande de Chlamys islandica à un niveau donné.

A condition que le MSY soit à un niveau satisfaisant, la quantité

possible de viande de Chlamys islandica à pêcher chaque année peut s'élever à environ 50.000 tonnes.

Un grand pourcentage de matière "non - coquillage" (pierres, coquillage mort etc.) dans la récolte peut cependant réduire ces chiffres.

#### Introduction.

Norwegian bivalve shellfish resources has traditionally been exploited in small scales limited to fishing for bivalves using them for long line bait. In Northern Norway the Iceland scallop was one of the favoured bait species used by the fishermen. After the World War II this fishery decreased and stopped during the 1950-ties.

Up to 1982 there was no interest among fishermen to dredge for scallops probably because of great abundance of other and more common fish resources. In 1982 one single vessel started dredging for the Iceland scallop at the coastal beds in Northern Norway, and he is now fishing for scallop throughout the year with fairly good results.

During 1984 a tremendous interest for scallop resources in the Barents Sea was developing. Stern trawlers and purse seiners have been and are rebuilt and equipped for scallop fishery in the Spitsbergen and Bear Island area.

The Iceland scallop is a boreal/arctic species and is common both in Iceland, Greenland and Canada. Commercial fishery for this species is going on in all these three countries and the Icelandic fishery amounts up to 15.000 tonnes yearly.

Some preliminary work have been done on the scallop resources in the Spitsbergen and the Bear island area (WIBORG, 1970, WIBORG et al. 1974, ANON, 1982), but there no knowledge about stock size and possible yields from these scallop stocks. In this work, an estimate is proposed of the harvestable amount of scallops in the areas between Bear Island and Hopen Island. These calculations are based on additional knowledge from scallop beds at the coast of Northern Norway and from beds around the Bear Island.

One would like to emphasize that the basis for these calculation are very scarce and may therefore be incorrect in size of magni-

tude. Even though, one found it necessary in some way to highlight the scallop resources that might exist in the areas.

#### CURRENT KNOWLEDGE ON SCALLOPS IN THE BEAR ISLAND AREA.

##### Areal distribution.

There have been carried out three investigations on the Iceland scallop distribution around the Bear Island. All three have been done in the same area, but the most extensive one is from a cruise in 1973 (figure 1) (WIBORG et al. 1974). Scallops were found in a belt 15 - 25 nautic miles off the Bear Island and the most dense concentrations were observed in the depths between 80 and 100m. Highest catch rates were obtained south and east of the island with maximum 400 scallops in a 5 minutes haul as a maximum. There were also found scallops in areas Northwest and Southeast of the Spitsbergenbanken. These catches were, however, relatively small.

##### Size composition.

In order to obtain a continuous scallop harvest from beds in northern Norway a minimum scallop size of 65 mm shell height have been proposed (VENVIK & VAHL 1979).

On the beds around the Bear Island more than 90 % of all scallops caught were larger than 55 mm shell height (WIBORG 1970). This large size composition seems reasonable since the scallop populations in the Barents Sea never have been fished on, and the population accumulated with majority of old individuals.

Growth rate.

According to WIBORG (1970) and VENVIK and VAHL (unpubl.) the growth rates, defined here as the yearly increment in shell height, are at the same level as in scallops caught at the norwegian coast (figure 2).

There seem, however, to be a slower soft tissue growth rate in the scallops from the Bear Island compared to those from coastal areas in Northern Norway (VAHL, unpubl.) Therefore, the obtainable yield per m<sup>2</sup> from the Bear Island beds must be lower than the estimated yield per m<sup>2</sup> from the coastal beds (VENVIK & VAHL, 1979).

Reproduction.

Currently nothing is known about the reproduction or recruitment in the scallop beds around the Bear Island. The spawning time is probably the same as found at the coastal beds; at the end of June (SKRESLET and BRUN 1969). There are some possibilities for genetic exchange between the scallop populations around the Bear Island and those at the norwegian coast. A very short season with primary production and extremely low temperatures in the sea around Bear Island may result in a failure to larval survival some years. These populations may therefore be partly recruited from coastal scallop populations .

#### POTENTIAL SCALLOP RESOURCES.

Population parameters.

In order to make an estimate of the maximum sustainable yield it is necessary to have knowledge about the yearly net production of soft scallop parts together with scallop density on the beds. As mentioned earlier the soft tissue growth seem to be somewhat lower in the Bear Island scallops compared to scallops from the coastal areas. In addition we know that the densities are lower at the Bear Island.

Yearly net production of scallop meat on a coastal bed are about 10 grams dry weight/year/m<sup>2</sup> which gives 53.5 tonnes of scallop adductor muscle as a sustainable yield per km<sup>2</sup> (VENVIK and VAHL 1979). In these estimates 25 harvestable scallops were used as the standard density per m<sup>2</sup>.

Depth and surface sediment parameters.

The Iceland scallop is usually found on gravel or sandy bottoms and usually in places with strong currents (EKMAN 1953, WIBORG 1962).

A map over the surface sediment distribution in the northern Barents Sea is available and makes it possible to limit the scallop distribution to certain areas according to the sediment character (ELVERHØI and SOLHEIM 1983).

More than 50.000 km<sup>2</sup> of the bottom in the areas between the Bear Island and the Hopen Island have a surface sediment sufficient for scallop growth (figure 3). Since the scallops in these areas, however, are found more or less in certain depths the plausible area for scallop growth must be reduced. Therefore, the area of potential scallop growth ends up to be about 10.000 km<sup>2</sup>.

Estimation of harvestable scallop resources.

The levels of both density and tissue growth parameters are much lower at the Bear Island beds compared to the beds in northern Norway. The yield per km<sup>2</sup> from the Bear Island beds is therefore proposed to be only 10 % of the yield from the coastal beds. If we use the 10 % level as a basis for calculation the 10.000 km<sup>2</sup> area would give a MSY of more than 50.000 tonnes scallop meat from these areas. These numbers seem tremendously high and I do not think it is realistic to accept them even though they are highly conservative.

Earlier investigations on these beds have shown that the scallops are heavily overgrown specially with barnacles which impede the production process. High percentages of nonscallop material

as stones and dead shells in the catches does also make the catching methods less efficient (ANON 1982).

Catching and production of scallops.

Norwegian fishing vessels from 90 to 130 feet long have been equipped for this fishery. The scallops are caught by dredging and the dredges are of several types; size and shape. The most common dredge seem to be the one developed by the Icelandic scallop industry. Each vessel is supposed to operate two dredges at the same time; one is fishing while the other is hauled and the catches taken care of.

Production lines have been installed on each vessel and the whole system is based on a non-manual operation, which means that the scallops are schucked, the adductor muscle are cleaned and frozen automatically. The shell, gonads and other soft tissue parts are discarded.

In conclusion one might say that the potentials for scallop fisheries in the areas between Bear Island and Hopen Island are very promising. This optimistic view is based on the fact that there is a great bottom area sufficient for scallop growth, and not on the knowledge of an actual standing stock.

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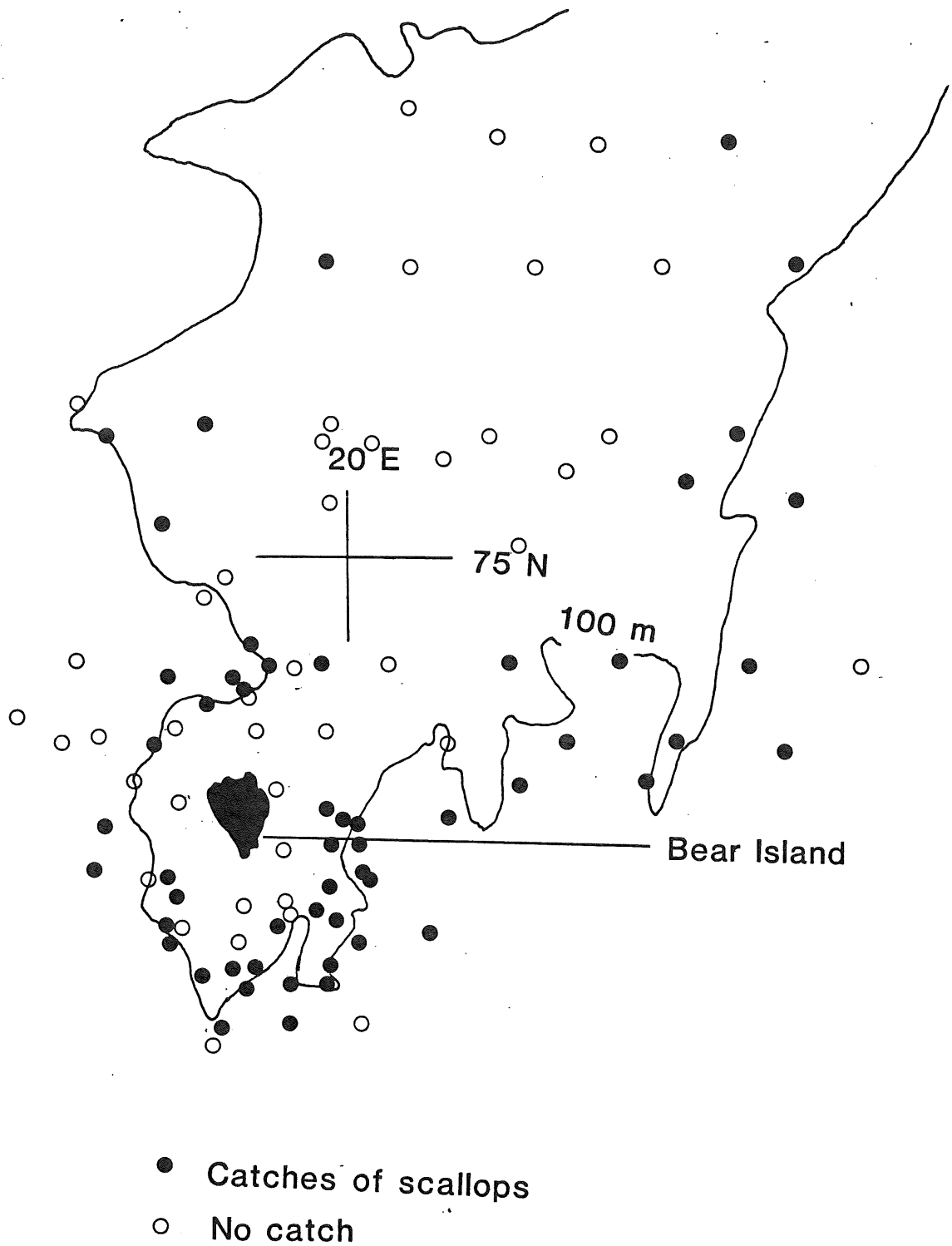


Figure 1. Recordings of scallops in the Bear Island area. (From WIBORG 1970).

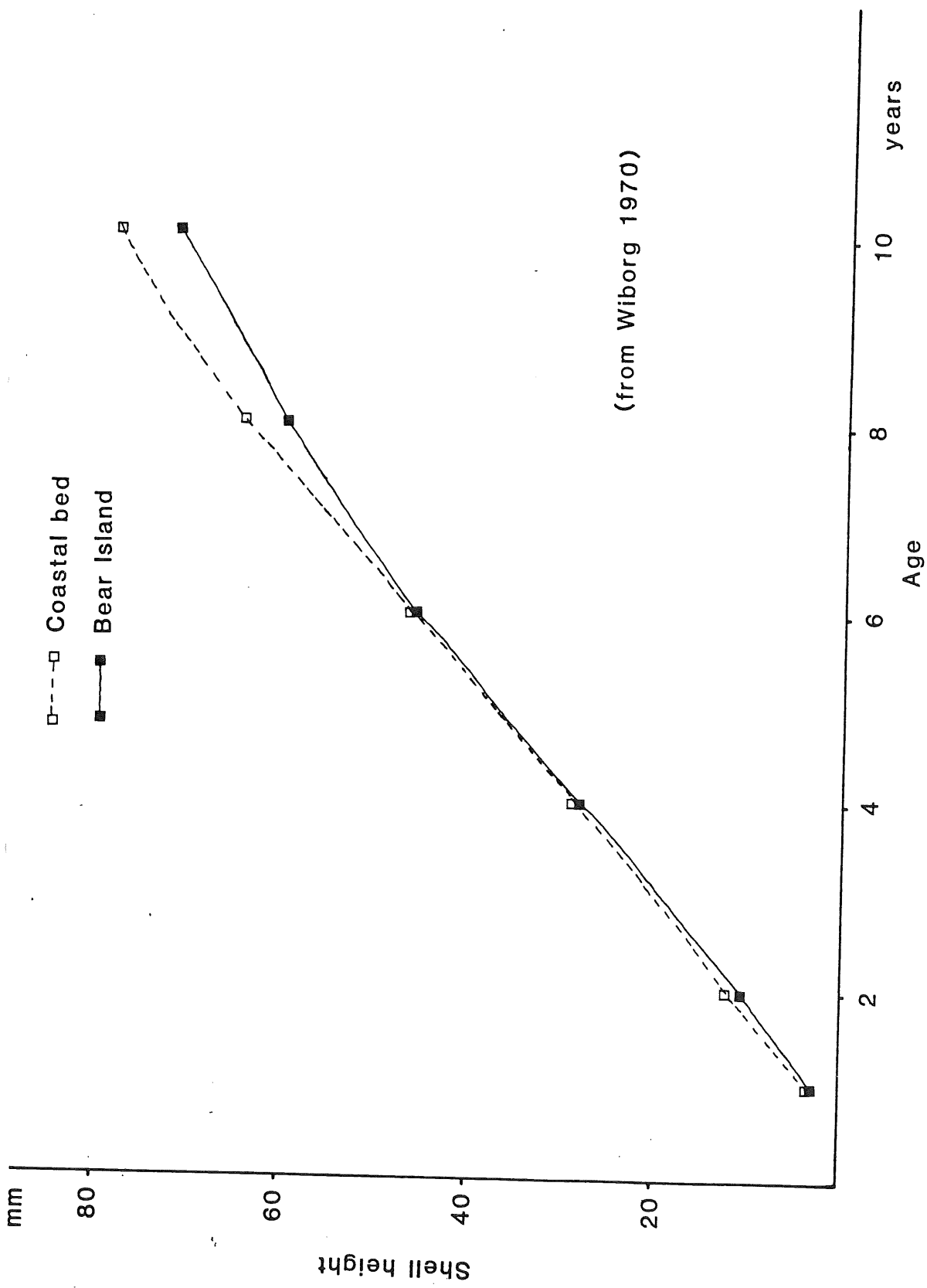


Figure 2. Yearly shell increment in scallops from Bear Island beds and coastal beds.

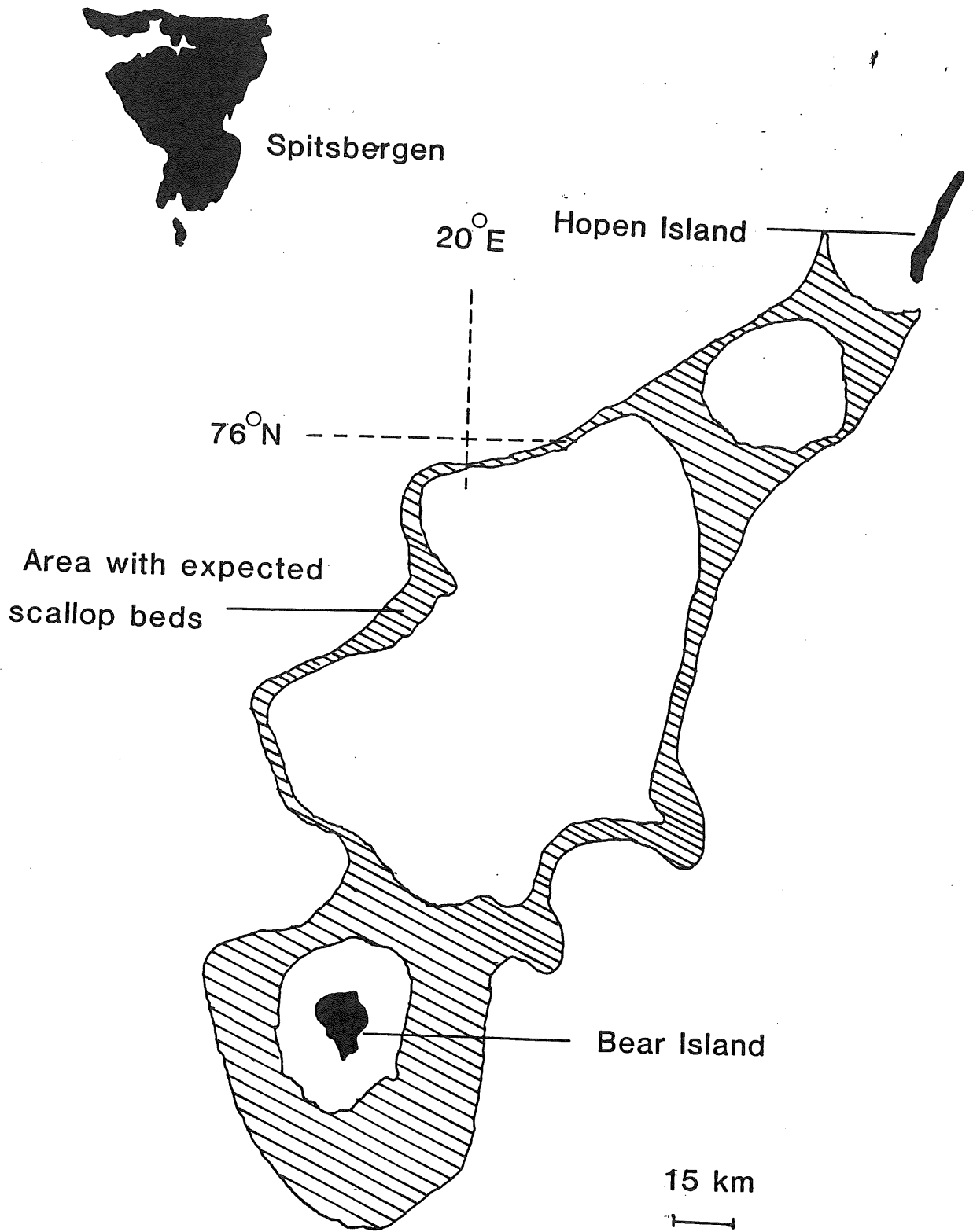


Figure 3. Area with expected scallop beds between Bear Island and Hopen Island.