# AMAP
# Marine Sampling Programme
# Greenland 1994
# Nanortalik

Prepared by: Christian Glahder

Greenland Environmental Research Institute, September 1994

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## 1.INTRODUCTION

The monitoring programme in relation to Greenland marine environment was initiated in 1994 as a part of the Arctic Marine Monitoring Programme (AMAP). Monitoring is carried out in four regions in Greenland: Avanersuaq (Thule), Disko, Narsarsuaq/Nanortalik, Ittoqqortoormiit (Scoresbysund)/Kangerlussuaq.

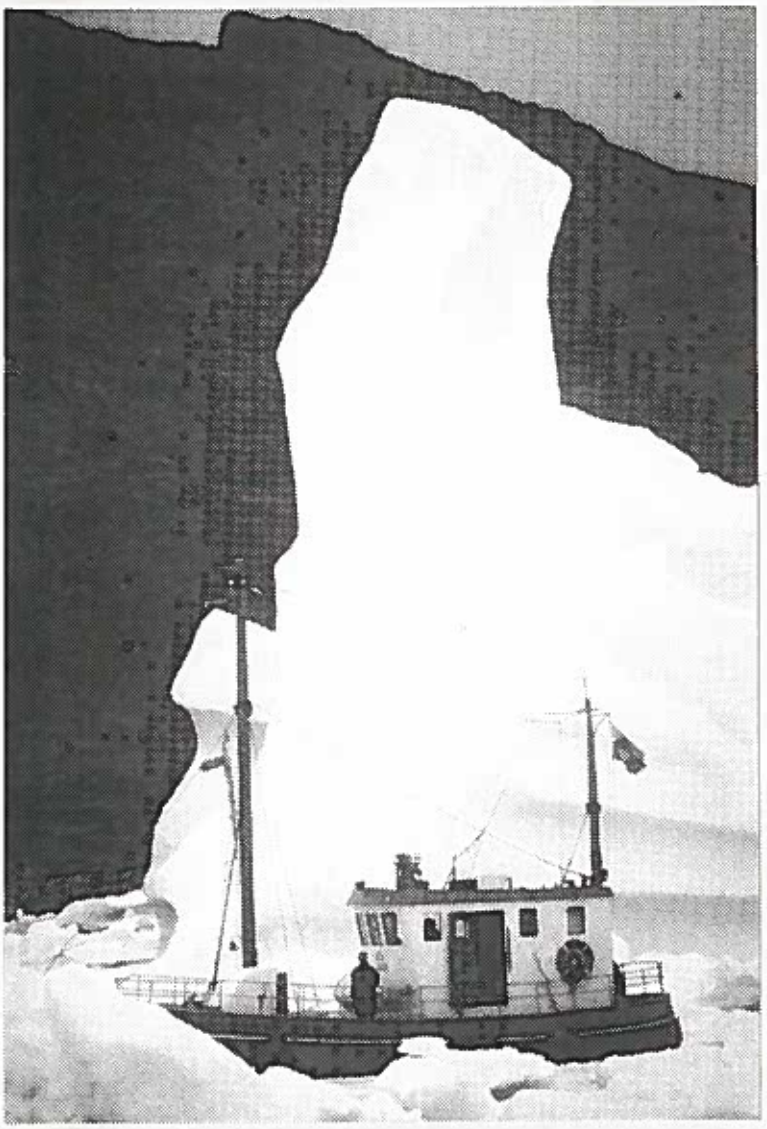
This report describes the marine monitoring programme carried out in the Nanortalik region in June 1992. Samples were taken of sediments, Blue mussels (*Mytilis edulis*), Shorthorn sculpin (*Myoxocephalus scorpius*) and seawater. In the same region - near Aappillattoq, east of Nanortalik - Ringed seals (*Phoca hispida*), and later Glaucous gulls (*Larus hyperboreus*), were collected.

The samples collected will be analyzed for (1) heavy metal content by Greenland Environmental Research Institute (GERI); (2) organic compounds (PAH and PCB) by Denmark Environmental Research Institute (DERI); and (3) for radionucleatides (Cs-134/137 and Sr-90) by Risø.

## 2. LOGISTICS

The members of the expedition arrived at Narsarsuaq from Copenhagen and Nuuk respectively on 7 June 1994. The research vessel "Adolf Jensen" awaited in the Narsarsuaq harbour and departed at 4 pm. The navigation through Tunulliarfik (Skovfjord) past Igaliku and Narsaq progressed without any problems as there was little ice present. On the way to Mato-løbet the ice was extremely tightly packed (8/10). At 10 pm. we anchored in a small bay before Mato-løbet.

We reached Qaqortoq, Julianehåb, the next morning after sailing for three hours through very tightly packed ice (8-9/10). Here we replaced the ships batteries, and in the afternoon we continued following the inland route past Eqalugaarsuit and Saarloq to Zacharias Havn



Tightly packed polar ice in Mato-løbet near Qaqortoq, Julianehåb, 8 June 1994

north of Alluitsup Paa, Sydprøver. Few problems with the ice were encountered on the way.

From the 9 - 12 June samples were collected over an area of approximately 150 km$^2$ around Tuttutuarsuk island, ca. 10 km east from Alluitsup Paa. The ice conditions in the area were reasonable and only hampered sampling efforts a little.

On the afternoon of 12 June, we departed the sampling area and travelled along the same route back to Narsuaq, where we arrived at 3 am. 13 June. Once again, it was only in Mato-løbet that there was a lot of ice. In Narsuaq all the samples were delivered to KNI to be sent back to Copenhagen. The research vessel departed Narsuaq on the morning of 14 June, and headed towards Narsarsuaq, where we then caught a plane back to Copenhagen. The flight was delayed until 9 pm. due to bad weather.

The members of the expedition included - Marianne Cleemann (chemist - DERI)), Lone Hertz (laboratory technician - DERI) and Christian Glahder (expedition leader - biologist - GERI). Laura Glahder Lindberg also came along as a guest . The skipper of the "Adolf Jensen", was Alving Ettrup. In addition to this, there was a crew of 6 men (engineer, cook, 3 sailors and a an assistant biologist).

## 3. MARINE SAMPLES

As mentioned, the marine sampling was carried out in the area around Tuttutuarsuk island and Unartoq, about 40 km north from Nanortalik and ca.10 km east from Alluitsup Paa, Sydprøven (Appendix 1.7).

The study area was chosen for two reasons. The first reason was to come as close as possible to the area where Ringed seals and Glaucous gulls were collected, about 50 km east of Nanortalik. Due to the limited duration of the expedition (1 week) and the heavy polar ice, it was considered not possible to reach as far as Aappillatoq. The other reason was to find an area close to the coast where it was possible to collect coastal sediment samples which were relatively uninfluenced by the big rivers.

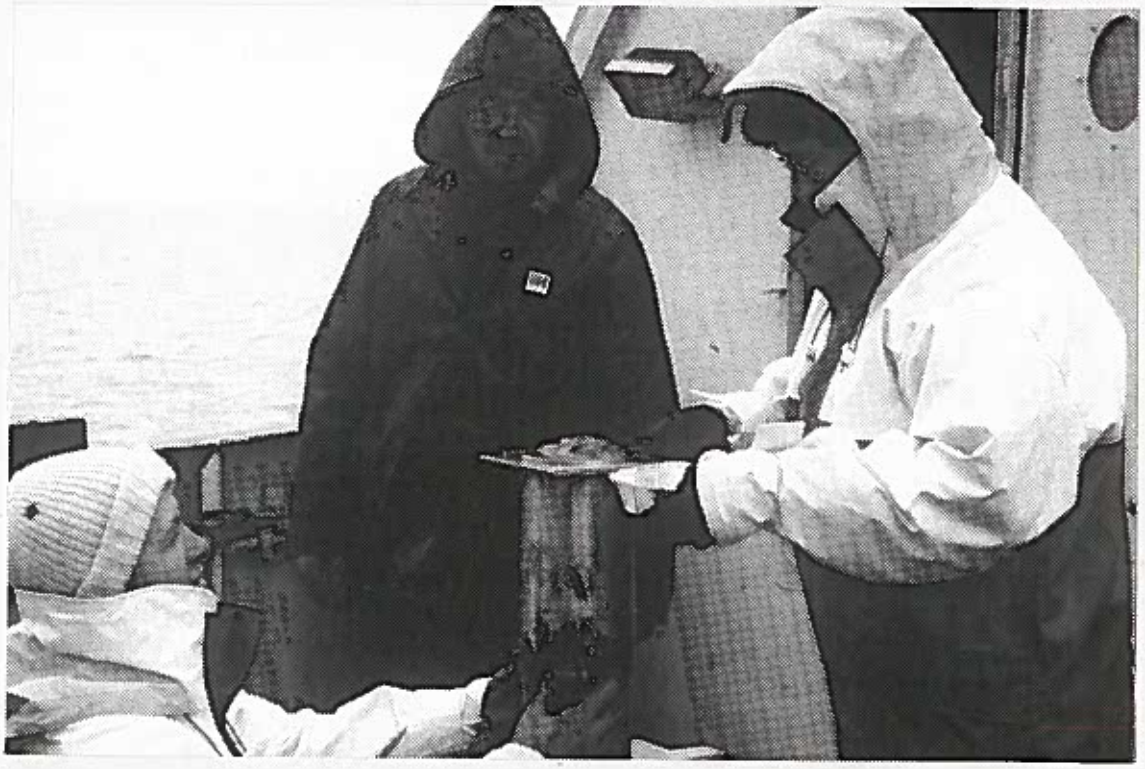
Overall, 10 sampling stations were established and 177 samples were collected. At 5 sediment sample stations a total of 39 samples were taken, including 9 sediment columns cut into slices. At 3 mussel stations, 31 samples were collected containing 5 different size groups of Blue mussels. 102 Shorthorn sculpin were caught at 1 fish station, which was divided into 4 separate netting sites. Finally, 5 samples of seawater, each consisting of 50 l, were collected from 1 water sampling station.

The four marine sample types are discussed in greater detail below.

### 3.1 Sediment

The positions of the 5 sediment stations (S 1 - S 5) are given in Appendix 1.1, together with respective water depths. The geographic positioning of the stations is depicted in Appendix 1.7. For further details refer to Appendix 1.2.

Sediment samples were taken from relatively deep water (160 - 285 m) as the bottom was soft at these depths. Samples were taken with a HAPS bottom sampler with a 1/70 $m^2$ orifice. In most cases only the top 1.5 cm (0 -1.5 cm) of the ca. 20 cm column of sediment collected was taken as a sample. According to the AMAP programme guidelines, only the top 1 cm (0-1.0 cm) was to be sampled. However, as the bottom surface was often uneven, the approximate average surface level was determined as being 0 cm in order to avoid collecting insufficient sediment.



The top 1.5 cm of the sediment column was cut off with a stainless steel knife for PAH/PCB-analyses, 9 June 1994. (Marianne Cleemann, Daniel and Lone Hertz).

One to two columns of sediment per station, 8 columns overall, were cut up into 1 cm slices for possible dating and further analyses. One column was cut up into 3 cm slices and used for Risø´s analyses. If there is a need of more sample material, for instance if there is a big stone in the top 9 cm of the Risø sample, sediment can be obtained from one of the sediment columns mentioned above.

Sediment samples that were to be used for heavy metal analyses (GERI) and Risø´s tests were cut with a plastic ruler and placed into plastic bags and frozen.

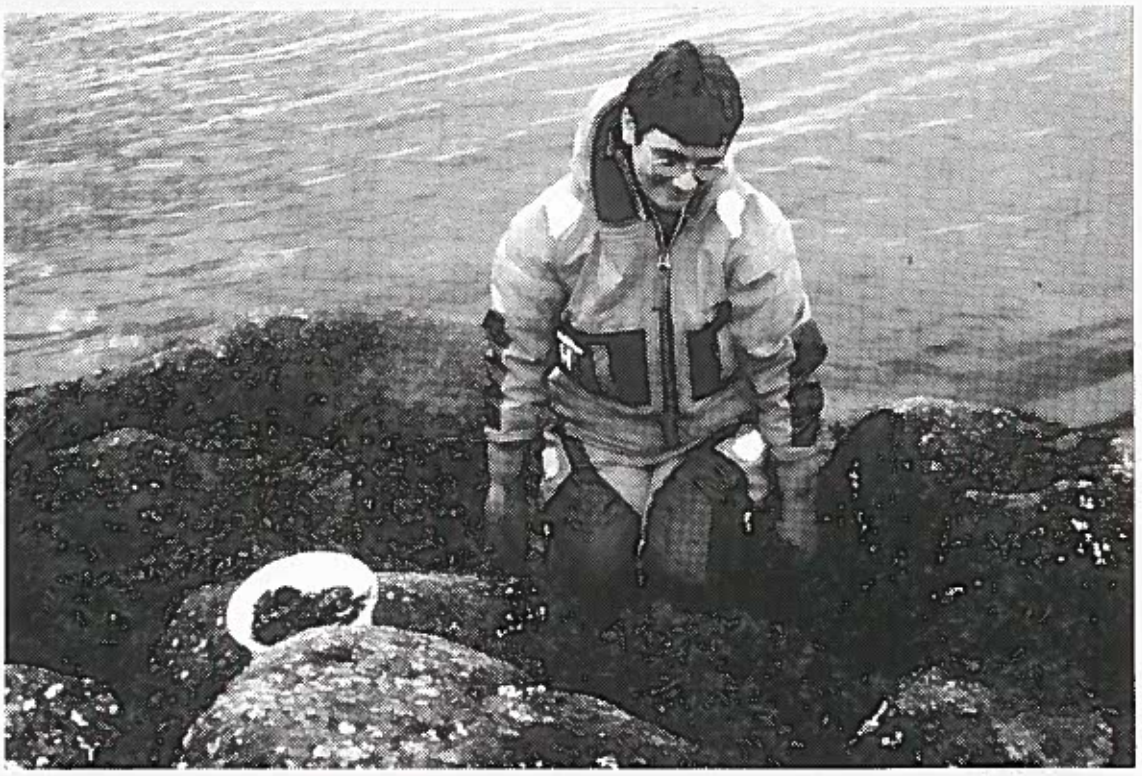
Sediment samples that were to be used for PAH- and PCB-analyses (DERI) were cut with a stainless steel knife and placed into a folio tray and frozen.

### 3.2 Mussels

The positions of the 3 mussel stations (M 1 - M 5) are given in Appendix 1.1 The geographic positioning of the stations is depicted in Appendix 1.7. For further details refer to Appendix 1.3 and 1.4.

Blue mussels (*Mytilus edulis* ) of the following 5 size categories were collected at the 3 sampling stations (shell length in cm): 3.0 -3.9; 4.0 - 4.9; 5.0 - 5.9; 6.0 - 6.9; 7.0 - 7.9. As was recommended in the AMAP programme, an attempt was made to collect mussels of the 2.0 -2.9 cm size category, but the few that were found of that size were inaccessible. A minimum of 40 mussels in the 3.0 - 3.9 cm size category were collected from each station, and 30 of these were cut up for tests. A minimum of 30 mussels were collected for each of the other groups at each station, of which approximately 20 were cut up for tests.

In the laboratory on board the "Adolf Jensen" the mussels were separated into mm groups within their respective cm size categories (see Appendix 1.4), cut up and left to drip dry. The soft sections were then cut free with a scalpel and deposited directly into plastic bags (for heavy metal analyses, GERI) or folio trays (for PAH- and PCB-analyses, DERI) and frozen. The shells were dried in paper bags and packed down in plastic bags for possible future use.



Collection of Blue mussels *(Mytilus edulis)* at station M 2, 11. June 1994 (Lone Hertz).

### 3.3 Fish

The positions of the fish station´s 4 netting sites (F1) are given in Appendix 1.1 The geographic position of the fish station is depicted in Appendix 1.7. For further details refer to Appendix 1.5.

According to AMAP´s marine monitoring programme, it is essential to take samples from Polar cod (*Boreogadus saida*) or Arctic cod (*Arctogadus glacialis*). However, discussions with the local trawl fishermen revealed that Polar cod were seldom caught in the area. Since the "Adolf Jensen" was only fitted with a little trawl net (a so called Siegsbee trawl) it was decided to catch the AMAP programme`s alternative fish Sculpin *Myoxocephalus* sp. We chose the Shorthorn sculpin *(Myoxocephalus scorpius)*.

The Shorthorn sculpins were caught in shallow water. The mean length of the sculpins was 24.8±4.7 cm (N=102) ranging from 15.0 to 37.0 cm. The mean weight of the fish was 198.3±117.8 g (N=88), ranging from 43 to 575 g. All the sculpin were placed in plastic bags and frozen.

### 3.4 Seawater

The position of the seawater sample station (V1) is given in Appendix 1.1., together with the water depth at which samples were taken. The geographic position of the fish station is depicted in Appendix 1.7. Appendix 1.6 shows the five 50 l water samples that were taken at the station. The Risø containers were rinsed 3 times with seawater prior to being filled up. The water temperature measured with two reversible thermomers at a depth of 3 meters was found to be +1.49$^{0}$C. The water samples were sent directly to Risø from Narsaq.

## Appendices

Appendix 1.1 Station positions

| Station | Location | Latitude (N) | Longitude (W) | Depth (m)/sample |
|---|---|---|---|---|
| S1 | N. Unartoq Fjord | 60°28'96 | 45° 23'90 | 160 |
| S2 | Unartoq Øst | 60°29'15 | 45°18'27 | 235 |
| S3 | Tugtutuarssun Øst | 60°25'30 | 45°20'22 | 285 |
| S4 | Unartoq Øst | 60°26'50 | 45°18'25 | 272 |
| S5 | Tugtutuarssuk Sydvest | 60°24'60 | 45°28'55 | 256 |
| M1 | Tugtutuarssuk Øst | 60°25'60 | 45°24'30 | Mussels |
| M2 | Nukasak Vest | 60°28'20 | 45°16'20 | Mussels |
| M3 | Unartoq Vest | 60°30'30 | 45°21'20 | Mussels |
| F1 | Unartoq | 60°30'50 | 45°19'50 | Sculpins |
| F1 | Unartoq | 60°25'30 | 45°23'30 | Sculpins |
| F1 | Unartoq | 60°28'35 | 45°16'20 | Sculpins |
| F1 | Unartoq | 60°29'70 | 45°26'00 | Sculpins |
| V1 | N. Unartoq Fjord | 60°28'96 | 45°23'90 | 3 |

Appendix 1.2 Sediment stations

| Station | ID.no. | Sample | Project | Date | Ini. | Column slice (cm) | Remarks |
|---|---|---|---|---|---|---|---|
| S1 | 13801 | Sediment | AMAP | 9.6.94 | CMG | 2 | DERI |
| S1 | 13802 | " | " | " | " | 1,5 | DERI |
| S1 | 13803 | " | " | " | " | 1,5 | DERI |
| S1 | 13804 | " | " | " | " | 1,5 | DERI |
| S1 | 13805 | " | " | " | " | 1,5 | DERI, ÷PAH |
| S1 | 13806 | " | " | " | " | 1,5 | DERI, ÷PAH |
| S1 | 13807 | " | " | " | " | 0-16 | GERI, in one cm slices |
| S1 | 13808 | " | " | " | " | 0-3,3-6,6-9, 9-12, 12-14 | RISØ, one big stone in upper 9 cm |
| S2 | 13809 | " | " | " | " | 1,5 | DERI |
| S2 | 13810 | " | " | " | " | 1,5 | DERI |
| S2 | 13811 | " | " | " | " | 1,5 | DERI |
| S2 | 13812 | " | " | " | " | 1,5 | DERI |
| S2 | 13813 | " | " | " | " | 1,5 | DERI |
| S2 | 13814 | " | " | " | " | 1,5 | DERI |
| S2 | 13815 | " | " | " | " | 0-21 | GERI, in one cm slices |
| S2 | 13816 | " | " | " | " | 0-21 | GERI, in one cm slices |
| S3 | 13817 | " | " | " | " | 1,5 | DERI |
| S3 | 13818 | " | " | " | " | 1,5 | DERI |
| S3 | 13819 | " | " | " | " | 1,5 | DERI |
| S3 | 13820 | " | " | " | " | - | DERI |
| S3 | 13821 | " | " | " | " | 1,5 | DERI |
| S3 | 13822 | " | " | " | " | 1,5 | DERI |

Appendix 1.2 Sediment stations, (cont.)

| Station | ID.no. | Sample | Project | Date | Ini. | Column slice (cm) | Remarks |
|---|---|---|---|---|---|---|---|
| S3 | 13823 | Sediment | AMAP | 9.6.94 | CMG | 0-19 | GERI, in one cm slices |
| S3 | 13824 | " | " | " | " | 0-19 | GERI, in one cm slices |
| S4 | 13825 | " | " | 10.6.94 | CMG | 1,5 | DERI |
| S4 | 13826 | " | " | " | " | 1,5 | DERI |
| S4 | 13827 | " | " | " | " | 1,5 | DERI |
| S4 | 13828 | " | " | " | " | 1,5 | DERI |
| S4 | 13829 | " | " | " | " | 1,5 | DERI |
| S4 | 13830 | " | " | " | " | 1,5 | DERI |
| S4 | 13831 | " | " | " | " | 0-19 | GERI, in one cm slices |
| S4 | 13832 | " | " | " | " | 0-19 | GERI, in one cm slices |
| S5 | 13833 | " | " | 11.6.94 | " | 2 | DERI |
| S5 | 13834 | " | " | " | " | 2 | DERI |
| S5 | 13835 | " | " | 12.6.94 | " | 1,5 | DERI |
| S5 | 13836 | " | " | " | " | 1,5 | DERI |
| S5 | 13837 | " | " | " | " | 1,5 | DERI |
| S5 | 13838 | " | " | " | " | 1,5 | DERI |
| S5 | 13839 | " | " | 11.6.94 | " | 0-14 | GERI, in one cm slices |

Appendix 1.3 Musselstations (Blue mussel *Mytilus edulis*) (number = no.; length category= l.c.)

| Station | ID.no. | Sample | Project | Date | Ini. | no. | l.c. (cm) | Remarks |
|---|---|---|---|---|---|---|---|---|
| M1 | 15311 | Blue mussel | AMAP | 10.6.94 | CMG | 34 | 3-4 | DERI |
| M1 | 15312 | " | " | " | CMG | 28 | 3-4 | GERI |
| M1 | 15313 | " | " | " | CMG | 20 | 5-6 | GERI |
| M1 | 15314 | " | " | " | CMG | 34 | 4-5 | DERI |
| M1 | 15315 | " | " | " | CMG | 20 | 4-5 | GERI |
| M1 | 15316 | " | " | " | CMG | 20 | 6-7 | GERI |
| M1 | 15317 | " | " | " | LH | 25 | 5-6 | DERI |
| M1 | 15318 | " | " | " | CMG | 8 | 7-8 | GERI |
| M1 | 15319 | " | " | " | MC | 20 | 6-7 | DERI |
| M1 | 15320 | " | " | " | LH | 8 | 7-8 | DERI |
| M1 | 15321 | " | " | " | CMG | - | - | RISØ ca. 1.400 g |
| M1 | 15359 | " | " | " | CMG | - | 6-7 | GERI, shell |
| M1 | 15360 | " | " | " | CMG | - | 4-5 | GERI, shell |
| M1 | 15361 | " | " | " | CMG | - | 5-6 | GERI, shell |
| M1 | 15362 | " | " | " | CMG | - | 3-4 | GERI, shell |
| M1 | 15363 | " | " | " | CMG | - | 7-8 | GERI, shell |
| M1 | 15364 | " | " | " | LH | - | 3-4 | DERI, shell |
| M1 | 15365 | " | " | " | LH | - | 4-5 | DERI, shell |
| M1 | 15366 | " | " | " | LH | - | 5-6 | DERI, shell |
| M1 | 15367 | " | " | " | LH | - | 6-7 | DERI, shell |
| M1 | 15368 | " | " | " | LH | - | 7-8 | DERI, shell |
| M2 | 15369 | " | " | 11.6.94 | LH | 20 | 4-5 | DERI |
| M2 | 15370 | " | " | " | CMG | 20 | 4-5 | GERI |
| M2 | 15371 | " | " | " | CMG | 20 | 5-6 | GERI |
| M2 | 15372 | " | " | " | MC | 20 | 5-6 | DERI |
| M2 | 15373 | " | " | " | LH | 20 | 6-7 | DERI |
| M2 | 15374 | " | " | " | CMG | 18 | 6-7 | GERI |
| M2 | 15375 | " | " | " | CMG | 20 | 7-8 | GERI, shells lacking |
| M2 | 15376 | " | " | " | MC | 17 | 7-8 | DERI, shells lacking |

Appendix 1.3 Musselstations (Blue mussel *Mytilus edulis*), (cont.)

| Station | ID.no. | Sample | Project | Date | Ini. | no. | l.c. (cm) | Remarks |
|---|---|---|---|---|---|---|---|---|
| M2 | 13840 | Blue mussel | AMAP | 11.6.94 | LGL | 27 | 3-4 | GERI |
| M2 | 13841 | " | " | " | MC | 27 | 3-4 | NERI |
| M2 | 13873 | " | " | 12.6.94 | CMG | - | 4-5 | GERI, shell |
| M2 | 13874 | " | " | " | CMG | - | 3-4 | GERI, shell |
| M2 | 13875 | " | " | " | CMG | - | 5-6 | GERI, shell |
| M2 | 13876 | " | " | " | CMG | - | 6-7 | GERI, shell |
| M2 | 13877 | " | " | " | CMG | - | 3-4 | NERI, shell |
| M2 | 13878 | " | " | " | CMG | - | 4-5 | NERI, shell |
| M2 | 13879 | " | " | " | CMG | - | 5-6 | NERI, shell |
| M2 | 13880 | " | " | " | CMG | - | 6-7 | NERI, shell |
| M3 | 13881 | " | " | " | CMG | 31 | 3-4 | GERI |
| M3 | 13882 | " | " | " | MC | 30 | 3-4 | NERI |
| M3 | 13883 | " | " | " | LH | 25 | 4-5 | NERI |
| M3 | 13884 | " | " | " | CMG | 20 | 4-5 | GERI |
| M3 | 13885 | " | " | " | CMG | 20 | 5-6 | GERI |
| M3 | 13886 | " | " | " | MC | 20 | 5-6 | NERI |
| M3 | 13887 | " | " | " | LH | 20 | 6-7 | NERI |
| M3 | 13888 | " | " | " | CMG | 20 | 6-7 | GERI |
| M3 | 13889 | " | " | " | CMG | 20 | 7-8 | GERI |
| M3 | 13890 | " | " | " | MC | 20 | 7-8 | NERI, in two trays |
| M3 | 13891 | " | " | " | LH | - | 7-8 | NERI, shell |
| M3 | 13892 | " | " | " | LH | - | 6-7 | NERI, shell |
| M3 | 13893 | " | " | " | LH | - | 5-6 | NERI, shell |
| M3 | 13894 | " | " | " | LH | - | 4-5 | NERI, shell |
| M3 | 13895 | " | " | " | LH | - | 3-4 | NERI, shell |
| M3 | 13896 | " | " | " | LH | - | 7-8 | GERI, shell |
| M3 | 13897 | " | " | " | LH | - | 6-7 | GERI, shell |
| M3 | 13898 | " | " | " | LH | - | 5-6 | GERI, shell |
| M3 | 13899 | " | " | " | LH | - | 4-5 | GERI, shell |
| M3 | 13900 | " | " | " | LH | - | 3-4 | GERI, shell |

Appendix 1.4 Mussels, length categories (Blue mussel *Mytilus edulis*) (length category = l.c.)

| Station | l.c. | length categories in mm | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (cm) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| M1 | 3-4 | 5 | 4 | 2 | 0 | 1 | 3 | 5 | 4 | 4 | 6 | NERI |
| M1 | 3-4 | 0 | 1 | 5 | 5 | 1 | 2 | 5 | 1 | 3 | 5 | GERI |
| M1 | 4-5 | 4 | 2 | 3 | 7 | 5 | 3 | 3 | 3 | 2 | 2 | NERI |
| M1 | 4-5 | 0 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 3 | GERI |
| M1 | 5-6 | 2 | 1 | 3 | 2 | 1 | 3 | 3 | 3 | 4 | 3 | NERI |
| M1 | 5-6 | 2 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | GERI |
| M1 | 6-7 | 2 | 1 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 0 | NERI |
| M1 | 6-7 | 2 | 3 | 1 | 3 | 2 | 2 | 1 | 2 | 3 | 1 | GERI |
| M1 | 7-8 | 0 | 2 | 3 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | NERI |
| M1 | 7-8 | 2 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | GERI |
| M2 | 3-4 | 1 | 0 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 5 | NERI |
| M2 | 3-4 | 1 | 0 | 3 | 4 | 3 | 3 | 3 | 2 | 4 | 4 | GERI |
| M2 | 4-5 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 3 | NERI |
| M2 | 4-5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | GERI |
| M2 | 5-6 | 0 | 3 | 0 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | NERI |
| M2 | 5-6 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | GERI |
| M2 | 6-7 | 1 | 2 | 0 | 6 | 4 | 2 | 2 | 0 | 1 | 2 | NERI |
| M2 | 6-7 | 5 | 2 | 1 | 1 | 0 | 4 | 3 | 0 | 1 | 1 | GERI |
| M2 | 7-8 | 1 | 4 | 5 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | NERI |
| M2 | 7-8 | 4 | 3 | 1 | 3 | 2 | 1 | 3 | 2 | 0 | 1 | GERI |
| M3 | 3-4 | 2 | 1 | 2 | 4 | 1 | 3 | 5 | 4 | 3 | 5 | NERI |
| M3 | 3-4 | 0 | 2 | 2 | 2 | 3 | 6 | 3 | 2 | 3 | 8 | GERI |
| M3 | 4-5 | 3 | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | NERI |
| M3 | 4-5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | GERI |
| M3 | 5-6 | 0 | 3 | 2 | 1 | 3 | 3 | 2 | 1 | 3 | 2 | NERI |
| M3 | 5-6 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 0 | GERI |
| M3 | 6-7 | 2 | 2 | 2 | 3 | 3 | 2 | 0 | 2 | 3 | 1 | NERI |
| M3 | 6-7 | 3 | 1 | 3 | 2 | 1 | 2 | 1 | 3 | 2 | 2 | GERI |
| M3 | 7-8 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 0 | NERI |
| M3 | 7-8 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | GERI |

Appendix 1.5 Fish stations (Shorthorn sculpin *Myoxocephalus scorpius*)

| Station | ID.no. | Sample | Project | Date | Ini. | length (cm) | weight (g) | Remarks |
|---|---|---|---|---|---|---|---|---|
| F1 | 13842 | Shorthorn sculpins | AMAP | 12.6.94 | CMG | 27.0 | 252 | GERI |
| F1 | 13843 | " | " | " | " | 23.9 | 146 | NERI |
| F1 | 13844 | " | " | " | " | 25.0 | 190 | GERI |
| F1 | 13845 | " | " | " | " | 24.3 | 190 | NERI |
| F1 | 13846 | " | " | " | " | 24.4 | 185 | GERI |
| F1 | 13847 | " | " | " | " | 25.9 | 225 | NERI |
| F1 | 13848 | " | " | " | " | 24.6 | 185 | GERI |
| F1 | 13849 | " | " | " | " | 23.5 | 167 | NERI |
| F1 | 13850 | " | " | " | " | 22.2 | 130 | GERI |
| F1 | 13851 | " | " | " | " | 18.9 | 83 | NERI |
| F1 | 13852 | " | " | " | " | 20.9 | 122 | GERI |
| F1 | 13853 | " | " | " | " | 23.2 | 135 | NERI |
| F1 | 13854 | " | " | " | " | 21.4 | 109 | GERI |
| F1 | 13855 | " | " | " | " | 23.0 | 155 | NERI |
| F1 | 13856 | " | " | " | " | 21.9 | 127 | GERI |
| F1 | 13857 | " | " | " | " | 19.0 | 74 | NERI |
| F1 | 13858 | " | " | " | " | 18.3 | 71 | GERI |
| F1 | 13859 | " | " | " | " | 37.0 | >600g | NERI |
| F1 | 13860 | " | " | " | " | 28.0 | 334 | GERI |
| F1 | 13861 | " | " | " | " | 25.9 | 190 | NERI |
| F1 | 13862 | " | " | " | " | 25.0 | 226 | GERI |
| F1 | 13863 | " | " | " | " | 23.9 | 156 | NERI |
| F1 | 13864 | " | " | " | " | 26.1 | 254 | GERI |
| F1 | 13865 | " | " | " | " | 25.0 | 208 | NERI |
| F1 | 13866 | " | " | " | " | 24.7 | 235 | GERI |
| F1 | 13867 | " | " | " | " | 24.6 | 178 | NERI |
| F1 | 13868 | " | " | " | " | 22.6 | 140 | GERI |
| F1 | 13869 | " | " | " | " | 22.5 | 143 | NERI |

Appendix 1.5 Fish stations (Shorthorn sculpin *Myoxocephalus scorpius*), (cont.)

| Station | ID.no. | Sample | Project | Date | Ini. | length (cm) | weight (g) | Remarks |
|---|---|---|---|---|---|---|---|---|
| F1 | 13870 | Shorthorn sculpin | AMAP | 12.6.94 | CMG | 20.3 | 99 | GERI |
| F1 | 13871 | " | " | " | " | 20.0 | 95 | NERI |
| F1 | 13872 | " | " | " | " | 17.4 | 60 | GERI |
| F1 | 15301 | " | " | 10.6.94 | " | 23.5 | - | NERI |
| F1 | 15302 | " | " | " | " | 29.4 | - | NERI |
| F1 | 15303 | " | " | " | " | 19.6 | - | NERI |
| F1 | 15304 | " | " | " | " | 22.2 | - | NERI |
| F1 | 15305 | " | " | " | " | 23.6 | - | NERI |
| F1 | 15306 | " | " | " | " | 22.1 | - | NERI |
| F1 | 15307 | " | " | " | " | 29.8 | - | NERI |
| F1 | 15308 | " | " | " | " | 27.6 | - | NERI |
| F1 | 15309 | " | " | " | " | 32.0 | - | NERI |
| F1 | 15310 | " | " | " | " | 22.0 | - | NERI |
| F1 | 15322 | " | " | " | " | 15.0 | - | - |
| F1 | 15323 | " | " | " | " | 24.0 | - | - |
| F1 | 15324 | " | " | 11.6.94 | " | 34.2 | 456 | NERI |
| F1 | 15325 | " | " | " | " | 37.0 | >610 | NERI |
| F1 | 15326 | " | " | " | " | 35.3 | 534 | NERI |
| F1 | 15327 | " | " | " | " | 36.7 | 545 | NERI |
| F1 | 15328 | " | " | " | " | 25.8 | 195 | NERI |
| F1 | 15329 | " | " | " | " | 25.0 | 182 | NERI |
| F1 | 15330 | " | " | " | " | 27,0 | 238 | NERI |
| F1 | 15331 | " | " | " | " | 23.6 | 156 | NERI |
| F1 | 15332 | " | " | " | " | 23.6 | 149 | NERI |
| F1 | 15333 | " | " | " | " | 23.7 | 156 | NERI |
| F1 | 15334 | " | " | " | " | 23.8 | 160 | NERI |
| F1 | 15335 | " | " | " | " | 21.1 | 102 | NERI |
| F1 | 15336 | " | " | " | " | 23.7 | 142 | NERI |

Appendix 1.5 Fish stations (Shorthorn sculpin *Myoxocephalus scorpius*), (cont.)

| Station | ID.no. | Sample | Project | Date | Ini. | length (cm) | weight (g) | Remarks |
|---|---|---|---|---|---|---|---|---|
| F1 | 15337 | Shorthorn sculpin | AMAP | 11.6.94 | CMG | 23.0 | 152 | GERI |
| F1 | 15338 | " | " | " | " | 21.5 | 109 | GERI |
| F1 | 15339 | " | " | " | " | 25.1 | 185 | GERI |
| F1 | 15340 | " | " | " | " | 30.0 | 365 | GERI |
| F1 | 15341 | " | " | " | " | 28.3 | 300 | GERI |
| F1 | 15342 | " | " | " | " | 29.0 | 280 | GERI |
| F1 | 15343 | " | " | " | " | 25.8 | 202 | GERI |
| F1 | 15344 | " | " | " | " | 28.9 | 150 | GERI |
| F1 | 15345 | " | " | " | " | 22.8 | 155 | GERI |
| F1 | 15346 | " | " | " | " | 21.7 | 142 | GERI |
| F1 | 15347 | " | " | " | " | 22.9 | 140 | GERI |
| F1 | 15348 | " | " | " | " | 25.3 | 195 | GERI |
| F1 | 15349 | " | " | " | " | 23.3 | 159 | GERI |
| F1 | 15350 | " | " | " | " | 23.0 | 128 | GERI |
| F1 | 15351 | " | " | " | " | 21.0 | 114 | GERI |
| F1 | 15352 | " | " | " | " | 22.4 | 138 | GERI |
| F1 | 15353 | " | " | " | " | 18.3 | 70 | GERI |
| F1 | 15354 | " | " | " | " | 18.6 | 78 | GERI |
| F1 | 15355 | " | " | " | " | 17.7 | 63 | GERI |
| F1 | 15356 | " | " | " | " | 17.9 | 57 | GERI |
| F1 | 15357 | " | " | " | " | 19.3 | 84 | GERI |
| F1 | 15358 | " | " | " | " | 15.2 | 43 | GERI |
| F1 | 15377 | " | " | " | " | 24.8 | 189 | GERI |
| F1 | 15378 | " | " | " | " | 25.2 | 184 | GERI |
| F1 | 15379 | " | " | " | " | 25.0 | 181 | GERI |
| F1 | 15380 | " | " | " | " | 27.9 | 251 | RISØ |
| F1 | 15381 | " | " | " | " | 25.3 | 215 | RISØ |
| F1 | 15382 | " | " | " | " | 22.5 | 112 | RISØ |

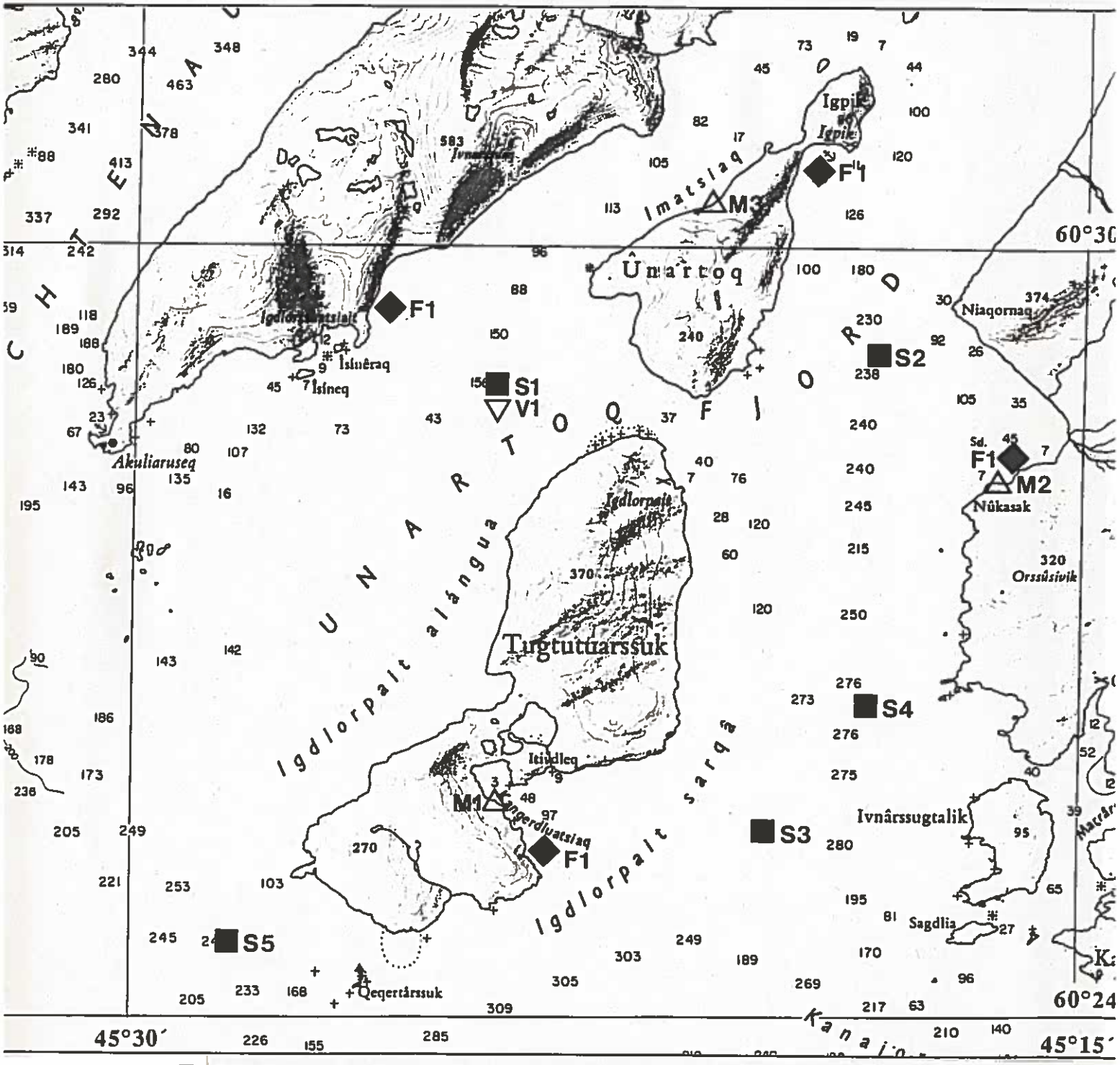
Appendix 1.5 Fish stations (Shorthorn sculpin *Myoxocephalus scorpius*), (cont.)

| Station | ID.no. | Sample | Project | Date | Ini. | length (cm) | weight (g) | Remarks |
|---|---|---|---|---|---|---|---|---|
| F1 | 15383 | Shorthorn sculpin | AMAP | 11.6.94 | CMG | 16.8 | 43 | RISØ |
| F1 | 15384 | " | " | " | " | 17.3 | 47 | RISØ |
| F1 | 15385 | " | " | 12.6.96 | " | 32.0 | 430 | RISØ |
| F1 | 15386 | " | " | " | " | 31.6 | 415 | RISØ |
| F1 | 15387 | " | " | " | " | 30.3 | 382 | RISØ |
| F1 | 15388 | " | " | " | " | 30.6 | 273 | RISØ |
| F1 | 15389 | " | " | " | " | 28.7 | 310 | RISØ |
| F1 | 15390 | " | " | " | " | 28.6 | 248 | RISØ |
| F1 | 15391 | " | " | " | " | 27.5 | 268 | RISØ |
| F1 | 15392 | " | " | " | " | 29.8 | 330 | RISØ |
| F1 | 15393 | " | " | " | " | 19.8 | 87 | RISØ |
| F1 | 15394 | " | " | " | " | 20.6 | 94 | RISØ |
| F1 | 15395 | " | " | " | " | 33.8 | 575 | RISØ |
| F1 | 15396 | " | " | " | " | 31.8 | 446 | RISØ |
| F1 | 15397 | " | " | " | " | 30.6 | 356 | RISØ |
| F1 | 15398 | " | " | " | " | 31.6 | 366 | RISØ |
| F1 | 15399 | " | " | " | " | 27.2 | 250 | RISØ |
| F1 | 15400 | " | " | " | " | 28.3 | 310 | RISØ |

Appendix 1.6 Seawater station

| Station | ID.no. | Sample | Project | Date | Amount | Remarks |
|---|---|---|---|---|---|---|
| V1 | - | Seawater | AMAP | 9.6.94 | 5 x 50 l | - |

Appendix 1.7 Map of sampling area with stations marked




■ S 3 Sediment station

△ M 2 Mussel station

◆ F 1 Fish station

▽ V 1 Seawater station