

Melville Bay/ Qimuseriarsuaq Narwhal Tagging Field Report 2006

NOAA Project Title: Winter oceanographic exploration of an offshore Arctic ecosystem – assisted by narwhals

Ocean Explorers:

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Skipper Jens Kjeldsen (JK) and "Dog" (D)



Expedition Dates: 30 August – 21 September 2006

PI and Chief Scientist: Kristin Laidre

Co-PI: Mads Peter Heide-Jørgensen

Participating Organizations: Greenland Institute of Natural Resources, Nuuk

Vessel: MV *Sila*

Geographic Area of Operations: Coastal Northwest Greenland

Brief Summary of Expedition Objectives and Milestones:

The cruise was conducted aboard the vessel m/v *Sila* chartered from Jens Kjeldsen in Aasiaat, Greenland. The cruise started in Upernavik the closest harbour to Melville Bay. Equipment for the field operation has been shipped in a 20 feet container in advance to Upernavik. After the field period the ship returned to Upernavik where the equipment was unloaded and shipped south to Nuuk. The study area encompassed the entire Melville Bay (76°N, 60°W) but was focused in the Balgoni and Fisher Islands where tagging occurred. The objective was to instrument narwhals (*Monodon monoceros*) with satellite-linked time-depth-temperature recorders collecting water column temperature profiles in the pack ice to >1,500 m depths. Three whales were instrumented (2 F, 1 M) during the field season and all tags are working well (Table 1). Body, fluke and tusk measurements were taken on all whales and a biopsy was collected for genetic studies. Traditional narwhal net capturing methods were used: nets were 50-150 m long and approximately 10 m deep (Table 2). Nets were set from shore or the bow of the boat and were monitored 24 hours a day in rotating watches. Buoys placed on the float line of the nets allowed biologists to determine if a whale had entered the net and become entangled. When whales entered the net inflatable boats were immediately launched and the whales were brought to the surface and disentangled. Instruments (Wildlife Computers Mark 10-A) were mounted on captured whales on the dorsal ridge using two 6 mm nylon pins. The dorsal transmitters were attached to the pins by 0.5-2 mm plastic coated wires secured and cut to restrict the movements of the tags. The handling procedure lasted about 1 hour and was conducted with the whales held in the net between two inflatables, secured with strong canvas straps. Data collected from diving narwhals will consist of point samples of time-depth- and temperature values at a resolution of 1 meter and 0.1°C. Geographic positions combined with these temperature data will be used to characterize spatial gradients in vertical water column structure based on date-time stamps, latitude and longitude, and horizontal area use.

Table 1. Details on captured narwhals.

Whale ID	Sex	Body length (cm)	Fluke length (cm)	Tusk length (cm)	Capture date	Capture time	Release Time	Biopsy
3960	F	372	110	-	9/9	22:45	23:47	839
3962	F	390	100	-	9/9	22:45	00:42	840
3964	M	437	108	187	9/13	20:25	21:41	848

Table 2. Summary of narwhal catching net-effort in Melville Bay.

Date Set	Net Hours	Length of Net
9/2	06:00-10:00	100 m
	19:00-12:00 on 9/3	100 m
	19:00-12:00 on 9/3	150 m
9/3	15:00-14:00 on 9/5	100 m
	15:00-14:00 on 9/5	150 m
	18:30-14:00 on 9/5	100 m
9/6	15:00-01:00 on 9/8	100 m
	15:00-00:00 on 9/7	200 m
9/7	11:00-01:00 on 9/8	200 m
9/8	08:00-15:00	200 m
	11:00-15:00	100 m
	19:30-00:00 on 9/9	150 m
9/10	16:30-04:00 on 9/11	150 m
9/11	13:00-21:30	100 m
9/12	07:00-08:00	100 m
	09:00-13:00	50 m
	13:00-23:00	100 m
9/13	06:30-19:30	100 m
	19:30-00:00 on 9/14	150 m
9/14	08:00-12:00	100 m
	12:00-23:00	150 m
9/15	07:00-18:00	100 m
	18:00-23:00	150 m
9/16	17:00-23:00	150 m

Thoughts for the Future:

A future tagging operation in Melville Bay should probably start about one week earlier to avoid very bad weather, especially wind which tends to become a larger problem later in the season in September. Extreme tides around full moon should also be avoided as they cause problem with movements of nets and sea ice. A suggestion would be to go directly to the Fisher Islands and not start at the Balgoni Islands, where the iceberg problems seem to be worse. With the experience and knowledge gained during this field operation it seems clear that large scale tagging operations of narwhals in Melville Bay can be successfully conducted provided that sufficient logistic support is available. Thus the concept of using narwhals as oceanographic sampling platforms for long-term monitoring of Baffin Bay is feasible.

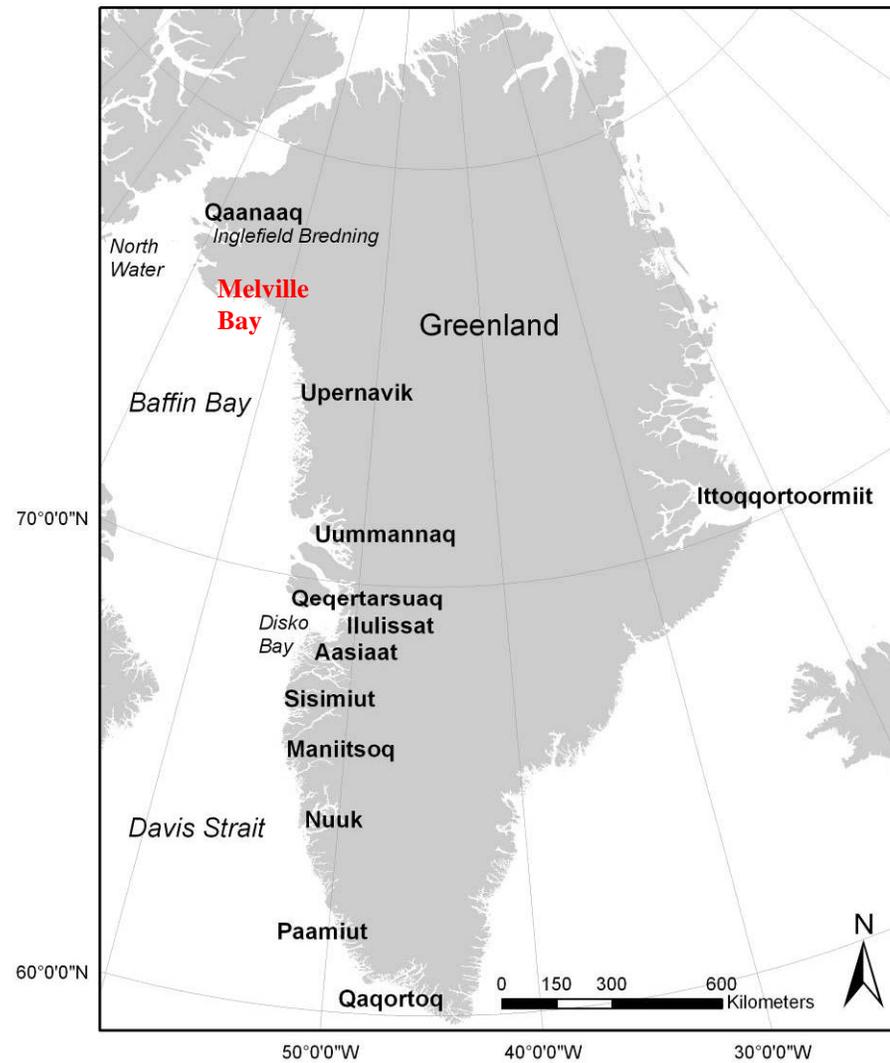


Figure 1. Map of Greenland and location of Melville Bay.

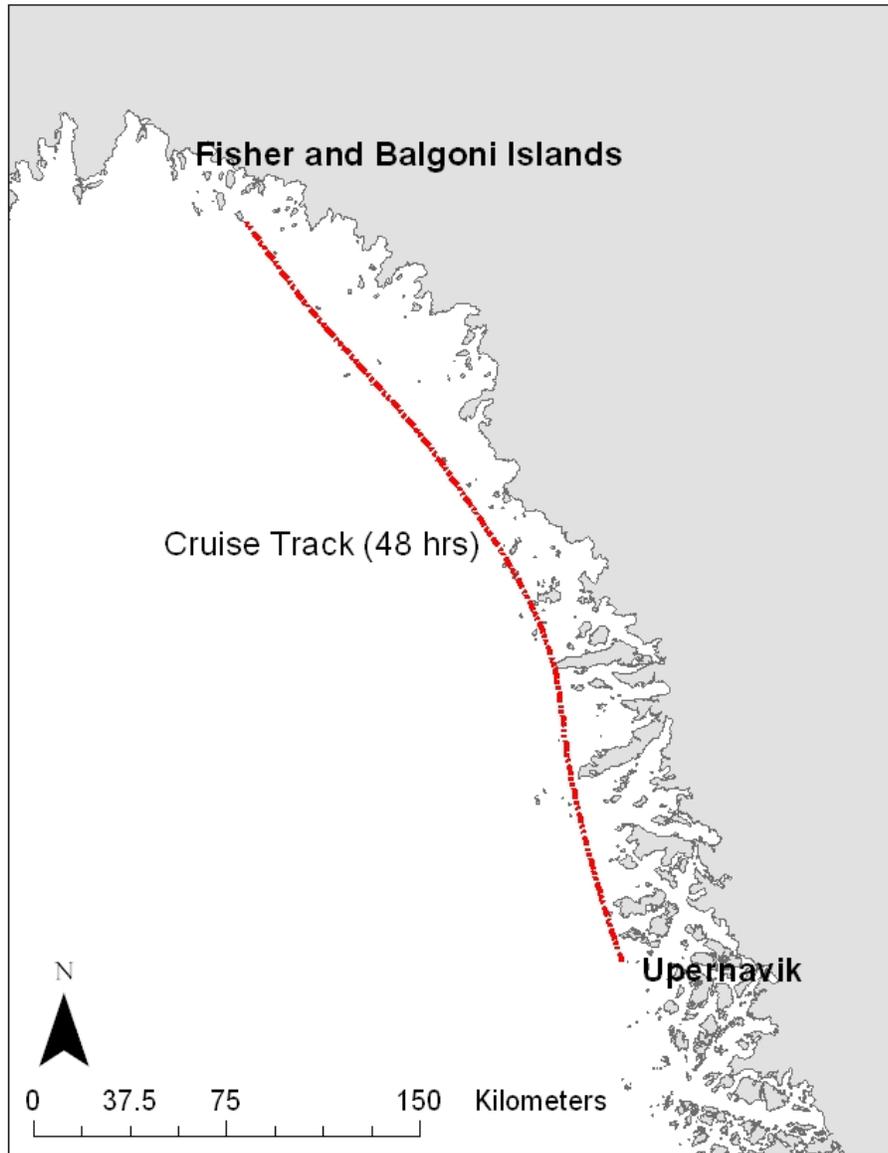


Figure 2. Cruise trackline along the northwest coast of Greenland starting in the town of Upernavik and ending in the Balgoni and Fisher Islands of Melville Bay.

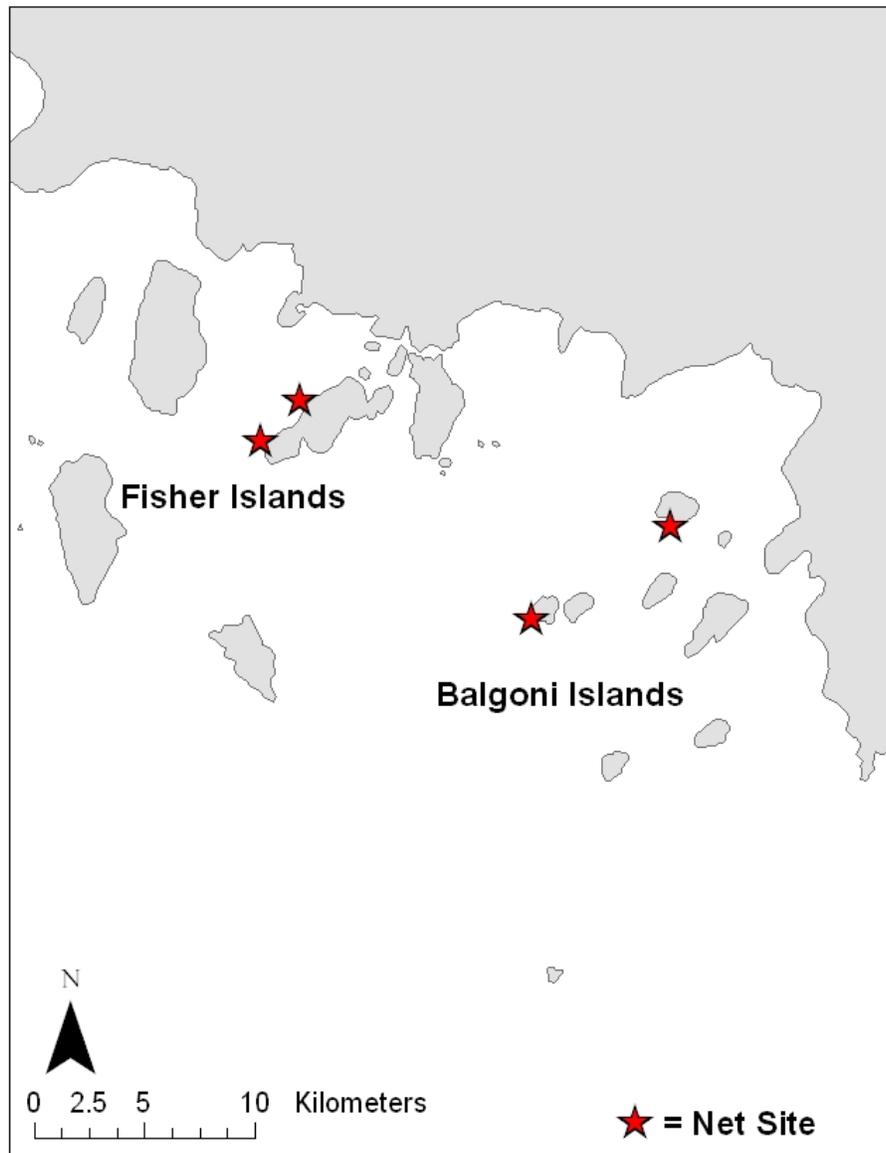


Figure 3. Sites where nets were set for catching narwhals in the Balgoni and Fisher Islands.

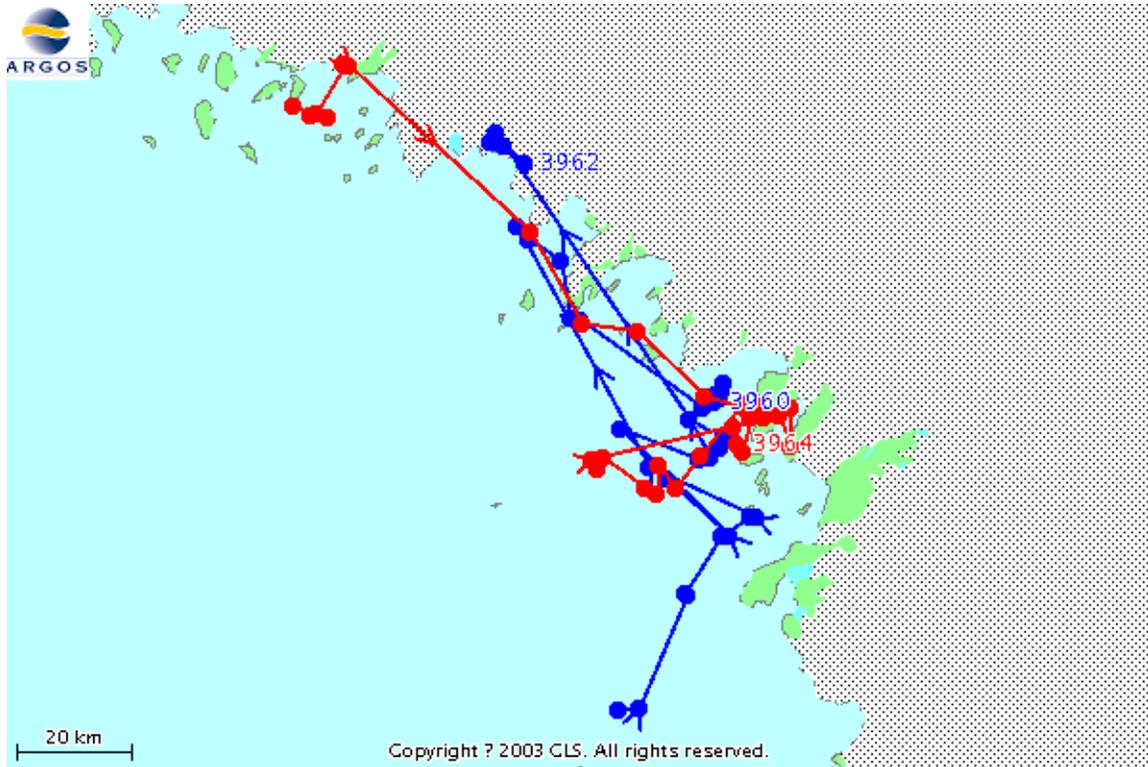


Figure 4. Map of real-time tracks of narwhals as of 9/23.

Daily Log and Photo Safari for Melville Bay 2006

August 30

MPHJ, KE, GK and KL fly from Qaanaaq to Upernavik and arrived at 15:00. HCS had arrived a few hours earlier from Ilulissat. Picked up boxes sent from Nuuk and Copenhagen at the community house and deposited gear in container. All 5 personnel stayed at the Upernavik Refugium house overnight because *Sila* was out sailing.



Photo: Town of Upernavik, point of departure.

August 31

Unloaded the container and loaded all the gear onto *Sila* the entire day with Skipper JK. We also grocery shopped for 6 people for 3 weeks and had everything done by 6 pm. We departed Upernavik Harbor by 18:30 and set sail north for the Balgoni Islands – a 48 hour sail trip.



Photo: Loading Sila (left) in the Upernavik harbor. Sila is 43 feet long and built in 1948.

September 1

Sailed all night long on 8/31 and all day long on 9/1 at a speed of about 6 knots. Took a route from Upernavik along the coast north to Wilcox Point and the Sabine Islands. Only saw a few seals and dovekies but no whales. Weather was foggy with swell. Passed an island inhabited by Vikings in 1300 AD with a cairn left on the top of the mountain.



Photo: Passing the island where Viking evidence was found from 1300 AD on the way north to Melville Bay.

September 2

Sailed all night on 9/1 in the fog and we could hardly see the icebergs. Arrived at the Balgoni islands at 04:35. Immediately set the anchor and put 100 m of nets in the water. By 10:00 we had to take the net up because it was completely filled with ice brought in by the current. We re-set 100 m of net and then that afternoon a huge iceberg the size of a 5-story apartment building collapsed on top of the net. Then we re-set the net again by 19:00 and also set a second 150 m net was set. KE saw narwhals far away from the lookout on top of Balgoni island.



Photo: Arrival at the Balgoni Islands at 04:35 after 48 hours of sailing.

September 3

Nets were in all night on 9/2 and until 12:00. We did not see any whales and had big problems with icebergs going into the nets, so we decided to move to a new site on another one of the Balgoni Islands where ice might be less of a problem. We spent most of the day pushing icebergs out of the way with the 15 hp zodiacs. Found some old polar bear bones on the Balgoni island when looking for whales, it is an area where many polar bears hibernate in summer. Arrived at the new island by 13:30 (location was $76^{\circ} 05.475$, $61^{\circ} 01.829$). Weather overcast, windy and a swell. We set one 150 m net and one 100 m net from shore and from the bow of Sila. No whales seen.



Photo: Site #1 on Balgoni Islands with Sila to the right of the photo and nets seen on the left. The large iceberg on the left crumbled on top of the net.

September 4

Remained at the same site, looking out on the islands of Issusarsuit. All nets were in the water overnight and again big problems with ice. It rained all night long and was very windy. At 18:30 we set another 100 m of net. At 20:00 one narwhal swam by camp right between the nets but did not go in. First close call with catching a whale!



Photo: Islands of Isussarsuit.



Photo: New net site from 9/3 with net and white buoys seen in the background.

September 5

Nets were in all night long but we did not catch anything. We saw 2 narwhals swim by at 08:30 am in front of the boat but again they missed the net. We spent several hours

pushing icebergs out of the nets with the zodiacs. Pulled in the nets at 14:30 because of very bad wind and moved *Sila* to the head of the glacier near the mainland for refuge.



Photo: Pushing icebergs out of the way of the narwhal nets with the zodiacs.

September 6

Overnighted 9/5 at the head of the glacier in the wind. We awoke to conditions that were still bad and decided to head back to the second site after 12:00 when the wind had died. We set one 200 m net and one 100 m net. Wind and rain and strong current all day.

September 7

We had to take the 200 m net in at 00:00 because a huge iceberg traveling at rapid speed nearly took them all away. Darkness is setting in around 01:00 and it is very dark between 02:00 and 04:00. Several groups of narwhals moved offshore past our site at 08:00 and we were all encouraged to see whales. Pods consisted of 3-5 animals and there were about 15 pods in total. Weather improved and the sun came out but no whales were caught. Nets in the water all day.



Photo: Second whale catching site in Balgoni Islands.

September 8

At 01:00 we had to cut several buoys and lower the nets by 10 m to let an iceberg pass by. Some nets we pulled in towards land and tied them for the night. We put the 200 m net back in the water at 08:00 and the 100 m net in the water by 11:00. Immediately more ice passed by and we moved icebergs until 13:00 at which time we decided to find another spot. We packed up and sailed back to our first site to find it completely filled with ice and unworkable. Instead we headed to a new group of islands called the Fisher Islands where we arrived at 18:00 (76°, 06.965, 61°, 42.453). We set 150 m of net from land by 19:30 (despite the fact we had never been there or seen whales in the area). By 22:00 we had several pods of narwhals swimming very close to the boat and the nets, 3 pods of 5-7 animals and we were very close to catching a whale, but didn't!



Photo: Narwhals (left) approaching the nets (right) at the Fisher Islands.

September 9

Nets were in the water all night long and through the day but no more whales were seen. It started to snow in the morning and was snowing and foggy all day long. Watched for whales the entire day and did not see anything until 22:30 when whales showed up. At 22:45 we caught our first 2 female narwhals. First whale was 372 cm in length, 110 cm flukes and received tag ID 3960. She was captured at 22:45 and released at 23:47. The second whale was also captured at 22:45 but was held while the first whale was tagged. The second animal was 390 cm long and had 100 cm flukes. She received tag ID 3962 and was released at 00:24 on 9/10. Prevailing darkness slowed the process of handling the whales.



Photo: Nets in the water at Fisher Islands, with Jens and Dog removing an iceberg with a rowboat to keep engine noise from scaring whales away.

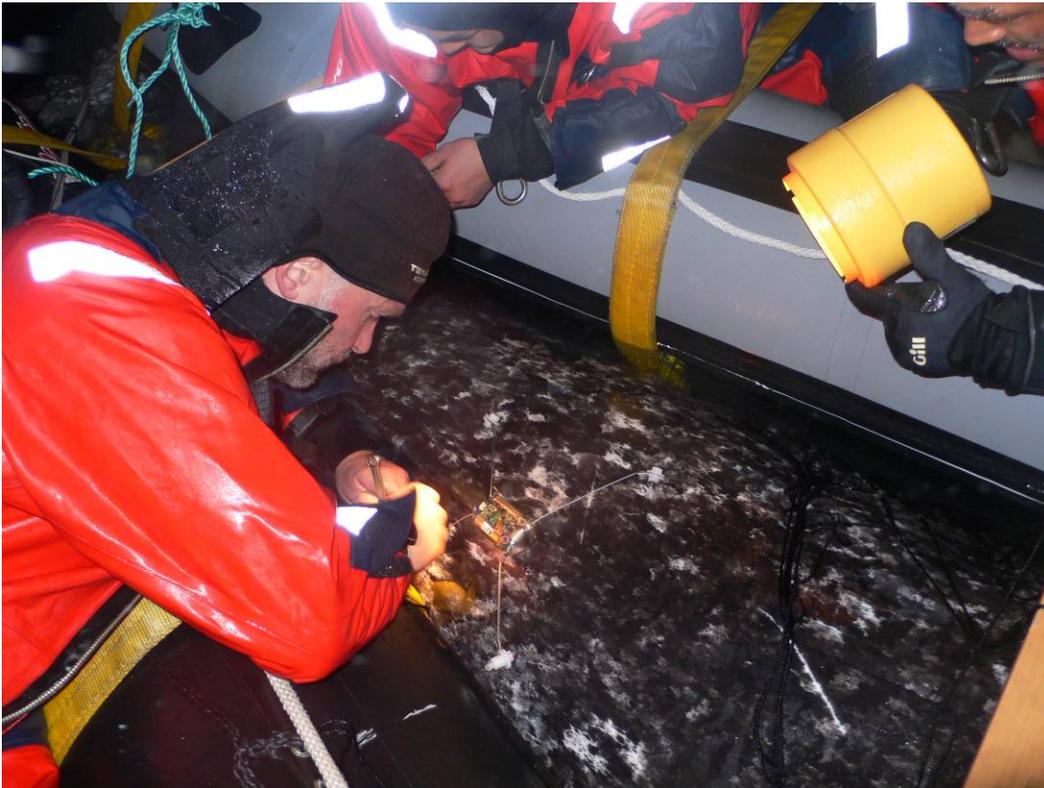


Photo: The narwhals went into the net in near darkness and during a snowstorm, so the tags were attached using a flashlight to see during instrumentation. Photo of ID 3960.

After the tagging, we removed the buoys and sunk the nets for the night. A huge iceberg hit *Sila* and we had to run around and fix that until 02:00.

September 10

The zodiac received major damage during the tagging operation and we awoke to find it deflated with a 6 inch long hole in the side. We pulled the boat to land the repaired the hole under a makeshift tent to keep it dry while at the same time sewing the nets. Zodiac was fixed by 13:30 and we re-set 150 m of net at 16:30.



Photo: Pushing icebergs out of the way of the whale nets.

September 11

Nets were in the water until 04:00 at which time the buoys were removed and they were sunk due to ice. The sun set at 21:15 and it is too dark to see the nets in the evening so we decided to have a new rule that we pull up all nets at dusk and no longer work during the night for safety reasons. Nets were re-set by 13:00 and pulled up at 21:30.



Photo: Sunset from Sila at the Fisher Islands.

September 12

Everyone agreed to wake at 06:00 and set nets by 07:00. One hour later, two Greenland sharks were caught in the nets close to where they hit the bottom. The sharks were removed from the nets and 50 m of net was put back out. Weather was very snowy and cold and windy but we decided to set a second 50 m of net by 13:00. No whales were seen all day and we pulled the nets up by 23:00 for darkness.





Photos: Greenland sharks caught in the whale nets. Sharks were removed from the nets (carefully).

September 13

100 m of net were set by 06:30, weather was still very windy with many waves but calmed down by 13:00. Some narwhals were seen passing by the boat right in front of the nets but too far offshore (~20 animals in 2 pods). We set a third (monofilament) net at 19:30 and within one hour caught a narwhal less than 25 m from the boat. The whale was a male with a large tusk, body length 437 cm, fluke length 108 cm and tusk length 187 cm. He was captured at 20:25, released at 21:41 and received tag ID 3964. Nets were pulled in at 00:00.



Photo: Male narwhal captured on September 13. Net can be seen above the water surface.



Photo: Disentangling the male narwhal's flukes from the net before instrumentation.



Photo: Male narwhal removed from the net and secured with ropes and 2x4 board for instrumentation.

September 14

100 m of net were set by 08:00 because it is now too dark to set nets at 06:00. We added another 50 m of net at 12:00. Several pods of whales were seen moving in and out. One pod of $n=10$ animals must have gone right under our net and several more pods were observed between 19:30 and 20:00, likely over 30 whales with one pod as large as 20. Whales were moving very fast through the area. Nets were pulled in at 23:00. Weather was perfect, flat calm sea.



Photo: Pod of narwhals moving past the boat and nets at the Fisher Islands.

September 15

Woke up at 06:00 and set 100 m of net by 07:00. Weather was perfect, flat calm sea and sun. Few whales were seen all day, a single narwhal at 13:00 and one small pod at 14:00. We set an additional 50 m of net at 18:00. Nets were in the water until 23:00 when they were pulled in for the night.

September 16

We sailed into the Fisher Islands archipelago to see if there was a better spot for catching whales because the wind was blowing very hard and it was not ideal for setting nets. The archipelago consists of many small islands and channels along the heads of glaciers. Although we did not find a better spot, when we returned to our original site it was filled with ice that had blown in over a 2-3 hour period. Instead we moved slightly in towards the glacier to an ice-free spot and set 150 m of nets by 17:00 (76°, 07.320, 61°, 41.570). We quickly realized why the site was ice-free because the current was very strong, however kept the nets in the water until 23:00.



Photo: Exploring the Fisher Islands archipelago, prime narwhal habitat.



Photo: Fisher Islands archipelago.



Photo: Setting nets at the final site on 9/16.

September 17

Woke to very strong wind. Packed up the zodiacs, secured the gear on the deck, and set sail south by 12:00. Sailed all day long. Hooded seals were seen hauled out on icebergs on the way south.



Photo: Sailing south through Melville Bay with new ice forming in September.

September 18

Sailed all night long through Melville Bay and all day south along the Greenland coast. Stopped in Kullorsuaq, a small Greenlandic settlement, at 13:00 for supplies, boat fuel, and some much needed chocolate. We spent about 3 hours in town and departed south again.



Photo: The settlement of Kullorsuaq, approximately 350 people live in the town and mostly hunt and fish for a living.

September 19

Sailed all night long and arrived in Upernavik at 13:00. We unloaded Sila by 15:30 and packed the gear into the container. Slept on Sila in the harbor.

September 20

GK and KE fly to Qaanaaq at 10:00

MPHJ, KL, and HCS fly to Ilulissat at 16:00, overnight in Ilulissat at hotel

September 21

MPHJ and HCS to Denmark

KL to Nuuk