ANNEX 1.1

NAMMCO PLANNING COMMITTEE ON THE TRANS NORTH ATLANTIC SIGHTINGS SURVEY (T-NASS) WORKING GROUP III

St. Andrews, UK, 30 March – 1 April 2007

PLENARY SESSION

1. CHAIRMAN'S WELCOME AND OPENING REMARKS

The Chairman, Geneviève Desportes, welcomed the Delegates (see Section 5) to the third planning meeting for the Trans North Atlantic Sightings Survey (T-NASS), kindly hosted by Phil Hammond at the Sea Mammal Research Unit (SMRU). She briefly reminded the convened Delegates of the unprecedented uniqueness, value and synoptic character of T-NASS. A listing of the agreements from the two previous meetings and a reminder of the time constraints ahead followed. The Chairman underlined that the Delegates have agreed on strong coordination and invited them to briefly introduce themselves to the new members. Finally the Chairman pointed out that by end of the meeting a draft instead of a full meeting report would be produced and that the full report will be submitted to the Delegates for approval by e-mail by the end of April.

2. ADOPTION OF THE AGENDA

The draft Agenda circulated before the meeting (Appendix 1) was adopted unanimously without modifications.

3. APPOINTMENT OF RAPPORTEURS

The NAMMCO Outgoing Scientific Secretary (Daniel Pike) and Appointee Scientific Secretary (Mario Acquarone) were designated as general rapporteurs. Specifically, Greg Donovan volunteered for reporting on the Aerial Surveys Working-Group and Mario Acquarone for reporting on the Shipboard Surveys Working-Group.

4. STATUS

At this point the Chairman invited the Delegates to present the status of the project in their respective areas.

4.1 Resources per area

Faroes

One vessel able to carry two platforms has been approached, but the charter contract has not been signed yet.

Iceland

A formal request procedure had to be followed, only 2 offers for vessels had been received, but none was good enough and both were refused. The Redfish Survey

vessel is ready and available. Other possibilities are being investigated to obtain vessels for the main T-NASS and there is confidence in finding other vessels in a matter of weeks. A Partenavia Observer aircraft equipped with bubble windows, and possibly even with photo equipment, has been secured for charter between 20 June- 21 July. This should amount to approximately 100 hr flying-time.

UK-CODA

The tender process for the ship charters will be completed in May and the contacts will be passed on to Iceland. There may be 2 Faroese platforms in sight.

Greenland

The vessel available for the Shipboard Survey belongs to the Danish Navy. The Navy has specified that they would have to respond to any emergency during the survey period, which could mean an interruption of the survey work. The ship will be made available in Ilulissat and has to return to Narsarsuaq at the end. This means that the surveying work will have to follow a North to South course. Due to military obligations the vessel will have to stay in Greenlandic waters. The Canadian part of South Baffin Bay and Davis Strait will have to be surveyed otherwise. The Greenland Delegate remarked that it is a small round-bottom vessel which may be very uncomfortable for the observers and have practical stability problems. A contract with Air Greenland has been signed for the charter of a Twin Otter aircraft with bubble windows for a series of surveys beginning in mid-August.

Canada

This survey will be conducted by the Federal Department of Fisheries and Oceans (DFO). Funding for the the Newfoundland-Labrador strata has been secured, and it will be surveyed using a charter Twin Otter aircraft. $100K CAN funding for the Gulf area survey component has been secured, and there is a an assurance that funds to conduct the full Gulf survey (an additional $50K CAN) will be found. As far as the Scotian shelf area is concerned there is no funding yet, but there is reasonable certainty that the area will be surveyed. The intent is to begin the Canadian survey in mid July in the northern Labrador area, and continue southwards in what is presumed to be the opposite direction to the annual migration patterns of several large whale species expected in the survey area. The Gulf survey will commence in July, with the likely survey platform being a Cessna 337 Super Skymaster (as has been done in previous surveys here). If funding is available, the Twin Otter team will continue flying transects along the Scotian Shelf in August at a time to correspond with the American effort to the south. The survey transects will be designed for all strata in the Canadian survey areas (with the assistance of D. Pike), and logistical planning is underway to begin the surveys later in the summer. All necessary equipment is in place to carry out the visual surveys. No vessel-based observations are planned. Lawson has requested several days flying time on a Canadian military aircraft, the Arcturus, whose primary mission is to monitor fisheries within NAFO areas. The aircraft has long range (up to 17 hours duration), is extremely well-equipped with navigation, observation and acoustic recording equipment. However this aircraft has a minimum manoeuvring airspeed of 170 knots which may be faster than practical for a marine mammal survey. The Canadians are hoping to assess the efficacy of this

platform during several trial flights in the Davis Strait between southern Baffin Island and Greenland, and off the Flemish Cap of eastern Newfoundland. The hope is that Jack Lawson will employ this platform in August.

4.2 General funding available

NAMMCO council has decided to allocate most of the 2007 NAMMCO Scientific Committee budget plus a special allocation of 150,000 NOK to T-NASS and T-NASS extension.

The Nordic Council of Ministers had allocated to T-NASS 128,000 DKK. There has been no success in finding additional funding. The latest rejection came from the Danish "A.P. Møller og Hustru Chastine McKinney Møllers Fond til amene Formal". The rest of the funding needed for equipment, salaries etc. will have to be sought from other sources.

NAMMCO will address applications for sponsorships in the order of magnitude of *ca* 20-50,000 DKK to small companies in the different T-NASS countries, if the necessary information is forwarded by these countries. An application of this kind has already been sent out in Iceland and a response is expected shortly. (for information, the answer given after the end of the meeting was positive and *ca* 300 kDKK were secured for the Icelandic part of the acoustic survey)

There is some uncertainty on how to finance the salaries of the observers on the Greenlandic surveys.

Some equipment could be loaned or rented. Paul Thompson makes available up to two hydrophones, even though one has to undergo repair. However they are different to the ones used in SCANS II and CODA and special analysis would be necessary, which is not optimal. Canada later agreed to loan two pairs of "Big Eye" binoculars and stands to other partners, as well as two sea surface temperature measurement systems for the aerial survey teams.

The Chairman urged all the Delegates check and report to the Secretariat the amount of funding already secured and what is needed for the ordering of necessary equipment (*e.g.* hydrophones for acoustic monitoring and standard material for opportunistic surveys).

4.3 Coordination with opportunistic surveys

Redfish Survey in the Irminger Sea

All vessels will embark observers and all have the capability of towing hydrophones. The **German vessel** will be leaving Bremerhaven 14 June and is planned to be back by 14 July. NAMMCO will provide two whale observers for this ship. The **Russian vessel** *Smolensk* will have one NAMMCO observer and one Russian observer onboard. It will be preferable to pick up the NAMMCO observer in Reykjavik for bureaucratic and practical reasons. *Smolensk* will leave Murmansk between 5-10 June and will have to be back in Murmansk at the end of July – for approximately 50 cruise

days. *Smolensk* will be calling in Reykjavik 22-24 June/9-10 July. In the Norwegian Sea, on its way to the Irminger Sea it will perform other Oceanographic and Ichthyology work within the framework of the INFERNO cooperation between Russia and Norway.

Pelagic survey in the Norwegian Sea: Norway

Two vessels have been charted for three weeks between 15 July and 7 August to perform an adaptive survey in a large area of the Norwegian Sea. One vessel will have BBC people to film blue whales in the waters around Jan Mayen. There will be two T-NASS observers on each vessel. IMR will hire the observers directly and NAMMCO will provide the equipment and the procedure.

4.4 SCANS II

Data analysis problems, avoidable with a better data collection. A list of comments based on her experience with SCANS II data was provided by Louise Burt (Appendix 2).

5. GENERAL STRATEGY FOR COVERAGE

The general strategy for coverage was discussed in the following points.

5.1 Survey design in Distance

Presentation by Len Thomas based on the distributed paper "Designing line transect surveys for complex survey regions" *J.Cetacean Res.Manage.*

An interesting and useful presentation was held by Len Thomas on the use of the programme *Distance* and on *Survey Design*. Among the points he made was that effort should be distributed equally over the survey area unless there is prior information that warrants stratification. The general coverage probability can be estimated if the coverage probability for all sub-areas is known. However this calculation is not (yet) implemented in *Distance*.

As far as the design of transects, it is clear that zigzag minimizes lost effort for transport from one transect to the next and that it is best to get many reasonably short transect samplers rather than few long ones. In big areas it is possible and advisable to divide the stratum lengthwise so that the number of lines, and thus samples, will be increased. This presents the advantage that the lines can be cruised in both directions In general an equal spaced zigzag has proven best for non rectangular areas.

In case the shape of the strata is very complex one can improve and ease the design by cutting the complex shape into sub-areas while retaining spacing. One will typically then generate several survey simulations for the same area. The subdivision in sub-areas presents the drawback that transects in adjoining sub-areas do not necessarily join up.

Complex coastlines such as fjord areas will necessarily present serious edge effects that are large proportional to the survey area. In this case it is generally more correct

to orient the transect lines perpendicular to long axis but shallow angle zigzags could also be used.

5.2 Considering the combination of both dedicated surveys and opportunistic surveys: do we want overlapping areas or can we rely on the opportunistic data?

The value of simple distribution data and on the importance of maximizing coverage was generally agreed upon. It was pointed out by some Delegates that T-NASS should strive as far as possible to provide an estimate compatible with IWC standards and this might mean that the opportunistic surveys could not be included for a density estimate within the IWC framework.

In conclusion all the important areas for which it is necessary to obtain a reliable population abundance estimate of target species have to be covered by a dedicated Survey.

6. SCANS II SHIPBOARD METHODOLOGIES: VISUAL AND ACOUSTIC (Presentation by Doug Gillespie and Rene Swift)

SCANS II shipboard methodologies were presented by Doug and Rene in their lab.

6.1 Presentation of the shipboard visual and acoustic methodologies and protocols

This point was treated together with the next in the laboratory with the equipment at hand.

6.2 Presentation of shipboard visual equipment and acoustic equipment

See above 6.1.

SUB-COMMITTEES

7A. SURVEY DESIGN

Present at this Sub-Committee were: Pike (chair), Acquarone (rapporteur), Desportes, Donovan, Golyak, Gunnlaugsson, Hammond, Lawson, Mikkelsen, Simon, Vikingsson, Zabavnikov and Øien. The Sub-Committee Chair Daniel Pike reminded the Delegates that the aim of the Sub-Committee is to help and assist with designing the following components of the survey (from West to East):

- Canadian aerial surveys, including Twin Otter, Skymaster, and Arcturus components;
- West Greenland Ship Survey;
- Iceland ship survey, taking into account existing redfish design;
- Iceland aerial survey, secondary inshore strata;
- Faeroes ship survey.

The task can be divided into the following 3 components:

1) Establishing boundaries of survey areas;
2) Stratification and Effort allocation;
3) Transect design.

The first two points should be agreed upon as a group and the transect design will be left for a specialized working group.

In general the procedure should be:

1) Establishment of boundaries of national survey areas, with regard to known boundaries of other surveys, available effort and species distributions.
2) Stratification within areas, based mainly on species distributions.
3) Assignment of effort to these strata, based on expected density of target species.

For the moment the Sub-Committee should concentrate its work on procedural points 1) and 2).

7A.1 Survey boundaries (in coordination with CODA, SNESSA and opportunistic surveys)

Because of the synoptic aspect of T-NASS it is necessary to examine the different areas each for itself and as a whole.

Norway

It has been decided to give highest priority to survey the Eastern Barents area if the permission from Russia can be obtained. A final decision on the permission to enter Russian waters is not far away. In the best of cases one vessel will survey the Eastern Barents Sea and the other will concentrate on VHF tagging and looking for blue whales with the BBC. A "Plan B" for Norway in case permission from Russia is refused could be to add to survey blocks BJ, NØN, SV and SVI.

The southernmost boundary of the Norwegian survey will be 74°N which will coincide with the northernmost extent of the Icelandic survey.

The committee regretted that very little, if any, consideration was given to T-NASS needs in the Norwegian decision.

Greenland ship

The ship survey should extend to the Greenland-Canada mid-water line. Greenland will have:

- a wide northern area out to 58°W from just south of Disko and down to the latitude of Nuuk
- a narrow southern area a little bit beyond the shelf extending a little the previous surveys.

It was agreed that these are fin whale areas and that we have to allocate equal sighting probability for the two strata.

Canada
Survey transects will extend from the coastlines out to slightly past the shelf break. The southeastern part of the Newfoundland area will be covered as much as possible but will have to be truncated at its outer margin because of technical considerations (Twin Otter range). The proposal for the Arcturus will be to survey across the southern Davis Strait (and perhaps the southwestern tip of Greenland), and off the Flemish Cap of S.E. Newfoundland over a period of 2-3 days.

Faroes
The area to be covered by the Faeroese will be contained between the Icelandic areas in the West, the Norwegian area in the North and the CODA boundary in the East. It was agreed to use a southern boundary at 52° N. Available effort is known.

Iceland ship
It was agreed to use a southern boundary at 52°N extending as far east as the CODA boundary and that it was not necessary to re-cover the opportunistic areas unless there is a very high density of animals. It was also agreed to delimit the north block I at 74°N and 4°W. The 74°N is because of the "Plan B" Norwegian survey which is planned to extend down to that latitude.

The Western boundary of the Icelandic Redfish vessel will be Cap Farvel so it meets with the Greenlandic ship survey. Available effort is known.

The two blocks south and east of Iceland will be covered by the Icelandic and Faroese vessels respectively.

Iceland aerial secondary strata
These will be done on days when it is impossible to fly offshore. It should be considered a pilot project and should cover several fjords that are not well covered in the main survey by establishing transects in them. There is little information available on the distribution of harbour porpoises in the area. Available effort is not known and these will be done opportunistically.

CODA's bight, south of Ireland, will be filled by France. The North and northwest boundaries are flexible. CODA will join to the SCANS II area, and the Faroese T-NASS block and CODA will join.

Additionally
Stratification of the new areas will be executed in an appropriate manner to reduce effort in areas of lesser priority because of the coverage by opportunistic surveys.

A small block "opportunistic stratum" will be drawn around the Charlie Gibbs fracture zone to be surveyed if there is time (down to 50°N). This can be done by the Icelandic or the Faroese vessels or both.

7A.2 Stratification

Canada

- Newfoundland: on the basis of fin and blue whale distribution there will be 3 strata, North, South and Central with most effort allocated to Central. Attention should be paid also to minke whale distribution, especially Davis Strait sightings.
- Gulf: stratification is complete and based on previous DFO aerial surveys by Kingsley.
- Scotian Shelf: not much basis for stratification, maybe East - West blocks but maybe not.

Greenland

- It was suggested as a possibility to divide the area from Nuuk south to Kap Farvel, into an inshore and offshore stratum. The inshore stratum should have most effort and should extend to just beyond shelf break, maybe 10 km or so.
- The coverage by the Arcturus might depend on realized effort in offshore stratum.

Iceland

- *Redfish blocks*: it was suggested to divide the area into 3 blocks: North, West and South, with higher effort in North and West blocks.
- Otherwise it should be similar to 2001 scheme.
- Eastward extent depends on the extent of the Norwegian survey.
- It my be useful to consider a southward extension west of Coda and east to Redfish extension blocks, as this is an important area for pilot whales and other species such as beaked whales.

Faroes

- Similar to 2001 but it depends on where the Norwegian effort is allocated.

7A.3 Effort allocation by stratum (and estimation of realizable effort)

The northern blocks

These will be divided in two blocks by a vertical line and the two resulting blocks will have equal coverage.

Redfish blocks

- A Western stratum that as far as possible has equal area coverage.
- A Northern area will be an extension of the Northern block (already decided).
- A Western boundary to the south-central block will be moved slightly to the west to include the Mid-Atlantic ridge. But pay attention: “the world is big down there” (Phil Hammond).

Greenland

Equal coverage will be attempted as a starting point (equal-space zigzag).

Canada

The Newfoundland and Labrador (NL) survey component will comprise 3 strata, with most effort allocated to the eastern stratum that will extend from southern Labrador to the southeastern coast of the island: NL Labrador Stratum (69,540 n.mi^2, 20% of NL effort); NL Eastern Stratum (81,360 n.mi^2, 40% of NL effort); NL Southern Stratum (62,660 n.mi^2, 40% of NL effort).

- Scotian Shelf: no stratification is planned, assuming equal probability (56,810 n.mi^2).
- Gulf: stratification from previous DFO surveys, assuming equal probability (66,930 n.mi^2).
- An equal-spaced zigzag pattern will be used in the Newfoundland and Labrador, and the Scotian Shelf strata. East-west and north-south transects will be employed in the Gulf strata.
- The opportunistic Arcturus trial will cover survey areas as determined above.

Norway

The Norwegian vessels will sail from Kirkenes. Time allocation for T-NASS is 2-3 weeks.

- It is recommended that Norway's survey join up appropriately at 74°N with the Icelandic block up to the ice edge, and that the transit area from Kirkenes be included.
- The committee appealed to Norway to use as much effort as they have available for a direct participation in the T-NASS effort.

7A.4 Transect design

See 7A.2 and 7A.3 above.

7A.5 Other (e.g. coastal harbour porpoise strata in Iceland)

See 7A.1 above.

7A.6 Rules for adaptation (i.e. changing the design underway)

It was firmly underlined that the tracks must **not** be redesigned underway so as not to jeopardize the validity of the estimate. However a redistribution of vessels is allowed.

Daniel Pike will provide the track design. He will contact the delegates for the details needed.

Geneviève reminded that, in the allocation of effort, training time on land and at sea has to be taken into consideration as it takes time to get used to the new technology and distance estimation.

It was agreed that at least 2 harbour days be used for equipment setup and use training and at least one sea day must be allocated to training in effort conditions and that training continues further until satisfactory results be obtained.

7B. SHIPBOARD PROTOCOLS

Present at this Sub-Committee were: Acquarone (rapporteur), Desportes (chair), Golyak, Gunnlaugsson, Hammond, Mikkelsen, Simon, Vikingsson and Øien.

The Chair (Desportes) reminded the group that the aim was not to finish the session with a written protocol, but it was important to reach an agreement on all the points that a protocol is composed of.

7B.1 Review of protocol for dedicated surveys with 8 observers and 2 independent platforms

7B.1.1 Survey modes

Iceland - Faroes - 4 vessels with 2 independent platforms which will follow the BT methodology, as agreed last meeting.

The higher-tracker platform will concentrate on far sightings and the lower-primary platform will concentrate on nearer sightings within 500 m from the trackline.

Tracking - it was agreed to track everything except sperm whales, and to assume minke whales as very high priority (i.e. always track even if you were tracking something else). It is important to be sure to track small cetaceans (species identification and school size).

It was agreed to track up to Sea State Beaufort 4 included, with no reason for tracking in Beaufort $\geq$ 5. When the conditions impose a stop in tracking, the platforms are combined as a single primary platform (the observers remain in place but work in the same way searching everywhere). A code should be inserted in the effort form for indicating which searching mode was used, i.e., the exact point when effort is shifted from two separate to one single (combined) platform should be recorded with certainty.

Note that when using the BT mode, it is important to keep the primary platform separate from the trackers, and to keep the same pairs of primary observers during the entire survey to minimize heterogeneity.

7B.1.2 Equipment

It was agreed not to use "Big eyes" because of cost and difficulty in timely delivery, but to use medium and small binoculars. The medium binoculars will be attached to a monopod fixed to the deck at the bottom end.

The observers should be advised to have their own computer with them to speed up the data validation and control process.

It was agreed on a previous occasion to use the visual equipment developed for SCANS and the order was placed for four kits.

7B.1.3 Survey procedures

Shipboard T-NASS will generally follow the procedures developed for SCANS.

For technical positions it might not be advisable to have persons with low computer or English skills (e.g. whalers).

Observers on the primary platform should concentrate to look and search without using binoculars up to 500 m but all their sightings will be recorded even beyond that distance.

T-NASS will aim to avoid paper forms, but these should be available in case of catastrophic events or "learning challenged" observers.

Observers with 7x50 binoculars should search between +60°-60° and the observers with the medium eyes binoculars should search +40°-40°. Trackers platform observers will track until duplicates are established or the animal has passed abeam of the vessel. The two trackers will cooperate on tracking the same sighting. The Duplicate Identifier (DI) will act as observer when not assisting the duplicate. The DI will be using 7x50 reticules and will pass any sighting to the trackers. Closing mode for ID will only happen when the sighting is abeam and closer than 1.5 nm.

7B.1.4 Sighting protocol

No need for discussion at this meeting.

7B.1.5 Data collection procedures

No need for discussion at this meeting.

7B.1.6 Calibration experiments (distance and angle experiment)

No need for discussion at this meeting.

7B.1.7 Data calibration

No need for discussion at this meeting.

7B.1.8 Cruise leader and observer training

Iceland

Training will be done by Desportes and Jacobsen (a tracker from SCANS II) first on land, then at sea and will possibly be held in common for all the vessels.

Faroes

Training will be done by Mikkelsen and Hansen (a tracker from SCANS II) first on land, then at sea.

7B.2 Review of protocol for the Greenlandic vessel with a single platform and 4 observers

Differing combinations of observers were suggested. One suggestion was to have at any time 2 observers on duty and 2 resting. The other suggestion was to have 3

observers working simultaneously and 1 rotating. It was recommended that if possible, 3 observers worked at the same time. If weather permitted long working days in a row, then two observers would work at any time. It was underlined that it is important to have best quality effort rather than effort over longer periods with doubtful quality (observers give better data working in pairs and need to rest). A minimum of 6 hrs rest per night was recommended.

Single Platform Surveys will be in Passing Mode (Closing allowed for species ID, when sighting passed abeam and not further than 1.5 nm)

The recommendation of the WG is to place 2 persons on the lowest platform. They should concentrate on searching with their naked eyes +90°-10° and reciprocal. Another observer should be placed in the crows' nest to keep a look out ahead with binoculars at +30°-30°. Binoculars (reticules) should in general be used only when looking at +30°-30° ahead.

The use of 3 observers is highly recommended and they have to be able to communicate easily with each other to avoid double sightings (via radio-link?). In case money is an issue then the observer in the barrel can communicate with the others through a radio-link. Data can be recorded on a single computer or on paper.

The ship will be in Nuuk in April and only at that time will it be clear if there is space in the crow's nest.

For the training of the observers, days must be allocated and eventually the cruise leader could be participating in the Icelandic training if useful (noting the difference in the equipment).

7B.3 Review of protocol for opportunistic surveys

7B.3.1 With 2 observers: Redfish (Russian and German) and pelagic survey

The ships will operate in passing mode with no closing. It was recommended that the two observers work and rest together at the same time.

To give an idea of the working hours it was pointed out that in the Norwegian Sea the rest time is usually 6 hrs. The Icelandic ships will trawl approximately 4 hrs three times a day when the speed will be at most 2 kn. This is an obvious time for the observers to rest. The Russian ship will trawl shallower with a corresponding reduction in trawl time.

The observers search with naked eyes from +90°-10° and reciprocal and that they use a recording system similar to the Greenlandic vessel. For large angles (60°-90° almost abeam) they should concentrate the search close to the vessel. Binoculars are only to be used for species ID and determination of school size.

7B.3.2 With one observer: MAR-ECO

The procedure is the same as those for the Redfish vessels. The recording system will also be the same as the Greenlandic vessel.

Single observers should look symmetrically around the trackline ahead, but concentrate on the trackline

7B.3.3 Training of 'opportunistic' observers

If possible, at the discretion and with the collaboration of the ship's captain, these observers could be trained in distance estimation using a buoy-radar reflector system.

7B.4 Ice edge protocol

In case of ice encounter the vessels should follow the SOWER protocol (IWC).

7B.5 Group size estimation for pilot whales and dolphins

In SCANS II Guidelines for Observers p.11 there are instructions for this situation. In those instructions it was indicated preferable to cut large groups in subunits and to record them separately. It is important to note as much as possible of the details of each sighting. For large and very "messy" groups, use common sense.

For all vessels, it is important to ensure that the data are entered/validated as soon as possible (e.g. every evening).

7C. AERIAL SURVEY PROTOCOL

Present at this Sub-Committee were: Donovan (Chair/Rapporteur), Lawson, Pike, Simon and Zabanikov.

7C.1 Review of protocol for dedicated surveys with 4 observers and 2 independent platforms (Iceland and Greenland – September survey)

7C.1.1 Survey mode

It was agreed that for fin and minke whales, cue counting would be the primary method, with blow being the cue for fin whales and dive the cue for minke whales. In practice, the data collected will be in a manner to allow either cue counting or line transect analyses as appropriate.

The surveys will be carried out in independent mode (at least one-way audio/visual isolation) to the extent possible. The pilot will not be considered as an observer but should quietly inform the cruise leader if making a sighting. Ideally, there will be an intercom system such that each observer has one way communication with the cruise leader during survey mode. For safety reasons, the pilot will need to be able to override the system. Further details can be found in the protocol document.

It is extremely important to ensure that the data are entered/validated as soon as possible (e.g. every evening). Appropriate software to allow the cruise leader to examine the data is essential to allow problems in collection to be identified as soon as possible. If necessary, an additional person should be used to ensure that the data entry entry/validation is kept up to date.

7C.1.2 Equipment

The Icelandic aerial survey will use the usual (serviced and checked) equipment for recording the necessary data for sightings (Icelanders to clarify the potential copyright issues around use of the Hval programme).

Jack Lawson has kindly offered to lend one Sea Surface Temperature (SST) sensor. It is recommended that this be used on both the Icelandic (July) and the Greenlandic (September) surveys provided this meets air safety approval for the planes. He will send the system to Iceland and Greenland as soon as possible.

There may be video/still photography capabilities on one or both surveys.

7C.1.3 Survey procedures

Survey speed

Aim for as slow as possible (around 100 knots) depending on stall speed.

Survey height

This depends on the primary target species. For the Icelandic survey, the altitude will be 600 feet as some priority is being given to harbour porpoises. In Greenland, it may be 750 feet (best for fin and minke whales) or lower if harbour porpoises are given some priority. There is no theoretical reason why different heights cannot be used depending on circumstances (e.g. low cloud, priority for harbour porpoises) provided altitude is accurately recorded (ideally a direct link to the altimeter) so that an appropriate effective searching width is estimated.

Survey conditions

Surveys will be carried out in Beaufort Sea States of 3 or less along with other acceptable visibility conditions (e.g. wind, rain, fog etc). Further details can be found in the protocol document.

Large schools

Procedure for closing on schools

In general, surveys are effectively carried out in 'passing mode' – however there may be occasions when it is not possible to get a good enough estimate of schools size (or for certain small cetaceans, species and school size) for priority species. It is important to take distance and angle readings to the smallest discrete groups feasible while on track. Include comments where appropriate. In such circumstances, the cruise leader may decide to close with the school after abeam and then circle to get a good estimate of school size. For surveys where a large number of non-primary target dolphin schools are expected/found that might result in considerable 'confirmation' time and compromise the overall survey for primary species, it might be appropriate to determine a rule (either random or every x^{th} sighting) to try to enable a correction factor to be determined (the school size estimates when abeam are compared with the 'confirmed' values). Further details can be found in the protocol document.

Recording of additional data (other than usual effort and sightings data associated with cetacean surveys)
It was agreed that recording of additional data should only be undertaken if the cruise leader was happy that this would not interfere with cetacean sightings and recording of primary data. Seal sightings will not be recorded in the Greenland survey. Marine debris, oil slicks may be recorded. SST data will automatically be recorded.

7C.1.4 Sighting protocol

The past Greenlandic protocol (05tnass_5) will form the basis for the final protocol document. The final version, taking into account discussions at this meeting, will be developed by the working group within the next month.

7C.1.5 Observer training

The importance of training was stressed. Considerable benefit can be obtained from training in the plane even when it is on the ground! Greg Donovan will rediscover the old cue-counting training program and circulate it to the working group. Priority should be given to giving the Greenland cruise leader training in Iceland.

7C.2 Review of protocol for dedicated surveys with multiple observers, one leader and one platform (Canada and SNESSA)

7C.2.1 Survey mode

7C.2.1.1 Survey mode (Canada)

As in 7C.1.1. A line transect was suggested. It was agreed that the survey timing off coastal Canada (NL and Scotian Shelf components) would be designed to start in the north and move towards the south over time. This would reduce the chances of double-counting marine mammals if they are migrating from south to north, as it is assumed species such as fin and humpback whales are in this area. Similar transect timing issues will be addressed in the Gulf.

7C.2.1.2 Survey mode (SNESSA)

Details on SNESSA were not available at the time of this meeting.

7C.2.2 Equipment

Surveys in Canada and the SNESSA will be aerial-based visual surveys using multiple observers and dedicated data recorders. The SNESSA will also have a vessel-based component (see above).

7C.2.2.1 Equipment (Canada)

The equipment used will ensure that the appropriate data can be collected, and in such as way as to accurately record the location and time of each sighting event. Therefore the data can be analyzed using cue counting or line-transect methods, depending on the species. This will be assured using a keypad triggering system for each observer that will be attached to the GPS-linked data recorder's laptop computer. The computer will be running a modified version of NMFS' VOR survey programme that can record

time, location, inclination, species ID, group size, sighting cue, weather, sighting conditions, and other notes. It is linked to a GPS system for location, and displays the course of the aircraft as well as the underlying transects for navigation checks.

Distances of the sighted animal(s) from the trackline will be determined be each observer using inclinometers.

7C2.2.2 Equipment (SNESSA)

Information on SNESSA equipment and protocols were not available at the time of the meeting.

7C.2.3 Survey procedures

Given the extensive survey coverage planned, the multi-species nature of the Canadian surveys, and the second rear observer station on the right side of the Otter, it is not feasible to use the 'circle back' procedure that has been used to estimate detection probabilities for harbour porpoises.

For the parts of the Canadian survey flown using the Twin Otter (NL and Scotian Shelf), independent data from front and rear observers at bubble windows on the right side of the aircraft (there is a single observer at the bubble window on the left side) will be compared to estimate detection probabilities (corrected for perception bias). While not ideal, it was agreed that it will also be possible to use correction factors obtained from the US surveys for harbour porpoises, which include a correction for availability bias derived from circle-back experiments. All three observers will be visually and aurally isolated from each other, passing data to the recorder using their keypads or headset microphones.

The Gulf surveys will be flown with a Cessna Skymaster, during which there will be two observers at bubble windows in the rear of the aircraft and a dedicated data recorder/navigator in the front right seat. As for the Twin Otter surveys, data will be recorded using the VOR programme on a GPS-linked laptop computer. Circle-back techniques are not planned to be used.

The Otter and Skymaster will be flown at 105 knots and 650 feet ASL (above sea level).

A proposal has been submitted that, if approved, will allow Canadian researchers to fly for several days in an Arcturus aircraft. This large, four-engine platform will be operated at 750 feet ASL and an airspeed of 170 knots. It is planned to have two independent teams of observers on the front and rear of the aircraft (6 people in total), collecting sightings data using the same protocol as for the Twin Otter. Circle-back techniques are not planned to be used. At this point it is unclear which survey pattern will be employed, but likely east-west oriented survey transects in two locations (described above).

7C.2.4 Sighting protocol

In both the Canadian and SNESSA aerial surveys, sightings data will be collected using Distance-based analyses of sightings locations relative to the survey trackline.

7C.2.5 Observer training

In the NL Region observer training has occurred using dedicated flights with the Twin Otter and Skymaster platforms in the past several years. For the Otter, all survey equipment has been employed and tested. In the 2007 T-NASS it is not planned to conduct further training in advance of the survey.

PLENARY SESSION

8. REVIEW OF SURVEY DESIGN

It was agreed that transects should be based on the realizable effort plus a general bonus of *ca* 20% (Iceland and Faroes), where there was no other indication by the local coordinators. A parsimonious design will be used especially in the northern blocks assuming equal coverage in order to allow for flexibility to adapt the track design. This will allow the Icelanders to define the final survey tracks as late as possible in order to integrate the best and latest ice information available.

If an area is missed by one vessel, another may step in to cover the tracks missed. In general, how the "whale survey" time in the Redfish survey will be used must be defined on site. The cruise leader will have to decide on the base of local weather, previous coverage, and ship schedule (e.g. stop during the night).

It is very important to establish a viable working rhythm between the Redfish and Whale time and to follow it throughout the whole area.

9. REVIEW OF SHIPBOARD PROTOCOL

Seat and shelter for the observers should be provided.

10. REVIEW OF AERIAL SURVEY PROTOCOL

- Data for small areas.
- Independent platforms in all areas.
- Weather as normal, up to and including Beaufort Sea State 3.
- Cameras may be present but only as ancillary.
- Data entered and validated every day.
- A ground person in Iceland to enter data.
- SST on loan from Canada.
- Standard methods.
- Altitude 600 ft but record if different (650 feet in Canada in Otter and Skymaster, 750 feet in Arcturus).

- Mainly passing mode, with closing to confirm species identification and group size if necessary (abeam) but careful if many non-primary dolphins.
- In Iceland closing may be carried out on a subset of dolphin schools to derive corrections for school size estimation.
- Additional data will be collected if it does not interfere with the primary objectives.
- Training important at all levels (even on the ground with a fishing rod).
- Greenlandic cruise leader to be trained on Iceland.
- US/Canada will not use cue counting.
- Arcturus: importance to maintain two independent teams.
- Icelandic plane:
  Experimental digital stills taking a strip of 200 m under the plane where each point twice right under the plane.
- Greenland:
  Not sure yet but there will be either stills or digital.

11. OBSERVERS STATUS

Iceland
Looking for at least one observer with acoustics background and/or a SCANS tracker.

Faroes
Looking for 2 experienced and 2 additional observers (even 2 inexperienced), an experienced acousticians would be desirable.

Greenland
Looking for one observer for plane and one for ship survey.

Norway
Observers are being hired now, names to be sent to Nils Øien if any available.

12. COLLECTION OF ANCILLARY DATA

Jack Lawson agreed to provide temperature probes for the Icelandic and Greenland planes and the appropriate survey coordinators will ensure that the necessary installation approval from the authorities is obtained.

Vessels will regularly record water temperature and marine debris.

13. ACOUSTIC SURVEY

It was unclear at the time of this meeting whether there would be acoustic material available. For this reason there was no input about this on the protocol.

In any case, ships carrying acoustic recording equipment must be able to:

- tow and hook up the material

- have a shelter for the electronics
- have a winch for hauling in the hydrophone.

In the Redfish Surveys the hydrophone will probably have to be hauled in while trawling. In the southern sector it would be desirable to have one hydrophone on the Faroese sector, so it could be used in an area adjacent to the CODA area.

Canada is investigating whether acoustic sono-buoys can be dropped from the Arcturus aircraft during the surveys. These will record marine mammal vocalizations, as well as ambient noise and anthropogenic sound sources.

14. BIOPSY AND TAGGING STUDIES

Biopsies and Photo-ID will have a very low priority but adequate equipment and instructions should be onboard.

15. BIRD SURVEY

It was unclear if it was possible to host bird observers on the Faroese and the two Icelandic vessels and there was certainly no room for them on the Redfish Survey, Greenlandic or Russian vessels.

Bird observers would have to bring their own platform and equipment.

Henrik Skov will be requested to contact the national contact persons and not expect an answer before at least a month.

16. CONTACT AND COORDINATION DURING MAIN SURVEY

As for previous surveys there should be contact for:

- internal coordination
- the “visual equipment”.

For any change in protocol or design the person responsible **must** contact the main advisor who will be equipped with (satellite)-phone and/or other permanent means of communication for the whole duration of T-NASS.

Genevieve Desportes will request technical support from the same team as CODA (Doug Gillespie: dg50@st-andrews.edu.uk).

Desportes, supported by Donovan, will be the general advisor for protocol or design change for the shipboard survey and Donovan for the aerial survey.

17. COORDINATION

Coordination matters were discussed under the following points.

17.1 IPY-ESSAR

Contact has been kept with IPY-ESSAR contact person Ken Drinkwater who has received all information circulating internally in T-NASS. There was no further information on other activities in IPY-ESSAR. It looks as if there are not many coordination activities within it, just a lot of paperwork.

17.2 Other matters

There should be coordination between the CODA - T-NASS (Faroese-Icelandic) vessels, especially those operating in adjacent areas. Contacts among the cruise leaders should be initiated shortly and Desportes will attend the CODA coordination meetings.

Permission to enter national waters has to be applied for and by the individual vessels. Usually this takes 3 months which means that applications should be sent as soon as possible. For entering into UK waters permission should state that T-NASS is in coordination with CODA which is financed by the UK government and endorsed by the IWC. T-NASS has also been endorsed by the IWC.

The IWC asks that a person trusted by the IWC Scientific Committee be designated to guarantee that IWC standards have been followed. Gísli Víkingsson will be the T-NASS contact person for the IWC.

18. T-NASS GENERAL ETHICS

T-NASS should be a reasonably environmentally responsible survey. To this end, waste should be collected entirely and brought back to shore even when international regulations would allow for disposal in the sea. This should be stated in the contract with the vessels. Furthermore, care should be taken that animals are not harassed in any way.

The Chairman suggested that T-NASS be made carbon-neutral. To this end some suggestions were made:

- the Carbon Trust for planting a CO_2 equivalent in trees
- partial participation by taking care of travel for observers
- minimization of oil consumption by good survey design.

In response to the general reaction, Hammond reminded them that EU-rules impose environmental considerations when choosing vessels. It was finally agreed that all cruise leaders and observers (all contracted personnel) be formally invited to contribute individually for carbon-neutral travel and that a pointer to a way to do so be included in the individual information material.

19. STRATEGY FOR DISSEMINATION TO THE WIDER PUBLIC AND PRESS

There is no money available in the T-NASS budget for the establishment and

maintenance of a website. The NAMMCO Secretariat has been appointed by the NAMMCO Council to be in charge of this task (creating the site, producing text, maintaining and updating the site). The site should ideally be a placed as a sub-section of the NAMMCO website and should be available at least in all NAMMCO languages. The update of the site should be performed at least at the beginning and at the end of the survey and at completion of the analysis. There should be links to the IWC, Canada, Russia, USA, as well as to CODA.

Multilingual Press Releases should be made available both at the beginning and the end of the survey.

NAMMCO and the different project participants should agree in advance on the content of both the website and the press releases.

20. TASKS TO BE COMPLETED

1) Data validation criteria
2) Protocols (to be ready by the end of April):
    a. Aerial (within a month)
    b. Ship (also as soon as possible, with priority to the single platform section. The latter has very high priority as it has to be sent to the translators)
3) Cruise reports guidelines and deadlines
4) Standard Contracts for Cruise Leaders and Observers
5) Survey Design
6) Request for permission to enter territorial waters to be submitted for individual vessels (immediately, as this can take several months to obtain).

21. DATA VALIDATION AND ANALYSIS

The Chairman reminded the Delegates that having good rules for the validation and quality insurance of the data is as important as good analysis. She therefore urged the Delegates to define common data validation criteria (e.g. using e-mail) very soon, and suggested starting by examining the CODA protocol as an example. It was common understanding that a uniform analysis strategy is paramount for maintaining the synoptic character of T-NASS.

To speed up the production of tangible results, data on the focal species should be assigned high priority. The high priority species to be analyzed first, are fin whales, minke whales and pilot whales, plus humpback whales for Canada. Norwegian large whale data will be available for the second analysis cycle. NAMMCO should ask David Borchers about the possibility of being contracted for the analysis of aerial survey data or at least to arrange it for the use of his software.

Opportunistic Surveys
A decision must be made on who is going to validate and analyze these data too. And

also in this case, it is important to define uniform data validation criteria.

Data
By this point it was clear that it is important to define uniform data validation criteria and that it should be emphasized to the cruise leaders that they should check the quality of the data as frequently as possible.

Data should agree with the IWC data availability policy if T-NASS (NAMMCO) data have to be accepted for use by the IWC for the implementation of an RMP.

An *ad hoc* Data Group to look into these questions will comprise: Geneviève Desportes, Phil Hammond, Greg Donovan, Thorvaldur Gunnlaugsson, Bjarni Mikkelsen, Nils Øien, Jack Lawson, Malene Simon and the NAMMCO Secretariat.

22. OTHER ITEMS

It would be particularly useful for finding good personnel for future surveys, to establish an information database on observers' performance. No action was decided on this as it surely will clash with regulations on storing personal information in several countries.

A NAMMCO stall at the Marine Mammal Biennial Conference in Cape Town, South Africa, could house a T-NASS theme exhibit. There is unfortunately no time for submission of a T-NASS poster at the same conference as the deadline for abstracts is in May.

23. NEXT MEETING

It was agreed to aim at an analysis meeting in the spring 2008 (March-May).

24. ADOPTION OF REPORT

The report will be circulated for approval in draft form the week after Easter.

25. FINAL REMARKS

The Chair closed the meeting and warmly thanked Phil Hammond and SMRU for housing this meeting with great hospitality, exceptionally good food, a choir of grey seals outside the meeting room and amazingly good weather.

Appendix 1

AGENDA

PLENARY

1. CHAIRMAN'S WELCOME AND OPENING REMARKS
2. ADOPTION OF AGENDA
3. APPOINTMENT OF RAPPORTEURS
4. STATUS
- 4.1 Resources per area (incl. description and resources of rented vessels)
- 4.2 General funding available
- 4.3 Coordination with opportunistic surveys
- 4.4 SCANS II data analysis problems, avoidable with a better data collection (Louise Burt / Phil Hammond)

5. GENERAL STRATEGY FOR COVERAGE:
- 5.1 Survey design in Distance (presentation by Len Thomas)
- 5.2 Considering the combination of both dedicated surveys and opportunistic surveys: do we want overlapping areas or can we rely on the opportunistic data?

6. SCANS II shipboard methodologies: visual and acoustic (Presentation by Doug Gillespie and Rene Swift)
- 6.1 Presentation of the shipboard visual and acoustic methodologies and protocols
- 6.2 Presentation of shipboard visual equipment and acoustic equipment

SUB-COMMITTEES

7A. SURVEY DESIGN (Pike (Chair), Donovan, Hammond, Lawson, Mikkelsen, Simon, Víkingsson, Øien, Zabavnikov + *Palka and Witting*)

7A.1 Survey boundaries (in coordination with CODA, SNESSA and opportunistic surveys)
7A.2 Stratification
7A.3 Effort allocation by stratum (and estimation of realizable effort)
7A.4 Transect design
7A.5 Other (e.g. coastal harbour porpoise strata in Iceland)
7A.6 Rules for adaptation (i.e. changing the design underway)

7B. SHIPBOARD PROTOCOLS (Desportes (Chair), Golyak, Gunnlaugsson , Hammond, Mikkelsen, Simon, Øien, + *Palka and Witting*)

7B.1 Review of protocol for dedicated surveys with 8 observers and 2 independent platforms
- 7B.1.1 Survey modes
- 7B.1.2 Equipment
- 7B.1.2 Survey procedures
- 7B.1.3 Sighting protocol
- 7B.1.4 Data collection procedures
- 7B.1.5 Calibration experiments
- 7B.1.6 Data calibration
- 7B.1.7 Cruise leader and observer training

7B.2 Review of protocol for the Greenlandic vessel with a single platform and 4 observers

7B.3 Review of protocol for opportunistic surveys
7B.3.1 With 2 observers: Redfish and pelagic survey
7B.3.2 With 1 observers: MAR-ECO
7B.3.3 Training of 'opportunistic' observers
7B.4 Ice edge protocol
7B.5 Group size estimation for pilot whales and dolphins

7C. AERIAL SURVEY PROTOCOL (Donovan (Chair), Lawson, Pike, Simon, + *Palka and Witting*)

7C.1 Review of protocol for dedicated surveys w. 4 obs and 2 independant platforms (Iceland and Greenland – September survey)
7C1.1 Survey mode
7C1.2 Equipment
7C1.3 Survey procedures
7C1.4 Sighting protocol
7C1.5 Observer training
7C.2 Review of protocol for dedicated surveys with 2 observers, 1 leader and 1 platform (Canada and SNESSA)
7C2.1 Survey mode
7C2.2 Equipment
7C2.3 Survey procedures
7C2.4 Sighting protocol
7C2.5 Observer training
7C.3 Review of protocol for *Arcturus* survey (Canada)

PLENARY

8. REVIEW OF SURVEY DESIGN
9. REVIEW OF SHIPBOARD PROTOCOL
10. REVIEW OF AERIAL SURVEY PROTOCOL
11. OBSERVERS STATUS
12. COLLECTION OF ANCILLARY DATA
13. ACOUSTIC SURVEY
14. BIOPSY AND TAGGING STUDIES
15. BIRD SURVEY
16. CONTACT AND COORDINATION DURING MAIN SURVEY
17. COORDINATION
17.1 IPY-ESSAR
17.2 Other matters
18. T-NASS GENERAL ETHICS
19. STRATEGY FOR DISSEMINATION TO THE WIDER PUBLIC AND PRESS
20. TASKS TO BE COMPLETED
21. DATA VALIDATION AND ANALYSIS
22. OTHER ITEMS
23. NEXT MEETING
24. ADOPTION OF REPORT.

Appendix 2

Louise Burt: Comments on validation of SCANS II shipboard visual survey data

The data that were collected on the visual survey were generally good. The cruise reports were useful and especially useful was a log of which transects were covered each day. Although primary observers didn't like recording sightings on paper forms, the primary data generally had few problems or missing fields. The paper forms also meant that primary data were easy and quick to check. Validation fell into three categories; correcting minor typos, interpolating for GPS not working and checking of the tracker angle and distance measurements.

1. Minor errors

There were minor typos that included things like using lowercase letters or codes such as cue or behaviour or using a single letter instead of the two letter code. This latter was OK if there was only one code beginning with that letter. More problematic was using codes that weren't included in the list of possible codes. Other out of range values also occurred for aspect, glare left and glare right where the values were greater than 360.

Records that had to cross-reference another record - i.e. duplicates or matches (same animal seen by 7x50 and "Big eye" trackers) - didn't always cross-reference correctly.

Platform code and button didn't always match!

Some problems with Transect numbers - missing, not always correct, didn't correspond in effort and sightings.

2. GPS not working

Occasionally the GPS would fail so that there would be missing sections in the GPS file, or it would get stuck so that from the GPS coordinates it looked like the vessel wasn't moving although the vessel was on search effort. Sometimes there was a link in the effort or sightings data to the GPS file but then no corresponding record in the GPS file.

3. Checking tracker and angles

This was the part that took the longest. Tracker angles and radial distances were checked if there were big discrepancies between the estimated values (obtained from the angleboard and reticules) and the 'measured' values (webcam and video). The commonest problems were

1. Not being able to find the video or webcam image
2. Couldn't find audio file to check commentary
3. Record linked to wrong image or video
4. Couldn't spot animal in the video
5. Video was blurred or horizon was unclear, fog or land
6. Webcam image was too bad to measure bearing (e.g. because of glare)
7. Angleboard estimate or radial distance missing from commentary
8. Not corrected for sighting abeam when measuring hearing from image
9. Pointer not aligned properly on angleboard
10. Typo in reticule or angle estimate
11. Not measuring bearings or distances carefully enough from images.

5.5
NAMMCO PLANNING COMMITTEE ON THE TRANS NORTH ATLANTIC SIGHTINGS SURVEY (T-NASS) WORKING GROUP III
St. Andrews, UK, 30 March – 1 April 2007

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