

**Report of the IWC Workshop
on Impacts of Increased Marine
Activities on Cetaceans
in the Arctic**

**6-7 March 2014, Anchorage,
Alaska, USA**

Report of the IWC Workshop on Impacts of Increased Marine Activities on Cetaceans in the Arctic¹

1. INTRODUCTION

The Workshop was held from 6-7 March 2014, in Anchorage, Alaska, USA. DeMaster was appointed Chair. The list of participants is given as Annex A and the Agenda as Annex B. The report was compiled by Reeves, Donovan, Moore, Rosa, Garcia, Reed, Tillman, Rowles, DeMaster and Brockington.

1.1 Background

During the 62nd meeting of the International Whaling Commission (hereafter IWC) in 2010 (IWC, 2011a, p.24), the Commission agreed that the Arctic was a region which required the development of measures to prevent tragedies similar to the Deepwater Horizon oil spill. As a result, the Commission requested that interested member governments work with the Scientific Committee to establish an intersessional Working Group to help develop a plan for a Workshop on Anthropogenic Impacts in the Arctic Ocean relevant to cetaceans. The Commission also requested the Workshop consider all the growing anthropogenic uses arising from increased access to the Arctic, rather than just limiting research to oil and gas. The United States and the World Wildlife Fund contributed funding to the IWC in support of this Workshop.

In 2011 and 2012, a steering committee developed a proposed agenda for this Workshop and submitted it to the IWC Scientific Committee for review (IWC, 2012, p.37; 2013, p.46-7). In addition to making specific recommendations to be considered while planning the Workshop, the steering committee recommended that the Workshop focus on human activities related to oil and gas exploration, commercial shipping and tourism, as well as likely changes to the ecosystem as a result of climate change.

In 2012, the United States offered to host the Workshop. In 2013, the United States re-convened the steering committee, with additional representatives from the Scientific Committee and other bodies, to finalise the detailed planning. The steering committee considered the 2010 recommendations of the Commission and 2012 recommendations of the Scientific Committee in developing the Workshop agenda.

1.2 Mission of the Workshop

The Arctic is a unique region with extreme climate, sensitive ecosystems, vast natural resources, and rich wildlife diversity. Changes in the climate are leading *inter alia* to a decrease in ice cover, an earlier seasonal retreat, and later formation of ice which provides new opportunities for transport and access to resources. Interest in the region for shipping, tourism, oil and gas, and other industries continues to grow. Developing the Arctic in a responsible manner (by putting the environment and local people to the fore) and increased use of environmentally efficient technologies may lead to sustainable economic growth by stimulating job creation. If this is not done the consequences for local communities, whales and the environment could be severe. Cooperation and dialogue among the Arctic states, international organisations, industry, scientists, and civil society organisations are critical. An important focus of the

present Workshop is Arctic commercial shipping and oil and gas activities, and in particular their potential impacts on cetaceans and the ecosystems upon which they depend. The Workshop aimed to facilitate an open dialogue amongst stakeholders on *inter alia* what research has been/is being conducted; what management measures have been/are being implemented; what knowledge gaps and concerns exist; and what information the IWC can provide to assist managers in preparing for the expected impacts. For additional information, see Annex B.

1.3 Participants

Participants included individuals from a wide range of stakeholders, including: intergovernmental organisations, national authorities from IWC member countries, indigenous people and local authorities, affected communities, environmental organisations, industries and companies working within shipping and oil and gas, scientists and academics. For additional information, see Annex A.

2. WORKSHOP OPENING

Doug DeMaster, Science Director of the Alaska Fisheries Science Center, opened the Workshop, welcomed participants and provided an overview of the Workshop objectives. Recognising that a 2-day Workshop could only be the start of the process, he noted the need to begin to: (a) identify concerns of stakeholders; (b) identify knowledge gaps that if filled can also assist to prioritise threats and help identify mitigation measures; (c) obtain input from stakeholders on how the IWC should prioritise its future work related to the Arctic (e.g. scientific focus, policy effort, timing, funding); (d) provide advice or mechanisms to obtain information, and assist sustainable development in the Arctic that preserves the ecosystem, cetacean populations, and native cultural traditions; and (e) discuss how current initiatives by various groups/nations could be supported by the IWC or its members, with the objective of coordinating efforts across international boundaries and increasing international collaboration.

Simon Brockington, Secretary to the IWC, introduced participants to the structure, roles and responsibilities of the IWC. He highlighted the IWC's regulatory role in managing whaling and noted that there are many other human activities that may affect the status of whales. He emphasised that the IWC collects information from many sources, including that gathered at this Workshop, and generates advice on reducing impacts. This advice is applied either by member governments, by other intergovernmental organisations, or in partnership with industry and/or NGOs.

Greg Donovan, the IWC Secretariat's Head of Science, introduced the work of the Scientific Committee with a focus on how it might be able to assist international collaborative efforts on scientific aspects of the Arctic issues. He emphasised the work the Committee has done to estimate the effects of human activities on cetacean populations, assist in setting mitigation priorities and assess the effectiveness of mitigation measures. He noted the key expertise of the IWC Scientific Committee in terms of: (1) monitoring abundance; and (2) developing population modelling frameworks that explicitly account for uncertainty. Dealing with activities

¹Presented to the meeting as IWC/65/Rep07rev1.

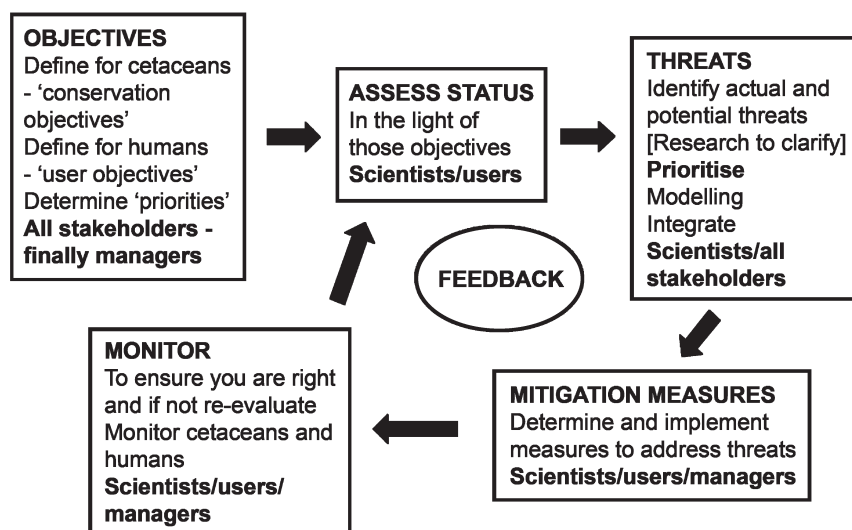


Fig. 1. General approach to examine effects of human activities on cetaceans.

that lead directly to mortality (e.g. hunting, ship strikes, entanglements in fishing gear) is easier than addressing threats that affect the health or viability of a population (e.g. the many factors surrounding habitat 'degradation').

Donovan also mentioned the importance of determining user and conservation objectives to prioritise work and measure success (or failure). Fig. 1 summarises the general approach developed over the years by the Scientific Committee. Challenges arise in situations involving multiple types of users and when a balance needs to be found between user and conservation objectives. He suggested a number of ways in which the Scientific Committee could assist including providing (1) information on principles and guidelines for objectives; (2) data sharing agreements; (3) agreed analytical approaches to monitoring; (4) consistent interpretation and evaluation of mitigation measures; and (5) international endorsement of work proposed or undertaken.

Fran Ulmer, Chair of the US Arctic Research Council, delivered a keynote speech titled 'Ecosystems to Climate Change: Where Do We Go from Here?' She stressed the importance of addressing threats in the Arctic based on the best available information and science, emphasising that the question is not if, but rather how the Arctic will be developed (and when and by whom). Ulmer discussed step changes in Arctic ice that have occurred over the past few decades. She noted that these step changes, which scientists are attempting to understand, represent stunning change in an ecosystem in which ice is a controlling mechanism for productivity at many trophic levels. Understanding the consequences for ice-dependent and ice-associated species, as well as for the ecosystem overall, is the challenge. Ulmer stressed the impacts and changes not only for marine mammals in the Arctic, but also for local indigenous human communities whose health and culture could be affected.

Ulmer closed by discussing why it is essential for scientists to improve their communication skills in order to share their observations with both the public and policy-makers. In a world where the economy dominates the news, it is hard to attract attention to the environment unless it is clear that what is happening in the environment is closely tied to the social and economic health of a region. Ulmer underscored that good science advice must incorporate ecological information and also provide context, including economic and social aspects.

3. PANEL PRESENTATIONS

Day one of the Workshop consisted of presentations as part of four panels: framing, shipping, oil and gas-related activities, and indigenous focuses on increased shipping and oil and gas-related activities. Each panellist was asked to consider the following questions in his or her presentation.

- (1) What is the speaker's perspective on the present and future status of Arctic shipping activities (including, but not limited to, commercial, scientific, oil and gas, fishing, and tourism activities) and the impacts on cetaceans (e.g. noise, ship strikes, pollution, debris)?
- (2) What has been done to date? Are there any lessons learned (e.g. case studies)? What are the knowledge gaps and concerns?
- (3) Any recommendations to the IWC for what information would be most useful and how the IWC should prioritise its future work related to the Arctic?

Annex C provides the available summaries of the presentations².

3.1 Framing Panel

The first panel consisted of three presentations to frame the overarching issues of the Workshop:

- (1) a status update of marine mammals in the 'new normal' Arctic;
- (2) the distribution of endemic cetaceans in relation to hydrocarbon development and commercial shipping in a warming Arctic; and
- (3) an overview of the Arctic Council's work related to impacts of increased marine activities on cetaceans.

Sue Moore's presentation, entitled 'Marine Mammals in the 'New Normal' Arctic', summarised how marine mammals are responding to the recent extreme reductions in seasonal sea ice, increases in sea temperatures and alteration of marine trophic structure. Polar bears, walrus and ice seals appear to be the biggest 'losers' with regard to loss of sea ice habitat, while various species of cetaceans appear to be 'winners', at least in the short term (Fig. 2a). For example, over the past decade the Bering-Chukchi-Beaufort (B-C-B) population of bowhead whales (*Balaena*

²Copies of each presentation are available from the authors.

mysticetus) has increased in number, the observed number of calves is high and individuals taken by hunting are in good body condition. In part, this may be because bowheads are finding more prey, both copepods and euphausiids, in the 'New Normal' Arctic (Fig. 2b). This recent finding was highlighted because, during the 2009 IWC Cetaceans and Climate Change Workshop (IWC, 2010), a focal question was how B-C-B bowhead whales might respond to habitat alterations associated with rapid climate change. Moore emphasised that all cetacean species, both those endemic to the Arctic and those that seasonally migrate there, would have to be resilient enough to adapt to the now-evident rapid pace of change, including impacts brought by increasing human activities.

Randall Reeves gave a presentation entitled 'The Arctic 'Ice' Whales: Warming, Shipping, and Oil and Gas Development,' summarising Reeves *et al.* (2014). He credited Wendy Elliott (WWF-International) for initiating the project and Pete Ewins (WWF-Canada) for driving it to completion. The objective was to produce authoritative range maps for the three cetacean species endemic to the Arctic, the bowhead whale, white whale (beluga) and narwhal, and then use these maps together with maps of ship traffic patterns and of oil and gas lease areas and structures (e.g. platforms, drilling sites) to obtain a broad-scale understanding of the potential impacts of climate-related expansion of industrial activity on Arctic whale populations. Results showed extensive overlap between areas inhabited by the whales and areas of increasing interest for shipping and hydrocarbon exploration or development. Among points of emphasis were:

- (1) there is little reliable baseline information (numbers, trends, health, etc.) on some species in some areas (e.g. Okhotsk vs B-C-B Seas bowhead whales; Svalbard/ Frans Josef Land narwhals);
- (2) the nature and degree of threats are likely to vary by species, region and time, with great uncertainty regarding the relative sensitivity and potential for adaptation of the different species;
- (3) understanding of cause-effect relationships, impact thresholds (dose-response) and how to measure and assess risk, mitigation effectiveness etc. is improving but still far from sufficient; and
- (4) although significant progress is being made in the search for ways to define, quantify and assess cumulative impacts, much more development and testing of applicable methodologies is needed.

Allison Reed provided an overview of the Arctic Council's work related to impacts of increased marine activities on cetaceans. The Arctic Council provides a forum for promoting cooperation, coordination, and interaction among the eight Arctic States with the involvement of indigenous communities on common issues. The Council supports six working groups, all of which have activities relevant to anthropogenic impacts on cetaceans. The presentation highlighted activities from the three working groups with the most direct relevance to the IWC (Fig. 2c): Conservation of Arctic Flora and Fauna (CAFF); Emergency Prevention, Preparedness, and Response (EPPR); and Protection of the Arctic Marine Environment (PAME). CAFF's work involves planning and implementing biodiversity monitoring and assessments, while EPPR's work includes recommendations for oil spill prevention and response. PAME's work focuses on the identification of ecologically and culturally important marine areas and assessing options for management and

protection of such areas. PAME's Arctic Ocean Review, presented at the 2013 Ministerial meeting in Kiruna, Sweden, recommends increasing collaboration with the IWC and other international organisations on cetacean-related issues.

3.2 Shipping Panel

The second panel, chaired by Cheryl Rosa of the US Arctic Research Commission, provided information and views related to commercial shipping issues. Lawson Brigham framed the panel presentations, identifying the following key issues for the Workshop: traffic increase, seasonal shipping, traffic monitoring and awareness (AIS), ship data sharing, balancing freedom of navigation and special measures for cetaceans, information sharing, ship observations and indigenous hunting, routing and fairways, and regional and local agreements. Four experts provided overviews and information on several shipping-related issues.

- Heike Deggim discussed the International Maritime Organization (IMO) and its regulatory activities.
- James Houck outlined the US Coast Guard's proposed routing measures to mitigate the effects of additional shipping while, simultaneously, increasing safety and predictability in the Bering Strait.
- Henrik Falck summarised industry experience with transshipment in the Northern Sea Route.
- Angelia Vanderlaan discussed right whale vessel strikes and mitigation measures in Canadian waters touching upon successes and failures.

Annex C provides summaries of presentations, where these were provided. The highlights of the presentations and discussions are summarised below.

3.2.1 Highlights of Shipping Panel presentations and discussions

In their presentations, the individual panellists highlighted a number of points and recommendations regarding issues related to commercial shipping; other recommendations arose out of discussions after the presentations. A summary of these is given below.

SHIPPING DATA AND PROJECTIONS

- It is probably better to frame the issue as 'marine operations' rather than 'shipping'.
- The global economy is the main driver of development in the Arctic, although climate change affects the practicality of certain economic activities related to marine operations, now and in the future.
- When examining shipping and potential impacts, number of port calls is probably a more relevant metric than transits (provided that reliable data can be obtained). New offshore developments in Russia generate high numbers of port calls, yet the highest concentrations of ship traffic are in the Norwegian Arctic. Thus examining infrastructure is an important component of assessing risk.
- Commercial use of Arctic waters and the Northern Sea Route (NSR) is increasing, but not at the level that is often portrayed in the media (again, commercial viability and profit margins are the dominant factors).
- At present (and probably well into the future), the NSR is not a viable replacement for the Suez or Panama canals (economy of scale 'trumps' shorter sailing distance).
- At present, use is seasonal, and even during 'open water' time, the seas are rarely ice-free in the Arctic. This presents an appreciable risk to mariners (one that is often overlooked).

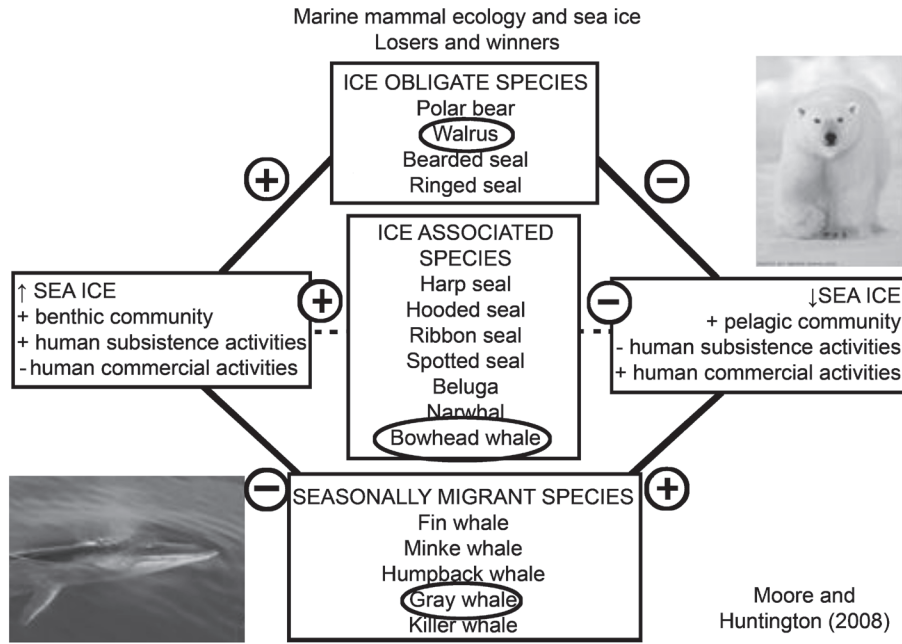


Fig. 2(a). ‘Winners’ and ‘losers’ of marine mammal species in the context of reductions in seasonal sea ice, increases in sea temperatures and alteration of marine trophic structure. [Figure modified from Moore and Huntington (2008)].

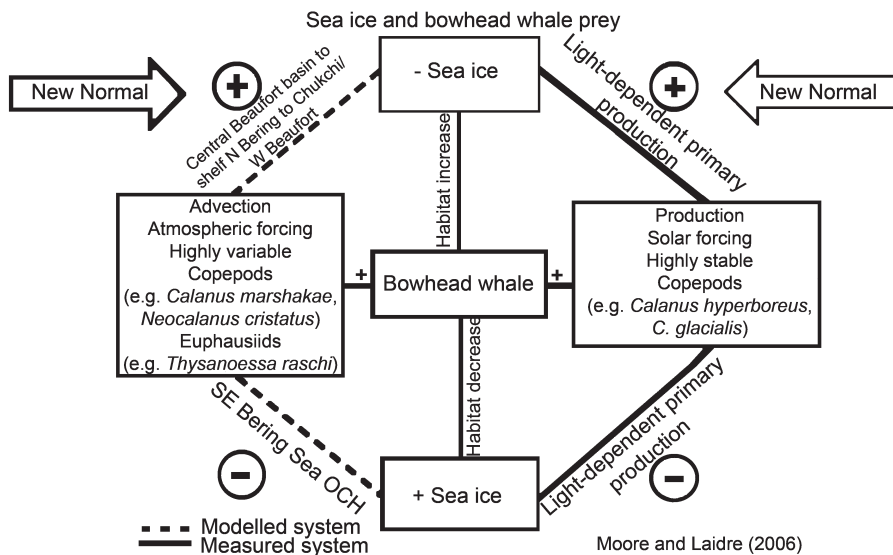


Fig. 2(b). Mechanisms driving the availability of bowhead whale prey in the ‘New Normal’ Arctic where sea ice is reduced in surface area, volume and period. [Figure modified from Moore and Laidre (2006).]

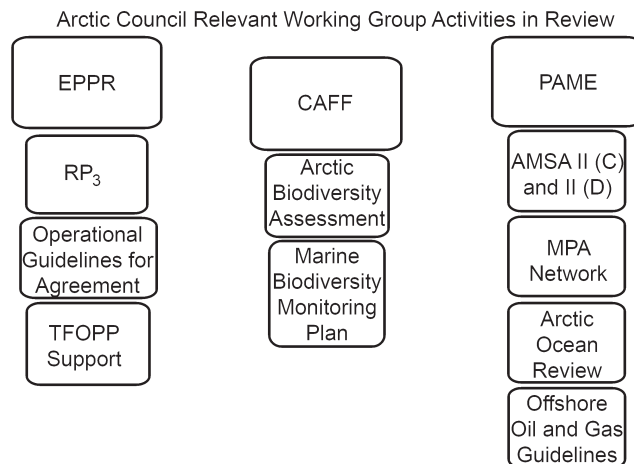


Fig. 2(c): Arctic Council Relevant Working Group Activities in Review. [Figure taken from A. Reed presentation during the Workshop.]

- With respect to risk in icy waters, high-performance ice-strengthened, state of the art vessels are carrying oil in the NSR, often with escorts³. These ships employ a strategy that involves carrying their cargo to the edge of Arctic waters then transferring cargo to a non-ice class vessel for further transport to markets. Thus in terms of risk it may be more important to examine the safety of these transfers rather than focus solely on the transport *per se*.
- Most voyages involve polar class ships going through the Arctic, but there is relatively little trans-shipment.
- Projections out to 2050 (AMSA Report) hold the possibility of a very different scene to the present one, with the possibility of transit directly across the pole rather than along the NSR or Northwest Passage.

RELEVANT STAKEHOLDERS

It is important that IWC works with other organisations, some of which are already involved in study, assessment and conservation of marine mammals, e.g.:

- The Arctic Council's the PAME Working Group undertook development of the Arctic Marine Shipping Assessment (AMSA, conducted by the Protection of the Arctic Marine Environment/PAME Working Group) in 2009, with updates at two-year intervals. The AMSA Theme 2 highlights marine mammals and notes that Arctic states should work with IMO and the relevant IGOs to determine impacts of noise, disturbance, ship strikes on cetaceans⁴.
- IMO which has multiple relevant measures already in place (e.g. MARPOL, SOLAS, Polar Code) that dictate how polar shipping is to be conducted in the Arctic as well as the responsibility for other potential mitigation measures (e.g. particularly sensitive sea areas (PSSAs), traffic separation schemes (TSSs), issues related to noise).
- Member governments (as well as non-member governments) – marine mammals do not recognise national borders and a co-ordinated approach is essential.
- Alaskan Eskimo Whaling Commission (AEWC) which has an Open Water Season Conflict Avoidance Agreement (CAA) with the oil and gas industry.
- Maritime users - working with industry early, often and closely has been shown to be instrumental to the success of many mitigation measures.
- Scientific bodies – mitigation measures need to be based on robust science.

MITIGATION MEASURES

- Human activities can be managed – free ranging cetaceans' activities cannot.
- Measures (and who is responsible for developing and implementing them) depend on the nature of the threat (ship strikes, chemical pollution, noise pollution, etc.).
- Collaboration and co-operation amongst organisations and stakeholders is key (see 'relevant stakeholders' above) – including those that do not normally communicate directly with one other.
- Moving from a reactive to a proactive position on inter-governmental cooperation, especially in areas such as the Bering Strait, is important for anticipating and avoiding disasters and dealing with accidents.

- It is important to learn from experience in other areas, such as the Bay of Fundy and Scotian Shelf in Canada and Boston and other harbours along the US east coast, which have a suite of different mitigation measures in place to protect whales from ship strikes.
- Introducing measures and getting them adopted by IMO can be a lengthy process but it is worth the effort – understanding the formal process is essential to success.
- Robust risk analyses (that use reliable data on whales, impacts, human activities and likely success) are essential - economic evaluation of the implications of various mitigation measures (e.g. routing restrictions vs speed changes) should be part of the documentation that accompanies any proposal.
- Consideration could be given to expanding the AEWK's CAA with the oil and gas industry (see 'relevant stakeholders' above) to include the shipping industry
- Education of mariner users is key to finding solutions and assuring compliance (users have to understand the problem and the solution).
- Ship noise and quieting measures are under discussion by the IMO and the IWC participates in this and should continue to do so. While ship quieting is expensive, economies of scale might eventually bring the costs down, and putting such technologies on new vessels is much less costly than retrofitting existing ships. If actions start now, positive results may be obtained within a decade or so.
- Consideration needs to be given to the class of fishing vessels operating within the Arctic, as at present there is no binding agreement on quality of vessels (although there is a process underway within IMO that requires further ratifications before it becomes binding)⁵.
- It is important for national agencies to ensure that adequate response capacity exists in anticipation of accidents.

3.3 Oil- and Gas-related Activities Panel

The third panel, chaired by Teri Rowles of the US National Marine Fisheries Service, focussed on oil- and gas-related activities. Bill Streever framed the panel presentations with overview of oil- and gas-related activities in the Arctic. Five experts provided overviews and information on several shipping-related issues.

- Alexey Knizhnikov gave an overview of oil and gas development in Russia and summarised World Wildlife Fund-Russia's experience with seeking solutions to minimise impacts on cetaceans.
- Mark Everett highlighted the US Coast Guard's environmental protection functions and responsibilities.
- Jim Kendall's presentation described the US Bureau of Ocean Energy Management's outer continental shelf Arctic programs and activities.
- Michael Macrander summarised Shell's oil and gas activities in the Arctic, focusing on the link to science, including studies of marine mammal behavioural responses to acoustics, drilling and seismic activity.
- Lori Schwacke gave an overview on assessing risks to cetaceans from oil- and gas-related activities based on her experiences working on the Deepwater Horizon disaster.

³Falck noted that all ships transiting the NSR are accompanied by Russian X-class icebreakers. This reduces the concern of shipping companies over the likelihood of possible grounding or other maritime accidents in the case of loss of vessel power.

⁴<http://www.pame.is/index.php/projects/arctic-marine-shipping/amsa>.

⁵<http://www.imo.org/About/Conventions/ListOfConventions/Pages/The-Torremolinos-International-Convention-for-the-Safety-of-Fishing-Vessels.aspx>.

Annex C provides summaries of presentations where these were provided. The highlights of the presentations and discussions are summarised below.

3.3.1 Highlights of Oil and Gas Panel presentations and discussions

In their presentations, the individual panellists highlighted a number of points and recommendations regarding oil and gas operations, in general, and oil spills, in particular. Other potential issues arose out of discussions after the presentations. A summary of these is given below.

GENERAL AND RISK ASSESSMENT

- All Arctic basins have great potential for further development with major volumes of resources offshore.
- The expected increase in oil and gas activities should be understood as involving factors such as development and transport as well as production.
- Rapid development of shipping as a service for offshore/onshore oil and gas projects can be expected.
- Risk assessment studies should include environmental and socioeconomic evaluations that incorporate traditional knowledge and community input, as well as strong cetacean science (preferably peer-reviewed).
- Once activities have been permitted, monitoring (of both human activities and cetaceans) is essential to assess effectiveness and inform adaptive management.
- It must be recognised that oil and gas-related activities are not the only source of oil pollution or spills.

CO-OPERATION AND RELEVANT STAKEHOLDERS

- Arctic Council Working Groups: EPPR and PAME. The Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic is designed to strengthen cooperation, coordination and mutual assistance and promote operational guidelines in oil pollution preparedness and response. The PAME working group provides policy advice and recommendations on marine safety and marine environmental protection.
- Learning from experience elsewhere is extremely important. This includes:
 - through impacts of and responses to previous accidents (e.g. the 1989 *Exxon Valdez* and 2010 Deepwater Horizon incidents);
 - examples of improved procedures, e.g. work the Alaska Regional Response Team's work on issues such as dispersant use policy and preauthorisation planning, ESA biological assessment of unified plan, NOAA spill risk assessment, and definition of areas to be avoided (ATBA) for dispersant use;
 - development of the AEWG's Conflict Avoidance Agreement (CAA) with the oil and gas industry, which could provide a useful model for other areas;
 - lessons learned from the development of seismic survey monitoring and mitigation plans through collaboration between IUCN's Western Gray Whale Advisory Panel (WGWAP) and Sakhalin Energy Investment Company, which led to the broad approach described by Nowacek *et al.* (2013).
- The International Maritime Organization (IMO) deals with many aspects of safety and marine pollution. The IWC has been trying to increase collaboration with the IMO on issues related to ship strikes and impacts from underwater noise under an Agreement for Cooperation that was signed in 2008.
- Oil spill response: This requires various levels and mechanisms of involvement among parties ranging from

national government authorities to state/local government and tribal authorities as well as international coordination through bilateral and multi-lateral agreements, often enabled and/or under the aegis of IGOs.

- Industry and science: There is a need for better scientific understanding of short- and long-term responses of cetaceans to various activities (e.g. those that produce chronic noise, seismic surveys, vessel operations) and for monitoring cetaceans immediately before, during and after potentially disturbing activities or events (e.g. see work undertaken by the WGWAP).
- All research groups: It is important that groups share their experience and disseminate results in a rapid and transparent way given the many related studies being undertaken today (e.g. through the Joint Industry Programme, many companies' individual programmes, naval investigations into effects of sound such as the collaborative study with the USA and Norway, work of the WGWAP, the investigation of the mass stranding of cetaceans in Madagascar).

THREATS AND MITIGATION

- Marine environmental protection includes identification of threats, regulation/monitoring/enforcement, prevention, preparedness, response and oversight, damage or injury assessment, and restoration.
- There is great concern regarding the risks of oil spills and the need for preparedness to respond both to current and projected vessel traffic and to current and projected oil and gas development. Though many requirements for oil spill avoidance and response capability that apply to oil and gas vessels are in place in some areas, such requirements are generally lacking when it comes to other types of vessel traffic.
- There is a need to assess regional capabilities and build capacity for spill response (including training) before new developments occur.
- WWF Russia assessed oil spill response (OSR) capabilities in the Arctic and noted the importance of improved legislation, sensitivity mapping, modelling and monitoring of the behaviour of spills.
- There was an emphasis of the critical role of policies and procedures, planning, training and drills at various levels of response.
- Development of improved mitigation requires a better understanding of cetaceans in a number of ways (the IWC Scientific Committee can assist with this) including:
 - baseline information on potentially impacted populations through prior coordinated research on populations and individuals including evaluation of health parameters;
 - responses of cetaceans to potentially harmful exposures, e.g. to chemicals (directly through inhalation/skin exposure/ingestion and indirectly through prey consumption or habitat) and sound (both pulsed and continuous);
 - characterisation and quantification of cumulative effects or impacts;
 - the modelling framework proposed by the IWC's Pollution 2000 Phase II which is useful in examining population-level effects of chemical pollution and as input into wider modelling efforts.
- Identification of areas to be avoided for cultural or biological reasons may be important for mitigation and management.

POTENTIAL SUBJECTS OF RECOMMENDATIONS

- New offshore oil development should not occur until three gaps are filled: the knowledge gap, governance gap, and technological gap (with respect to spill response in ice).
- The importance of co-operation and partnerships should be stressed, including the coordination of spill response and injury assessment plans across borders and the determination and dissemination of best management practices for response activities.
- As well as providing scientific advice, the IWC should seek to collaborate with the Arctic Council and expand collaboration with the IMO (possibly via an informal group).
- Transparency and inclusiveness should be part of the process for achieving prevention and mitigation; this is especially critical when it comes to oil spill response technology and practice in ice.
- Training and education programmes are needed to address a range of issues (e.g. direct and indirect impacts of *inter alia* noise and chemicals on cetaceans, other potential impacts of industry activities on cetaceans and on human communities that depend on cetaceans for subsistence, cultural differences) and to achieve a common understanding of critical aspects of issues.
- Strategic Environmental Assessment (SEA) should be promoted for all Arctic projects in all Arctic states as a tool for addressing cumulative effects.
- Co-operation with the Arctic Council on the recommendation to conduct a circumpolar risk assessment (EPPR's RP3 report) would be desirable, recognising that a scoping exercise is under way.
- Incorporation of a process similar to the IUCN-WGWAP process should be considered for Arctic projects (e.g. in the Chukchi/Bering Sea pilot project).
- An assessment 'toolbox' for cetaceans, which may vary by species and geographic area, would be useful.
- A process should be developed to evaluate potential sampling approaches, identify model species, support the acquisition of baseline data, coordinate analyses so that regional differences are recognised and understood, establish reference intervals (e.g. frequency of surveys) for monitoring and support preliminary risk assessments.
- A mechanism should be developed for distributing recommendations from workshops such as this one in order to inform policy and legal discussions.

3.4 Indigenous focuses on increased Shipping and Oil and Gas-Related Activities Panel

The fourth panel, chaired by Michael Tillman of the US Marine Mammal Commission, focused on the experience and perspectives of indigenous people regarding increased shipping and oil and gas-related activities. Four panellists were asked to provide views on: (1) the problems their indigenous communities have or anticipate having from oil and gas development and shipping; (2) what might be needed to address these problems (in terms of information needs and/or management actions); and (3) how the IWC and its members might help.

- Eduard Zdor and Edward Rypkhirgin represented the Russian Federation's Traditional Marine Mammal Hunters of Chukotka.
- Fernando Ugarte represented the perspectives of Greenland.
- George Noongwook represented the US Alaska Eskimo Whaling Commission.

Annex C provided summaries of presentations where these were provided. The highlights of the presentations are summarised below.

3.4.1 Highlights of Indigenous Panel presentations

The IWC has an explicit interest in the conservation of large whales and the responsibility for managing any hunts taking these species. Such is the case for the hunting undertaken by indigenous communities of three Arctic members of the IWC: the Russian Federation, Denmark and the United States. These indigenous communities also have hunts for some Arctic species of small cetaceans, over which the IWC's Scientific Committee maintains a watching brief; these are also considered by the North Atlantic Marine Mammal Commission (NAMMCO) and the Canada/Greenland Joint Commission on Conservation and Management of Narwhal and Beluga (JCCM).

THREATS

Although differing in the depth of their concerns, the panellists essentially all recognised the following actual or perceived threats that could impact subsistence consumption:

- oil and gas development and shipping would result in changes in the availability of whales to traditional hunts, e.g. whales respond to seismic operations by changing their migration routes;
- the outcome of cleaning up an oil-spill, whether from a shipping accident or an oil or gas incident, would be uncertain, e.g. threatening the whale stocks used or compromising the safety of the subsistence foods derived from those whale stocks; and
- shipping not only poses a threat to whales but also to whalers, e.g. through collisions and incidents with vessel wakes.

The degree of concern panellists expressed about these threats varied, however, in accord with the nature of domestic governance in their respective countries. Since Greenland has a home-rule government, Greenland hunters are totally integrated into the deliberations and decisions regarding all domestic aspects of oil and gas development, ranging from considering threats to implementing mitigation. Although the US federal government is obliged to consult with Alaskan Native communities about oil and gas development, the perceived effectiveness of consultation efforts was considered generally unsatisfactory; there had been some good results, however, in making private arrangements directly with industry representatives (e.g. conflict avoidance agreements). In the Russian Federation, Chukotka Natives have virtually no input on oil and gas development decisions, a situation which they find to be completely unsatisfactory.

Regarding shipping, panellists focused mainly on the need for increased international cooperation, particularly with respect to monitoring and control to prevent accidents or incidents in the first place. This emphasis was particularly true where countries shared a common maritime choke point, such as the Bering Strait. The growth of tourism in the Arctic was also viewed with some alarm, especially since both domestic and international governance appeared to be lacking.

NEEDS

The panellists identified the following list of needs that governments and industries should address together or individually.

- Providing for transparency regarding all planning and operations.

- Consulting directly with, and making good-faith efforts to account for the concerns of, indigenous communities.
- Sharing in the costs of obtaining and providing the full information required to assess threats and develop mitigation measures.
- Requiring and making use of traditional local knowledge as the foundation for science and management.
- Establishing and maintaining appropriate mechanisms for international cooperation, including any needed governance agreements.
- Developing ship tracking/communication networks for Arctic routes, especially at international choke points.
- Updating and/or development of Arctic charts.
- Providing education and training for indigenous communities which will inevitably be the first responders to any incident.
- Developing the infrastructure (roads, airports, harbours, communication systems, housing, animal treatment and holding facilities, etc.) needed for an adequate response to any incident in the remote, underdeveloped Arctic.

POTENTIAL RECOMMENDATIONS TO IWC

Panellists provided the following ideas on how the IWC might assist in the efforts undertaken by other international fora (e.g. the Arctic Council, IMO) and various national or local bodies to address Arctic development issues.

- Contribute to and facilitate the international exchange of information, particularly with respect to the status of Arctic whale stocks and the IWC's role in managing the indigenous hunts for them.
- Establish a link on the IWC's website to pertinent areas of the websites of other relevant international fora that can be used by IWC members and others interested in IWC issues.
- Establish observer status with pertinent international fora as a way of ensuring that the IWC has a voice regarding subsistence whaling in the Arctic.
- Urge and support the development of needed international agreements for the governance of oil and gas development and shipping.

4. BREAKOUT GROUP DISCUSSIONS

On Day 2 of the Workshop, small breakout groups addressed questions related to two themes. Each theme was led by two Theme Leads, who reported the highlights and recommendations from the small group discussions to the full Workshop. Discussion of those highlights and recommendations took place in light of the earlier Panel discussions and provided additional opportunities for participants to comment on the presentations by Panellists (there had been limited time for detailed discussions of those given the tight workshop timeframe) as well as to raise new issues should they wish.

4.1 Highlights from Theme 1 Breakout Group Discussions (Leads: Donovan and Moore)

Discussion in Theme 1 Breakout Groups focused on two questions:

- (1) actual and potential threats facing cetaceans in the Arctic; and
- (2) knowledge gaps and how to fill them (including the need for collaborative studies).

The summary below is an attempt to integrate the main issues raised by the four breakout groups, which formed the basis for the recommendations developed under Item 5.

4.1.1 Threats and priorities

It was agreed that the focus of the discussions of threats to cetaceans⁶ should be on the following species: the Arctic 'endemic' species (bowhead whale, white whale or beluga and narwhal), the 'regular seasonal residents' (common minke whale, gray whale (Pacific), northern bottlenose whale (Atlantic), killer whale and harbour porpoise). Other 'not-so-regular' (but increasingly present) visitors to parts of the Arctic (blue whale, humpback whale, fin whale, long-finned pilot whale (Atlantic)) may also be subject to the identified threats.

In the Arctic, now and in the future in the light of climate change projections, the major actual/potential threats are those associated with the following human activities:

- (a) oil and gas operations;
- (b) vessel traffic (of many kinds including transport, tourism/whale watching, fishing, servicing oil and gas operations);
- (c) fishing activities; and
- (d) unsustainable or unmanaged hunting.

It is likely that all of these, except perhaps (d), will increase in the future.

The actual or potential impacts on cetaceans and the associated activities are summarised in Table 1. The extent to which these impacts are or will become threats at the population level depends on whether appropriate mitigation measures are put into place and complied with.

4.1.2 Knowledge gaps

The general approach to examining the effects of human activities on cetaceans (see Fig. 1) forms the basis for the consideration of knowledge gaps in this section. Apart from the need for stakeholders/managers to determine user and conservation objectives, a necessary first step is to assess the status of the cetacean populations, which implicitly requires an understanding of stock structure. For the large whales, in particular, expertise to achieve this lies within the IWC Scientific Committee; for the small cetaceans, the IWC and NAMMCO Scientific Committees are the primary groups, along with national scientific bodies (e.g. NOAA laboratories in the US, the Committee on the Status of Endangered Wildlife in Canada) and other organisations such as the Joint Committee on Narwhal and Beluga or the JCNB (Greenland and Canada). The IWC Scientific Committee Workshop on Climate Change (IWC, 2010) summarised the state of knowledge on abundance and trends of Arctic cetaceans at that time. This information was also updated in the 2012 Arctic Biological Assessment by the Arctic Council's CAFF Working Group. The information ranges from excellent, for example for the Bering-Chukchi-Beaufort Seas stock of bowhead whales and eastern Pacific gray whales, to poor for some of the other populations of bowhead whales.

Knowledge of status and trends provides a foundation to determine priority populations for conservation and provide a baseline for the examination of risk. If total numbers of deaths caused can be counted or estimated through modelling (e.g. see the recent developments in the IWC POLLUTION 2020 programme; IWC, 2015b), then these numbers can be used to examine population-level effects. However, obtaining quantitative information on the impacts of some stressors (e.g. habitat degradation, noise, chemical pollution) remains difficult for many species and

⁶It was recognised that increases in some human activities have the potential to affect other marine mammal species as well as human communities but this was considered to be generally beyond the scope of Theme 1.

Table 1

Overview of the threats to cetaceans in the Arctic and the primary human activities that are or might be the source of those threats. The Workshop agreed that the most significant concerns in relation to cetacean conservation in the Arctic are oil and gas operations, shipping, fishing and hunting (see text).

Actual/potential threat	Primary human activity/ies
Bycatch	Commercial (and perhaps recreational) fishing
Serious injury/death (not bycatch)	Ship strikes from commercial and recreational vessels; hunting; potentially seismic surveys, military sonar
Mechanical destruction of habitat	Bottom trawls, infrastructure construction, oil and gas development
Prey depletion	Overfishing, habitat degradation due to pollution, climate change, introduction of invasive pathogens, competitors or predators
Acoustic pollution/continuous	All types of vessels, infrastructure construction including that associated with the oil and gas industry
Acoustic pollution/pulse	Seismic surveys, military sonar
Chemical pollution/chronic	Terrestrial industrial development, terrestrial run-off, harbours, discharges from ships, marine development (e.g. associated with oil and gas development; tourism)
Chemical pollution/acute	Oil spills, leaks and some oil spill response activities; other toxin spills
Disease	Discharge from shipping, introduction of invasive species
Synergistic/cumulative	All

populations. In addition, a particularly difficult issue to address concerns the incorporation of synergistic (i.e. when more than one threat is occurring at the same time) and cumulative (i.e. the accumulation of impacts over a period of time) impacts. This presents a challenge from both practical and theoretical perspectives; considerable scientific work is needed to address this issue, both within and outside the IWC Scientific Committee.

In addition, robust risk analysis for certain threats (e.g. ship strikes, entanglement, noise exposure), which can lead to prioritised mitigation efforts, requires good information on the relative abundance and temporal/geographical distribution of both the cetaceans and the human activities. This information can support predictive spatial modelling and mapping approaches that can identify high risk areas (e.g. a number of initiatives to map 'soundscapes' and compare these with maps of cetacean density and distribution). Spatial modelling requires information on potential explanatory variables (again at appropriate temporal and spatial scales) such as those related to physical factors (e.g. bathymetry, salinity, temperature) and biological factors (e.g. primary productivity, prey availability). This report is not the appropriate place to describe these approaches in detail but rather to note the ongoing work of the IWC Scientific Committee and others in this regard (IWC, 2015a; Redfern *et al.*, 2006; 2013). The Workshop emphasised that for many populations and human activities, information at the appropriate temporal and geographical scales is lacking.

In summary, there are a number of broad areas where further knowledge is required and these vary by species and population and by threat including:

- (1) assessment of status of Arctic cetacean populations in the light of agreed conservation objectives;
- (2) knowledge of cetaceans and human activities at the appropriate temporal and geographical scales;
- (3) quantitative measures of the impacts of individual stressors; and
- (4) quantitative assessment of synergistic and cumulative effects.

How these gaps might be filled is discussed in more detail below.

4.1.3 Methods to fill knowledge gaps

DISTRIBUTION, ABUNDANCE AND TRENDS OF CETACEANS

Good information on cetacean distribution and trends in abundance is available for some populations, but lacking in others. Methods for obtaining reliable estimates of absolute abundance and trends (and stock structure) are well known

and include visual and acoustic surveys, photographic and genetic mark-recapture studies, etc.; however, undertaking the necessary field work and analyses is expensive and can be logistically challenging in the Arctic. In addition, as is well known, cetaceans do not respect national borders. It is clear that collaborative survey efforts are required. Baseline information is most easily obtained and interpreted from large-scale synoptic surveys.

On a related matter, to identify high-risk areas and design effective mitigation measures, surveys need to be conducted at different times of the year, not simply the time that is best suited for estimating absolute abundance. In order to make use of modern spatial modelling techniques, data on explanatory environmental variables need to be collected. Data need not come solely from large-scale synoptic surveys; smaller-scale studies, both systematic and opportunistic, can contribute useful information if they are designed to collect the right kind of data.

The Workshop **agreed** that the IWC Scientific Committee is an appropriate body to assist in the design of surveys and the collection and analysis of data to:

- (1) estimate absolute abundance and trends of Arctic cetaceans (and the associated uncertainty);
- (2) co-ordinate small-scale and opportunistic studies such that they can contribute to Arctic-wide modelling and to the development of spatial/habitat models for the Arctic, with the goal of enabling robust predictive modelling to help identify high-risk areas and assist in the development of effective mitigation measures;
- (3) improve information on cetacean movements by promoting collaborative studies using photographic and genetic identification of individuals as well as telemetry; and
- (4) review and evaluate results of studies undertaken and suggest improvements.

The Workshop **stressed** the need for collaboration amongst research groups and organisations within the region and for data sharing and common analyses. In addition to providing scientific expertise, the IWC may be an appropriate body to assist in such efforts given its experience with data availability agreements and combined databases. It **agreed** that long-term monitoring is essential.

INFORMATION ON HUMAN ACTIVITIES

As noted above, it is important that information on human activities is available at temporal and spatial scales consistent with those of cetaceans (both for identifying high-risk areas and determining effective mitigation measures). Obtaining such information requires considerable collaboration. It

is particularly important to recognise that: (1) in some and perhaps many cases, commercial sensitivities will need to be addressed but also that: (2) threats to cetaceans can **only** properly be assessed and mitigated against if knowledge of human activities is known from **throughout** the population's range (which may include non-Arctic waters). This requires not only the collection of the correct information but also the sharing of that information in an efficient way that protects the interests of data holders. With respect to oil and gas development, the Workshop noted that in some areas, notably off West Greenland, the authorities have ensured that data sharing occurs; in other areas (e.g. on the Sakhalin shelf), lack of data sharing amongst companies has proved a significant barrier in assessing risk and implementing effective mitigation. It is also important to obtain reliable future scenarios for increased human activities when assessing threats and determining mitigation measures and their likely effectiveness. From Table 1, this includes information on:

- (1) commercial shipping (collaboration with IMO, industry groups, coast guards, navies, port authorities etc.);
- (2) commercial fishing (collaboration with FAO, regional fisheries bodies, fisherman associations, etc.);
- (3) offshore oil and gas operations including seismic surveys and infrastructure both at sea and on land (collaboration with industry organisations, individual companies, national authorities, etc.); and
- (4) hunting (collaboration amongst intergovernmental bodies such as IWC and NAMMCO, national authorities, local authorities and hunting organisations).

The Workshop again **stressed** the need for collaboration and data sharing within the Arctic region. This will require careful negotiation amongst authorities, industry, research groups and intergovernmental organisations and data sharing. It **agrees** that the IWC may be an appropriate body to assist others in such efforts given its experience with data availability agreements.

INFORMATION ON INDIVIDUAL STRESSORS

For certain threats, such as those from bycatch in fishing gear, ship strikes and hunting, the 'impact' on individuals is relatively straightforward (assumed death in the worst case), although quantification can be extremely difficult for the first two of these for a number of reasons including detection and under-reporting. The IWC and its Scientific Committee have been examining these issues and are continuing to work on them (e.g. see recent IWC Scientific Committee reports and the two Workshops on ship strikes in 2010 and 2014). They are of course providing advice on matters related to aboriginal subsistence hunts for large whales including advice on long-term safe management that explicitly takes uncertainty into account. The AWMP/RMP approaches (not necessarily the specific details of these e.g. with respect to objectives) are appropriate ways to examine population-level impacts.

As noted earlier, determining the impacts of other stressors that do not cause immediate death but may affect 'fitness' of individuals and populations (e.g. affect mortality and reproductive rates) is more complex and difficult. A number of initiatives are underway, such as the IWC's POLLUTION 2000+ and 2020 programmes to examine the impacts of chemical pollutants, and various noise projects under the oil and gas 'Joint Industry Program'⁷, IUCN's WGAP⁸, national initiatives and the IWC Scientific Committee.

Regardless of the difficulties involved in obtaining information on non-direct stressors, it should be noted that the RMP/AWMP approaches provide robust means of determining safe removal levels in the face of changing carrying capacity (a proxy for many habitat-related stressors, singly or in combination).

INFORMATION ON SYNERGISTIC AND CUMULATIVE EFFECTS

As noted above, the most difficult issue to address when assessing risk to cetaceans arising out of human activities concerns the incorporation of synergistic (e.g. one or more threats occurring at the same time) and cumulative (i.e. the accumulation of impacts over a period of time) impacts. A complicating factor is that at least in some areas, threats from different companies operating in the same general area at the same time are often only examined individually rather than together by authorities; from a cetacean perspective, it does not matter who is causing the disturbance or what their motives may be. There are some ongoing initiatives to try to examine these complex issues such as the Population Consequences of Disturbance (PCoD)⁹ project and the Cumulative Effects Working Group convened by the University of California, Santa Barbara.

Recognising the importance of integrated examination of threats and potential impacts into population modelling, the initiatives that are taking place elsewhere and the expertise within the IWC Scientific Committee on population modelling and dealing with uncertainty, the Workshop **agrees** that there is merit in the IWC Scientific Committee exploring the value of holding a co-sponsored specialist workshop on examining synergistic and cumulative effects at the population level with other interested bodies and projects.

4.2 Highlights from Theme 2 Breakout Group Discussions (Leads: Reeves and Brockington)

The Theme 2 discussion focused on: (1) guidelines and principles for monitoring and mitigation; and (2) development of a collaborative model for the Arctic. The summary below is an attempt to integrate the main issues raised by the four breakout groups, which formed the basis for the recommendations developed under Item 5.

4.2.1 Monitoring

The Workshop identified several issues related to monitoring and mitigation. For human activities, the focus was on shipping and the oil and gas industry. With regard to shipping, there are concerns around ship strikes, noise disturbance, toxin spills, bilge water, tourism, and the need for international coordination and collaboration. With regard to oil and gas development, concerns centre on toxin spills or leaks, noise disturbance (and potentially injury) especially from seismic surveys and icebreaking, dispersant use, and other aspects of oil spill response. These are summarised in Table 1.

With respect to baseline information on cetaceans, it was agreed that there is a need for improved mapping of cetacean ranges and movement patterns; better understanding of population structure, abundance, population dynamics, and health status; climate change processes; and pollutants.

In conclusion, the Workshop **emphasised** that baseline monitoring of whale populations, human activities, and environmental conditions needs to begin before changes or disasters occur and be maintained over the long term post-disturbance (e.g. following an oil spill incident).

⁷<http://www.jipsurvey.com/>.

⁸<https://www.iucn.org/wgap/wgap/>.

⁹[http://www.smru.co.uk/news/interim-pcod-\(population-consequence-of-disturbance\)-report-published/](http://www.smru.co.uk/news/interim-pcod-(population-consequence-of-disturbance)-report-published/).

Priorities for monitoring should include direct efforts to characterise whale populations in terms of distribution, abundance, trends, and health indices (e.g. external appearance, body condition) and to describe and quantify ecosystem characteristics. In parts of the Arctic, documenting subsistence harvests and sampling harvested animals can be a valuable element of monitoring (e.g. studies being undertaken during the Alaska bowhead whale hunt). The Workshop **agreed** that the use of whaling villages as centres for cetacean population monitoring, development of underwater sound profiles, biological sampling, etc. should be carefully considered as part of overall monitoring strategies in those parts of the Arctic where aboriginal whaling takes place.

With respect to human activities, a critical component is data sharing. With respect to the oil and gas industry, for example, it is important that events (such as seismic surveys) are not seen in isolation by company. From the perspective of possible impacts on whales then it is important to assess the effect of *all* relevant activities within the species range not just those from a single company (e.g. see the experience off the Sakhalin shelf provided by the IUCN WGWAP which has frequently sought information from all companies not just the company that works with WGWAP). While this may bring to the fore questions of commercial confidentiality, the Workshop **agreed** that it is important that ways are found to respect this whilst ensuring that the requisite information is provided to allow potential impacts to be assessed and appropriate mitigation strategies developed.

The Workshop also briefly discussed new technologies that can assist in monitoring human activities. One example is AIS (or similar) tracking of vessel movements, which *inter alia* allows evaluation of compliance with ship traffic rules to mitigate the ship strike risk to whales as well as providing information on the overall patterns and densities of shipping. It was noted that this technology is not compulsory for all vessels. Other new and emerging monitoring tools that merit development, refinement and dissemination include the use of autonomous aerial platforms and under- or in-water devices such as gliders, moorings, and autonomous underwater vehicles (AUVs). It was **agreed** that the value of monitoring is greatly enhanced by transboundary cooperation and coordination, which can be facilitated by organisations or forums such as the Arctic Council and its components; such coordination should involve scenario planning, scaled approaches, and strategic use of limited resources.

4.2.2 Mitigation

Mitigation in the present context was considered to be a three-part process: (1) measures are implemented based on what is known (likely effectiveness may be evaluated through computer simulations in some cases); (2) the effectiveness of those measures is assessed through monitoring of both human activities and cetaceans; and (3) measures are adapted accordingly if necessary, particularly taking account of observed and expected changes in migratory, feeding, and other behaviour of whales in the Arctic in response to climate change and the rapid decrease in sea ice. The Workshop **stressed** that as for monitoring, mitigation efforts must be designed and scaled appropriately for addressing impacts on subsistence hunting as well as on whales, whether at the individual or population level.

Several aspects of mitigation in relation to industrial activity were highlighted during the discussions.

Regarding ship strike avoidance, the Workshop referred to previous discussions (e.g. Beaulieu Ship Strikes meeting; IWC, 2011b) of potential mitigation methods and their strengths and weaknesses. The most effective is to find ways

to separate ships from whales in time and space (e.g. traffic separation schemes) but these may often not be possible. Technological procedures that alert ship captains in 'real time' when they are approaching areas with an elevated likelihood of encountering whales have been instigated in some areas but require evaluation as to their effectiveness. Similarly, the presence of observers onboard has some merit but is dependent on weather, light and the ability of the ship to react appropriately; again this requires further evaluation. Studies show that slowing vessels down to speeds of 10 knots or less will reduce the number of lethal encounters if not encounters themselves. The Workshop **noted** the efforts of the IWC Ship Strikes Working Group in this regard.

To manage vessel noise, ship quieting technologies should be investigated thoroughly in terms of desirability (there may be a trade-off between the goals of reducing noise disturbance and lowering the risk of ship strikes), feasibility (e.g. cost, fuel efficiency), and timescale (e.g. building new ships vs retrofitting the existing fleet). Noise mitigation is also needed in the offshore oil and gas industry, particularly when it comes to seismic surveys, platform construction, and pile driving. Time/area closures are among the available tools that are already being developed and applied and that will likely need to be refined and used with greater frequency in the future. The value of tested mitigation measures and a common approach for the whole industry was recognised and reference was made, for example, to the recent work of Nowacek *et al.* (2013) on mitigation approaches for seismic surveys and Moore *et al.* (2012) on a new framework for assessing the effects of anthropogenic sound on marine mammals in a rapidly changing Arctic. Monitoring the effectiveness of mitigation strategies and data sharing within and across industries of the results to increase sample sizes was also stressed.

Oil spill prevention was deemed the most critical area for attention because of the potentially catastrophic effects of a major spill in Arctic waters. Among the key elements of this are activity management (including vessel traffic control, regular inspection of equipment, etc.), relief wells, double-hulled tankers, and worst-case scenario planning. Although participants stressed that oil spill prevention must be the highest priority, they also emphasised the need for a high level of readiness capability to respond when a spill occurs. This requires strategically located caches of response equipment but also, and very importantly, personnel and accommodations available near potential accident sites. It was noted that even in Barrow, one of the larger human settlements in the high Arctic, it would be an enormous challenge to 'host' and help launch a major clean-up event. Finally, the Workshop highlighted: (1) the importance of cross boundary co-operation; (2) the need to conduct realistic training exercises for oil spill responders; and (3) the need to evaluate response techniques and 'best practices' not just under 'normal' conditions but even more importantly under non-ideal (worst-case) conditions.

With respect to compliance with mitigation measures, the Workshop noted that several approaches (mandatory with little or no monitoring, mandatory with enforcement, voluntary, etc.) were used throughout the region. It was emphasised that whatever approach was taken, compliance was more likely if measures were shown to be both effective and cost-effective. The role of 'external' factors such as insurance benefits, fuel efficiency and public approval, etc. was noted.

Among other points raised in the discussions were that: (1) present differences in regulatory regimes among national jurisdictions need to be accounted for in mitigation strategies

but that discussions to try to minimise the differences would prove valuable to both industry and the environment in the long term; (2) operator buy-in is often key to compliance with mitigation measures; (3) there is a longstanding need for robust methods to define, quantify, assess, and manage cumulative impacts (across ranges/borders and over time; see Item 4.1, above); and (4) a truly comprehensive review of risk exposure requires a centralised repository of information as well as appropriate syntheses of the information.

4.2.3 Role of IWC

Participants were asked to consider the role or roles that the IWC might play in bringing together stakeholders (e.g. Arctic Council, indigenous organisations, national and local governments, industry, NGOs) and developing broad guidelines or 'good practice' models across national boundaries and on the high seas.

Given the IWC's ability to compile and interpret information from member nations and experts, as well as the Scientific Committee's expertise in research design and population analyses, it was agreed that the IWC is well placed to advise and collaborate with other bodies such as the IMO and Arctic Council, as well as to lead on cetacean issues. This will require stronger communication networks (e.g. through memorandums of understanding, establishing observer exchanges, formally agreed information exchange mechanisms) that make it possible to set research priorities, identify information gaps, determine how best to fill them, and avoid redundancy or duplication of effort. Towards this end, it was **agreed** that the IWC should endeavour to track the agendas of various working groups within the other organisations (e.g. those on oil spill prevention and response, ship quieting, etc.) and decide where, how, and when to engage. It should also continue to act as a data repository (e.g. ship strikes, disentanglements, stranding events) and make further improvements in access to the data held, as well as liaise with industry and others with respect to acting as a data repository for other information (e.g. related to human activities that may affect cetaceans and mitigation measures and effectiveness).

As a way of ensuring that various industry sectors have a better understanding of the risks their activities might pose to whale populations and subsistence whaling communities, it was suggested that the IWC could help to develop and promote training materials and conduct information sessions through the IMO, Arctic Council, and other bodies. It could also work with industry and national authorities to convince or require companies to contribute cetacean, acoustic, and other environmental data (obtained, for example, from marine mammal observer programs) to a common database or databases (e.g. National Oceanographic Data Centre) and make their information publicly available via the IWC or some other conduit.

In considering more specific activities, the Workshop **emphasised** the strength of the Commission's history of engagement with subsistence whaling organisations and agreed that this should be enhanced. For example, as a repository of cetacean information, the IWC Scientific Committee is almost uniquely positioned to aid in the development of 'hotspot' mapping and other data management tools to identify areas of the Arctic where measures are needed to protect whales and subsistence whaling communities from the impacts of industrial activities and climate change. Data of many kinds (on whale distribution, relative density, aggregation sites and migratory routes, human activities, underwater noise, etc.) from various sources (observations by aboriginal whalers, historical catch records, NAMMCO, industry monitoring programs,

scientific surveys, etc.) require integration and synthesis – tasks in which the IWC can either take the lead or be a key participant. The outputs of these tasks would inform and support measures such as the designation of IMO Particularly Sensitive Sea Areas in the Arctic (e.g. Unimak Pass, Bering Strait), other navigation control measures or advisories, time/area closures to particular types of industrial activity, etc. Other specific initiatives for the IWC to consider are: (1) follow the model of the Commission's successful whale disentanglement training effort by establishing a similar program to train industry operators (e.g. the shipping, oil and gas, and tourism sectors) and increase their awareness of and sensitivity to conservation concerns and the cultural aspects of aboriginal subsistence whaling; (2) provide technical support to individual shipping companies such as Automflot and the Northern Sea Route Administration in Russia that are willing to adopt voluntary avoidance areas and ship quieting technology; (3) encourage and facilitate placement of trained marine mammal observers (MMOs) onboard vessels in the Arctic as an approach to monitoring and collecting data on cetaceans; and (4) develop, promote, and disseminate standards or guidelines for cetacean observers, drawing on experience of BOEM, Joint Nature Conservation Committee, Sakhalin Energy and other entities that have established such standards or guidelines, training programmes, etc.

4.2.4 Developing a Regional Model of Cooperation and Collaboration

The Workshop recognised that the challenge of developing a regional model for collaboration on Arctic issues was not within the formal remit of the IWC. However, they identified some of the entities that should be considered as potentially illustrative examples in such an exercise. These include the Association of Arctic Expedition Cruise Operators (voluntary cruise ship limits), the Arctic Marine Mammal Coalition, the 'conflict avoidance agreements' between Alaska North Slope communities and oil and gas companies, the Canadian Cooperative for Wildlife Health (links villages and facilitates information sharing), the Arctic Council and IMO committees and working groups (e.g. CAFF, PAME, EPPR, STWG), the Western Gray Whale Advisory Panel (Sakhalin Energy, IUCN), the Shetland Terminal, the Chukchi Sea Environmental Studies Program, and the recent effort in Greenland to assess or monitor multiple seismic survey footprints, with companies involved sharing costs.

5. CONCLUSION AND WORKSHOP RECOMMENDATIONS

5.1 Overall conclusions

One of the most successful aspects of this intense two-day Workshop was to bring together representatives of many of the key stakeholders in the Arctic to begin to discuss common issues related to the Arctic environment (and especially its cetaceans) and minimising human impacts upon it, at a relatively early time in both the industrial development process and the changes being brought about by climate change. Whilst welcoming the important intergovernmental and other initiatives that are underway (e.g. the work of the Arctic Council and the IMO), it is **important** that the IWC brings its expertise to this existing work in terms of assessing potential negative effects of environmental change and human development on: (a) cetaceans; and (b) subsistence whaling cultures and communities, and contributing to mitigation efforts. Thus a key focus of the Workshop was to examine ways in which the IWC can improve collaboration with the wide variety of stakeholders as soon as possible.

5.1.1 Intergovernmental organisations

One of the key regional organisations is the Arctic Council, which has eight member countries (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and USA) of which all but Canada are also IWC members. In addition it has observer countries and approved intergovernmental and non-governmental observers. The Arctic Council has a series of working groups for which cetacean issues are relevant including those on the Arctic Monitoring and Assessment Programme (AMAP), the Conservation of Arctic Flora and Fauna (CAFF), the Protection of the Arctic Marine Environment (PAME), the Arctic Contaminants Action Program (ACAP), the Sustainable Development Working Group (SDWG) and the Emergency Prevention, Preparedness and Response working group (EPPR). In addition it has a number of relevant programmes and action plans including those on Arctic Biodiversity Assessment (ABA), Circumpolar Biodiversity Monitoring Program (CBMP) and Arctic Climate Impact Assessment. The scope for IWC co-operation at many levels has been highlighted earlier in this report. As recommended more formally below, it is essential that the IWC applies for observer status and that the two Secretariats work together to determine how best co-operation and collaboration can take place.

The IWC already has an Agreement of Cooperation with the IMO, and the Workshop identified ways in which co-operation on the current areas of common interest (which include the Polar Code, MARPOL, a variety of mitigation measures relevant to ship strikes and the reduction of acoustic disturbance) should continue and be expanded. Similarly, the IWC has a number of areas of common interest with other international organisations that deal with cetaceans and hunting including NAMMCO and the JCNB; again, increased co-operation can only improve efforts to safeguard the Arctic environment and communities.

5.1.2 Other stakeholders

In addition to intergovernmental organisations, discussions at the Workshop **highlighted** the importance of increased communication, collaboration and data sharing with those involved in the existing and new developments in the Arctic, especially those associated with oil and gas development, the maritime shipping sector and fishing. Evaluating and understanding actual and potential threats to cetaceans (and subsistence communities) requires not only knowledge of cetaceans but also knowledge of present and likely future human activities at appropriate geographical and temporal scales. Even within the limited time available, a number of important data gaps were identified both with respect to cetaceans and human activities. The common analysis and sharing of data at a large-scale has been shown time and again to be more powerful than examination of the results of small-scale studies. Increased collaboration is addressed more formally in the recommendations below.

5.1.3 Common standards, measures and monitoring across the Arctic

The migratory and trans-national range of most Arctic cetaceans highlights the need for concerted action by all stakeholders both within national waters and the high seas. Obtaining sufficient data on cetaceans and human activities to prioritise threats, develop and implement mitigation measures (and monitor to ensure that those measures are successful) requires high levels of co-operation, scientific effort, political will and data sharing. The Workshop **agreed** that this need could provide a valuable catalyst to developing an agreed framework or frameworks within

the region to begin to explore the development of common approaches on a number of important matters, all of which can be seen as advantageous not only for the environment but also for industry who will be able to have a common approach whether they are operating within national waters of one or more countries or on the high seas. Such issues should include:

- (a) common standards for environmental impact assessments for new human activities (both in terms of requirements, scientific standards and methods of evaluation) taking into account synergistic and cumulative effects on cetaceans and other components of the environment;
- (b) common standards for effective mitigation measures and mechanisms for ensuring compliance including evaluation of their success (or otherwise);
- (c) common scientific research efforts and programmes to assess threats, develop mitigation measures and monitor the status of cetaceans over time;
- (d) common resources and action plans to deal with catastrophic events such as oil spills; and
- (e) agreement on how to address issues of conflicting priorities across the region (e.g. oil and gas development in one area against subsistence hunting in another).

The Workshop recognises that these are complex and difficult issues involving many disciplines, stakeholders and regulatory bodies but **stresses** their long-term importance to the future of the Arctic from a human and environmental perspective. The Arctic Council appears to be the most appropriate framework to take this forward. The Workshop believes that the IWC can contribute to this work in a number of ways ranging from the provision of expertise, information and mechanisms for data sharing through to encouragement of international collaboration both within the IWC itself and by encouraging participation by IWC member nations working in different organisations and nationally. An important challenge for the IWC is to determine the details of how best it can encourage and contribute to such a major effort in a timely and comprehensive manner.

5.1.4 Some key areas of IWC expertise in relation to the Arctic

The key areas of provision of expertise/advice by the IWC and its subsidiary bodies include the following.

- (a) Provision of advice on appropriate methods for cetacean status assessment, risk and population modelling, spatial and habitat modelling, dealing with uncertainty, monitoring strategies and evaluation of mitigation strategies (Scientific Committee and Conservation Committee).
- (b) Summary of present knowledge of cetacean population status, distribution and movements, density and critical habitat (Scientific Committee).
- (c) Identification of high risk areas for cetaceans (in time and space) and known/projected human activities where possible – identification of where data are insufficient and how to obtain the requisite data where not (Scientific Committee).
- (d) Evaluation of actual or potential risks by species and/or region based on expected timelines of human activities including monitoring (Scientific Committee).
- (e) Experience in data sharing agreements and centralised databases (Scientific Committee).

- (f) Development and evaluation of mitigation approaches (Scientific Committee, Conservation Committee, Whale Killing Methods And Associated Animal Welfare Issues Working Group).
- (g) Information on subsistence hunting and communities (including consideration of traditional knowledge) along with actual or potential threats to this way of life posed by other human activities (Scientific Committee and Aboriginal Subsistence Whaling Sub-Committee).

5.2 Priority recommendations

The recommendations in this section represent the participants' contributions, and are represented as recommendations from the Workshop. The Workshop **strongly emphasised** that the IWC has an important role to play in the protection of the Arctic environment and its subsistence whaling communities. An important challenge for the IWC is to determine the details of how best it can encourage and contribute to such a major effort in a timely and comprehensive manner. It also **recommends** that the IWC considers including a standing agenda item on the Arctic at each biennial meeting to consolidate the progress made by its subsidiary bodies and the Secretariat during intersessional periods and to discuss future actions.

5.2.1 Increased co-operation with the Arctic Council

The Workshop **recognises** the importance of the work already underway by the Arctic Council and its working groups and programmes (see Item 5.1.1). As a matter of highest priority, it **strongly recommends** that the IWC Secretariat:

- (1) approaches the Arctic Council requesting observer status and provides as part of that request a short summary of the types of expertise the IWC can provide (see Item 5.1.4) as well as a copy of the present report;
- (2) liaises with the Arctic Council Secretariat and chairs of the various Arctic Council working groups to determine how best the IWC can contribute to and participate in their work, including cetacean-related aspects of the development of common standards, measures and monitoring across the Arctic (see Item 5.1.3);
- (3) invites the Arctic Council to participate in relevant IWC meetings and Workshops, including those of Committees, sub-committees and working groups;
- (4) liaises with the Arctic Council over the need for a formal Memorandum of Understanding between the two bodies, as appropriate;
- (5) invites the Arctic Council to publicise the IWC global ship strikes database and encourage member nations, observer nations and observers to submit data to the database to allow a better characterisation of the issue for the Arctic; and
- (6) encourages the Arctic Council to continue to recognise the importance of taking into account the needs of subsistence whaling communities and offers to provide information on IWC regulated hunts.

In addition, the Workshop **requests** that the Commission develops an approach to funding IWC participation at relevant meetings of the Arctic Council and its working groups.

5.2.2 Increased co-operation with IMO

The Workshop **acknowledges** the work already being undertaken by the IWC Secretariat and member nations within the IMO on matters related to ship strikes and noise. In particular, it **commends** the work of the Scientific Committee and the Conservation Committee's Ship Strikes Working Group in this regard.

The Workshop **recommends** increased co-operation by the IWC (Secretariat and member nations) with IMO with respect to mitigation measures for threats to cetaceans (e.g. Traffic Separation Schemes, speed restrictions, noise reduction) and increased awareness of the issue of ship strikes and the importance of the IWC global ship strikes database. It **strongly** urges Arctic nations to submit data to the IWC database to allow priorities for action to be developed, and referred to the July 2014 IWC Workshop on ship strikes as an appropriate place to take this general issue forward.

One of the most important IMO initiatives related to the Arctic is the development of a mandatory international code of safety for ships operating in polar waters (the 'Polar Code'), to cover the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the polar waters. The Workshop **strongly endorses** the need for such a code and **commends** the excellent work carried out to date. It **urges** IWC member nations and others to support the finalisation and ratification of the Polar Code as soon as possible.

5.2.3 Increased co-operation with stakeholders

An important component of the Workshop was to bring together a variety of stakeholders from intergovernmental organisations, member states, national agencies, industry, subsistence communities and NGOs. The Workshop **agrees** that effective mitigation requires *inter alia* participation of all stakeholders from an early stage in the process from identifying whether problems exist, developing mitigation measures, addressing competing stakeholder priorities and developing compliance and monitoring measures.

In an IWC context, the Workshop **recommends** the following.

- (1) Stakeholder participation is encouraged in relevant meetings of the IWC and its subsidiary bodies, as well as meetings of other intergovernmental organisations such as the Arctic Council and national authorities.
- (2) The IWC Secretariat, in consultation with others (e.g. the Arctic Council and IMO secretariats), draws up a list of relevant international and national stakeholder bodies for the Arctic region, in light of the discussions at this Workshop that prioritised the following: oil and gas operations, vessel traffic (of many kinds including transport, tourism/whale watching, fishing, servicing oil and gas operations), fishing activities and hunting.
- (3) The IWC Secretariat contacts the identified organisations with a copy of the present Workshop report and subsequent Commission discussions of it, expressing the interest of the IWC in co-operating and providing advice on issues of mutual interest including: (1) the sharing of scientific expertise (see Item 5.1.4); (2) assistance with issues of data sharing and common field work and analyses; and (3) information on subsistence hunts.
- (4) The IWC considers additional ways (including possible expansion of the Commission's successful whale disentanglement training effort) to increase the awareness of and sensitivity of industry operators (e.g. the shipping, oil and gas, fishing and tourism sectors) to conservation concerns and the cultural aspects of aboriginal subsistence whaling.
- (5) The IWC considers mechanisms to provide technical support to individual companies or industry bodies.

5.2.4 Scientific matters

The Workshop **recognises** the importance of a strong scientific foundation to the evaluation and prioritisation of threats and subsequent development, implementation and monitoring of mitigation measures. The IWC Scientific Committee is one of the foremost bodies for cetacean conservation science and has considerable expertise in many relevant topics identified at the present Workshop (e.g. see Item 4.1). It also acknowledges the work of other bodies including NAMMCO, JCNB and national agencies. In the time available, it was clearly not practical for the participants to summarise all of the available scientific information available for the Arctic or to specify other than in broad terms, the most important data gaps and how these might be addressed.

The Workshop **recommends** that the IWC Scientific Committee be requested to:

- (1) develop a summary of present knowledge of cetacean population status, distribution and movements, density and important habitat of the Arctic species;
- (2) develop plans for a co-hosted specialist workshop or workshops with appropriate stakeholder participation (with a focus on the Arctic and with particular case studies to be determined) on identifying and evaluating threats to cetaceans from human activities including:
 - (a) data and analytical requirements (both for cetaceans and human activities) for identifying high risk areas to cetaceans at the correct geographical and temporal scales;
 - (b) evaluation of non-direct threats to cetaceans at the population level including chemical pollution, noise, climate change, etc.;
 - (c) methods to examine synergistic and cumulative effects of a range of actual and potential threats at the population level (see Item 4.1.3); and
 - (d) specific recommendations with respect to data requirements and monitoring for the Arctic region in the light of projected human activities within the region.
- (3) collate a summary of advice relevant to the Arctic which it has provided with respect to a number of issues identified at this workshop including: climate change; chronic and acute noise; oil spills, ship strikes, fishery bycatch, habitat degradation; and
- (4) work with the IWC Secretariat to increase the prominence, awareness and availability of its advice through the IWC website.

The Workshop also **recommends** that the IWC Scientific Committee contributes to efforts to develop of common standards, measures and monitoring across the Arctic (see Item 5.1.3) with respect to issues related to the effects of human activities on cetaceans.

6. ACKNOWLEDGEMENTS

The Workshop thanked the following individuals and organisations for assisting in making this Workshop a success: Doug DeMaster for his time and expertise serving as Workshop Chair; Teri Rowles, Cheryl Rosa, Sue Moore and Michael Tillman for their time and expertise planning this Workshop and serving as Panel Chairs; the World Wildlife Fund and the United States for contributing resources to support this Workshop; all speakers, breakout group discussion leaders and rapporteurs.

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Annex A

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Annex B

Agenda

DAY 1: MARCH 6, 2014

1. Welcome and introduction

- Welcome and Workshop objectives - Doug DeMaster, Workshop Chair; Director, NMFS
- Alaska Fisheries Science Center
- IWC roles and responsibilities – Simon Brockington, IWC Secretary
- Current IWC Scientific work and policy focus related to the Arctic - Greg Donovan, IWC Head of Science

2. Keynote speaker

- Fran Ulmer, Chair, US Arctic Research Council

3. Framing presentations

- Marine Mammals in the ‘New Normal’ Arctic - Sue Moore, Senior Scientist, NMFS Office of Science and Technology
- Distribution of endemic cetaceans in relation to hydrocarbon development and commercial shipping in a warming Arctic Randall Reeves, Okapi Wildlife Associates; Chairman, Committee of Scientific Advisors, US Marine Mammal Commission
- Introduction to the Arctic Council Responsibilities and Activities - Allison Reed, NOAA Office of International Affairs

4. Panel on Shipping

Panel Chair should introduce presenters and **objectives** – Dr. Cheryl Rosa, Deputy Director, US Arctic Research Commission

Framing presentation - Lawson Brigham, Distinguished Professor of Geography and Arctic Policy, University of Alaska Fairbanks; Captain, USCG (Ret.): Chair, AMSA (2005-09)

Presentations addressing the following questions

- (1) What is the speaker’s perspective on the present and future status of Arctic shipping activities (including, but not limited to, commercial, scientific, oil and gas, fishing, and tourism activities) and the impacts on cetacean (e.g., noise, ship strikes, pollution, debris)?
- (2) What has been done to date? Are there any lessons learned (e.g., case studies)? What are the knowledge gaps and concerns?
- (3) Any recommendations to the IWC for what information would be most useful and how the IWC should prioritise its future work related to the Arctic?

Presenters

- Heike Deggim, Marine Environment Division, International Maritime Organization (IMO)
- James Houck, US Coast Guard
- Henrik Falck, Tschudi Shipping Company, Norway
- Angelia Vanderlaan, Department of Environmental Conservation University of Massachusetts Amherst

5. Panel on Oil and Gas-related Activities

Panel Chair should introduce presenters and objectives – Teri Rowles, Head, Marine Mammal Health and Stranding Response Program, US National Marine Fisheries Service

Framing presentation - Bill Streever, Senior Environmental Studies Advisor, BP Exploration (Alaska) Inc.

Presentations addressing the following questions

- (1) What is the speaker’s perspective on the present and future status of Arctic oil and gas-related activities and the impacts on cetaceans (e.g. noise, vessels, pollution, spill response and restoration)?
- (2) What has been done to-date? Are there any lessons learned? What are the knowledge gaps?
- (3) Any recommendations to the IWC for what information would be most useful and how the IWC should prioritise its future work related to the Arctic?

Presenters

- Alexey Knizhnikov, Head, Oil and Gas Environmental Policy, World Wildlife Fund, Russia
- Lori Schwacke, Chief, Oceans and Human Health Branch, National Centers for Coastal Ocean Science, US National Ocean Service
- Mark Everett, Arctic Council Emergency Prevention, Preparedness and Response (EPPR) Working Group; US Coast Guard; Chair of US Alaska Regional Response Team
- James Kendall, Regional Director of Alaska’s Outer Continental Shelf Region, US Bureau of Ocean Energy Management
- Michael Macrander, Shell Alaska Venture

6. Panel on Indigenous Focuses on Increased Shipping and Oil and Gas-Related Activities in the Arctic

Panel Chair should introduce presenters and objectives – Michael Tillman, Chair, IWC Aboriginal Subsistence Whaling Working Group; US Marine Mammal Commission

Presentations

- (1) What is the speaker’s perspective on the present and future status of Arctic shipping and oil and gas-related activities? What is the speaker’s perspective on the impacts of these activities on cetaceans?
- (2) What each group done to assist with management of shipping and/or oil and gas-related activities in his region? Are there any lessons learned? What are the knowledge gaps and concerns?
- (3) Any recommendations to the IWC for what information would be most useful and how the IWC should prioritise its future work related to the Arctic?

Presenters

- Eduard Zdor and Edward Rypkhirgin, Russia, Traditional Marine Mammal Hunters of Chukotka
- Fernando Ugarte, Greenland Institute of Natural Resources
- George Noongwook, US, Alaska Eskimo Whaling Commission

DAY 2: MARCH 7, 2014**7. Recap of Day 1 and Plan for Day 2**

Workshop Chair

8. Highlights of Panels and potential recommendations/ areas for breakout groups to consider**8.1 Shipping Panel****8.2 Oil and gas related activities Panel****8.1 Indigenous focus Panel****9. Introduction of break out group exercise by Theme leaders****10. Breakout Groups on Theme 1**

Group Leaders: Greg Donovan (Theme Lead), Lori Quakenbush, Arne Bjørge, Sue Moore (Theme Lead), Robert Suydam, Fernando Ugarte

Theme 1: Actual and potential threats, filling knowledge gaps and collaborative studies*Threats and priorities*

- What are the major actual and potential threats to cetaceans from new activities?
- What are the main data gaps in assessing/prioritising these from the perspective of cetacean data and data on human activities?
- Given available knowledge, how would you prioritise potential and actual threats in terms of actual or likely threats, severity of threat, likely extent of threat, singly and cumulatively?

Collaboration and data

What are stakeholders views on: (a) collaborative data collection and data sharing (wrt both cetaceans *and* human activities) to increase efficiency and consistency of approach.

How data collection efforts might these be prioritised with an emphasis on how this may have been done elsewhere and by whom.

Identify potential for co-operation with other bodies (e.g. Arctic Council, Indigenous organisations, National and local governments, industry and NGOs) including those for whom cetaceans not a priority or not the only priority.

11. Breakout Groups on Theme 2

Randall Reeves (Theme Lead), Peter Thomas, Layla Hughes, Simon Brockington (Theme Lead), Doug DeMaster, Michael Macrander.

Theme 2: Monitoring and mitigation, guidelines/ principles and a collaborative model for the Arctic*Mitigation*

What are the main issues wrt future **monitoring** (of cetaceans and humans) and **mitigation** (of human activities)? This will include data collection, sharing and analysis in assessing efficacy and implementation of mitigation measures? What examples already exist?

Role of IWC

What facilitating or other role could the IWC play in bringing stakeholders together (e.g. Arctic Council, Indigenous organisations, National and local governments, industry and NGOs) and developing **broad guidelines/practice models** across national boundaries and in high seas. Can a degree of commonality assist stakeholders? Has this been achieved in other places and if so, how?

Model for the region

Can we develop the outline of a suitable model for collaboration on Arctic Issues and what should it cover (can include issue from both themes)?

12. Breakout group presentations of recommendations; Plenary discussion**13. Next steps and closing remarks**

Workshop Chair

Annex C

Summaries of Presentations

MARINE MAMMALS IN THE 'NEW NORMAL' ARCTIC

Sue E. Moore

Arctic climate continues to change more than twice as fast than at lower latitudes due to coupled positive feedback processes. Sea ice cover and thickness continue to decrease, while air and water temperatures increase, suggesting that the Arctic climate system has reached a 'New Normal' state (Jeffries *et al.*, 2013). Extensive ice-free regions now occur each year in the Pacific Arctic sector, with record-low sea ice extents in 2007 and 2012. In response, walrus now often haul out by the thousands along the NW Alaska coast in late summer, and summertime reports of harbor porpoise, humpback, fin and minke whales in the Chukchi Sea suggest these temperate species now routinely occur there (Clarke *et al.*, 2013). In 2010, satellite tagged bowhead whales from Atlantic and Pacific populations met in the Northwest Passage, an overlap thought precluded by sea ice since the Holocene (Heide-Jørgensen *et al.*, 2012). Concurrently, lower trophic level plankton and benthic fauna are responding to the 'new' environmental forcing at variable time and space scales (Post *et al.*, 2013). Changes to these prey populations can have energetic impacts to marine mammals, as well as alter trophic transfer of biotoxins and contaminants (Altizer *et al.*, 2013). In addition, increasing offshore anthropogenic activities can alter marine mammal exposure and responses to infectious disease, underwater sound and potential injury/mortality from ship strikes. International efforts such as the Arctic Council/Circumpolar Biodiversity Monitoring Program (CBMP)¹⁰, and the Pacific-sector-focused Distributed Biological Observatory¹¹ can provide an environmental foundation for the development of a Marine Mammal Health Mapping tool, envisioned as a component of the U.S. Integrated Ocean Observing System (IOOS)¹². An overarching goal is to identify 'New Normal' health-ecology patterns for marine mammals, as a foundation for integrative research and adaptive management.

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DISTRIBUTION OF ENDEMIC CETACEANS IN RELATION TO HYDROCARBON DEVELOPMENT AND COMMERCIAL SHIPPING IN A WARMING ARCTIC

Randy Reeves

Abstract of: Reeves, R.R., Ewins, P.J. Agbayani, S. Heide-Jørgensen, M.P. Kovacs, K.M. Lydersen, C. Suydam, R. Elliott, Polet, W.G. van Dijk Y. and Blijleven, R.. 2014. Distribution of endemic cetaceans in relation to hydrocarbon development and commercial shipping in a warming Arctic. *Marine Policy* 44:375-89.

The Arctic is one of the fastest-changing parts of the planet. Global climate change is already having major impacts on arctic ecosystems. Increasing temperatures and reductions in sea ice are particular conservation concerns for ice-associated species, including three endemic cetaceans that have evolved in or joined the arctic sympagic community over the last 5 M years. Sea ice losses are also a major stimulant to increased industrial interest in the Arctic in previously ice-covered areas. The impacts of climate change are expected to continue and will likely intensify in coming decades. This paper summarises information on the distribution and movement patterns of the three ice-associated cetacean species that reside year-round in the Arctic, the narwhal (*Monodon monoceros*), beluga (white whale, *Delphinapterus leucas*), and bowhead whale (*Balaena mysticetus*). It maps their current distribution and identifies areas of seasonal aggregation, particularly focussing on high-density occurrences during the summer. Sites of oil and gas exploration and development and routes used for commercial shipping in the Arctic are compared with the distribution patterns of the whales, with the aim of highlighting areas of special concern for conservation. Measures that should be considered to mitigate the impacts of human activities on these arctic whales and the aboriginal people who depend on them for subsistence include: careful planning of ship traffic lanes (re-routing if necessary) and ship speed restrictions; temporal or spatial closures of specified areas (e.g. where critical processes for whales such as calving, calf rearing, resting, or intense feeding takes place) to specific types of industrial activity; strict regulation of seismic surveys and other sources of loud underwater noise; and close and sustained monitoring of whale populations in order to track their responses to environmental disturbance.

FRAMING THE ISSUES: ARCTIC MARINE OPERATIONS AND SHIPPING

Lawson W. Brigham

Globalisation and regional climate change are influencing the maritime Arctic in significant ways early in the 21st century. The Arctic is increasingly being linked to global commodity markets by offshore and onshore natural resource developments, and these economic drivers require new marine transportation systems. Arctic marine access is changing as sea ice undergoes a profound retreat and transformation in extent, thickness and character influenced by global and regional warming. These physical

¹⁰<http://www.caff.is/marine>.

¹¹<http://www.arctic.noaa.gov/dbo/>.

¹²<http://www.sccoos.org/projects/mmhealth/>.

changes in turn have implications for increasing access and allowing potential, longer seasons of navigation. All of these economic and environmental changes present unique challenges to the existing legal and regulatory structures which cannot meet the needs today for enhanced Arctic marine safety and marine environmental protection. These challenges in the 'new' maritime Arctic will require historic levels of cooperation among the eight Arctic states and broad engagement with the indigenous peoples of the Arctic, many non-Arctic stakeholders, and a host of actors within the global maritime industry. Arctic-specific issues are increasingly being discussed and actions taken at such bodies as the International Maritime Organization (IMO), the International Hydrographic Organization, and World Meteorological Organization. It is important that the International Whaling Commission also respond within its mandate to the potential impacts on cetaceans of the increasing marine activities throughout the Arctic marine environment.

The IMO is deeply involved in developing a mandatory Polar Code for ships operating in polar waters, moving beyond a set of voluntary guidelines created and promulgated early this century. A new, binding Polar Code will provide a framework of rules and regulations to enhance Arctic marine safety and environmental protection. Key will be a set of measures to reduce risk for ships operating in polar waters by: requiring new ships' construction standards; requiring polar marine safety equipment; and, enhancing the experience and international standards of training for pilothouse personnel and other members of the crew. Also being addressed are environmental, pollution prevention measures for oil, noxious liquid substances, sewage, and garbage from ships. The Polar Code, hopefully to be implemented by 2017, will be an historic and critical instrument for protection of Arctic people, polar mariners, marine life and the Arctic marine environment. The Polar Code is highly relevant to the emerging work of the IWC in developing impact mitigation measures for cetaceans.

The Arctic Council's Arctic Marine Shipping Assessment (AMSA) released in April 2009 remains the framework for the Council's response to enhancing Arctic marine safety and marine environmental protection. AMSA is a comprehensive study that can be viewed as: a strategic guide to a host of Arctic actors and stakeholders; a baseline assessment and snapshot of Arctic marine activity early in the 21st century; and, as a policy document for the Arctic Council, since the report was negotiated and consensus was reached for its approval by the eight Arctic Ministers. An AMSA scenarios creation effort identified nearly 120 driving forces and key uncertainties that will shape the future of Arctic marine activity and use to 2050. Two of these driving forces were considered primary and they anchor, as axes of uncertainty, a scenarios matrix used to develop a set of plausible futures: resources and trade (the level of demand for Arctic natural resources and trade), and governance (the degree of relative stability of rules and standards for marine use in the Arctic and internationally). The scenarios work indicated the central role of Arctic natural resource development driving increased Arctic marine activity. Full consideration was given to climate change, and continued retreat of Arctic sea ice is assumed to provide for improved marine access and potentially longer seasons of navigation. A set of 17 AMSA recommendations lays out a strategy for the Arctic Council to address three themes: Enhancing Arctic Marine Safety; Protecting Arctic People and the Environment; and, Building the Arctic Marine infrastructure. One of the AMSA recommendations makes specific reference to Addressing Impacts on Marine Mammals:

That the Arctic states decide to engage with relevant international organisations to further assess the effects on marine mammals due to ship noise, disturbance and strikes in Arctic waters; and consider, where needed, to work with the IMO in developing and implementing mitigation strategies.

As AMSA addresses a wide range of issues related to indigenous communities, the legal governance of the Arctic Ocean, today's Arctic marine infrastructure deficit, and significant environmental issues (most serious being the release of oil in Arctic waters), this study is considered a holistic assessment providing an integrated framework from which to address the challenges of expanded Arctic marine use.

In summary the following key issues are noted as important to the Workshop discussions on measures to protect cetaceans.

- Most of the Arctic traffic increases in large ships are by tankers, bulk carriers and LNG carriers, as well as cruise ships and offshore support vessels. Destinalional voyages, rather than trans-Arctic voyages, are the primary mode of Arctic navigation.
- Arctic shipping remains seasonal in most regions with possible extensions to the length of the navigation season for the eastern Northern Sea Route and through Bering Strait. In some cases the ship navigation seasons mirror the cetacean migration routes in spring and autumn.
- Arctic traffic monitoring and awareness have been enhanced by automatic identification systems (AIS) whose signals are received by satellite and land-based receivers. An agreement should be reached by the Arctic states to share ship traffic data across borders.
- There should be a balance between the basic freedom of navigation expressed in UNCLOS and any special measures developed to protect Arctic cetaceans.
- Communications between ship operators and indigenous hunters must be enhanced. Regional and local agreements can be developed to mitigate interaction or conflict between these Arctic marine users.
- Any Arctic ship routing measures must be flexible and seasonally implemented.
- AMSA should be used by the IWC as a strategic guide to address the range of ongoing issues related to protecting Arctic people and the environment. And, the IWC should follow closely the development and implementation of the mandatory IMO Polar Code.

SUMMARY OF PRESENTATION ON ARCTIC SHIPPING AND IMPACTS ON CETACEANS

Heike Deggim

Ships operating in the polar environments are exposed to a number of unique risks. Poor weather conditions and the relative lack of good charts, communication systems and other navigational aids pose challenges for mariners. The remoteness of the areas makes rescue or cleanup operations difficult and costly. Cold temperatures may reduce the effectiveness of numerous components of the ship, ranging from deck machinery and emergency equipment to sea suction. When ice is present, it can impose additional loads on the hull, propulsion system and appendages.

Over the last 20 years or so, the International Maritime Organization (IMO)¹³ has developed a raft of requirements, guidelines and recommendations regarding navigation

¹³IMO, the International Maritime Organization, is the United Nations specialised agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships.

in polar waters, and this work is now culminating in the development of a mandatory International Code for ships operating in polar waters (the Polar Code). The speaker will give an update on the progress made to date with the work on the Polar Code which is expected to be finalised in 2014 and briefly outline the structure and contents of the new Code.

With regard to the prevention of ship strikes with cetaceans, the speaker will also address relevant IMO provisions, in particular mandatory ship reporting systems and special guidance to minimise such ship strikes. Furthermore, a brief update on IMO's work concerning particular sensitive sea areas (PSSAs) and guidelines for minimising underwater noise from commercial ships will be presented.

BERING STRAIT SHIPPING PRESENTATION

James Houck

The presentation contrasts the current level of large ship traffic transiting the Bering Strait with predicted traffic levels. It then outlines proposed routing measures to mitigate the effects of additional shipping while, simultaneously, increasing safety and predictability in the Bering Strait.

MITIGATION OF RIGHT WHALE VESSEL STRIKES IN CANADIAN WATERS THROUGH RESEARCH, EDUCATION, MITIGATION, MONITORING, AND INDUSTRY STEWARDSHIP

M.W. Brown^{1,2,3}, A.S.M. Vanderlaan^{4,5} and C.T. Taggart⁴

Vessel strikes are a threat to large whales worldwide and represent a source and level of mortality for North Atlantic right whales (*Eubalaena glacialis*) that is hampering the recovery of this highly endangered species throughout its known range along the eastern seaboard of North America. In the 1990s, in the absence of government legislation mandating action in Canada to address and reduce vessel strike mortality, a unique approach emerged. Here we present the past 20-year development and implementation of regulations that resulted in Canada gaining two internationally sanctioned, area specific strategies that minimised the risk of vessel-strikes in two critical habitat areas – once having determined that mariner awareness programs were insufficient. Our analyses and efforts first resulted in the Bay of Fundy Traffic Separation Scheme (TSS), mandatory for all vessels greater than 20 meters in length, being amended through the International Maritime Organization (IMO) and implemented by Canada in 2003. The amendment resulted in a reduction of relative risk by 62% when measured throughout the Bay of Fundy. Similar analyses and efforts resulted in the IMO adopting a recommendatory and seasonal (June through December) area to be avoided (ATBA) that was implemented by Canada on Roseway Basin (SW Nova Scotia). For the ATBA, we initiated the Marine Stewardship Recognition Program (MSRP) that uses vessel-tracking data (Automatic Identification System receivers) to measure vessel-

operator compliance with the ATBA. The measurements are communicated directly to the commercial and governmental fleet navigating in the region in an attempt to further reduce the risk of vessel strikes through fleet-wide compliance. Vessel operator compliance was initially high and increased from 71% in 2008 to 80% in 2009; a relative risk reduction of ~80%. However, the goal of achieving 100% compliance with the Roseway Basin ATBA has yet to be achieved, and the MSRP continues its efforts to solicit greater fleet compliance. The insights gained from scientists and industry working with government to manage human activities to better protect North Atlantic right whales serves as a model for others who are seeking greater protection of whale species that face similar risks elsewhere in the world.

MARINE ENVIRONMENTAL PROTECTION (MEP) IN ALASKA

Mark Everett

This presentation describes marine environmental protection (MEP) functions and participants and US Coast Guard MEP responsibilities, generally. It then focuses more specifically on how Seventeenth Coast Guard District organises and executes its MEP roles through interagency, intergovernmental, and international fora. There is additional optional content on the Arctic Council *Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic*.

BOEM OUTER CONTINENTAL SHELF ARCTIC PROGRAMS AND ACTIVITIES

James Kendall

The Bureau of Ocean Energy Management (BOEM) has the responsibility for managing the development of energy and mineral resources on the US Outer Continental Shelf (OCS) in an environmentally sound and safe manner. Resource related activities include vessels associated with exploratory drilling, development, and production operations; geological and geophysical surveys; and research. Arctic OCS activities have occurred in the Bering, Chukchi, and Beaufort Seas. A review of past and current OCS activities indicate that activity levels peaked in the Bering Sea in the mid-1970s to mid-1980s (and then ceased); and peaked in the Arctic seas in the early 1980s to early 1990s followed by nearly two decades of very little activity. Recent Arctic OCS activities are focused in the Chukchi and Beaufort Seas.

In 2012, two exploratory drilling operations occurred, the first in over a decade in the Beaufort Sea and the first in over two decades in the Chukchi Sea. These operations involved over 20 vessels. We expect any future exploratory drilling to involve a comparable number of vessels and level of activity to that observed in 2012.

Recent (2012) energy resource related vessels accounted for 10% or less of total vessel activity in the US Arctic. Vessel operations related to energy resources in the Arctic OCS are required by the BOEM to employ protected species observers, operate at generally lower speeds than other vessels, are restricted in certain areas and times to avoid conflict with subsistence activities, employ oil and hazardous material spill plans, and, for seismic surveys, have exclusion zones for marine mammals with mitigation shutdown and start-up procedures for the seismic sound sources. Any sound-based exclusion zones specified in Incidental Take Authorizations for protection of marine mammals from harassment are also honored by the BOEM.

¹Canadian Whale Institute, 20 Morning Star Lane, Wilson's Beach, NB, Canada E5E 1S9.

²Provincetown Center for Coastal Studies, Provincetown, MA, USA 02657.

³New England Aquarium, Central Wharf, Boston, MA, USA 02110 [address for correspondence].

⁴Oceanography Department, Dalhousie University, Halifax NS, Canada B3H 4J1.

⁵Large Pelagics Research Center, University of Massachusetts Amherst, Gloucester MA, USA 01931.

The behaviour and habitat characteristics of US Arctic marine mammals have been studied for 40 years by the BOEM. Combining this research with Traditional Knowledge from local subsistence hunters, adaptive mitigation measures were developed and implemented to protect subsistence uses. These mitigation measures will continue to evolve by incorporating ongoing studies.

PERSPECTIVES OF CHUKOTKAN HUNTERS

Eduard Zdor and Edward Rypkhirgin

ChAZTO (Association of Traditional Marine Mammal Hunters of Chukotka) considers that it is necessary to provide the transparency of all the processes, which are related to the traditional subsistence of Chukotka indigenous peoples. Our unique culture, the maritime culture of Chukchi and Eskimo, essentially depends on the sea conditions and its inhabitants. That is why it is necessary to let every person of the Chukotka coastal village be aware what will happen in the waters of the Chukchi Sea. This information must be full and competent. We mean, that the representatives of all oil companies must organise community meeting at all levels - village, district and regional organisations of Chukotka indigenous peoples. Besides, it is very important, the oil companies must provide funding to the indigenous peoples organisations in order to set the meetings and inform local people on the matters of future plans of work in the sea. They also must provide the possibility to Chukotka local people to hire experts such as ecologists, anthropologists, etc., so that the last ones will do their independent expertise on how the work in the sea affects marine mammals habitat and traditional subsistence of Chukotka indigenous peoples.

The same requirement applies to the questions regarding increasing of the shipping in the Bering Strait. Possibly, some international foundation and international shipping organisations must provide funding. In general, everybody, who is in this realm should do this.

We want to emphasise, that all that we suggest does not decline similar activities on our federal and regional levels.

What is your point of view on the current and future status of the arctic shipping and gas activities regarding oil in your region? How do you think those activities will affect cetaceans?

ChAZTO is aware that the industrial development of the Arctic is inevitable, if we take into consideration global climate change, and even more - mankind needs natural resources such as oil, gas and bio-resources.

Still, we, the peoples of Chukotka do not see any clear fact that the modern oil and gas industry, as long as shipping, are able to guaranty the prevention of any accidents in the Arctic and, even more, to effectively eliminate their consequences. More than that, the recent tragedies demonstrate us opposite. They are the tragedy with Exxon Valdez in 1989, the wreck of the drilling platform 'Kolskaya' in the Sea of Okhotsk in 2012, the Shell drilling platform that wrecked near Alaska coast in 2012, the messages from the dwellers of the both sides of the Bering Strait regarding birds and seals covered with oil.

Shell, responsible for the recent oil spills in Nigeria and Great Britain, asserts us that it will be able to clean up 90% of the spilled oil in Alaska. At the same time, the Alaska Geographical Service considers to clean only 20%. After the shipwreck of the 'Deepwater Horizon' only 3% of the oil was cleaned and 9% after Exxon Valdez.

When creating the strategy of the industrial development of the Arctic we would like three parties find a compromise.

We do realise that the transnational corporations want to earn money; we know that various state governments wish to provide economic security and diminish their dependence from the energy sources export; but we are also aware about the citizens' aspiration to live in world of ecological security, which is able to reproduce enough its flora and fauna. In our message we point to the uniqueness of the Bering Strait - they key habitat for hundred thousands marine mammals and millions of birds.

In this regard, the role of such international organisations as IWC increases. It brings together governments, international organisations and non-governmental organisations from many countries.

ChAZTO is pretty confident that with the increasing of the industrial activities, during the seismic exploration and possible oil extraction on the shelf, the whales will be forced to change their migration routes. It won't only affect the coastal village residents directly, will disturb their traditional seasonal whale and walrus hunting. We think that the industrial development near the Bering Strait might change their habitat as well.

In its turn it means that people will stop go hunting to the sea, there will be nothing to harvest and, as a result, there will be nothing to bring home for dinner. Nowadays, the hidden unemployment in the coastal villages is preliminary from 60% up to 80%. There is a high probability of the humanitarian disaster. We must mention that besides some technological obstacles of getting food, our small ethnicities face another serious issue - the absence of OUR traditional subsistence will lead to the death of our local languages, people will stop to preserve their traditions and will lose their ethnic identity. Even if oil companies pay enough compensations in order to calm people down, still, the dying out of Chukotka indigenous peoples will be the natural phenomenon because the migration routes of the whales and walruses will change due to the industrial development of the Arctic.

We also think that if some forecasts on disappearing summer ice come true then it will lead to the multiple increasing of the shipping - tankers and large-capacity containers ships. No doubt, the pressure on the Bering Strait might be critical. It is necessary to consider these risks.

What did your group do to provide any help in governing shipping and/or oil and gas activities in your region? Any results? What are the gaps in knowledge and what are the problem?

Our organisation held some meetings devoted to those questions. We tried to attract attention of our regional and federal authorities to the fact that nobody invited Chukotka indigenous peoples to participate (or at least to inform them) in the questions of the shipping rules regulations in the Bering Strait. However, we received typical answers that the question was under the process. More, our local authorities announced that the Russia's geopolitical interests are more important the Chukotka coastal village residents and their own interests.

State company 'Rosneft' (Russian oil) has been investigating for several years the possibility of the oil extraction on the shelf of the Chukchi Sea. Unfortunately, we could not establish the dialog with this company still. There was not any public meeting on geophysical work in the Chukchi Sea. The meeting was held as the questionnaire or just demonstrating company's plans on the walls. ChAZTO had no opportunity to present our position and questions. There should be meeting on the 5 March, but we do not have either invitation or any affordable information regarding this meeting.

In the fall 2013, ChAZTO sent its application on registration the community ecological expertise in two municipal districts of Chukotka. Our request was declined. After this, we asked for help for some Russian ecological organisations. One of them was WWF-Russia and another one was Center of the Wild Nature Preservation. They supported us. Then, after long resistance and only when the public prosecutor interfered into the lawless actions of the municipal authorities, there was second registration of the application from the Center of the Wild Nature Preservation.

We consider, that such attitude and relation, to the wish of the civil society to get full information can be explained by the fact that Rosneft received those sites without any competition. We suggest that only some bureaucrats made this decision and as a result it might be possible that there will be some problems with providing ecological security by standards.

What kind of recommendation could you suggest regarding information, which is necessary to solve this issue and how IWC should determine its priorities in its work connected with Arctic?

Answering this question, we think that IWC should send a request to the governments of the USA and Russia and ask to inform on their existing plans regarding oil extraction and development of shipping in the North West Route and Northern Sea Route. They should answer if there are effective ways of security and safety for the Bering Sea and nearby seas, traditional subsistence of Chukotka and Alaska indigenous peoples.

We must know what the rules in getting the license for the resource extraction are. Will the companies follow any ecological standards? Will the indigenous peoples participate in the decision taking of the important questions regarding the preservation of the Bering Strait?

ChAZTO would like to emphasise that lately it has been actual to use quasi-governmental organisations, which sign various agreements and other documents on the agreement on behalf of indigenous people without considering their real opinion. Another issue is the one-sided presentation of the industrial development of the region by the authorities when they, with their own weight, suppress the population's wish to get full information, rate risks and take right decision. That happened, for instance, in Pevek on hearing of PATES (floating atomic power station), which is going to be built in Pevek.

GREENLAND VIEWS ON WHALES, OIL AND SHIPPING

Fernando Ugarte (Greenland Institute of Natural Resources), Leif Fontaine (Organization of Fishermen and Hunters - KNAPK) and Amalie Jessen (Department of Fisheries, Hunting and Agriculture)

In Greenland, all natural resources, including whales are managed by the Government of Greenland, which is composed by a majority of local people (kalaallit = ethnic Inuit). When it comes to whales, stakeholders include local resource users (hunters and local commercial and private whale watchers); managers (central government and municipal authorities) and scientific advisors (Greenland Institute of Natural Resources - GINR, the Danish Centre for Energy and Environment – DCE and international organisations such as IWC, NAMMCO and JCNB). Seismic hydrocarbon exploration has intensified during the last decades and we expect that seismic pulses will be part of the acoustic landscape in the ice-free periods during many years

to come. Shipping has also increased and is predicted to increase more in the future. Marine traffic includes both off shore and in shore fisheries, as well as hunting and leisure boating, tourism and transport of goods and people.

The view of the hunters regarding the effect of this increase of human activities in whales is difficult to summarise because it varies according to the individual hunter, depending of factors such as the region where they live, the level of impact they experience or the information they are exposed to. A combined interview and field study concluded that narwhal hunters in Melville Bay did not perceive any substantial impact of seismic exploration on the catch of narwhals in 2012, a year when intense seismic surveys were carried out, and when the hunt was good. In 2013, when there were less seismic surveys, the hunt was bad and the issue of disturbance of cetaceans had been aired on the media and by NGO's, the Inuit Circumpolar Council (ICC) and the Organization of Fishermen and Hunters (KNAPK) backed up a number of hunters that were worried about the possibility that poor catches and behavioural changes observed on the narwhals could be due to disturbance from Seismic exploration.

In October 2013, KNAPK asked ICC for support to propose: (1) better mapping of the natural resources; (2) more consultation and agreements with the locals before industrial activities are started; (3) the creation of a commission of experts on the North Water Polynia (NOW) that should evaluate and discuss the significance of the area; and (4) a ban of commercial activities, including seismic exploration in the NOW until this commission has delivered a report and until an effective contingency response in case of accident or oil spill can be guaranteed. We do not know what the outcome of this request will be.

A sound management of shipping and/or oil and gas-related activities and their impact on whales should include the following components: (1) Gathering of baseline information on the ecosystem and its importance before activities start through multidisciplinary environmental and social studies; (2) mapping of natural resources and areas of cultural and social importance, followed by delineation of protection zones where human activities are limited or excluded; (3) monitoring of vulnerable whale populations at regular intervals during periods of activity, including abundance and distribution (aerial surveys/telemetry), sound exposure levels and occurrence of vociferous animals (passive acoustic monitoring) and perceptions of local users (interviews); (4) dialogue with all stakeholders before activity starts and while activities are taking place; (5) contingency plans in case of accidents, including oil spills; (6) international cooperation to exchange methodology and information; and (7) improved monitoring of vessel activity.

The IWC could contribute by facilitating the international exchange of information through workshops and special publications.

PERSPECTIVES OF THE ALASKA ESKIMO WHALING COMMISSION

George Noongwook

George Noongwook is the Commissioner to the Alaska Eskimo Whaling Commission (AEWC) from Savoonga, Alaska, and past Chair of the AEWC. His presentation addresses how changes in the Arctic are affecting indigenous communities in Alaska and steps being taken by the AEWC to help address those changes. Native communities of arctic Alaska rely on marine mammals as a significant part of their

daily food supply. Hunting, especially of marine mammals, is fundamental to survival in these communities. Given remoteness and harsh conditions, indigenous residents must think and act for themselves. When the IWC moved to ban bowhead whale hunting in 1977, the bowhead subsistence whaling villages came together to form the AEWEC as an advocacy and management body to protect bowhead whales and subsistence whaling. Since 1980, the AEWEC has managed the Alaskan bowhead whale subsistence hunt through a Cooperative Agreement with the US Department of Commerce/NOAA, within the regime set up by the IWC. The AEWEC also works very closely with researchers, combining local knowledge and observations with western science research to enhance understanding of bowhead whales and the ecosystem.

Beginning in the 1980s, offshore oil and gas development started moving into the Alaskan Beaufort and Chukchi Seas, affecting marine uses in the arctic coastal communities. Using local knowledge and western science research, the AEWEC undertook negotiations with offshore operators and created the Open Water Season Conflict Avoidance Agreement (CAA), which establishes mitigation measures reducing the adverse impacts of offshore industrial activities, including a

communications system and protocols, time-area closures, and reductions in drilling discharges for specific areas. With the recent increases in commercial, recreational, research, and international traffic moving through arctic waters, new issues of safety, food security, and health of the arctic ecosystem arise. Coastal Native communities must have a voice in planning, development of mitigation measures, and in response if that is ever needed. Decisions affecting arctic waters must give priority to the health and food security of local communities. In 2012, the AEWEC came together with four other arctic marine mammal hunter groups, local governments, and regional organisations to form the Arctic Marine Mammal Coalition (AMMC), to begin developing measures to protect hunters on the water, marine mammals - especially whales - and the marine ecosystem. The AMMC is working with the US Coast Guard, NOAA, and the Alaska Marine Exchange and hopes to begin working with members of the shipping industry to develop safe practices for western arctic waterways. Goals include the development of an integrated and cooperative communications system, vessel routing measures, the creation of an Arctic Waterway Safety Committee, and strategic uses of the Coast Pilot and the Notice to Mariners.

