



Western Arctic Oil Spill Response Gaps

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WWF Canada

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Executive Summary

Canada's Western Arctic is under renewed pressure from the oil and gas sector. The recent shortcomings of the spill response in the Gulf Of Mexico present valid questions over the current extent of the gaps in capacity to respond to a similar event in the Beaufort Sea, and the potential to close these gaps.

WWF believes the first stage in considering the risks from hydrocarbon development should be a strategic assessment of the options, including whether any such development is appropriate in sensitive ecosystems. These assessments need to be open processes based on scientific analysis, involving relevant stakeholders.

Greater understanding is needed of the sensitivity of ecosystems, the fate of oil in ice conditions and the potential worst case scenarios from operations. Improved modelling of oil spill scenarios can inform stakeholders and decision-makers about the implications of allowing developments to proceed. At present there is a gap in understanding of the consequences of a major blowout causing a multi-year spill far from shore in the Arctic.

Industry naturally looks to technology to provide solutions. However reviews of the available response technology identify major limitations in the options for recovering oil in ice conditions. Even in ideal conditions, without ice, the industry only expects to recover 20% of the oil. There is clearly a major gap in the effectiveness of existing technology, however at present the levels of research funding committed by industry to improving techniques for the Arctic is not in proportion to the billions being spent on leases and exploration.

The current debate is not informed by sufficient analysis of the 'response gap' – ie the limitations due to weather conditions, safety restrictions, resources or technology. Conducting such an analysis for the Canadian regions considering expansion of hydrocarbon activity should be completed before further decisions are made. This is particularly relevant for the extreme conditions of the Arctic, which prevent any response being conducted during the winter months.

Once decisions are made to proceed with oil and gas operations then contingency plans are needed to clearly identify responsibilities and requirements for a response. Planning is important, but capacity to deliver is essential. This requires some specialist equipment and trained personnel, as well as adequate resources and effort. There is currently no specialist regional response organisation in Canada responsible for marine response north of 60° latitude. The remoteness of the region presents challenges in terms of mobilising enough personnel, transport and communications infrastructure to deliver an effective response. For example more people were involved in the Gulf of Mexico response than are resident in the whole of the Northwest Territories.

Liability for spills also needs to be considered, with few companies able to absorb the costs associated with a major blowout such as the Macondo well. At present the Canadian government is exposed to financial risk from a company with limited insurance or financial provisions to cover the costs of a major spill.

At present the gaps in Canada's understanding of the implications of a spill and the capacity for response raise serious concerns over proceeding with further offshore development.

Introduction

BP's message in the wake of the Macondo Well disaster was that it would "make things right." If only it were that simple!

BP and its contractors can compensate spill victims. They can't restore lost livelihoods. They cannot recover the submerged oil that has spread like a great toxic cloud into the Gulf. In fact, there is little that BP - or anyone else - can do but watch the ecological consequences unfold.

The major blowouts in the Gulf of Mexico and the Timor Sea in a single year delivered a sobering reminder that a decision to approve offshore oil exploration is a decision to accept the risk of a catastrophic spill, not to mention the risks of more frequent smaller events. In the wake of these tragic events, offshore oil regulators are reviewing those risks and asking valuable questions about the industry's capacity to control spills and recover oil from the environment.

The Arctic offshore is a daunting environment for exploration and development. For many years, WWF has sought to understand how the conditions of remoteness, sparse infrastructure, extreme cold, ice hazards and seasonal darkness might affect the likelihood and consequence of a major oil spill. The consequences of a major oil spill in the Arctic could be severe and long-lasting. The duration of spills could be longer due to the challenging and limiting conditions under which the operators would have to try to regain control. The means to recover spilled oil are also rendered ineffectual under conditions common in the region.

In light of these considerations, WWF believes there are places and circumstances where the risks of offshore drilling are unmanageable. It isn't possible to make things right once things have gone wrong, but it is possible to "keep things right" by disallowing drilling when and where it is prudent to avoid unacceptable risks.

Rob Powell, Director, WWF -Canada

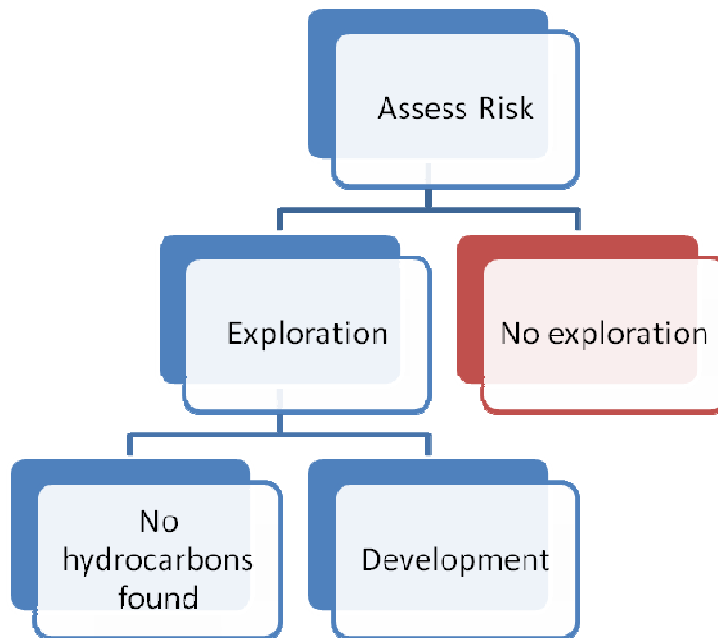
WWF is the only international conservation organization working in all the Pan-Arctic states. WWF's Arctic Initiative includes Norway, Denmark, Russia, the United States, Finland, Iceland, Sweden and Canada. The Arctic Network Initiative is headquartered in Ottawa.

Acknowledgements

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1. Oil spill preparation and response

This report considers the elements which contribute towards assessing risk and then preparing for and responding to an oil spill where exploration and production is allowed to take place.



The report considers each of these areas and indicates the current gaps in the existing capacity and approach being taken in Western Canadian Arctic. Some of these gaps are common to the industry due to the limitations of existing technology, while others relate to the context of limited recent oil and gas activity in the region or the specific regulatory specific approach taken in the Canadian Arctic.

2. Strategic Environmental Assessments

As implied by the name, SEAs are supposed to take a higher level view of regional development, balancing social, environmental and economic concerns. For example they can consider multiple sectors and fundamental questions about energy, rather than just focusing on project level impacts. SEAs can also identify data gaps which need to be addressed in order to establish a baseline. This is an important function if effective monitoring is to take place. The term strategic environmental assessment and variations of this term are applied to a range of processes, not all of which apply sufficient scope to be considered strategic by experts in the field. In this context, a key element is the timing of an SEA prior to leasing taking place.

The Cabinet Directive on Environmental Assessment of Policy, Plans and Programme Proposals includes guidance on applying SEAs. However this directive is not legally binding, leading to inconsistent application.

Indian and Northern Affairs Canada (INAC) commissioned a decision-making tool in order to map ecological and socio-economic priorities.ⁱ The Valued Ecosystem Components (VECs) chosen for this project include polar bear, beluga whale, ringed seal and migratory birds. When choosing the particular VECs, the project team identified species at risk or species that had high ecological, social, cultural or economic value. All the VECs selected also play an important social, cultural and economic role for the Inuvialuit Settlement Region (ISR) communities.

Beaufort Regional Environmental Assessment (BREA) Initiative

Indian and Northern Affairs Canada (INAC) announced this new initiative to increase research support to the Beaufort. BREA is a multi-stakeholder initiative to sponsor regional environmental and socio-economic research that will gather new information for the management of the Beaufort Sea and will inform potential offshore oil and gas activities in the Beaufort Sea.ⁱⁱ

The Government of Canada will provide the BREA initiative with C\$21.8 million over five years. These funds will support the delivery of a targeted science program to address spill preparedness and response, geotechnical and biophysical priorities, engineering requirements for safe operations, cumulative effects monitoring and assessment, climate change, waste management, and information management.

The purpose of the initiative is to:

- assist in generating science required for regulatory decision making in Beaufort Sea oil and gas exploration and development;
- address regional concerns and provide information to assist in the planning of oil and gas activities in the region;
- provide a vehicle for the Inuvialuit, northerners, industry and regulators to advance research priorities.
- better prepare for oil and gas exploration and development in the offshore by: 1) anticipating regional data gaps related to offshore oil and gas activities; and 2) supporting effective and efficient regulatory decision-making by providing detailed scientific and socio-economic information to all stakeholders.ⁱⁱⁱ

Some of the organizations and departments represented on the BREA Steering Committee are part of the Beaufort Sea Partnership and also engaged in integrated ocean management in the Beaufort Sea and proposals for Marine Spatial Planning.^{iv} The BREA does not constitute an SEA, however it may contribute some useful input in the form of baseline data if it has sufficient resources to cover the scope of work.

Stakeholder expectations

Stakeholders are looking for strategic environmental assessment processes to be fair and open, leading to science-based decision-making. To date these processes have not placed enough significance on zones critical for ecology, fisheries and traditional use, meaning that these areas continue to be exposed to oil and gas risks. Indian and Northern Affairs Canada (INAC) has granted leases in areas which are also now identified as Environmentally and Biologically Sensitive Areas (EBSAs). If an SEA is to influence where offshore oil and gas development is allowed, environmental sensitivity needs to be assessed prior to oil and gas leasing.

Once oil companies have started activities in an area, it is very difficult to stop the full cycle of exploration and development playing out. Governments should avoid having to go through the challenging and costly process of trying to take away licenses or rights once they have been granted. Public stakeholder consultation must take place prior to any leasing process.

The Gulf of Mexico spill has placed a spotlight on environmental assessment processes, which under the US Minerals Management Service (MMS) did not always include adequate data, consider worst case scenarios or apply effective risk thresholds. A US Government Audit Office review reported even before the spill that the MMS was selectively sharing data with those responsible for environmental assessments.^v This demonstrates how it is essential that an independent process based on the scientific assessments determines where oil and gas exploration and development might take place.

Gaps

- Strategic Environmental Assessment prior to leasing to support Arctic Offshore Development Policy is not in place
- Leasing decisions made through an opaque bureaucratic process and without the benefit of SEA may not give sufficient weight to social and environmental interests
- Thus far, no plans have been announced to engage the public in the development of terms of reference for the BREA

3. Oil spill modelling

The purpose of oil spill modelling is to understand the potential consequences of oil spill events. In order to comprehend the significance of the impact it is also necessary to have assessed the receptors of a potential spill to know which areas are more sensitive. If exploration activities go ahead which put sensitive regions at risk, then sensitivity analysis can be used to identify where efforts and resources should be focused to prevent impacts. For example, fish spawning areas or sensitive habitats can be prioritised and resources placed in proximity to this need.

Spill prediction

The potential environmental, social and economic consequences of an Arctic oil spill can only be comprehended if the potential trajectories and distributions of spilled oil are understood. In open seas it is possible to model potential oil spill scenarios, using data on weather, tides, oil type, etc. This modelling needs to consider a range of plausible scenarios. Although there will be scenarios which are more likely due to the prevailing wind, more infrequent conditions need to be considered, as it may be unusual conditions that contribute to a spill.

In the Canadian Arctic, there are obviously areas covered by seasonal ice, which presents challenges both to operations and indeed to modelling potential oil spills. Oil can become trapped under ice and transported long distances, which makes it impossible to accurately predict its trajectory in ice conditions.

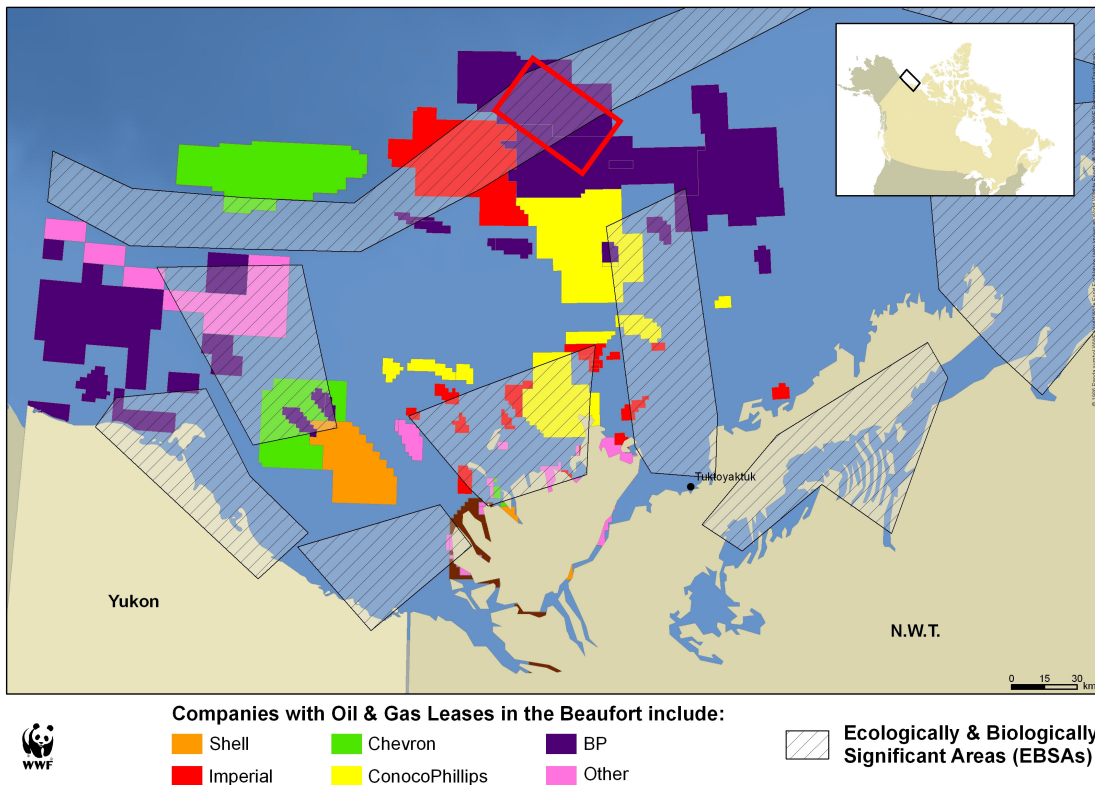
Blowouts are low frequency, high impact events; however as the leaks in the Timor Sea in 2009 and the Gulf of Mexico in 2010 demonstrate, they do happen. It is therefore imperative that these worst case scenarios are included in any spill prediction.

The current limitations of oil spill prediction are not widely known due to the limited exposure afforded oil spill response plans. Despite there being a clear public interest in the contents of an oil spill plan, stakeholders do not always have timely access to the operator's proposals or their assessment of potential oil spill scenarios. At present, some operators make their plans available publicly at a later date, but there is no central resource of draft oil spill response plans lodged with the regulator available for consultation and comment. This lack of transparency means that oil spill modelling is not subject to external scrutiny. Remedying this situation is essential to ensure that worst case scenarios and a range of possibilities across different seasons and conditions has been considered.

Sensitivity analysis

The Department of Fisheries and Oceans assesses areas to identify ecologically and biologically sensitive areas.^{vi} It then uses this information to introduce appropriate management measures to reduce risk to these areas. This does not necessarily mean that all areas will become exclusion zones or designated as Marine Protected Areas. Indeed overlaying the Environmentally and Biologically Sensitive Areas (EBSA) with oil and gas licensing shows that leases are found in two-thirds of the EBSAs. The map below depicts the situation in the Beaufort Sea:

Offshore Oil & Gas Development in the Canadian Beaufort Sea (Dec. 2010)



Despite the objections of WWF, BP secured a lease which straddles the Beaufort Shelf – a biologically productive region heavily used during the drilling season by Bowhead whales – a species at risk – as well as ringed seals and a variety of pelagic birds. BP conducted 3D seismic surveys in the area indicated by the red rectangle in their northern leases above.^{vii}

Sensitivity mapping solutions: Royal Sun Alliance (RSA) Case Study

As part of a strategic three-year partnership, RSA and WWF-Canada are working together to help conserve Canada's oceans by creating a network of Marine Protected Areas (MPAs) on the Pacific and Atlantic coasts to protect biologically important areas and maintain ecosystems that are more resilient to climate change.^{viii} The process will open the door for feedback and insight from all stakeholders to determine the right management approaches to create sustainable fisheries. Along with helping maintain a wide range of species, MPAs will also be beneficial to neighbouring communities by creating larger fish stocks and providing opportunities for eco-tourism. The goal is to create a healthy and productive marine environment which will ultimately provide for a stronger economy in Canada.

WWF works with business to create real solutions for improved conservation outcomes, and believes a similar approach to this project could be usefully applied in the Canadian Arctic, to inform decisions on oil and gas activities.

Worst case scenario

The dangers of underestimating the maximum size of spill and therefore whether it may reach the shore are plain to see in the Gulf of Mexico. If in the unfortunate event a contingency plan has to be put into use, it will severely hamper any response effort if there is no plan developed for spills of a significant size.

Regulators and operators have previously applied a selective approach to risk assessment. For example Devon Energy, in its application for the Beaufort Sea, used a blowout lasting 7 days as a 'reasonable worst case scenario.'^{ix} The use of 7 days in that case was justified by reference to a 1991 CAPP commissioned report and data from the Gulf of Mexico indicating that 84% of blowouts lasted less than one week.^x However this report also states that at least two scenarios should be evaluated:

- i) A high rate, short duration event controlled from surface or by formation collapse.
- ii) A low rate, long duration event requiring a relief well.

The average length of spill for the latter event requiring a relief well is 65 days according to the same report. It is clear from recent events that blowouts can last months in the Gulf of Mexico. However the worst case scenarios applied in the Arctic should reflect conditions there and consider multi-year spill events. At present the scenarios used appear to be far too optimistic, which could lead to misinformed decision-making or a lack of preparedness.

It is important to apply an accurate definition of the worst case scenario, as this would ultimately affect assessments under the Inuvialuit Final Agreement (IFA). Section 13(11) of the Inuvialuit Final Agreement requires the Environmental Impact Review Board (EIRB) to estimate the potential liability of a proponent determined on a worst-case scenario.^{xi}

Gaps

- Inadequate sensitivity data prior to leasing and approval processes
- Modelling of fate of oil in ice conditions has technical limitations
- Lack of clarity over worst case scenarios required to be considered by regulators
- Oil spill predictions and modelling not systematically made publicly available for consultation

4. Clean-up Technology

The oil industry takes pride in its technology and usually turns to a technological solution to any problem. However oil spill response is one area where technological advancements have not kept up with the rest of the industry. The sector at present is spending billions of dollars on new ways of exploring deeper or in more remote areas or extracting unconventional hydrocarbons. However the amount spent on developing oil spill response is minimal in comparison. A recent report by WWF-US reviewed the limited progress in oil spill response technology.^{xii} This means that while the frontiers have literally been pushed back in terms of where exploration and production can take place, response capacity is lagging behind.

Response methods:

Firstly it is worth noting that even on a perfect day in calm water with maximum resources, operators only expect to mechanically recover up to 20% of the volume of oil.^{xiii} Although there is a certain amount of “natural” breakdown and dispersal of oil in the ocean, this remaining 80% is also the oil that can damage ecosystems and livelihoods. Response technologies have not moved on significantly over recent decades, seeing more of an evolution than a revolution.

The oil sector has primarily designed its response technologies for operations which are either on land or at sea. The broken ice of the Arctic is neither of these things, which severely restricts the effectiveness of the machinery designed for either state. The traditional risk of an oil spill from a tanker also created a certain type of incident – typically close to shore, with a finite amount of oil, released as a slick. A deepwater blowout running for weeks miles from shore is an entirely different challenge, with potentially vastly greater quantities, some of which does not surface and can be emulsified in the water column.

Before oil can be cleaned up it also has to be located and accessed. In any spill response scenario, the weakest link in the response chain limits response capability. In the Arctic, weather, darkness, safety, and the lack of ice class vessels are among the main factors that limit response effectiveness today. An effective response requires:

- the ability to locate the spilled oil and continually track it;
- access to the spilled oil (technical capability to transport response workers and equipment to the spill site and support for the response operations);
- environmental and oil spill conditions safe enough for humans to operate response tools; and
- response tools that are effective for the type of oil spilled and the environmental conditions encountered.

WWF has reviewed oil spill response for Arctic conditions several times in recent years, working with industry experts Nuka Research and Hervey Consulting.^{xiv} This research has highlighted the following issues:

- The inability to detect oil spilled in and under ice in the most common arctic conditions remains a major technical challenge.
- Oil spill thickness mapping requires additional testing in arctic conditions.

- Mechanical response equipment has very low effectiveness in waters with more than 30% ice coverage in the spill area.
- *In situ* Burning (ISB) is limited to thick, pooled oil.
- Dispersants do not remove oil from the sea; rather they spread it through the water column.
- There is a very real response gap in most Arctic situations which technology has not filled.

It is also worth considering the environmental impacts of the clean-up operation itself as the methods are themselves not benign to the environment, especially in sensitive habitats. For example the possibility of applying *in situ* burning relies on oil being pooled within open areas in the ice. However it is these openings in the ice (referred to as polynas or leads) which are essential for marine mammals and provide the first biological activity each year due to the ocean's exposure to sunlight.^{xv} Dispersants are also chemicals, and the Gulf Of Mexico spill highlighted that the impacts of using large volumes of dispersant at depth has not been sufficiently researched.

Research Funding

In 1992 the US Arctic Research Commission called for more research into oil spill response in Arctic conditions. The Commission has been reissuing that request ever since with each spill that occurs.^{xvi} Despite the huge profits made in the oil sector, governments have failed to extract funds from the industry to finance adequate research into improving oil spill response. For example the five big oil majors made over US\$100 billion in profits in 2008. Regulators collect taxes and royalties but do not direct a proportional amount specifically for tackling the issues created by the industry. For example the Environmental and Social Research Fund has a budget of around C\$1 - 2 million levied from the oil and gas sector each year.^{xvii} This represents 0.01-0.02% of around C\$10 billion the oil and gas sector pays in taxes each year in Canada.

Six of the larger companies created a 3 year Joint Industry Programme in 2006, based in Norway, which aimed to develop knowledge, tools and technologies for environmental beneficial oil spill response strategies for ice-covered waters.^{xviii} This programme demonstrated it may be possible to extend the applicability of the existing techniques to Arctic conditions more than previously thought. However there is no breakthrough or step change as a result of the research. This programme was billed as "*the largest R&D program on oil spill contingency ever initiated*", although it only cost US\$9.5 million in financial support from the oil sector.^{xix} There are also a number of technical working groups across the Arctic such as the Arctic Marine Oilspill Program (AMOP), which is convened by Environment Canada.

Gaps

- Limited effectiveness of clean-up methods in dynamic ice
- Minimal level of research funding

5. Calculating the Response Gap

In order to fully understand the potential consequences of a spill it is also important to assess the limitations to response, combining the physical conditions with the available technology and capacity. A ‘response gap’ exists when activities that may cause an oil spill are conducted during times when an effective response cannot be achieved, either because technologies available will not be effective or because their deployment is precluded due to environmental conditions or other safety issues.^{xx} This concept was applied on behalf of the Prince William Sound Regional Citizens’ Advisory Panel in Alaska to identify the proportion of the year when response is inhibited by weather, ice cover, or season length.

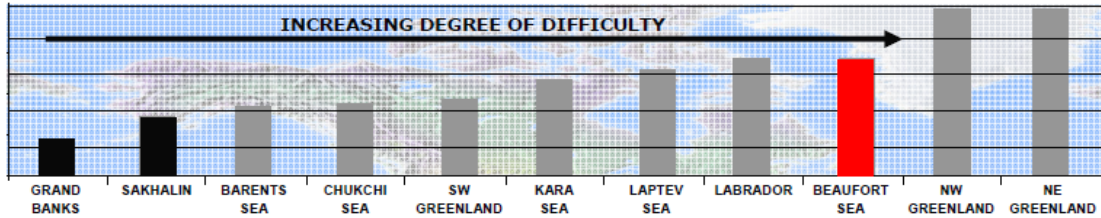
Case Study Prince William Sound Response Gap Analysis

Available historical data on wind, sea state, temperature and visibility were used to identify the proportion of the previous 6 years when there would have been conditions which would have precluded a response. For each variable, a traffic light banding system was applied indicating the conditions when response was not impaired (green), response was impaired (yellow), and response was not possible /effective (red). If two variables were indicating yellow then this was considered the equivalent of a red due to the cumulative impact on response. The following table shows the percentage of the seasons when a response gap was experienced.

Season	Green (not impaired)	Red (not possible / effective)
Entire Year	61.5%	38.5%
Summer (April through September)	83.8%	16.2%
Winter (October through March)	33.9%	66.1%

This analysis shows that Arctic conditions can result in an effective response not being possible around two-thirds of the time during the winter months (6 months).

The Arctic presents a new frontier in terms of the challenges presented by the operating environment. Prince William Sound generally experiences open water in the areas considered in the study reference above, meaning that in Arctic locations with seasonal ice cover the response gap is likely to be even greater. An assessment by Chevron in 2009 comparing the different Arctic basins in terms of degree of challenge (open water season, pack ice, severity index & iceberg conditions) indicated that only the offshore northern Greenland region was more difficult than the Beaufort Sea.^{xxi} The diagram below depicts the comparison of 11 Arctic basins made by Chevron, which indicates that to date only the least difficult two have started production:



The National Energy Board (NEB) policy requirement for Same Season Relief Well Capability requires operators to be able to drill a relief well before the winter ice closes in, which limits the drilling season. The policy objective is very sensible; unfortunately it has been exposed as unrealistic, with evidence given to the Standing Committee on Natural Resources by companies which confirms that a well cannot be delivered within a season. Under Imperial's own scenario for its Ajurak property, a blowout in the Beaufort could spew for up to three years before a relief well could be drilled.^{xxii}

Prior to BP's spill, industry had been pushing for a relaxation of the Canadian same season well capability requirement, due to it being too expensive.^{xxiii} Another approach has been lobbying by companies who have been developing new types of blow out prevention. This is referred to as "same season relief well equivalency", which aims to avoid the same season restrictions by adding another physical barrier. Chevron has presented this technology to Arctic states – billing a reliance on technology as a proactive approach compared to a reactive relief well.^{xxiv} Chevron's presentation in this case confirms that relying on relief wells in short drilling seasons is likely to lead to significant oil spills and subsequent impact. Companies are therefore attempting to rely on same well interventions, however around one third of blowouts occur below the well-head level at which these can be applied. The Montara spill in the East Timor Sea demonstrated that safety concerns may also prevent further drilling from taking place. Relief wells are not always successful in stemming the flow either.

Gaps

- A response gap assessment for the areas proposed for exploration would inform the decisions about whether to expose them to this risk.
- Same season relief well feasibility and alternative means to ensure blowout containment within a season not properly assessed

6. Contingency Plans

A range of plans are required for offshore oil and gas operations, which are referred to as oil spill response plans, emergency response plans, safety plans, and contingency plans. These plans should provide detailed information on what will happen if something goes wrong. Canada's general approach to emergencies is one of escalation, whereby an individual reports an issue, and each level of government raises the issue with the next level up if it cannot respond effectively.

The NEB is the lead authority in most situations. The NEB (*National Energy Board Arctic Offshore Emergency Response Plan*) and the Canadian Coast Guard (*Canadian Coast Guard Marine Spills Contingency Plan*) have primary responsibilities for emergency response to oil and gas spills. INAC also has a role where activities are covered by INAC legislation (*Northwest Territories Region Hazardous Material Spill Response Plan*).

The Arctic Regional Environmental Emergencies Team (REET) Contingency Plan is led by Environment Canada, and agreed bilaterally with the US. The purpose of the REET is to provide consolidated environmental advice to the lead agency. The objective of the REET is to minimize damage to sensitive resources and habitats, while making the best use of limited response resources. In the planning mode REET members meet to improve Contingency Plans and exchange new scientific and response ideas. The Arctic REET Contingency Plan describes the organizational framework, purpose, functions and composition of the team; the notification and activation procedures; and the classification and escalation of response to environmental emergencies.

The Coastguard is one of the main agencies involved in oil spill response provision. It also has a role to play in responding to shipping incidents, in particular those relating to the transport of oil which poses a risk to the coastal environment. The type of response for an oil tanker running aground close to shore is quite different to that for an offshore blowout. This means the Coastguard has a wide range of potential events to cover with limited resources.

Environment Canada has a brief oil spill response plan which was produced in 1999.^{xxv} DIAND has outlined how the various federal departments should work together in the event of an oil spill.^{xxvi}

Industry

Companies involved in oil exploration and development activities prepare plans, which are often a regulatory requirement and are typically reviewed by the regulator before permission to operate is granted. Such plans generally have four main components, as follows:

- An organization plan which sets out lines of command;
- Equipment description and location information which describes the type of equipment available to handle an incident and its availability;
- A plan of action which describes in some varying degrees of detail the response necessary to an incident, including reporting requirements, equipment deployment, and the like; and
- A training component to ensure that staff is familiar with oil spill operations.

Under the *Canada Oil and Gas Drilling and Production Regulations* oil companies have to create contingency plans during their application to NEB for authorization with respect to each work or activity proposed.^{xxvii} The Regulations provide goal-oriented requirements for operators and are therefore not prescriptive, leaving many aspects to the interpretation of the operator. The

Consultation Draft Safety Plan Guidelines provide more details for the requirement of a Safety Plan by the Regulations but are not mandatory.^{xxviii}

Gaps

- Ensure responsibilities are clear across government departments
- More specific mandatory requirements for contingency plans
- Review plans on a regular basis

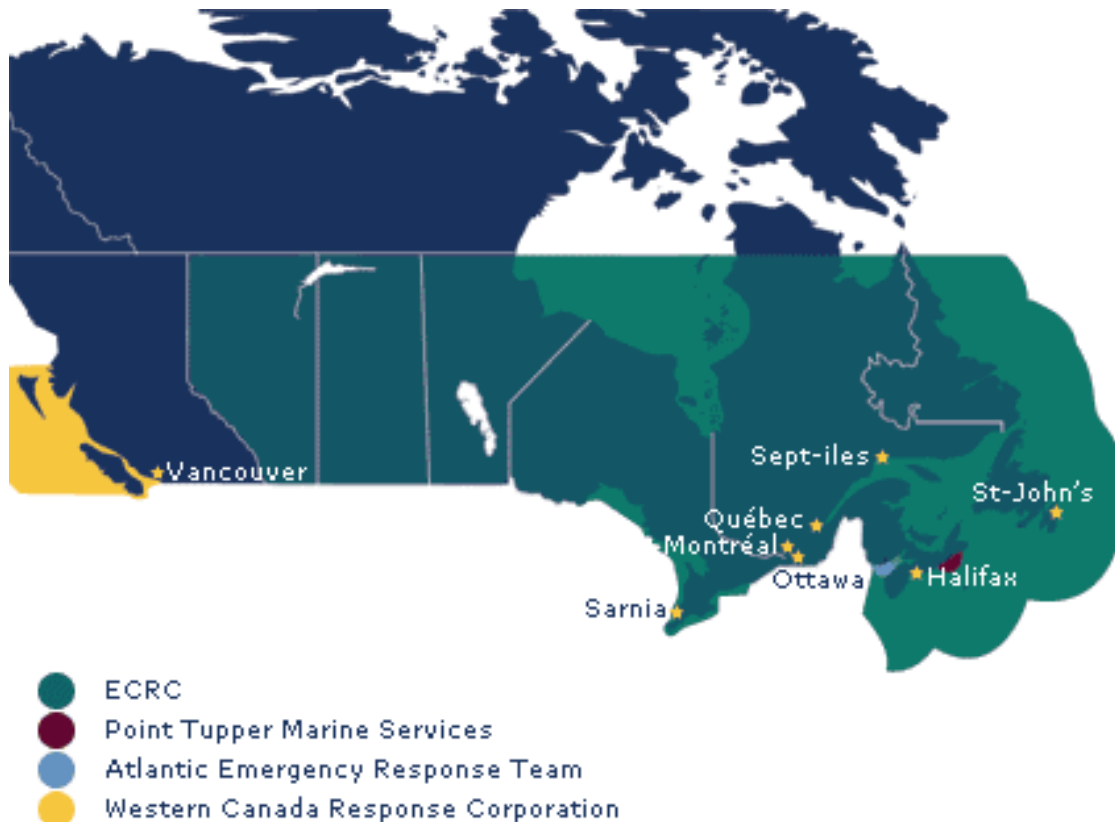
7. Oil spill response capacity

Oil spill response is divided into tiers as follows: ^{xxix}

- *Tier 1: operational-type spills that may occur at or near a company's own facilities as a consequence of its own activities. An individual company would typically provide resources to respond at this tier.*
- *Tier 2: a larger spill in the vicinity of a company's facilities where resources from other companies, industries and possibly government agencies can be called in on a mutual aid basis.*
- *Tier 3: larger spills where substantial further resources will be required and support from national or international cooperative stockpile may be necessary.*

Tier 3 capacity

Canada has two Tier 3 Regional Response Organizations which are a part of the Global Response Network. These two organizations are certified by Transport Canada to act during a spill into navigable waters: the Western Canada Marine Response Corporation and the Eastern Canada Response Corporation (ECRC). As the map below displays, neither of these regional organizations covers Canadian waters above 60 degrees latitude. ^{xxx}



Due to the limited amount of recent drilling activity in Canadian Arctic waters, the industry has not provided a specific Arctic focused organisation to respond to spills in the North American Arctic marine environment. Such a body would need to be prepared for the challenging conditions of the

region. The Canadian Association of Petroleum Producers (CAPP) provides information on the industry response.^{xxx1} This indicates that if required the international Oil Spill Response Ltd organisation based in Southampton, UK, could also be called in.

The Canadian government is claiming to have what they call “Governmental Tier 3 capabilities”. These capabilities consist of governments developing their own, substantial national stockpiles of specialized equipment for oil spill response. In some cases this reflects a particular desire to protect domestic coastal resources perceived to be of extreme importance. In most cases, however, it has been motivated by their exposure to major oil spills or being located in areas of internationally recognized high risk. The stockpiles in these cases are most often managed by a designated government agency, such as a Coastguard, but can also feature support and maintenance arrangements with commercial contractors.

In the case of Canada it is the Canadian Coast Guard that is creating very small stockpiles in the Arctic. The stockpiles are not substantial; they are being called “kits” for communities to use in case of a spill as an initial response. The greater stockpiles will have to come from elsewhere in Canada and be shipped or airlifted in. This is supposed to happen within 48 hours of the spill.

The Canadian government states it has a spill preparedness and response regime in place to handle spills of 10,000 tonnes. Supertankers can carry over 250,000 tonnes of crude oil and spills from blowouts can spill even larger volumes, (the BP Gulf of Mexico spill is estimated to have released over 650,000 tonnes of oil). The Canadian Auditor General reviewed the Coast Guard’s capacity to respond to a large spill from a vessel in 2010 and found that there was insufficient capacity to respond, and that the contingency plan had not been updated since 2000.^{xxxii}

Regional response organisations

Canada has no regional marine oil spill response organisations for the Arctic region. This is a major gap in the ability to respond to an oil spill. However such organisations have been established elsewhere in North America. The Mackenzie Delta Spill Response Corporation (MDSRC) is a non-profit organization. Companies operating within the Mackenzie Delta co-operatively joined together to fund and operate MDSRC. The mission of MDSRC is to protect the environment by providing spill preparedness and safe, effective response services to member companies. This is an example of a Canadian Arctic Response Organisation; however this organisation cannot cover offshore spills. It is specific to the Mackenzie Delta and is not equipped to work in the ocean.

Alaska Clean Seas Case Study

As a comparison in an equivalent environment, Alaska has its own regional response organisation: Alaska Clean Seas (ACS). ACS is a non-profit making, incorporated oil spill response co-operative whose current membership includes oil and pipeline companies that engage in or intend to undertake oil and gas exploration, development, production and/or pipeline transport activities on the North Slope of Alaska. Originally formed in 1979 as ABSORB, ACS was restructured in 1990 from an equipment co-operative into a full response organization. ACS is now organized to respond, like a fire brigade, to an emergency with both trained people and equipment. ACS is active in streamlining approval processes and in fostering a common organizational structure for responding to and managing spills on the North Slope of Alaska.

ACS has published a “North Slope Spill Response Equipment 2010” inventory which lists the equipment available for Alaska’s Arctic conditions.^{xxxiii} The ACS states that, currently the value of dedicated spill response equipment warehoused under ACS management is in excess of US\$50,000,000.

Community response

The Coastguard already works with some communities to create stations for local oil spill response. There have been requests for training and equipment to be provided to enable local communities to mount a localised response to an oil spill. For example the Mackenzie Gas Pipeline Joint Review Panel received submissions from First Nations communities recommending that oil companies establish, train and fund local spill response teams.^{xxxiv} This is a last line of defence which reflects the desire of communities to try and protect their valuable local resources and environment. However in isolation a small-scale community response could never provide an adequate level of protection to deal with a sizeable spill.

Gaps

- Currently no Tier 3 response company in place specifically for Arctic conditions above 60°
- No regional response organisation to provide a co-ordinated response

8. Implementation

There is obviously a difference between a good contingency plan on paper and the ability to implement it effectively. The Mackenzie Gas Project proposed in the Northwest Territories has been subject to a panel review which reported in December 2009. This panel is not persuaded that there is a plan for the detection or remediation of spills in Arctic waters, or for the prosecution of the party responsible.^{xxxv}

Case study: Gulf of Mexico response effort (during the first 12 weeks)^{xxxvi}

RESPONSE VESSELS

Vessels of Opportunity: 2,710

Barges: more than 500

Skimmers: more than 580

Other Vessels: more than 2,930

Total active response vessels: more than 6,720

Aircraft: 121

BOOM DATA

Boom deployed: more than 3.12 million feet

Boom available: more than 815,000 feet

Total boom: more than 3.93 million feet

OIL RECOVERED

Oily water recovered: nearly 31.02 million gallons

Amount estimated burned: nearly 10.34 million gallons

DISPERSANTS

Surface dispersant used: more than 1.07 million gallons

Subsea dispersant used: more than 721,000 gallons

Total dispersant used: more than 1.79 million gallons

PERSONNEL INVOLVED

More than 45,000 personnel responding

Infrastructure and capacity

The sheer scale of the Gulf of Mexico response effort demonstrates what might be required in the event of a deepwater blowout, (see box above). Even this level of response had very limited success (3% skimmed; 5% burned)^{xxxvii}, despite being in a part of the world with extensive oil industry presence, major infrastructure and non-Arctic conditions. It is completely unrealistic to expect that remote Arctic operations could expect either the speed or scale of response that was possible in the Gulf. The people aren't there, the boats aren't available and the infrastructure is not in place to rapidly deploy resources from elsewhere or to accommodate them in the Arctic.

Questions have also been raised about the ability to co-ordinate a response in terms of telecommunications and Information Technology (IT) capacity. Such an emergency response exercise has never been attempted in the region. More people were involved in the Gulf of Mexico response than are resident in the whole of the Northwest Territories.^{xxxviii}

Equipment

The Coastguard has provided some pre-positioned equipment caches and depots and would “cascade” supplementary equipment from nationally available resources if and when required. These provisions consist of Rapid Air Transportable (RAT) packages which are designed for a 150 tonne response and can be air-lifted within 48 hours; and Delta 1000 tonne packages which in combination with a RAT package can provide a 1000 tonne response, within 5-7 days. As previously mentioned, this volume of oil is small even compared to a typical tanker capacity. The regional depots are reliant on local keyholders who need to be present to provide access to the equipment. Local people who have had training with the equipment also need to be available to respond. Those familiar with the region can imagine the logistical challenges of transferring equipment in the far north through Inuvik airport to an offshore location in winter.

Practice exercises

The industry does conduct some exercises to practice deploying equipment. Newfoundland and Labrador operators hold an annual spill response exercise.^{xxxix} In 2009 this included deploying boom, oil recovery systems and a satellite tracker buoy. These exercises are important to familiarise people with the equipment, however such planned simulations cannot fully recreate the conditions and challenges which may be in place during a real oil spill emergency. There is currently limited funding for full scale practice scenarios involving all stakeholders to test the co-ordination and infrastructure as well as the equipment.

Gaps

- Insufficient aircraft and boats present to mount a large response
- Communications infrastructure not developed in the region to support response
- Limited numbers of personnel available to respond
- Minimal practice exercises or local trained capacity
- Inadequate amounts of response equipment present in the region

9. Liability

The Gulf of Mexico spill has exposed that the oil industry has been carrying higher levels of risk than previously understood, with limited liability. In Canada, operators are currently liable for costs up to C\$40 million in the Arctic without proof of fault or negligence.^{xi} Further costs would be payable for actual loss or damage if fault was proven in a court of law.

The cost to BP of the response to the end of September 2010 amounted to approximately US\$11.2 billion, including the cost of the spill response, containment, relief well drilling, static kill and cementing, grants to the Gulf States, claims paid and federal costs.^{xii} Further legal claims have since been announced against a number of companies involved in drilling the well.

Most operators have some form of insurance in place to cover oil spill response up to a certain level. However the maximum coverage available per asset is currently around US\$1.5 billion, meaning that it would not be possible to obtain insurance to cover the full costs of another Macondo well incident. Only the four largest oil companies are big enough to withstand the level of costs experienced by BP – if it had been a smaller company responsible, then the government would be picking up the much of the tab.

Prior to the April 2010 spill, not enough attention was paid to the issue of liability. The NEB has indicated it will look at who should pay for a clean-up in its Arctic Offshore Drilling Review.^{xiii} The balance is not right at present, with favourable liability, taxation and royalty regimes failing to impose the true costs of operations onto the industry.

At present many governments are effectively providing the oil industry with a subsidy by not requiring sufficient financial security and liability insurance from the companies to cover the potential costs of a spill. In some cases the costs may be prohibitive to continuing operations. However it is surely better to realise this before it is too late than expose the taxpayer to major costs. This false fiscal regime also does not provide a level playing field to the energy sector, reducing the costs and risks to the oil and gas sector, disadvantaging renewable energy alternatives.

Gaps

- Limited scrutiny of financial provisions and insurance to cover potential liabilities

10. Response Gap Recommendations

The following section takes each element this report has considered and makes recommendations for what could be done to address current shortcomings. It then assesses to what extent these measures adequately close the gap to an acceptable level.

Issue	Gap	Recommendation
Strategic Environmental Assessments	SEAs not completed prior to leasing.	Ensure SEAs are completed before decisions are made about where should be leased.

An improved, earlier assessment of environmental and social risks, considering all economic activities in the region should lead to improved decisions about which areas are leased for oil and gas. As a result important areas will not be exposed to any risk of an oil spill, which is the only 100% effective way of closing the gap.

Issue	Gap	Recommendation
Oil Spill Modelling	Inadequate environmental sensitivity data prior to leasing and approval processes.	Ensure adequate baseline data is collected.
	Lack of clarity over worst case scenarios required to be considered by regulators.	Require operators to consider blowout events which cannot be controlled using same well interventions.
	Modelling of fate of oil in ice conditions has technical limitations.	Follow technical developments and acknowledge limitations. Employ the best available models to the extent of their capabilities.
	Oil spill predictions and modelling not made publicly available for consultation.	Publication of predicted oil spill trajectories to allow stakeholder views to be considered.

Better oil spill modelling will inform risk assessments so that decision-makers and stakeholders can understand the full implications of a worst case scenario. Greater transparency of the risks posed should prevent significant areas for biodiversity and livelihoods being exposed to an oil spill.

Issue	Gap	Recommendation
Technology	Limitations of spill tracking technology.	Invest in research to improve effectiveness of tracking technology in ice conditions (and acknowledge current limitations).

	Clean-up technologies are ineffectual under conditions commonly encountered in the Arctic.	Recognise limitations of existing technologies in assessing contingency plans.
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This is an issue that applies across all operators, especially in the Arctic. Oil spill response technology has been primarily developed for land or sea application, and then adapted for ice conditions. However there are clear limitations to applying mechanical clean-up methods in ice conditions. With a current best recovery rate of 20% in ideal conditions, the industry has a long way to go to provide adequate cover and close this gap.

Issue	Gap	Recommendation
Response Gap	Response gaps not considered in assessments and planning.	A response gap analysis should be completed for each region where oil-related activity is contemplated.

Recognition of the response gap is an essential step which governments can easily take to demonstrate they understand the limitations in response due to weather conditions, safety restrictions, resources or technology. A response gap analysis should be a priority for regions considering oil and gas activity, and would be a significant step to closing an information gap.

Issue	Gap	Recommendation
Contingency Plans	Ensure responsibilities are clear across government departments	Review structure and compare with models used in other countries, (also see regional response capacity below).
	Lack of mandatory requirements for contingency plans.	Review guidelines and make specific mandatory requirements.
	Plans out of date and not proven.	Update federal plans with latest research, information and lessons from recent experiences in the Arctic and across the industry.

Where oil and gas activity is allowed to take place contingency plans should be regularly reviewed and updated. It is understandable with the limited activity in parts of the Canadian Arctic that some plans are out of date; however this must be rectified before companies are allowed to renew their efforts. As the next two sections indicate, a plan alone is not enough and resources must be available to deliver it.

Issue	Gap	Recommendation
Response Capacity	No Tier 3 response company in place specifically for Arctic conditions above 60°.	Require operators to fund a Canadian Arctic technical response organisation.

	No regional response organisation to provide a co-ordinated response.	Create a regional structure to help co-ordinate plans and implementation.
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To date the Canadian Arctic has not developed any specialist regional response organisation to respond to a major incident. Those companies seeking a return from oil and gas in the Arctic should be willing to pay the costs of installing the required capacity.

Issue	Gap	Recommendation
Implementation	Insufficient planes and boats present to mount a large response.	Review feasibility of response plans and level of required response.
	Communications infrastructure not developed in the region to support response.	Review Communications and IT requirements and establish necessary networks and capacity.
	Limited numbers of personnel available to respond.	Identify potential sources of support teams from within and outside the region with transport options.
	Minimal practice exercises or local trained capacity.	Increase the number of response exercises. Practice mobilising multiple organisations and test infrastructure. Conduct drills and training to ensure local capacity can respond when required.
	Inadequate amounts of response equipment present in the region.	Ensure equipment available matches potential oil spill volumes.

The feasibility of any response plan should also be assessed in terms of having adequate transport, infrastructure, equipment and personnel to implement the plan. The remote location of the area concerned poses challenges in this regard. It would be impossible to mount a response similar to the one seen in the Gulf of Mexico in 2010, as the boats, aircraft and people are simply not available. Though more response equipment could be placed in the region, transport and trained manpower would still be needed to mobilise it in the event of a spill. It is hard to see how this implementation gap can be filled without major investment in infrastructure, which would be required for the exploration phase before any certainty of hydrocarbon production.

Issue	Gap	Recommendation
Liability	Inadequate financial provisions and insurance to cover potential liabilities.	Make the ability to cover the financial risk a prerequisite for entry.

The government needs to consider how to ensure the industry carries the financial risk of a spill, rather than subsidising high risk activities. There are a number of mechanisms which could be

applied to close this gap and ensure that in a worst case scenario, the taxpayer is not left paying the check.

Overall

The priority should always be to prevent a spill occurring in the first place; however recent events have reminded us that there is no guarantee when it comes to oil spill prevention. For WWF this makes it even more important that the right decisions are made about where oil companies are allowed to operate. Canada shares some challenges with other Arctic states such as the limitations of response technology and the presence of response gaps. However the limited recent offshore activity in Canada means that the country is at a crossroads where it needs to decide whether to make the major investment required to improve response capacity if it is going expose its Arctic ecosystems to the risks associated with offshore petroleum development.

There are specific areas where investment could bring improved capacity or technology to respond to a spill, however even here questions remain over the viability of delivering these improvements in Arctic conditions. It is therefore through improved risk management, strategic assessments and response gap analysis that better understanding of potential scenarios can provide informed decision-making regarding whether to lease an area for oil and gas exploration. Ultimately this will provide the best protection for ecologically sensitive areas.

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