The Canadian Arctic Offshore Oil and Gas Regulatory Regime

World Wildlife Fund Canada

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Contents

1. Introduction

The purpose of this report is to provide an overview of Canada's regulatory regime governing offshore oil and gas exploration and production in Canada's Arctic. It is intended as a general briefing note for WWF Canada in describing the process for approving and regulating offshore oil and gas in the North. The key statutes and regulations are described, as well as the management responsibilities of the National Energy Board (NEB) and relevant federal departments. The impacts of seismic testing on marine wildlife and the regulations governing this practice are also explained and Canada's regulatory regime is compared to international best practices. Finally, gaps in or problems with the current regulatory regime are considered along with some possible opportunities for reform and suggestions for how the regime can be improved.

Exploration drilling in Canada's Arctic began over 40 years ago in 1972.[1] Over 120 wells have been drilled in the Beaufort Sea, Eastern Arctic and High Arctic to date, but only one since 1991 (Beaufort Sea in 2005). There are currently no active oil wells in the Canadian Arctic; however as of January 2016, there are 16 exploration licenses being held in the Beaufort Sea offshore region, including leases that have expired. New oil and gas rights have not been issued in the Eastern Arctic offshore since the mid-1980s.

Canada's Arctic oil and gas regulatory regime consists of licensing rules, environmental rules, social and economic benefits, and rules related to oil and gas conservation. Licensing rules are administered under the Canada Petroleum Resources *Act* (*CPRA*), whereas the Canada Oil and Gas Operations *Act* (*COGOA*), through a number of regulations, governs the exploration, production, processing and transportation of oil and gas in federal marine areas. *COGOA* also administers safety requirements, environmental protection and resource conservation in Canada's oil and gas sector. Other components of the overall regime include the relevant provisions of the *National Energy Board Act*, the *Arctic Waters Pollution Prevention Act* (which limits an operator's absolute liability in the event of an accident) and laws of general application such as the *Canadian Environmental Assessment Act* (*CEAA*). Companies wishing to conduct seismic programs in the North must apply to the National Energy Board for a Geological/Geophysical Operation Authorization. Seismic testing is regulated by *COGOA* under the Canada Oil and Gas Geophysical Operations Regulations, which outline practices for seismic exploration and health and safety requirements for geophysical operations.

Jurisdiction for regulating northern oil and gas exploration was transferred to the NEB in 1991. The Department of Indigenous and Northern Affairs (INAC) is responsible for land tenure and related licenses, benefits plans, and collecting royalties, whereas Natural Resources Canada is responsible for areas outside of the territories that are under federal jurisdiction but not covered under an offshore accord. The administrative boundary separating the jurisdiction between INAC and NRCan extends from the mainland near Southhampton Island and along the southern part of Baffin Island out to the northern Labrador Sea. INAC manages rights and royalties north of this boundary, while NRCan does so south of this boundary (Figure 1).

[1] National Energy Board (2000). Regulation of Offshore Drilling in the Arctic. Government of Canada.

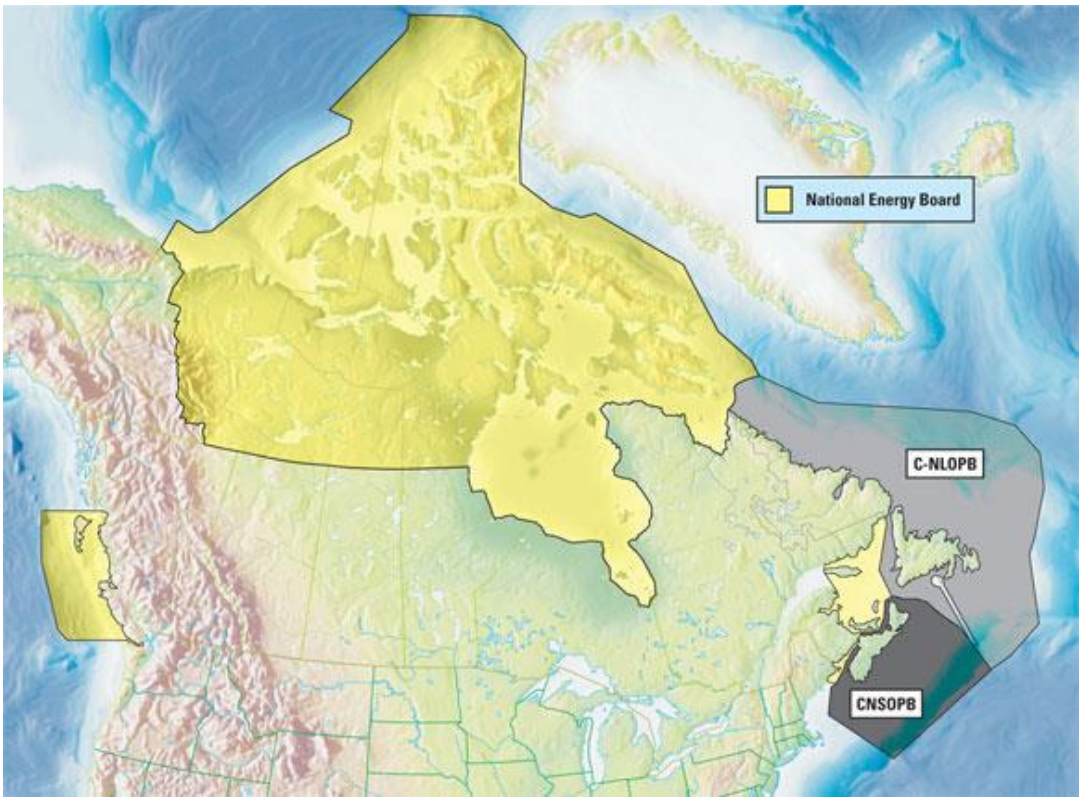

Fig. 1. Map of areas where the NEB regulates oil and gas exploration and production[2]

2 Key legislation, regulations and management

2.1 Canada Petroleum Resources Act

The *CPRA* governs oil and gas licencing in Canada's Arctic offshore by granting the allocation of rights to explore and develop petroleum resources on frontier lands, administering these rights and setting royalties on production. The Minister of Indigenous and Northern Affairs Canada (INAC) is the primary decision maker in the *CPRA* licensing process, although the National Energy Board (NEB) also plays a role. The *Act* focuses almost exclusively on the resources themselves and does not mandate that exploration rights must be issued. A decision to initiate the rights issuance processes under the *Act* is at the discretion of the Minister. No criteria are prescribed by the *Act* for the exercise of that discretion.

Under the *CPRA*, INAC or NRCan may issue a Call for Nominations and a Call for Bids, with the winning bid being granted the exclusive right to explore for and ultimately produce any oil and gas that is discovered. These rights are issued through three forms of licence under the *CPRA*:

1. **Exploration Licence -** maximum term of nine years
2. **Significant Discovery Licence -** indefinite term
3. **Production Licence -** renewable term of 25 years

[2] NEB (2000)

Importantly, some kinds of exploration activities do not require a licence; for example, a licence is not required to conduct seismic surveys (although an authorization from the NEB under *COGOA* is required). Section 5 provides more information on the regulations governing seismic testing.

2.1.1 Exploration Licence

Exploration licences are currently awarded by INAC or NRCan through a bidding process in which the highest bid (beyond $1 million) is awarded the licence. This allows for the exclusive right to drill and test for petroleum; to develop the lands for petroleum production; and to obtain a production licence. The exploration licence is also required before an operator can apply to the NEB for an operating licence, an operations authorization and ultimately well approval under *COGOA*, all of which are required before specific work or activities take place.

2.1.2 Significant Discovery Licence

A significant discovery licence (SDL) replaces the exploration licence when exploration results in a petroleum discovery. The term of the SDL is indefinite and the rights the SDL bestows in relation to the significant discovery area are identical to those provided by the exploration licence.

Before applying for an SDL, an operator must obtain from the NEB a Declaration of Significant Discovery confirming that the hydrocarbon discovery satisfies specific technical criteria and describing the area over which the discovered resources extend. Subsequently, an SDL, if issued, provides indefinite tenure to the petroleum discovery. The developer decides when to initiate development and apply for a production licence.

When viewed against comparable oil and gas regimes, the indeterminate term of Canada's Significant Discovery Licence appears to be an anomaly. As discussed in section 6 below, rights to mineral resources in Greenland are limited and in Norway the term of the production licence has a maximum of ten years and contains a specific work obligation to conduct exploration and/or drilling.[3] This term is extended to thirty years only if the licencee completes the work obligation within the initial period of the licence and fulfils any other applicable conditions in the licence.

2.1.3 Production Licence

A production licence replaces the significant discovery licence in relation to the commercial discovery area. Before applying for a production licence, an operator must obtain a Declaration of Commercial Discovery defining the area containing the petroleum reserves where production would take place. Subsequently, a production licence, if issued, provides exclusive right to drill and test for petroleum; develop the lands for petroleum production; produce petroleum from those lands; and assume title to the petroleum produced.

A production licence has a term of 25 years. Where petroleum is being produced commercially at the end of this term, the term is automatically extended for as long as commercial production continues. The licence qualifies the project for extension if production is underway or may

[3] Norwegian Petroleum Directorate. *Act 29 November 1996 No. 72 relating to petroleum activities*, s 3-8; *NPA Regulations*, s 13; *NPD – Production Licence* <http://www.npd.no/en/Regulations/Acts/Petroleum-activities-act/>.

recommence at a future date.

2.2 Canada Oil and Gas Operations Act

The Canada Oil and Gas Operations *Act* (*COGOA*), which replaced the *Oil and Gas Production and Conservation Act of 1969*, governs the exploration, production, processing and transportation of oil and gas in federal marine areas. The *Act* also administers safety requirements, environmental protection and resource conservation in Canada's oil and gas sector. Jurisdiction for regulating northern oil and gas exploration under COGOA is the responsibility of the National Energy Board.

The main purpose of the *Act* is to promote the safety of the public and workers, to protect the environment, and to conserve oil and gas resources.[4] In addition, an operations licence, operations authorization and well approval must be obtained from the NEB for every type of drilling work that may be required. The NEB assesses applications, issues the authorizations, and is the primary response and coordination body in the event of an oil spill.

COGOA is primarily a document outlining the duties of both the government and developers in a project. This *Act* gives the NEB the authority to attach requirements to the authorizations that are issued in order to achieve these goals. If these requirements or the applicable regulations are not met, the Board can suspend or revoke the authorization. Accordingly, any company planning to drill in the Canadian Arctic offshore must demonstrate to the NEB, according to the Board's standards under COGOA, that they can drill safely while protecting the environment. However, as we will see below, the NEB's criteria for what constitutes "safe drilling" are contentious.

Under COGOA, the NEB issues Guidelines to clarify regulatory expectations and to identify acceptable means of compliance. Guidelines cover a range of topics, including the NEB's expectations for the type of information that should be provided in applications for authorizations, or the Board's views on how to meet the regulations.

2.1.1 Regulations under COGOA

a) The Canada Oil and Gas Geophysical Operations Regulations outline practices for seismic exploration and health and safety requirements for geophysical operations (see section 5 below).[5]

b) The Canada Oil and Gas Drilling and Production Regulations are the main regulations concerning authorization and requirements for drilling and production activities.[6] To receive authorization to drill offshore for oil and gas, these regulations stipulate that the applicant for an authorization must have a management system and they require that once authorization is granted, the operator is responsible for ensuring conformity to the management system.

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[4] Canada Oil and Gas Operations Act (R.S.C., 1985, c. 0-7). <http://laws-lois.justice.gc.ca/eng/acts/o-7/>
[5] Canada Oil and Gas Geophysical Operations Regulations (SOR/96-117). <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-117/index.html>
[6] Canada Oil and Gas Drilling and Production Regulations (SOR/2009-315). <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2009-315/>

When a company applies for an authorization to drill in the Arctic offshore, these regulations stipulate that the operator must provide the NEB with:

- a **Safety Plan**, that sets out the procedures, practices, resources, sequence of key safety-related activities, and monitoring measures necessary to ensure the safety of the proposed work or activity;
- an **Environmental Protection Plan**, that describes the procedures, practices, resources, and monitoring necessary to manage hazards and protect the environment from the proposed work or activity; and
- **Contingency Plans**, including emergency response procedures, that describe how the effects of any reasonably foreseeable event that might compromise safety or environmental protection will be mitigated.

The NEB can impose conditions on a company's authorization to drill in order to promote safety and environmental protection. The applicant's management system must therefore include processes for:

- setting goals for the improvement of safety, environmental protection and waste prevention;
- identifying hazards and evaluating and managing the associated risks;
- ensuring that personnel are trained and competent to perform their duties;
- ensuring and maintaining the integrity of all facilities, structures, installations, support craft and equipment necessary to ensure safety, environmental protection and waste prevention;
- reporting and analyzing internally any incidents relating to health and safety and taking corrective actions to prevent their recurrence; and
- conducting periodic reviews or audits of the system and taking corrective actions if required.

c) The Canada Oil and Gas Installations Regulations outline requirements for design of installation safety features.[7]

d) The Canada Oil and Gas Diving Regulations outline safety requirements for diving activities conducted with respect to oil and gas activities.[8]

e) The Canada Oil and Gas Certificate of Fitness Regulations outline the requirements for obtaining a Certificate of Fitness for an offshore installation.[9] These regulations require that every production installation, accommodation installation, and diving installation at an offshore production or drilling site has a valid Certificate of Fitness. The Certificate of Fitness is issued by an independent expert organization called a certifying authority.

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[7] Canada Oil and Gas Installation Regulations (SOR/96-18). <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-118/>

[8] Canada Oil and Gas Diving Regulations (SOR/88-600). <http://laws.justice.gc.ca/eng/regulations/SOR-88-600/>

[9] Canada Oil and Gas Certificate of Fitness Regulations (SOR/96-114). <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-114/>

The certifying authority independently conducts the work that is necessary to determine that the drilling rig and drillship, and the associated equipment such as blowout preventers and well control equipment, have been designed, constructed, transported, installed, operated, and maintained in accordance with the regulations.

By issuing a Certificate of Fitness, the certifying authority states that it has verified that the installation can be operated safely, without polluting the environment, and that it is fit for the purpose for which it is intended, such as drilling in offshore Arctic waters. The operator must ensure that the Certificate remains in force for as long as the equipment or installation is used.

In addition, once a Certificate of Fitness has been issued, the operator cannot modify any of the drilling equipment without authorization. The equipment must be certified and used according to the design.

f) The Oil and Gas Spills and Debris Liability Regulations outline liability for spills or debris from oil and gas activities.[10]

2.3 Overview of the Regulatory Approval Process

As discussed, the regulatory approval process involves numerous authorizations and approvals under the *CPRA* and *COGOA* (Figure 2). Once INAC decides to open an area for petroleum exploration and development in the Arctic, it issues a Call for Nominations and a Call for Bids. If an operator is successful in its bid, it is awarded an exploration licence under the *CPRA*, which grants the exclusive right to drill and test for petroleum. However, *COGOA* prohibits an operator from actually going ahead with the exploratory drilling until an operating licence and operations authorization (OA) have been obtained from the National Energy Board. At this stage, an environmental assessment of the proposed project is usually conducted, although it is not necessarily mandated by the legislation. Previously, the Canadian Environmental Assessment *Act* (*CEAA*) required every exploratory offshore well to undergo an EA but the previous, Conservative government changed this requirement such that now only the first exploratory well "in an area set out in one or more exploration licences" requires an assessment. It is up to the NEB's discretion to define the boundaries of these areas. The new regulations under CEAA 2012 now cover a drilling program, which is defined as a series of wells in a given area, rather than individual wells.

The EA generally is carried out by either the NEB, the Environmental Impact Screening Committee (EISC), the Environmental Impact Review Board (EIRB) in the Inuvialuit Settlement Region, or the Nunavut Impact Review Board (NIRB). The operator must consult with the public for the EA and report on the results of these consultations in its application for an operations authorization. If the EA process is satisfactory to the NEB and the agencies set up under the land claims agreements, the Board will then complete its technical review of the proposed drilling project.

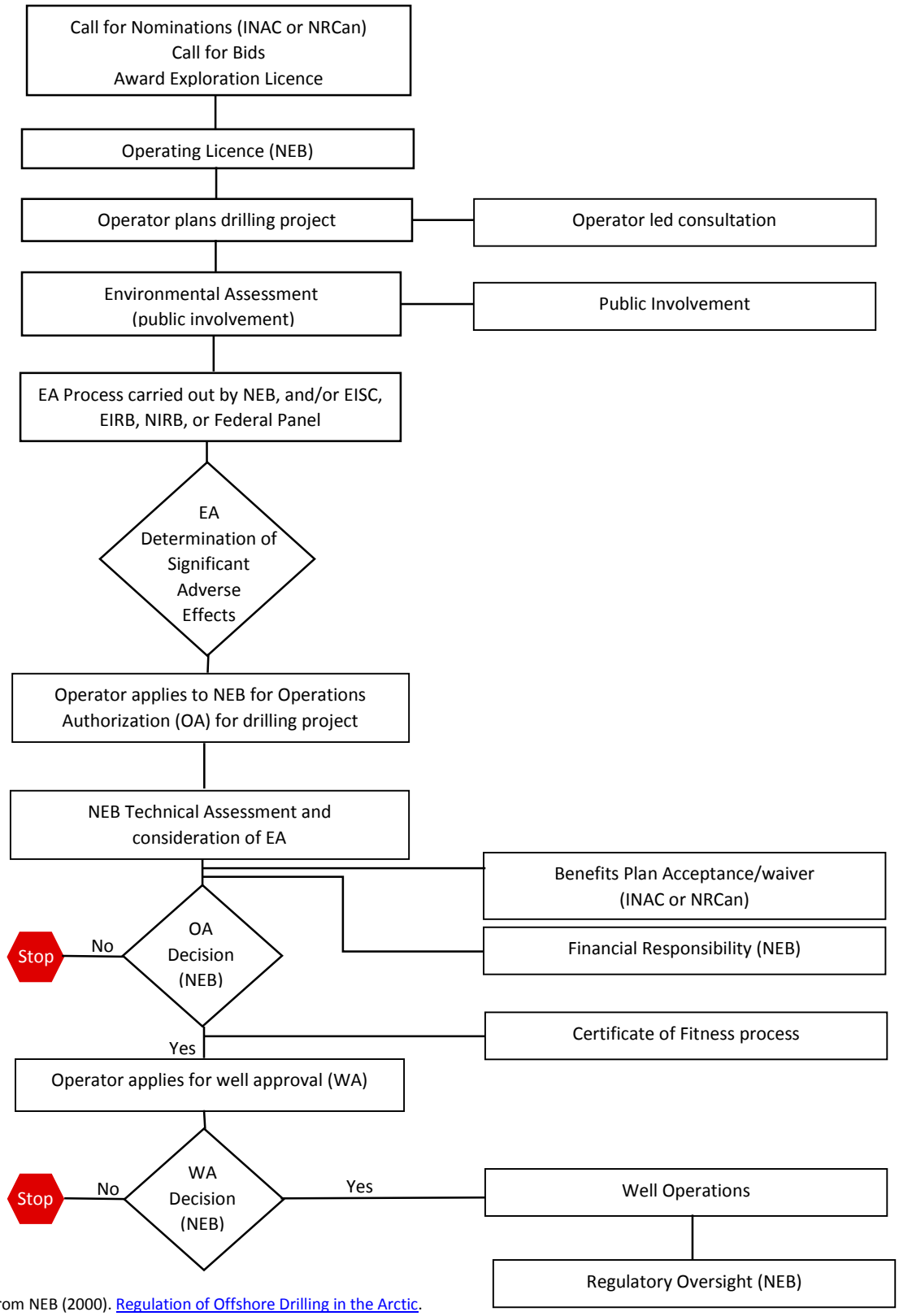
At this stage, the NEB requires a hazard assessment and evaluation. The operator must have an adequate management system, with specific plans in place, to effectively address safety, environmental protection, contingency planning with emergency response procedures and oil spill countermeasures,

[10] Canada Oil and Gas Spills and Debris Liability Regulations (SOR/87-331). http://laws-lois.justice.gc.ca/eng/regulations/SOR-87-331/

equipment suitability, and training and competency. The operator must also receive approval from INAC or NRCan of its benefits plan (or a waiver for this requirement) and provide proof of financial responsibility to the NEB to meet the absolute liability cap of $1 billion in the event of an accident.

If the NEB technical review supports granting the application, the NEB will issue the operations authorization for the drilling project with terms and conditions that consider the recommendations from the EA. Once the operations authorization has been granted, the operator can apply for a Certificate of Fitness and well approval from the Board to begin exploratory drilling. Should exploratory drilling result in a petroleum discovery, the operator can request a Declaration of Significant Discovery from the NEB and, if granted, subsequently apply to the Minister of INAC for a Significant Discovery Licence under the *CPRA*. If issued, the operator is at the final regulatory hurdle in which they are granted indefinite tenure to the petroleum discovery and can determine if and when to initiate development and apply for a production licence under the CPRA.

Figure 2: Process Overview for a Proposed Arctic Offshore Drilling Project



*Adapted from NEB (2000). Regulation of Offshore Drilling in the Arctic. Government of Canada.

2.4 Other legislation

Certain oil and gas activities may also require approval from federal departments such as the Department of Fisheries and Oceans or the Canadian Environmental Assessment Agency. The responsibility for an environmental assessment is set out in the Canadian Environmental Assessment *Act* (*CEAA*), the Inuvialuit Final Agreement, or the Nunavut Land Claims Agreement. Depending on the location of a proposed activity, several other organizations may be involved in the environmental assessment including: the Environmental Impact Screening Committee (EISC) and the Environmental Impact Review Board (EIRB) in the Inuvialuit Settlement Region, or the Nunavut Impact Review Board (NIRB). An operator must also comply with the requirements set out in the Canada Labour Code, Part 2 (Canada Labour Code) for all activities that the NEB has authorized it to undertake.

The last broad piece of legislation related to Canada's offshore oil licensing regime is the *National Energy Board Act*. This Act gives legal authority to the National Energy Board and outlines its mandate. The NEB conducts reviews and consultations with stakeholders in order to determine whether the project is in the public interest, according to the mandate set by Parliament. According to the NEB, "the public interest refers to a balance of economic, environmental and social interests that changes (sic) as society's values and preferences evolve. The NEB must assess the overall public good a project may create and its potential negative aspects. The NEB must also weigh its various impacts and make a recommendation or decision."[11] The agency's stated objective is to ensure that all energy extraction ventures are neutral or beneficial to the surrounding communities and environment. The NEB operates separately from the federal government but has been perceived to pursue the interests of the political party in power.

2.5 Management System

There is a clear separation of responsibility in the offshore Canadian Arctic between the regulation of drilling and the issuance of oil and gas rights (e.g., exploration, significant discovery and production licences) and the collection of royalties. Under *COGOA*, the NEB is responsible for regulating a project from start to finish, from the application, through the production phase, and even after a well is eventually abandoned, whereas INAC is primarily responsible for issuing land tenure and licences under the *CPRA*, approving or waiving benefits plans, collecting royalties and deciding whether an area will be open for bids. Natural Resources Canada is responsible for any areas outside of the territories and under federal jurisdiction that are not covered under the offshore accords.

2.5.1 Compliance and Enforcement

If the NEB authorizes an offshore drilling project, it is responsible for monitoring the facilities and activities to verify that the operator is complying with requirements under *COGOA* throughout the life cycle of the project. The Board uses a variety of tools to verify compliance:[12]

- **Audits** are a systematic evaluation of an operator's organization-wide management system, including programs, practices, procedures, plans, processes, manuals, records, systems, and

[11] National Energy Board Hearing Process Handbook (2013). <http://www.neb-one.gc.ca/prtcptn/hrng/hndbk/index-eng.html>. Government of Canada.
[12] NEB's Regulatory Framework. <https://www.neb-one.gc.ca/sftnvrnmnt/prtctng/index-eng.html>

activities. The objective is to verify that the operator is complying with regulatory obligations. Operators can be required to submit and implement corrective action plans to resolve any findings of non-compliance.

- **Inspections** are an on-site examination and assessment of an operator's activities compared to their regulatory obligations and commitments. NEB staff may conduct inspections at any time during the life cycle of the project.
- **Compliance meetings** are used to exchange information about an operator's programs or NEB requirements; verify the operator's implementation of their regulatory obligations and commitments; and assess the operator's performance, provide feedback, and seek an operator's commitment to improve if necessary.
- **Emergency response exercise evaluation** are on-site evaluations of an operator's capability to respond to an emergency in accordance with emergency response procedures and industry best practices.

It is an operator's responsibility to comply with the legislation under *COGOA* and its regulations and to demonstrate to the NEB that its drilling plans are safe for workers and protect the environment as defined by the *Act*. If the Board determines that, according to its regulatory criteria, an operator is not meeting its commitments or if working conditions are not safe or do not protect the environment, the NEB has the power to order an operator to take specific action or to suspend its operations.

Compliance enforcement can include notifying the operator and providing opportunities for voluntary compliance, up to revoking and suspending an operator's Authorizations or Operating Licences. Offences can also be prosecuted through the Office of the Attorney General of Canada. Under *COGOA*, a person can be held liable to a fine of up to one million dollars if found guilty of an offence. The offence is considered a separate offence for each day that it continues.

2.5.1 Performance-based vs. Prescriptive Regulations

The regulation of offshore drilling can be situated on a spectrum between prescriptive requirements and performance-based regulation. Many Arctic regulatory regimes include elements of both approaches. Prescriptive regulation sets specific technical or procedural requirements with which regulated entities must comply. Performance-based or goal-based regulation identifies functions or outcomes for regulated entities but allows them considerable flexibility to determine how they will undertake the functions and achieve the outcomes.

Each of these approaches has strengths and limitations and they are not necessarily independent of each other. As the Arctic Council notes in its Arctic Offshore Oil and Gas Guidelines, a combination of prescriptive and performance-based standards is another viable regulatory option that allows some flexibility.[13] While neither approach can be said with certainty to be better than the other, there are an increasing number of regulatory systems that are moving toward performance-based standards, which is what we have seen with the NEB's modified approach to the Same Season Relief Well (SSRW) requirement in its Review of Offshore Drilling in the Canadian Arctic. Whereas the NEB previously had a prescriptive SSRW requirement, the Board stated at the conclusion of the Review that it was open to

[13] Arctic Council (2009). Arctic Offshore Oil and Gas Guidelines. Protection of the Arctic Marine Environment Working Group. <http://www.pame.is/images/03_Projects/Offshore_Oil_and_Gas/Offshore_Oil_and_Gas/Arctic-Guidelines-2009-13th-Mar2009.pdf>

evolving technologies and it would consider departures from the SSRW policy on a case by case basis. The NEB therefore has now adopted a more performance-based approach, which allows applicants to demonstrate how they would meet or exceed the intended outcome of the SSRW policy by other means.[14] Some observers including WWF Canada have argued, however, that performance-based regulations are not appropriate for policies such as the SSRW requirement because a relief well is to date the only proven way to regain control of a blowout well.[15] [16] Other methods of regaining control have not been proven and therefore allowing for SSRW equivalency through a performance-based regulation would be purely speculative and potentially very dangerous if the control method does not work.

The NEB's approach is therefore a blend of traditional prescriptive regulations with performance-based regulations. The Canada Oil and Gas Drilling and Production Regulations, updated in 2009, contain mostly performance-based regulations, while other regulations (in particular, the Canada Oil and Gas Installations Regulations, Canada Oil and Gas Geophysical Operations Regulations and the Canada Oil and Gas Diving Regulations) are mainly prescriptive.

The NEB has adopted this hybrid approach depending upon whether the Board considers prescriptive or performance-based regulations to be most appropriate. It should be noted however that there is no consensus among Arctic nations on the best approach to ensuring regulatory compliance and effectiveness. Prescription tends to be used when compulsory means of compliance are desired. Goals are used when circumstances can differ greatly among the regulated companies or where superior outcomes are likely to be achieved through innovation or new technology.

Among the Arctic states, Norway is widely viewed as a model for utilizing performance-based standards, supplemented with prescriptive elements. While the regulator remains responsible for setting quantifiable goals, the performance-based approach leaves the means of reaching those goals up to the operators. Greenland's regime is also performance-based and requires operators to adopt the best international practices. The U.S. system is the most prescriptive.

5. Seismic testing

Before an oil company carries out offshore drilling, high resolution seismic site surveys are conducted, as there is a legal and operational need not only to find potential petroleum reserves, but also to have detailed information on the area immediately surrounding potential well locations and the geological layers immediately below the subsurface.[17] To conduct a seismic survey, compressed air streams or focused sonic waves are sent towards the ocean floor in order to gauge the depth, location and structure of the geological resources that lie underneath. The information on the nature of the seabed is

[14] National Energy Board (2015). SSRW Technical Proceedings: Frequently Asked Questions. <https://www.neb-one.gc.ca/nrth/ssrwtchnclprcdngfq-eng.html>

[15] Byers, M. (2012). Circumpolar Challenges: An Ambitious Agenda for the Arctic Council. The Rideau Institute. <http://www.rideauinstitute.ca/wp-content/uploads/2012/09/Byers-Arctic-Council-pre-conf-report-web.pdf>

[16] World Wildlife Fund Canada and Ecojustice (2011). WWF-Canada Recommendations to the National Energy Board Regarding Arctic Offshore Drilling Requirements.

[17] Beaufort Regional Environmental Assessment (2013). Oil and Gas Exploration & Development Activity Forecast (Updated): Canadian Beaufort Sea 2013-2028. Prepared for Aboriginal Affairs and Northern Development Canada by Lin Callow, LTLC Consulting in association with Salmo Consulting Inc.

needed to identify any physical hazards on the surface of the seabed and the information on the shallow subsurface is used to identify other unforeseen hazards, such as buried channels, shallow gas pockets, gas hydrates and permafrost that could cause problems if penetrated by the drill.

In deep-water areas Two Dimensional (2D) and Three Dimensional (3D) surveys are conducted by seismic vessels in generally open water conditions.[18] In 2D seismic surveying, a single seismic cable or streamer is towed behind the seismic vessel, together with a single source. The reflections from the subsurface are assumed to lie directly below the 'sail line' that the seismic vessel traverses, hence the name 2D. A 3D survey covers a specific area, generally with known geological targets generated by previous 2D exploration, and is usually undertaken to better identify potential reservoirs and drilling locations.

Airguns attached to the cables for both survey methods continuously blast loud, low frequency sound waves through the water column and into the sea bed with intervals as short as ten seconds.[19] Operations can last weeks or sometimes months depending on the size of the area being surveyed. Hydrophones are also towed behind the vessel to record sound waves reflected by the various sediment formations below the seabed. According to a report by Marine Conservation Research (commissioned by Greenpeace), sound levels from the airguns can reach 259 decibels, which would be perceived by humans as approximately 8 times louder than a jet engine taking off heard from 50 metres away. This is far beyond the threshold of roughly 150 dB at which eardrum rupture occurs in humans.

5.1 Seismic Testing Regulatory Approval Process

While oil and gas exploration and production in the Canadian Arctic requires a number of permits, licences and authorizations, only an authorization from the National Energy Board is required to conduct seismic surveys. Companies wishing to conduct seismic programs must apply to the NEB directly for a Geological/Geophysical Operation Authorization.[20] Consultation with local communities and other agencies that may have regulatory authority is required as part of the approval process; however, the legislation does not require that the operator obtain either a licence or conduct an environmental impact assessment in order to carry out underwater seismic tests. This is despite the growing evidence that underwater seismic blasting can have severe impacts on marine life (see section 5.2). Instead, the NEB produces an Environmental Assessment Report when it rules on an application for seismic testing, which includes expected environmental and socioeconomic impacts and respective mitigation measures.

Seismic testing for oil and gas reserves in the onshore and offshore Canadian Arctic is regulated by *COGOA* under the Canada Oil and Gas Geophysical Operations Regulations (COGGOR), which outline practices for seismic exploration and health and safety requirements for geophysical operations.[21] The regulations essentially describe the appropriate and acceptable uses of techniques for seismic testing

[18] International Association of Geophysical Contractors (2002). Marine Seismic Operations. An Overview. <http://www.cnlopb.ca/pdfs/mkiseislab/mki_app_a.pdf?lbisphpreq=1>
[19] Marine Conservation Research Ltd (2015). A Review of the Impact of Seismic Survey Noise on Narwhal and other Arctic Cetaceans. Prepared for Greenpeace Nordic by Cucknell, A.C., Boisseau, O., Moscrop, A.
[20] IAGC (2002).
[21] Canada Oil and Gas Geophysical Operations Regulations (SOR/96-117).

(known as geophysical operations in COGGOR) such as the use of the air gun system, air gun testing, gas exploders, seismic energy sources, and so on. COGGOR also outlines safety and health requirements, reporting requirements, and accident procedures. In terms of offshore geophysical operations, the guidelines and regulations are limited. Section 14 states the following:

> **14** Where an operator who is conducting an offshore geophysical operation uses or intends to use an electrical seismic energy source, the operator shall ensure that
>
> > **(a)** the charging and discharging circuits of the electrical seismic energy source are equipped with circuit breakers;
> >
> > **(b)** the electrical cables of the electrical seismic energy source are protected from damage and are adequately insulated and grounded to prevent current leakage and electrical shock; and
> >
> > **(c)** the electrical seismic energy source, when tested, is fully immersed in water.

There are no provisions in the regulations to ensure the safety of marine wildlife when conducting underwater seismic blasting operations. Notably however, Section 12(3) of COGGOR implicitly acknowledges the potential harm of seismic blasting (to humans) when it states that "During an offshore geophysical operation, no air gun shall be test-fired while the air gun is in the water if there are divers within 1,500 m of the air gun."[22] Moreover, when the NEB issued its Environmental Assessment Report for the Northeastern Canada Seismic Survey of Baffin Bay and Davis Strait, it acknowledged the sound produced by underwater airguns can lead to serious sensory and physical disturbances in birds, marine mammals and fish.[23] The Board's mitigation measures included a 500 metre radius "shut down zone" from the air gun should any mammals be detected within 500 metres of the blast, which is much smaller than the 1500 metre safety zone for divers set out in section 12(3) of COGGOR. The NEB identified the potential for adverse effects to marine mammals, traditional harvesting of marine mammals and fish, and commercial fish harvesting as "the main concerns associated with this project" but nonetheless ruled that its mitigation measures:

> "would minimize the possibility of marine mammals occurring in close enough proximity to the airgun discharges such that they would suffer permanent or temporary hearing damage or behavioural changes. The NEB finds that the Project's residual effects would likely be of short-term duration, in which individual receptors such as marine mammals would be exposed to effects during the seasonal survey, but the effects would be reversible during the life of the Project. The effects would occur at a local to regional scale and would be of low magnitude."[24]

5.2 Impacts of seismic testing on marine wildlife

In contrast to the NEB's assessment, other studies suggest that the impacts of underwater seismic tests

[22] Section 12(3)
[23] NEB (2011). Canada Oil and Gas Operations Act Environmental Assessment Report for the Northeastern Canada 2D Seismic Survey (Baffin Bay/Davis Strait). Government of Canada. <https://www.neb-one.gc.ca/nrth/dscvr/2011tgs/nvssssmnt/nvssssmnt-eng.html>
[24] Section 7.2.

are significant and that the NEB's proposed mitigation measures would likely be insufficient. As sound travels much better than light in the oceans, many marine animals use hearing as their primary sense and sounds have a large potential area of impact, much larger than the NEB's proposed 500-metre "shut down zones". Seismic surveys can raise background noise levels by 20 dB over 300,000 square kilometres continuously for days.[25] Marine life has used sound as its principal sense because it travels so efficiently underwater, travelling 5 times the speed of sound in air. Vision is only useful for tens of metres underwater, yet sound can be heard for hundreds, even thousands of kilometres.[26] The International Whaling Commission's Scientific Committee noted "…repeated and persistent acoustic insults [over] a large area…should be considered enough to cause population level impacts."[27]

Observed changes in marine mammals exposed to high levels of aquatic noise include changes in vocalizations, respiration, swim speed, diving, foraging behaviour, displacement, avoidance, shifts in migration paths, stress, hearing damage and strandings. For instance, Todd et al. (1996) determined that humpback whales in an area where underwater seismic testing was taking place displayed no avoidance or behavioural reactions to the explosions, yet an unusual pattern of fatal entanglement in fishing gear was observed.[28] In addition to individual deaths, impacts on populations, even non-lethal ones, can severely affect species survival.[29] Population impacts are hard to detect in animals as difficult to study as marine mammals, but noise has been thought to contribute to several whale species' decline or lack of recovery.[30] This suggested hearing damage or some other compromise of their navigation or sensory systems. Romano et al. (2004) observed detrimental changes in stress hormone levels of a beluga whale and bottlenose dolphin exposed to sounds from a seismic water gun.[31]

In April 2016, twenty-eight prominent marine biologists wrote an open letter to President Obama expressing their profound concern over the impacts of seismic testing on the North American right whale.[32] Their letter was in response to a decision by the Department of the Interior to allow seismic surveys for oil and gas exploration in the mid- and south Atlantic. Although this is a far different bioregion from Canada's Arctic, the predicted impacts on marine wildlife are remarkably similar to what many scientists have warned will result in the far North. The authors wrote that "seismic exploration is likely to disrupt essential behavior and degrade important habitat *notwithstanding the mitigation measures proposed by the Interior Department*, causing significant levels of stress that will further

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[25] Weilgart, Linda S. (2007). 'A Brief Review of Known Effects of Noise on Marine Mammals.' International Journal of Comparative Psychology. Vol. 20, 159-168. <http://escholarship.org/uc/item/11m5g19h>.

[26] Weilgart, Linda S. (Retrieved June 3, 2016). Underwater Noise: Death Knell for Our Oceans? <http://www.oceanmammalinst.com/pdfs/UnderwaterNoise.pdf>

[27] International Whaling Commission Scientific Committee (2004). Annex K: Report of the Standing Working Group on Environmental Concerns. Annual IWC meeting, Sorrento, Italy, 29 June – 10 July 2004. 56 pp.

[28] Todd, S. et al. (1996). Behavioural effects to underwater explosions in humpback whales. *Canadian Journal of Zoology.* Vol. 74, 1661-1672.

[29] Weller, D.W., Y.V. Ivashchenko, G.A. Tsidulko, A.M. Burdin, and R.L. Brownell, Jr. (2002). Influence of seismic surveys on western Grey Whales off Sakhalin Island, Russia in 2001. International Whaling Commission SC/54/BRG14. 15 pp.

[30] National Marine Fisheries Service (2002). Status Review under the Endangered Species Act: Southern Resident Killer Whales (Orcinus orca). National Oceanic and Atmospheric Administration Technical Memorandum NMFS NWAFSC-54, Seattle, WA. 131 pp.

[31] Romano, T.A. et al. (2004). Anthropogenic Sound and Marine Mammal Health: Measures of the nervous and immune systems before and after intense sound exposure. *Canadian Journal of Fisheries and Aquatic Sciences.* Vol. 61, 1124-1134.

[32] Nowacek, D., Read. A. et al. (2016). A Letter to President Obama on the Impact of Seismic Surveys on Whales. April 14, 2016. <https://nicholas.duke.edu/about/news/letter-to-obama-seismic-effects-whales>

reduce right whale health and, consequently, fitness. There is already evidence that increased noise in right whale habitat causes chronic stress in this species, which has negative effects on animal health" (emphasis added).[33]

A report by Marine Conservation Research, commissioned by Greenpeace, on the impacts of seismic testing on whales concluded that "It is indisputable that seismic noise has adverse impacts on marine life…From the research at hand, it is clear that noise from seismic activity impacts whales. It can damage their hearing, ability to communicate, disrupt diving behavior, feeding and migration patterns. There are increasing indications that this could cause serious injury to whales. It may also disrupt reproductive success and increase the risk of strandings and ice entrapments."[34] Notably, the report also concluded that there is a massive research gap in this field and that decision-makers should use "extreme caution" before allowing seismic activity in the Arctic.

Yet, allowing seismic activity before the impacts are fully understood is precisely what the Canadian government and the National Energy Board are doing in Arctic bioregions that are of extremely high ecological and cultural significance. In 2014, the community of Clyde River on Baffin Island launched a judicial review of the NEB's decision to allow a seismic survey of Baffin Bay and Davis Strait.[35] Their application to the Federal Court of Appeal stated that the federal government did not fulfill its constitutional duty to adequately consult the Inuit about the proposed 5-year testing project. Advocates further argued that the program violates the fundamental rights of the people of Nunavut and would have catastrophic consequences for marine mammals. Although the Court rejected their appeal, the community then appealed to the Supreme Court of Canada, which has agreed to hear their case in November 2016.[36]

Until recently Shell had held expired oil and gas exploration leases in Lancaster Sound, which the company had used as leverage to request permission to conduct seismic testing in the area. In June 2016 the company relinquished these exploration permits and donated them to the Nature Conservancy of Canada.[37] WWF Canada had filed a lawsuit against the government, maintaining that these permits were invalid as they hadn't been renewed since 1979. The leases were also blocking the establishment of a National Marine Conservation Area (NMCA) being sought by the Inuit in Lancaster Sound.

A feasibility study underway for the creation of a new NMCA in Lancaster Sound is underway, which is expected to be completed this year. Given the known and potential impacts of seismic testing on marine wildlife, the conservation objectives of the proposed Lancaster Sound NMCA may well be fundamentally incompatible with a seismic blasting program in the area. While it appears that the seismic program in Lancaster Sound will no longer take place in the near future, it is important to keep in mind that the government has committed to establishing NMCAs in a number of regions across the Arctic and any

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[33] Rolland RM, Parks SE, Hunt KE, Castellote M, Corkeron PJ, Nowacek DP, Wasser SK, and Kraus SD (2012). Evidence that ship noise increases stress in right whales. Proceedings of the Royal Society B: Biological Sciences, 279, 2363-2368

[34] Marine Conservation Research Ltd (2015). Caution Required: Seismic blasting harms whales. Media Briefing prepared for Greenpeace Nordic by Cucknell, A.C., Boisseau, O., Moscrop, A.

[35] Nunatsiaq News (July 28, 2014). Clyde River groups challenge Nunavut seismic testing in court. <http://www.nunatsiaqonline.ca/stories/article/65674clyde_river_groups_go_to_court_over_nunavut_seismic_testing/>

[36] Murray, N., CBC News North (April 2, 2016). Date set for Clyde River's appeal to Supreme Court over seismic testing. <http://www.cbc.ca/news/canada/north/clyde-river-supreme-court-date-set-1.3517652>

[37] Minogue, S., CBC News North (June 8, 2016). Shell leaving Lancaster Sound 'a relief' to Inuit, cynical ploy to Greenpeace. <http://www.cbc.ca/news/canada/north/shell-lancaster-sound-reaction-1.3622241>

proposed seismic activity in or near the proposed conservation areas is likely to frustrate or undermine the objectives of the NMCA program, which are discussed below.

5.3 Proposed National Marine Conservation Areas

Canada's federal marine protected areas network is comprised of three core programs:

- National Marine Conservation Areas established by **Parks Canada** to protect and conserve representative examples of Canada's natural and cultural marine heritage, and to provide opportunities for public education and enjoyment.
- Marine Protected Areas established by **Fisheries and Oceans Canada** under the *Oceans Act* to protect and conserve important fish and marine mammal habitats, endangered marine species, unique features and areas of high biological productivity or biodiversity.
- Marine Wildlife Areas established by **Environment Canada** to protect and conserve habitat for a variety of wildlife, including migratory birds and endangered species.

In addition to these core marine protected areas programs, migratory bird sanctuaries, national wildlife areas and national parks with a marine component are also important contributions to the marine protected areas network.

National Marine Conservation Areas (NMCAs), are marine areas managed by Parks Canada "for sustainable use and containing smaller zones of high protection. They include the seabed, the water above it and any species which occur there. They may also take in wetlands, estuaries, islands and other coastal lands."[38] NMCAs are protected from such activities as ocean dumping, undersea mining, and notably, oil and gas exploration and development. Traditional fishing activities are permitted, but managed with the conservation of the ecosystem as the main goal. The management of an NMCA requires the development of partnerships with regional stakeholders, coastal communities, Aboriginal peoples, provincial or territorial governments and other federal departments and agencies.

There are 29 marine regions in the Parks Canada National Marine Conservation Areas system plan, each a distinct combination of physical and biological characteristics.[39] Parks Canada's goal is to represent each of these distinct marine regions with a national marine conservation area. Nine of the marine regions are found in the Arctic, including the Beaufort Sea and Lancaster Sound regions (Figure 3). To date, only two NMCAs have been established in Canada, neither of which is in the Arctic.

[38] Parks Canada (2015). National Marine Conservation Areas of Canada. <http://www.pc.gc.ca/eng/progs/amnc-nmca/index.aspx>

[39] Parks Canada (2013). Canada's National Marine Conservation Areas System Plan (Archived). <http://www.pc.gc.ca/progs/amnc-nmca/systemplan/index_e.asp>

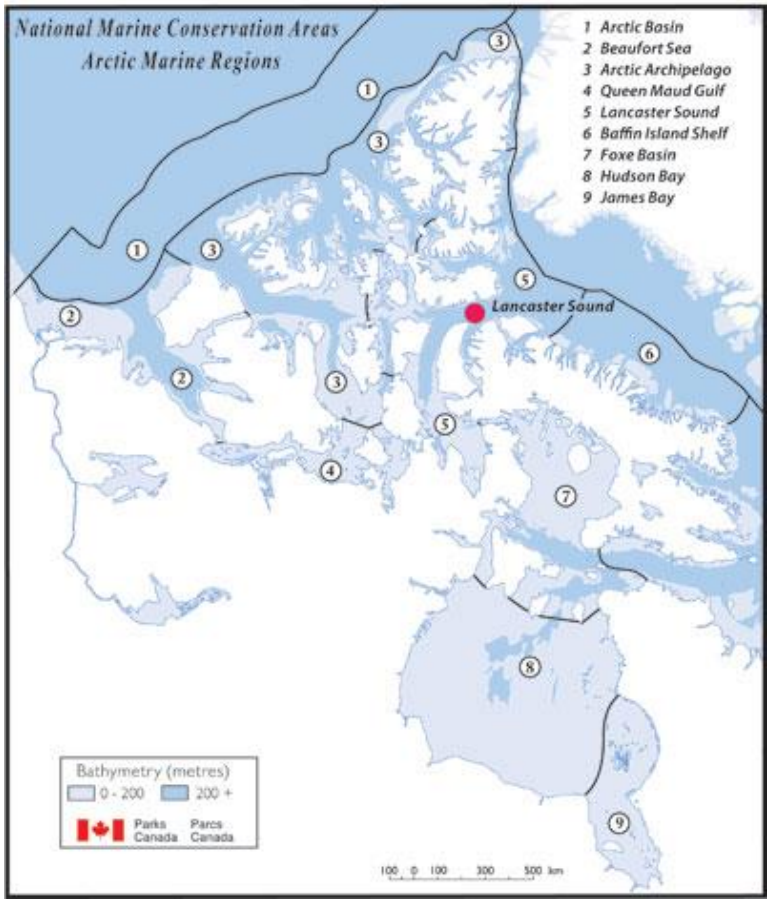

Figure 3. Nine Arctic marine bioregions identified by Parks Canada for representation in the network of National Marine Conservation Areas[40]

5.3.1 Beaufort Sea

The Beaufort Sea is recognized as a biologically diverse, unique marine region. The Mackenzie River drains into the Beaufort Sea and its abundant freshwater output has a profound influence on the productivity of the region. There are more than forty Pacific, Atlantic and Arctic fish species in the region, as well as several freshwater species. Roughly 5000 bowhead whales, about 75% of the world population and over 11,000 beluga whales summer and feed here, using the shore leads to reach their favourite feeding areas. This region also has one of the highest densities of polar bears and ringed and bearded seals in the Arctic. The Beaufort Sea is also one of the Canadian Arctic's most important areas for waterfowl and shorebirds. The only breeding populations of thick-billed murres and black guillemots in the Western Arctic are found here.[41]

Oil exploration activity in the Mackenzie Delta/Beaufort Sea region began onshore in 1957 and, with the discovery of oil and gas at Prudhoe Bay Alaska in 1968, activity intensified throughout the Western Arctic, particularly in the Mackenzie Delta and Canadian Beaufort Sea.[42] Several oil discoveries were made in the Mackenzie Delta in the 1970s, which increased exploration and investment offshore. The

[40] Parks Canada/Wayne Roach (2010). <http://www.pc.gc.ca/eng/progs/amnc-nmca/lancaster/intro.aspx>
[41] Parks Canada (2013).
[42] Beaufort Regional Environmental Assessment (2013).

signing of the Inuvialuit Final Agreement (IFA) in 1984 set aside an area of more than 900,000 square kilometres including much of the Canadian Beaufort Sea, which is now managed under the terms of the IFA. Ninety-two wells have been drilled in the Beaufort Sea region and, although there is currently no oil exploration activity in the area, numerous petroleum exploration and significant discovery licences are currently held in the Beaufort and Mackenzie Delta regions (see figure 4). In addition, two offshore seismic programs were completed in 2012 and there is potential for further seismic and drilling activity in the region according to the National Energy Board.[43]

The Beaufort region is not yet represented in the NMCA system. Three representative areas have been identified by Parks Canada as possible candidates for conservation: Cape Bathurst Polynya, Yukon North Slope, and Western Banks Island. At least two of these regions (Yukon North Slope and Cape Bathurst Polynya) appear to overlap with existing exploration and/or significant discovery licences where further seismic activity could take place.

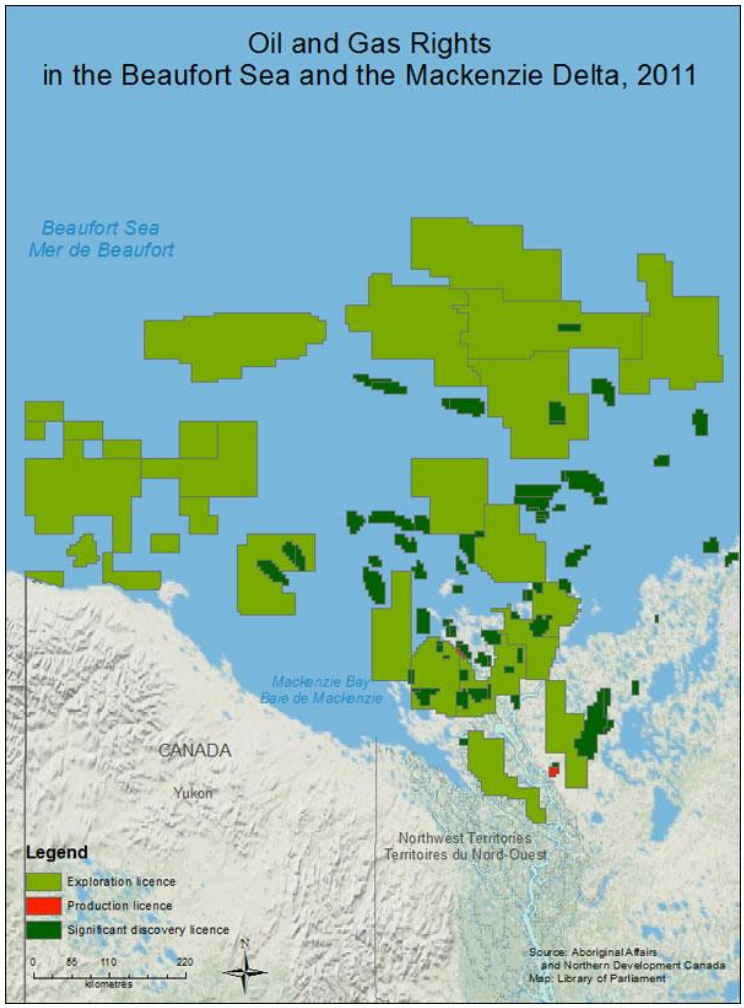

Figure 4. Oil and gas rights in the Beaufort Sea and Mackenzie Delta[44]

[43] https://www.neb-one.gc.ca/bts/nws/spch/2014/nrthrnlgsrgltn/index-eng.html
[44] Zakzouk, M. and E. Preville (2012). Status of Oil and Gas Development in Northern Canada. Library of Parliament. <http://www.lop.parl.gc.ca/content/lop/ResearchPublications/2012-04-e.htm>

5.3.2 Lancaster Sound

The Lancaster Sound NMCA proposal is considered important not only in the context of the marine region but for the Arctic in general. It is one of the richest marine mammal areas in the world: during the summer months most of the world's narwhal, a third of North America's belugas, large numbers of the Eastern Arctic's bowhead whales, as well as ringed seals, harp seals and walrus are found in these waters. Lancaster Sound also harbours one of the highest densities of polar bears in the Canadian Arctic and about one-third of Eastern Canada's colonial seabirds breed and feed here, including several hundred thousand pairs of thick-billed murres, black-legged kittiwakes and northern fulmars.[45]

An NMCA proposal for the Lancaster Sound area was first prepared in 1987, as the area was recognized for its tremendous importance within the marine region and the Arctic in general, but the feasibility assessment was suspended at the request of the local Inuit in the Eastern Arctic who have a history of opposing oil and gas development in the area. The prospect of drilling in the Sound, as well as shipping oil and natural gas through the area, drove Inuit activism against the oil industry in Canada, and played an important role in the political development of Inuit organizations. In fact, it was strong Inuit opposition to oil/gas development in the Lancaster Sound area, combined with a recognition of its biological value by conservationists, that have led to several attempts by Parks Canada to create some form of marine protected area in the region over the years. Oil and gas drilling would be banned within the boundaries of the NMCA in Lancaster Sound.

A second feasibility assessment for the proposed Lancaster Sound National Marine Conservation Area was launched in 2009 when Qikiqtani Inuit Association (QIA), the Government of Nunavut and Parks Canada signed a Memorandum of Understanding that committed them to assess the feasibility of an NMCA in Lancaster Sound. A steering committee was formed by representatives of each organization, tasked with undertaking a feasibility study. In December 2010, the Federal Government released a proposed boundary for the NMCA and in 2012, the Qikiqtani Inuit Association (QIA) released its own, larger boundary proposal, based on Inuit occupancy and traditional knowledge.

At the conclusion of the feasibility study, the Governments of Canada and Nunavut and Inuit organizations will consider the recommendations on whether an NMCA is practical and desirable. They will then decide on whether to proceed to the next step – negotiation of any necessary agreements needed for the establishment of the NMCA, including an Inuit Impact and Benefits Agreement (IIBA). The feasibility assessment is therefore an important step in the establishment process.

The feasibility report will include a final recommendation on the NMCA boundaries, which will likely be a key factor in determining whether the Governments of Canada and Nunavut, and the QIA will agree to proceed to the next stage of the process. Boundary selection requires consideration of several features such as: wellbeing and interests of communities, traditional ecological knowledge, ecologically sustainable use of living marine resources and mineral and energy potential.

Figure 5 shows the location of the proposed federal boundary for the Lancaster Sound NMCA and the location of suspected hydrocarbon reserves, which clearly overlap. Parks Canada's eastern boundary to the proposed NMCA was drawn in such a way as to exclude Shell Oil's exploration permits, despite the fact that these leases were located near the biodiversity-rich North Water Polynya. The QIA's proposed boundaries for the Lancaster Sound NMCA were based on Inuit Qaujimajatuqangit (IQ) mapping

[45] Parks Canada (2010). Feasibility Assessment for the Proposed Lancaster Sound NMCA. <http://www.pc.gc.ca/eng/progs/amnc-nmca/lancaster/intro.aspx>

(traditional Inuit knowledge), which considered the conservation importance of various parts of the Sound and therefore included the North Water Polynya and the area where Shell's leases were located.[46] Shell's recent decision to relinquish its exploration permits in the region should undoubtedly help with conservation efforts and the establishment of the NMCA; however it remains to be seen if the federal government will stick with its originally proposed NMCA boundaries or now consider the QIA's larger boundary proposal (figure 6).

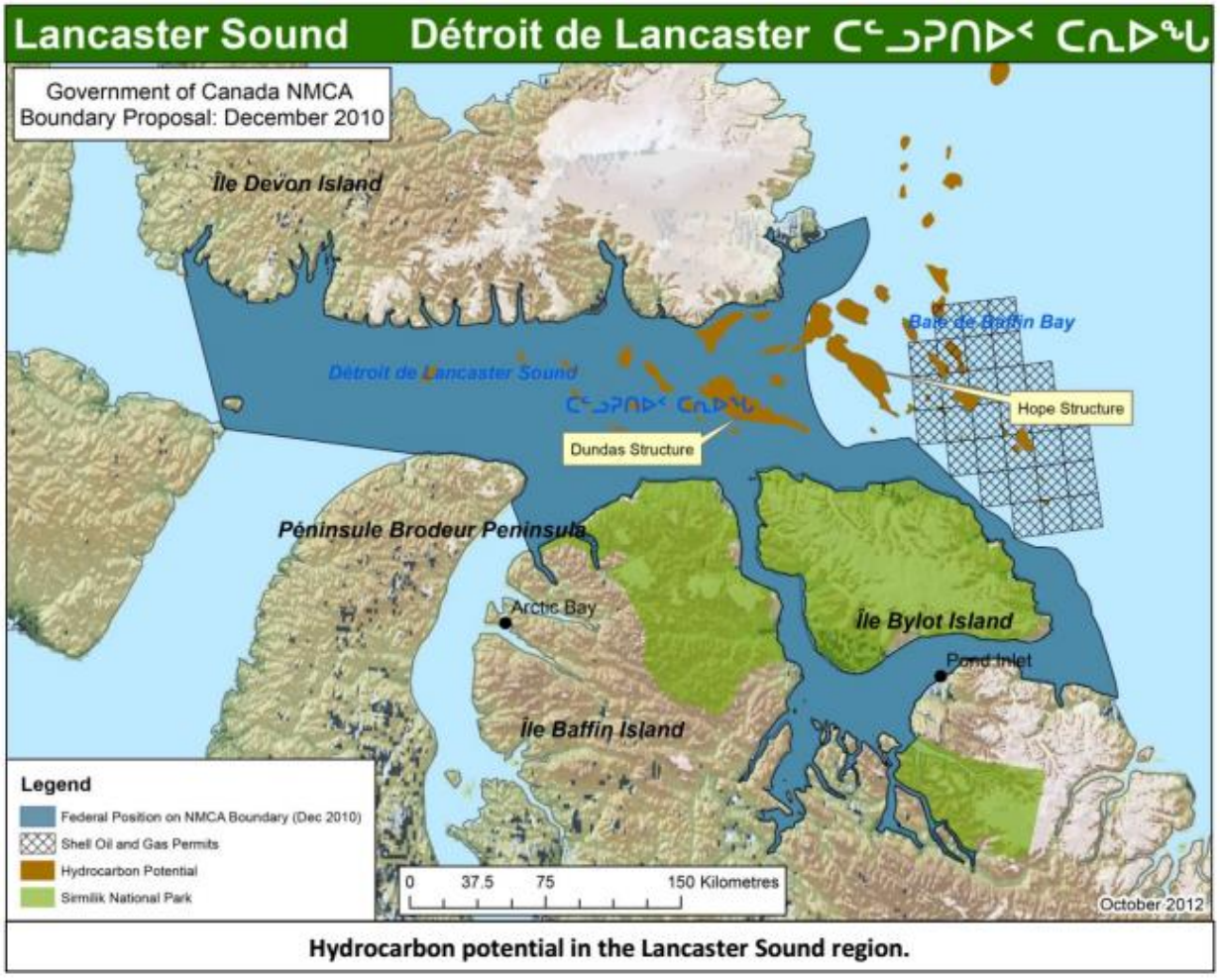

Figure 5: Proposed federal boundary, Inferred Resources and Shell Oil Permits.[47]

[46] Ducharme, S., Nunatsiaq News (March 31, 2016). Nunavut Inuit group wants to hear more about expired oil leases.

[47] D'Orazio, R. & Arreak, S. (2014). "Integrating Inuit Qaujimajatuqangit (IQ) in Decision Making: IQ Mapping for the Lancaster Sound NMCA".

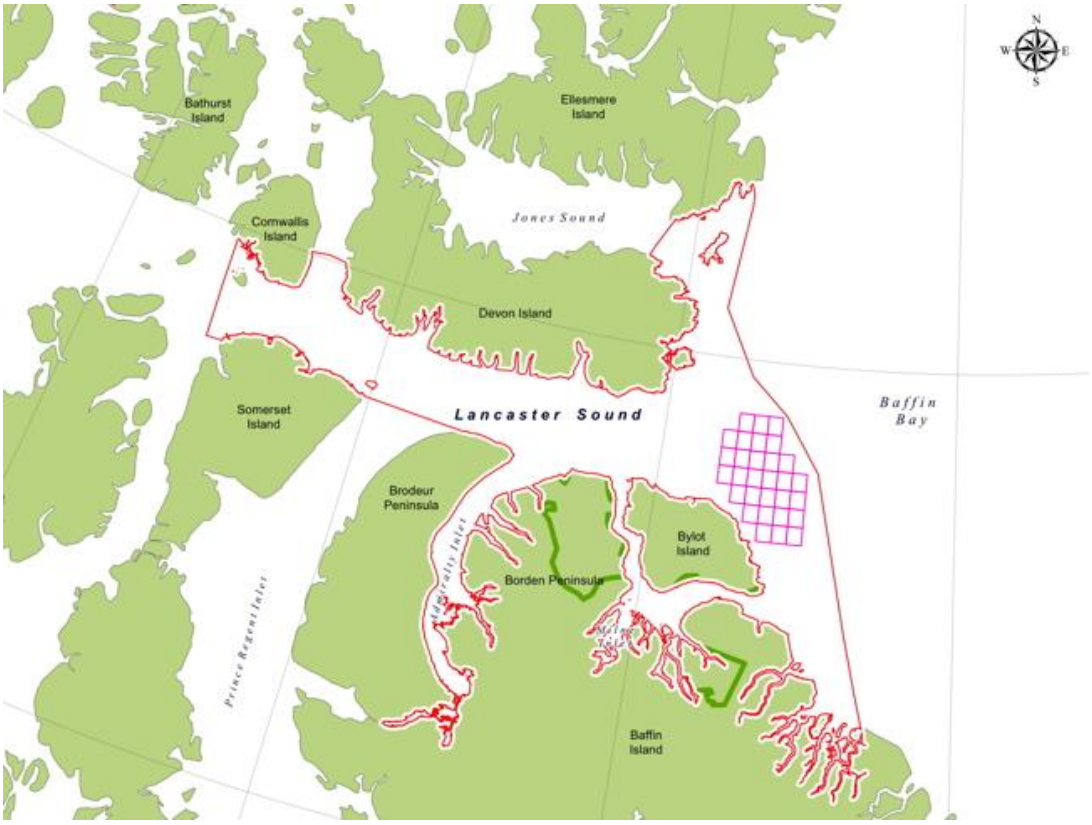

Figure 6. QIA's preferred boundaries for the proposed NMCA in Lancaster Sound.[48]

6. Select review of international best practices in relation to the Canadian context

6.1 Licencing

With two separate pieces of legislation regulating petroleum resources in the North, Canada's oil and gas regulatory regime is more complex than other comparable jurisdictions. As explained above, the relevant legislation in Canada includes not only the *CPRA* but also the *COGOA*, the relevant provisions of the National Energy Board *Act*, the relevant triggers of the Canadian Environmental Assessment *Act* and the application of the Arctic Waters Pollution Prevention *Act*. In contrast to Canada's approach, other regimes require that consideration be given to issues such as environmental protection, climate change, health, safety and social sustainability *before* an exploration licence is granted.

The *CPRA* itself does not have a policy section or preamble. Instead, the policy purposes of the *Act* are set out in a 1985 companion document titled "Canada's Energy Frontiers: A Framework for Investment

[48]QIA (2012). Inuit Participation in Determining the Future of Lancaster Sound. <http://www.qia.ca/sites/default/files/files/Publications/Lancaster_Sound_Report_Feb_2012.pdf/>

and Jobs".[49] As described in the Framework document, the *CPRA*'s policy focus is on developing Canada's energy resources as an engine for economic growth, achievement of energy self-sufficiency, the "fair treatment" of energy producers and cooperation between various levels of government. In contrast, Greenland's equivalent legislation, the *Mineral Resources Act*, is supplemented by the objective of aiming "to ensure that activities under the *Act* are securely performed as regards safety, health, the environment, resource exploitation and social sustainability as well as properly performed according to acknowledged best international practices under similar conditions."[50] Moreover, Parts 13 and 14 of the *MRA* set out specific rules regarding environmental protection and liability. Pursuant to section 56, the Greenland Government must attach importance to, for example, the consideration for avoiding impairment or any other negative impact on the climate when it makes a decision on the granting of a licence under the *MRA*.

Similar to these broader societal and environmental objectives described in Greenland's legislation under the *MRA*, Norway's equivalent, the *Petroleum Activities Act* (NPA), states that:

> Resource management of petroleum resources shall be carried out in a long-term perspective for the benefit of the Norwegian society as a whole. In this regard the resource management shall provide revenues to the country and shall contribute to ensuring welfare, employment and an improved environment, as well as to the strengthening of Norwegian trade and industry and industrial development, and at the same time take due regard to regional and local policy considerations and other activities.[51]

Before an area can be opened for licensing, the Ministry must evaluate the "various interests" in the area.[52] The evaluation must assess the impact of the petroleum activities on trade, industry and the environment, of possible risks of pollution, and the economic and social effects that may result from the petroleum activities. Of note, the assessment must also include a description of the impact of opening the area for petroleum activities in relation to living conditions for animals and plants, the sea bed, water, air, climate, landscape, emergency preparedness and risk, and the joint impact of these.[53]

In Canada, there are no such statutory requirements. Only after an exploration licence has been granted can an environmental assessment of specific activities in the licence area be triggered under the *Canadian Environmental Assessment Act, 2012* or under land claims agreements when the operator seeks an authorization from the NEB under *COGOA*. In Greenland, when deciding whether to grant a licence, the Greenlandic government must also attach importance to the consideration for avoiding impairment of nature and the habitats of species in designated national and international nature conservation areas and disturbance of the species for which the areas have been designated.[54] An

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[49] Minister of Supply and Services Canada (1985). Canada's Energy Frontiers: A Framework for Investment and Jobs. <http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ/STAGING/texte-text/cef_1314813132826_eng.pdf>

[50] *Mineral Resources Act*, s 1(2). <https://www.govmin.gl/images/stories/faelles/mineral_resources_act_unofficial_translation.pdf>

[51] Norwegian Petroleum Directorate (1996). Petroleum Activities Act (*NPA)*, s 1-2, para 2. < http://www.npd.no/en/Regulations/Acts/Petroleum-activities-act/>

[52] *NPA*, s 3-1, para 1 (production licences); note also *NPA*, s 2-1, para 1 (exploration licences).

[53] *NPA*, s 6c.

[54] *MRA*, s 60; *Explanatory Notes* at 92.

environmental impact assessment (EIA) must be conducted, and an EIA report approved by the Greenlandic government, *before* a licence for the exploitation of hydrocarbons can be granted.[55]

6.2 Drilling in Ice

Norway is the only Arctic country to prohibit drilling for oil in icy waters out of concern for the difficulty of cleaning up oil spills in ice. If similar regulations were in place in Canada, Arctic offshore oil exploration licenses in Lancaster Sound and the Beaufort Sea would not be tenable. At a minimum, there is a strong rationale for limiting oil drilling in the Canadian Arctic to regions where the sea is entirely ice free during the summer months and ceasing all drilling operations at least 45 days before the return of the "marginal" ice zone.

Norway does not allow and has never allowed oil operations within the boundaries of the maximum annual sea ice extent in the Barents and Norwegian Seas. In 2013, the Conservative Government in Norway reaffirmed the country's commitment to ban drilling operations in or near the maximum ice edge (as defined by the Norwegian Polar Institute) in the coming four-year period because there is currently no known technology or method that can recover oil from Arctic ice.[56] In fact, the last time a U.S. National Academy of Sciences panel looked at the issue, it concluded: "No current cleanup methods remove more than a small fraction of oil spilled in marine waters, especially in the presence of broken ice".[57] In addition, a recent report entitled *Estimating an Oil Spill Response Gap for the U.S. Arctic Ocean* shows that current oil spill control technologies will be mostly useless during the winter when pack ice covers the drill site (figure 7).[58]

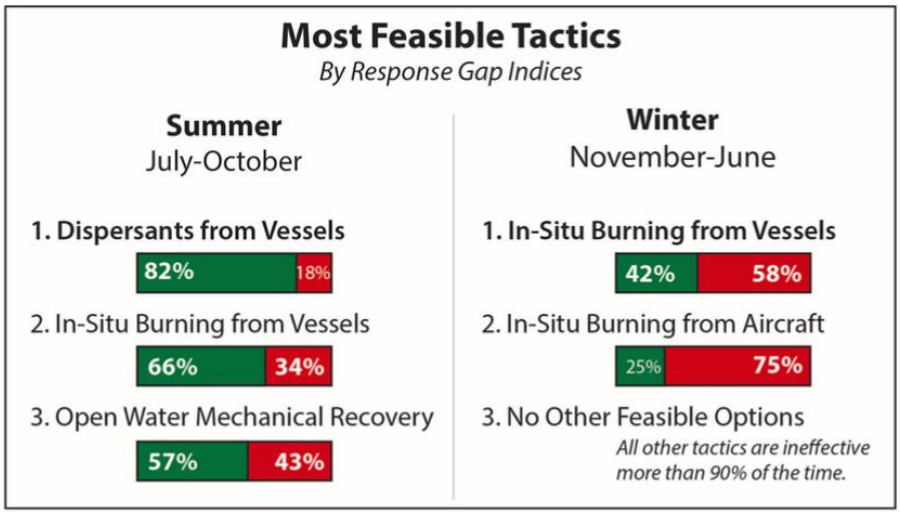

Figure 7. Predicted feasibility rate of various tactics. Figures in green by season, for the Chukchi Sea, represent percentage of time a tactic could be possible, but not necessarily successful (Nuka Research 2014).

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[55] *MRA*, s 73(1)(i).

[56] Mayeda, A., Nunatsiaq News (June 15, 2010). No way to clean up oil spill under Arctic ice: expert. <http://www.nunatsiaqonline.ca/stories/article/87890_no_way_to_clean_up_oil_spill_under_arctic_ice_expert/>

[57] National Research Council Committee on Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope (2003). Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope. <http://www.nap.edu/read/10639/chapter/1>

[58] Nuka Research (2014). Estimating an Oil Spill Response Gap for the U.S. Arctic Ocean. <http://www.nukaresearch.com/files/140910_Arctic_RGA_Report_FNL.pdf>

Arctic oil spill response is challenging because of extreme weather and environmental conditions; the lack of existing or sustained communications, logistical, and information infrastructure; significant geographic distances; and vulnerability of Arctic species, ecosystems, and cultures[59] - conditions that all apply in the Canadian Arctic. According to many experts, traditional methods of cleaning up spills, such as the use of containment booms, would be ineffective at capturing oil trapped under Arctic ice and mechanical equipment for the efficient recovery of oil in highly packed ice is not yet available.[60] [61] For instance, many of the techniques that were used to clean up oil in the Gulf of Mexico when the BP Deepwater Horizon oil rig exploded would be useless if a spill of similar magnitude were to occur under or near Arctic ice or in rough seas.[62] Oil controlling booms start to lose their effectiveness in metre-high waves and stop working entirely when the waves reach two metres high. Cold weather can make it difficult to apply dispersants to oil slicks and the presence of ice reduces their effectiveness, as dispersants rely on ocean waves to mix the oil and chemicals together.

Oil also behaves differently depending on the temperature of the water and the presence and thickness of sea ice. While the U.S. government has conducted some research into how oil responds in ice, the behaviour of oil in an Arctic environment is not fully understood.[63] In addition, without sunlight and with typically heavy cloud cover, an oil spill could be hard to detect and monitor in the Arctic using traditional techniques. There is also very limited knowledge of how marine ecosystems will be affected by the presence, composition and dispersion of oil, and the chemicals used for cleanup.[64]

Norway's policy therefore reflects the expert consensus that the possibilities for oil spill contingency in the Arctic are inadequate. Laboratory experiments, field research, and practical experience gained from responding to past oil spills have built a strong body of knowledge on oil properties and oil spill response techniques. However, much of the work has been done for temperate regions, and there are areas where additional research is needed to make informed decisions about the most effective response strategies for different Arctic situations. Simply not enough is known about how oil mixes with sea ice and whether oil trapped under the ice could become unrecoverable.[65] The industry does not yet have proven systems for recovering oil in areas with ice and little is known about how oil might interact with ice when spilled in significant quantities. Even Irene Rummelhoff, Statoil's Senior Vice President for exploration of the Norwegian continental shelf, acknowledged that the industry does not have good enough oil recovery systems for areas with sea ice.[66]

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[59] National Research Council Committee on Responding to Oil Spills in the U.S. Arctic Marine Environment (2014). Oil Spills in the U.S. Arctic Marine Environment. <http://www.nap.edu/read/18625/chapter/1>

[60] Pettersen, T. (June 16, 2010). No way to clean up oil spill under ice. Barents Observer. <http://barentsobserver.com/en/sections/articles/no-way-clean-oil-spill-under-ice-canadian-expert>

[61] Abdelnour, R. and G. Comfort (2001). Application of Ice Booms for Oil-spill Cleanup in Ice Infested Waters. Prepared for the Department of the Interior. < http://www.bsee.gov/Technology-and-Research/Oil-Spill-Response-Research/Projects/Project-353/>

[62] Nuka Research (2014).

[63] Abdelnour, R. and G. Comfort (2001).

[64] Kingwell, A., UToday (July 15, 2015). New Arctic Research Station Expands Oil Spill Studies. <https://www.ucalgary.ca/utoday/issue/2015-07-15/new-arctic-research-station-expands-oil-spill-studies>

[65] National Research Council (2014).

[66] TU Jobs (Retrieved June 2, 2016). 25 percent of the world's undiscovered oil could lie behind the ice edge. <http://www.tujobs.com/news/310215-25-percent-of-the-worlds-undiscovered-oil-could-lie-behind-the-ice-edge?page=9#sthash.EAliVWse.dpuf>

In addition to the difficulties in cleaning up oil spilled in icy waters, the impact of a spill in the fragile Arctic environment would also likely be much more significant than a spill in more temperate regions. The Norwegian Polar Institute notes that the ice edge zone in Norwegian waters, as in Canada, is important for many migrating species like ivory gull, ringed seal, polar bear, narwhal, beluga and Greenland whale. Ann Mari Vik Green, Chief Engineer of the Section for the Oil and Gas Industry in the Norwegian Environmental Agency, says that these environmental concerns are what weigh heavily in considering whether to allow oil industry near the ice edge.[67] According to Green, the safest decision for the environment would be if oil operations were kept far away from both the ice edge and the marginal ice edge zone, which is the transition between the open ocean and sea ice.

Norway's "no drilling in ice" policy is unique among Arctic nations, likely because if the same regulations were in place elsewhere, most, if not all, of the existing Arctic offshore oil licenses would not be feasible. No drilling within the maximum sea ice boundary in the Canadian Arctic would put existing or potential oil leases in Lancaster Sound, the Beaufort Sea, Hudson Bay, the Davis Strait, Baffin Bay, the east coast of Labrador and even the Gulf of St. Lawrence off limits. Figure 8 below shows the minimum and maximum sea ice extents in the Arctic in 2015. Note the extent of maximum ice coverage in Canada compared with Norwegian waters.

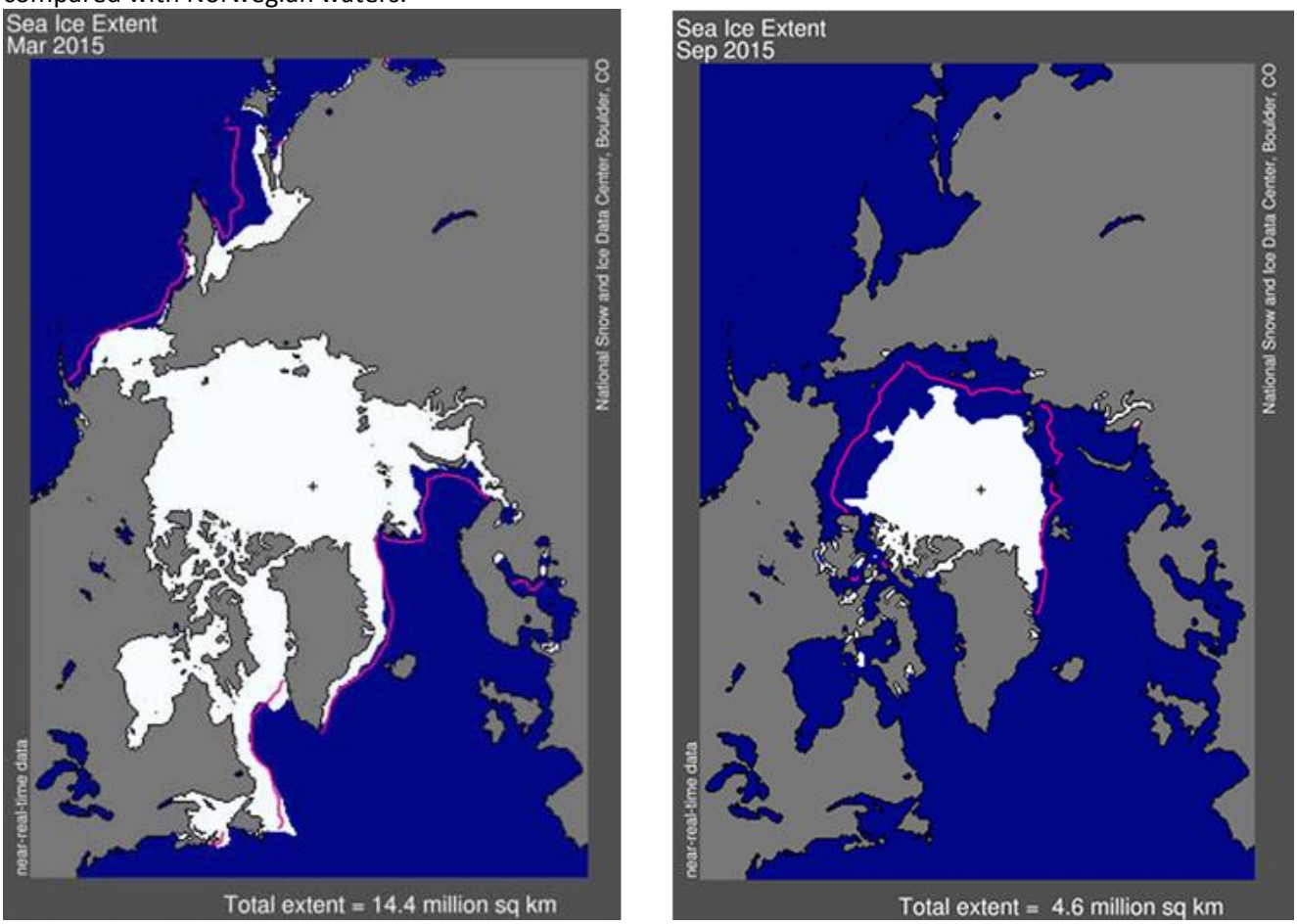

Figure 8. Average sea ice extent in March 2015 (left) and September 2015 (right) illustrate the respective winter maximum and summer minimum extents. The magenta line indicates the median ice extents in March and September, respectively, during the period 1981-2010. Map is from NSIDC at nsidc.org/data/seaice_index.

[67] Ibid.

Yet despite the much more extensive sea ice coverage in the Canadian Arctic, the rationale justifying Norway's no drilling in ice policy is just as applicable in the Canadian Arctic as it is in Norway, perhaps even more so given the remoteness of Canada's North and the commensurate lack of infrastructure needed to conduct oil drilling activities safely. The maximum sea ice extent reaches areas in the southern Canadian Arctic that are relatively or entirely ice free for large portions of the year; however other regions of the Canadian Arctic are ice-free for only short periods annually. The difficulty in cleaning up an oil spill in either sheet ice or the marginal ice zone would be just as formidable, if not more so, in parts of the Canadian Arctic including Lancaster Sound and the Beaufort Sea. In addition to improved clean-up technologies for oil spills in icy waters, Canada needs an enhanced presence and performance capacity in the Arctic, including area-specific training, icebreaking capability, infrastructure to support oil spill response, improved international coordination for transboundary spills, improved availability of vessels for responding to oil spills or other emergency situations, and aircraft and helicopter support facilities. Without the necessary precautions in place, the impact of an uncontained spill to Canada's ecologically sensitive Arctic ecosystem could potentially be catastrophic.

In Lancaster Sound, ice cover, both land-fast ice and pack ice, is common for nine months of the year. An uncontained spill in or under the sea ice or in the marginal ice zone would be nearly impossible to clean up with current technologies and the impacts could be devastating. The Canadian Beaufort Sea, where Imperial Oil, Chevron and BP hold exploration licenses (figure 9), is also frozen for most of the year. Historically, only a narrow pass of up to 100 kilometres opened up in the Beaufort Sea in August-September each year near the coast, although the ice-free area has been growing in recent years due to climate change.[68]

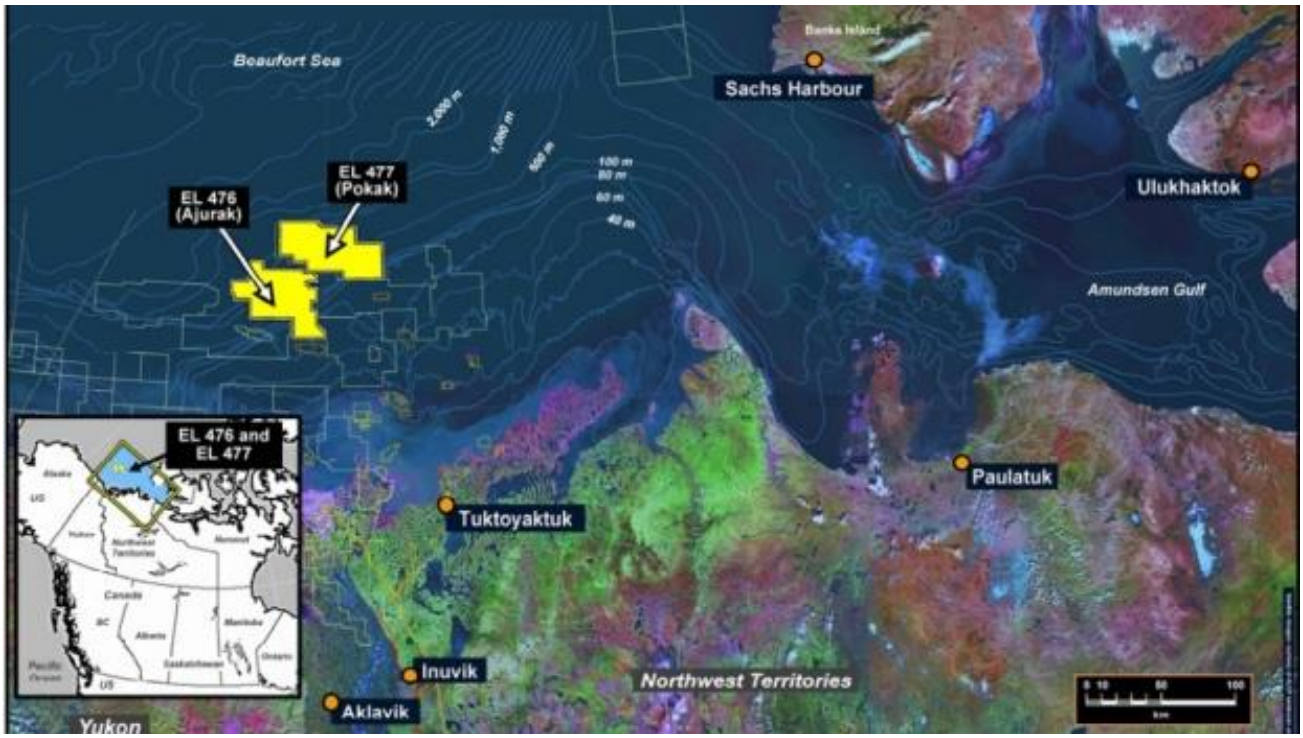

Figure 9. Imperial Oil holds an exploration license in the Beaufort Sea for the yellow parcel on the left. BP holds the license for the parcel on the right.[69]

[68] Encyclopaedia Britannica (retrieved June 2, 2016). Beaufort Sea. <http://www.britannica.com/place/Beaufort-Sea>
[69] CBC News (June 26, 2015). <http://www.cbc.ca/news/canada/north/imperaial-oil-bp-delay-beaufort-sea-drilling-plans-indefinitely-1.3129505>

In 2011, the NEB commissioned a study on the spill response effectiveness in the Western and Eastern Arctic.[70] The study aimed to estimate when and how long primary recovery and cleanup techniques would be unavailable due to environmental factors, including wind, waves, visibility, and darkness. The report states that for the Beaufort Sea region, oil spill response will not be possible from June to October between 16-46% of the time. For the Eastern Arctic and Davis Strait, oil spill response will not be possible from July to November between 16-56% of the time.[71] Some observers have suggested that these figures demonstrate a 'response gap' – i.e. a gap that exists when no effective response to an oil spill would be possible.[72] It is important to note that, according to the report, even when a response is possible, it may well not be effective.

A policy of no drilling in or near sea ice, or in marginal ice zones, in the Canadian Arctic would mean proposed or existing oil exploration blocks in Lancaster Sound and the Beaufort Sea are no longer viable. At a minimum, until oil recovery and cleanup technologies in icy waters have improved and the interaction of oil and ice is better understood, drilling in the Canadian Arctic should be limited to regions where the sea is entirely, not just marginally, ice free during the summer months and all drilling operations should be ceased at least 45 days before the return of the "marginal" ice zone. Although such a policy would place severe restrictions on oil exploration in Lancaster Sound and the Beaufort Sea, it is consistent with the scientific consensus that the possibilities for oil spill contingency in the Arctic are simply inadequate at the current time.

6.3 Oil Spill Response

Canada, like other Arctic nations, requires oil companies to submit detailed oil spill response and contingency plans to the NEB, which includes a combination of actions from the operator and regional/national authorities. The Board requires that an operator "appropriately respond" to a worst-case scenario but, unlike the United States, there is no specific capping requirement for a blown-out well. Oil companies operating in the U.S. Arctic are required by the Bureau of Safety and Environmental Enforcement to have their capping stack on site within 24 hours of a blowout off the coast of Alaska, whereas in Canada, there is no such requirement.[73] Instead, an operator's Contingency Plan must describe the capping and containment methods and systems proposed to appropriately respond to a worst-case scenario.

The U.S. also maintains a Same Season Relief Well requirement, which requires operators to demonstrate that they have immediate access to a separate relief rig that could "deploy and complete" a relief well in the event of a blowout within a maximum of 45 days.[74] Operators in the Canadian Arctic must demonstrate SSRW "capacity" as noted previously. A company can avoid the SSRW requirement

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[70] SL Ross Environmental Research Ltd. (2011). Spill Response Gap Study for the Canadian Beaufort Sea and the Canadian Davis Strait. Commissioned by the National Energy Board. <https://www.neb.gc.ca/ll-eng/livelink.exe?func=ll&objId=702787&objAction=browse>

[71] Ibid.

[72] WWF-Canada (2011). Recommendations for the NEB Regarding Arctic Offshore Drilling Requirements. <http://awsassets.wwf.ca/downloads/wwf_canada_presentation_to_neb_roundtable_in_inuvik_september_2011.pdf>

[73] Department of the Interior (2013). Oil and Gas and Sulphur Operations on the Outer Continental Shelf—Requirements for Exploratory Drilling on the Arctic Outer Continental Shelf. <http://www.bsee.gov/uploadedFiles/Proposed%20Arctic%20Drilling%20Rule.pdf>

[74] Ibid. p.129

where it can demonstrate how it can "meet or exceed" the intended outcome of controlling an out-of-control well in the same season. In its 2011 review, the NEB acknowledged that "there is a continual evolution of technology worldwide, including the technology needed to kill an out-of-control well. We are open to changing and evolving technology."[75]

To date, however, relief wells are the only proven way to regain control of a blowout well. At the NEB's Arctic Offshore Drilling Review in 2010, SSRW capability was the focus of extensive discussion during this process and even Chevron representatives admitted that in certain circumstances, capping and other same well systems could not be used and a relief well would be the only means to stop a blowout: "There is a situation if you lost well integrity and you breached the casing into the surface and that certainly – and we do not deny it – would require a relief well."[76] In any case, both Chevron and Imperial sought and obtained leave from the NEB to submit proposed alternatives for consideration outside of the drilling authorization process. Both companies subsequently withdrew from this process and did not submit alternative proposals.

The Board's longstanding requirement of SSRW capability had kept Canada in line with international regulatory best practice. The United States, Greenland, Norway and the United Kingdom all require relief well capability for northern offshore drilling activities.[77] Norway has some of the highest safety standards for offshore drilling of any country in the world, including a long-standing requirement for the capability to initiate a relief well within 12 days of a blowout.[78] Greenland has adopted Norway's high standards. In 2010 and 2011, a Scottish oil company, Cairn Energy, drilled a number of wells in Davis Strait off the west coast of the island. Two drill ships were required to be in the area at all times, leaving one available to drill a relief well if a blowout occurred.[79]

6.4 Liability

The liability regime for drilling operations conducted in Canada's Arctic is established pursuant to the *Oil and Gas Spills and Debris Liability Regulation* under *COGOA*, as well as through the *Arctic Waters Pollution Prevention Act* (AWPPA). Under the previous Conservative government's Bill C-22, *Energy Safety and Security Act*, in the case of an oil spill, the federal government could be left responsible for damages and clean-up costs in the billions of dollars due to the current $1 billion cap on liability, well below the anticipated financial costs of catastrophic spill response and damages.

Removing this cap and modifying the civil liability regime more generally, as other countries have done for nuclear accident liability, would eliminate these off-book liabilities by transferring the respective liabilities to those companies operating offshore. Bill C-22 included several fundamental weaknesses

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[75] NEB (2011). Review of Offshore Drilling in the Canadian Arctic. (Page 40). <https://www.neb-one.gc.ca/nrth/rctcffshrdrllngrvw/2011fnlrprt/2011fnlrprt-eng.pdf>

[76] National Energy Board, Public Review of Arctic Safety and Environmental Offshore Drilling Requirements, Roundtable transcript (2011) at para 755 [AODR transcripts]. See Bill Scott at para 4737.

[77] Pembina Institute (2011). Comparing the Offshore Drilling Regulatory Regimes of the Canadian Arctic, the U.S., the U.K., Greenland and Norway. <https://www.pembina.org/reports/comparing-offshore-oil-and-gas-regulations-final.pdf>

[78] "Norsok Standard D-010 Rev. 3 (Well integrity in drilling and well operations)," August 2004, Section 4.8.2, available at http://www.standard.no/PageFiles/1315/D-010r3.pdf

[79] See "Media Backgrounder: Cairn's Prevention and Response Capabilities offshore Greenland," available at http://www.cairnenergy.com/files/pdf/greenland/PreventionandResponseCapabilities.pdf

that compromise its effectiveness in terms of improving safety practices and protecting Canadian taxpayers in the event of a catastrophic spill:

1. $1 billion in absolute liability was an improvement upon the previous $40 million cap under the 1970 Arctic Waters Pollution Prevention *Act,* but it is still too low to cover the costs associated with catastrophic spills like the BP Deepwater Horizon, especially in the Arctic where environmental conditions would frustrate spill response efforts;
2. The bill provides for ministerial discretion to reduce absolute liability levels to below the legislated level of $1 billion;
3. The bill provides relief from liability, in certain cases, for the effects of dumping toxic spill treating agents (chemical dispersants) into marine environments;
4. The bill does not require an operator to provide proof that it has the financial resources to pay for the entire amount of at-fault liability (see section 6.5 below);

The current design of Canada's liability rules for Arctic offshore oil operations (as well as nuclear power and rail freight transportation) therefore leaves governments, taxpayers, communities and the environment vulnerable in the event of a significant accident or spill. The cap not only shapes and limits any claims for post-spill compensation, but it also creates an incentive for oil companies to pursue excessively risky activities, knowing they will only bear the full cost of liability (beyond the absolute liability cap) if negligence is established and upheld in court. Eliminating the liability cap is one major piece among a broader set of required offshore liability reforms that will encourage companies to weigh the full potential liability and make better risk decisions.

In Norway, the Petroleum Activities *Act* generally imposes strict liability for pollution damage from petroleum-related activities and has no cap on liability for offshore drilling. Operators are liable for pollution damage without regard to fault but this liability can be "reduced to the extent it is reasonable" if "an inevitable event of nature, act of war, exercise of public authority or similar Force majeure event has contributed to a considerable degree to the damage."[80] In other words, Norway's approach is exactly the opposite of Canada's. Instead of the government having to prove negligence on the part of the operator in court in order for a company to be held financially responsible, operators in Norway are by default automatically held fully liable and must make the case for why their liability should be reduced. Russia, Greenland and the U.K. also have no upper limit on liability in the event of an oil spill.[81]

6.5 Financial Responsibility

The US Government's Bureau of Ocean Energy Management (BOEM) has estimated that a catastrophic spill in the Chukchi Sea north of Alaska would cost $10.1 billion to $15.8 billion (USD) in terms of clean up, environmental damage and the value of lost oil. This does not include costs relating to legal proceedings such as fines.[82] For the Beaufort Sea, the figures are higher: between $12.16 and $27.77 billion (USD). The estimated sums, while huge, also seem quite low when compared to the Deepwater

[80] *NPA.* Section 7-3.
[81] Pembina (2011).
[82] Bureau of Ocean Energy Management (2012). Economic Analysis Methodology for the Five Year OCS Oil and Gas Leasing Program for 2012-2017 (p. 43).

Horizon disaster, which cost BP a total of approximately $54 billion (including fines and other legal costs).[83]

Smaller oil companies may have trouble even paying the $1 billion absolute liability, let alone if there was no absolute liability cap and they were responsible for all the clean-up costs. All Arctic countries require some demonstration, to varying degrees, of the operator's ability to take financial responsibility and/or demonstrate reserves, such as sufficient insurance, in the event of an oil spill; however, there is no legal requirement in Canada for operators to demonstrate financial capacity or insurance to cover liabilities up to a realistic level. Such a requirement exists in some places, such as the European Union.

In Canada, any oil company that seeks authorization for drilling, must show a financial responsibility, in an amount and form satisfactory to the NEB, for the costs of abating and containing a spill in the "worst case scenario"; however, the worst case scenario is not defined and there are no regulations specific to calculating spill severity.[84] Section 26.1(1) of COGOA states that an operator must show it has the financial resources necessary "to pay the greatest of the amounts of the limits of liability".[85]

Greenland has been showing some leadership on this issue, demanding that oil companies provide a $2 billion guarantee in advance of exploratory drilling. Smaller companies are required to provide the money up front, with the "bond" being designated specifically for meeting the cleanup costs resulting from any spill.[86] The licensee must provide a financial guarantee of $10 billion USD, which is an improvement upon Canada's absolute liability cap but still insufficient. In the U.K., in order to be satisfied that an operator is in a position to implement its plan, the Department of Energy and Climate Change must also be satisfied that the operator (together with its partners) has appropriately estimated the possible costs of implementing these steps and has in place the funds to do so.[87]

7. Opportunities for reform

As we have seen, the process for approving and regulating offshore oil and gas in the North appears to be outdated and misaligned with government priorities. Thirty years ago, the prospect of offshore oil in the Arctic looked much brighter than it does now. Yet heightened public awareness and deep concern about issues such as climate change, Indigenous sovereignty, land claims and environmental protection have raised serious questions about the appropriateness of Canada's current regulatory approach to petroleum development in the Arctic. Some of the regulations are not in line with international best practices and the entire regulatory regime, from the call for bids through to well operations, could benefit greatly from a comprehensive public review. Based on the analysis above, this concluding

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[83] Gilbert, D. and S. Kent (July 2, 2015). BP Agrees to Pay $18.7 Billion to Settle Deepwater Horizon Oil Spill Claims. Wall Street Journal.

[84] NEB (2011).

[85] COGOA (1985).

[86] Tim Webb, "Greenland wants $2bn bond from oil firms keen to drill in its Arctic waters," The Guardian, 12 November 2010. <http://www.guardian.co.uk/business/2010/nov/12/greenland-oil-drilling-bond>

[87] U.K. Department of Energy and Climate Change (2009). Oil Pollution Emergency Plan Requirements. <https://www.og.decc.gov.uk/environment/OPEP_Guidance.doc>

section suggests some possible opportunities for reform.

7.1 Improve Financial Responsibility and Liability Regulations

A series of significant and highly-publicized oil spills, including the BP Deepwater Horizon spill in the Gulf of Mexico, have highlighted the inadequacy of Canada's liability regime. The damages in the BP spill alone are currently estimated at $54 billion (USD).[88] There is currently no legal requirement in Canada for operators to demonstrate financial capacity or insurance to cover liabilities up to a realistic level.

In accordance with the polluter pays principle, operators in Canada should face unlimited absolute financial liability for oil spills and should be able to demonstrate sufficient reserves, such as adequate insurance, in the event of an oil spill. The $1 billion (CAD) absolute liability limit under *COGOA* and the *Arctic Waters Pollution Prevention Act* should be eliminated and the polluter-pays principle should be applied consistently to improve safety practices, reduce the likelihood of highly-damaging events and fully protect taxpayers.

Unlimited absolute liability will yield two direct benefits:

a) The appropriate allocation of risk will provide an incentive for industry to improve safety practices, reducing the likelihood of polluting accidents, and
b) It will ensure that taxpayers are entirely protected from the financial consequences of an offshore oil spill, which could run into the many billions of dollars.

Currently, *COGOA* requires that any oil company seeking authorization for drilling must show a financial responsibility for the costs of abating and containing a spill in the "worst case scenario". However, the "worst case" is not defined and there are no regulations specific to calculating spill severity. It is left to the discretion of the operator who could (and do) downplay the actual risks. There is also no legal requirement in Canada for operators to demonstrate financial capacity or insurance to cover liabilities up to a realistic level. Section 26.1(1) of *COGOA* only states that an operator must show it has the financial resources necessary "to pay the greatest of the amounts of the limits of liability", which is capped at an unrealistically low $1 billion as we have seen.

7.2 Include a conservation policy and adequate impact assessment

Given the significance of concerns about climate change, environmental protection, safety, and Indigenous land claims, sovereignty and consent, the federal government should adopt a much more comprehensive approach to oil and gas licencing, rather than one that prioritizes petroleum exploration over other possible options, and ensure that an environmental and social impact assessment, including climate change impacts, be conducted and approved *before* an exploration licence is granted.

Exploration licences are currently awarded through a bidding process in which the highest bid (beyond $1 million) is awarded the licence. The current legislation lacks a means to exclude any area from the bidding process and it places petroleum development ahead of all other uses, including conservation

[88] Gilbert and Kent (2015).

reserves. This precludes effective conservation regional planning that could be designed to accommodate conservation *and* development. It also precludes the effective reservation of specific areas identified by northern peoples as essential to their wellbeing.

Through the nomination process for licences under the *CPRA*, INAC generally requires that public bids for exploration licences consider environmental conditions, land claims and northern benefits. This is not equivalent to a comprehensive environmental impact assessment however. Unlike other offshore areas, planning for offshore drilling in the Arctic occurs on a project-by-project basis and there is no statutory requirement to conduct an environmental, social and/or climate impact assessment before an exploration licence is granted under the *CPRA*. Environmental assessment of specific activities in the licence area may only be triggered under the *CEAA* or under land claims agreements (where applicable) when the operator seeks an authorization from the NEB under *COGOA*. But by this stage, the operator has already paid for and been granted an exploration licence and has likely invested considerably in the exploration project. Moreover, the NEB defines the factors it will consider in an environmental assessment. There is no EA standard for drilling projects in the Canadian Arctic. While an EA could theoretically halt a drilling project after the exploration licence has been granted if it were found to involve unacceptable impacts, it stands to reason that the operator would pressure the NEB not to do so, given the substantial investments they would have made by this point in exploratory work. Considering environmental and social issues only after a licence has been granted also precludes the effective reservation of specific areas identified by northern peoples as essential to their wellbeing.

In contrast, Greenland's *Mineral Resources Act* (MRA) requires that an environmental impact assessment be conducted and approved by the government *before* a licence for the exploitation of hydrocarbons can be granted. Similarly, before an area can be opened for licensing in Norway, the Ministry of Petroleum and Energy must evaluate the "various interests" in the area including a description of the impact of opening the area for petroleum activities in relation to living conditions for animals and plants, the sea bed, water, air, climate, landscape, emergency preparedness and risk, and the joint impact of these factors.[89]

Environmental considerations feature prominently in the Arctic Offshore Oil and Gas Guidelines set out by the Arctic Council in 2009.[90] These guidelines set out general principles (such as the precautionary principle) as well as specific guidance on topics such as environmental impact assessment (including public participation and strategic environmental assessments). Canada has committed to "act on the request from the Arctic Council that all states apply these guidelines as minimum standards throughout the Arctic and will encourage others to do so as well."[91] Yet Canada's approach to rights issuance and the priority the *CPRA* places on petroleum development, ahead of all other uses, contradicts the government's commitments to the Arctic Council Guidelines, Indigenous rights, climate change and environmental protection.

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[89] *Norway Petroleum Act*, s 3-1, para 1 (production licences); note also *NPA*, s 2-1, para 1 (exploration licences). http://www.npd.no/en/Regulations/Acts/Petroleum-activities-act/

[90] Arctic Council (2009).

[91] Global Affairs Canada (2013). Canada's Arctic Foreign Policy. <http://www.international.gc.ca/arctic-arctique/arctic_policy-canada-politique_arctique.aspx?lang=eng>

Canada also does not require that a social impact analysis be conducted or that a consultation plan be submitted that includes a commitment to benefits sharing and recognizes the Indigenous right to free, prior and informed consent (FPIC). Prime Minister Trudeau has committed to implementing the United Nations Declaration of the Rights of Indigenous Peoples, which includes the FPIC standard in numerous provisions.[92] For example, Article 32(2) requires that states obtain the free, prior and informed consent of Indigenous peoples "prior to the approval of any project affecting their lands or territories or other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources."[93] The Canadian regulatory regime needs to be amended to reflect the government's stated commitment to the rights of Indigenous peoples and to a renewed relationship between the federal government and the Indigenous Peoples of Canada.

7.3 Maintain the Same Season Relief Well requirement

Ensure the Same Season Relief Well (SSRW) capability requirement (or equivalent) is fully maintained in the regulatory regime. Where it cannot be assured, drilling should not be permitted. Establish end-of-season cut-off dates to allow sufficient time to drill and complete a relief well.

The SSRW requirement is intended to prevent a blowout continuing unchecked through the Arctic winter. As noted previously, the NEB now requires that operators in the Canadian Arctic demonstrate Same Season Relief Well (SSRW) "capacity". A company can avoid the SSRW requirement where it can demonstrate how it can "meet or exceed" the intended outcome of controlling an out-of-control well in the same season. In its 2011 review, the NEB acknowledged that "there is a continual evolution of technology worldwide, including the technology needed to kill an out-of-control well. We are open to changing and evolving technology."[94]

A relief well is to date the only proven way to regain control of a blowout well. Allowing for SSRW equivalency could potentially be very dangerous if industry cannot prove that their proposed control method actually works. The United States, Greenland, Norway and the United Kingdom all require relief well capability for northern offshore drilling activities.[95] Norway has some of the highest safety standards for offshore drilling of any country in the world, including a long-standing requirement for the capability to initiate a relief well within 12 days of a blowout.[96] Greenland has adopted Norway's high standards. In 2010 and 2011, a Scottish oil company, Cairn Energy, drilled a number of wells in Davis Strait off the west coast of Greenland. Two drill ships were required to be in the area at all times, leaving one available to drill a relief well if a blowout occurred.[97] The NEB's longstanding requirement of SSRW

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[92] Website of the Prime Minister of Canada (June 21, 2016). <http://pm.gc.ca/eng/news/2016/06/21/statement-prime-minister-canada-national-aboriginal-day>

[93] United Nations Declaration on the Rights of Indigenous Peoples (2008). Published by the United Nations. <http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf>

[94] NEB (2011). P. 40

[95] Pembina Institute (2011).

[96] "Norsok Standard D-010 Rev. 3 (Well integrity in drilling and well operations)," August 2004, Section 4.8.2, <http://www.standard.no/PageFiles/1315/D-010r3.pdf>

[97] See "Media Backgrounder: Cairn's Prevention and Response Capabilities offshore Greenland," available at http://www.cairnenergy.com/files/pdf/greenland/PreventionandResponseCapabilities.pdf

capability has kept Canada in line with international regulatory best practice and must be maintained.

7.4 Introduce a capping requirement for well blow-outs

Canadian regulations should require that a capping stack be on site within 24 hours of a blowout. Canada, like other Arctic nations, requires oil companies to submit detailed oil spill response and contingency plans to the NEB, which includes a combination of actions from the operator and regional/national authorities. An operator's Contingency Plan must describe the containment methods and systems proposed to appropriately respond to a worst-case scenario, but there is no specific capping requirement for a blown-out well. Oil companies operating in the U.S. Arctic are required by the Bureau of Safety and Environmental Enforcement to have their capping stack on site within 24 hours of a blowout off the coast of Alaska. In addition, it is not clear in COGOA what is meant by an "appropriate response" or how the NEB determines what is appropriate.

7.5 Require sufficient response capacity and "response gap" analysis

New regulatory requirements are required to ensure that there is adequate response capacity to respond to an oil spill or well blow-out. The Canada Oil and Gas Drilling Regulations require that operators submit a safety plan, environmental protection plan and contingency plan, including emergency response procedures in the event of an accident and mitigation measures to ensure that any "foreseeable" accident does not compromise safety or environmental protection. However, research suggests such mitigation measures would likely not be sufficient at certain times of the year or under certain weather conditions. For instance, WWF Canada has identified major limitations, or "response gaps", in the effectiveness of existing technologies to respond to oil spills due to weather conditions, safety restrictions, resources or technology.[98] Even in ideal conditions, without ice, the industry only expects to recover 20% of the oil.[99] In the winter months, the extreme Arctic conditions would prevent any response being conducted. Exploratory and production licences should not be issued without first analyzing the risks to better understand whether response capacity is sufficient (i.e. a response gap analysis).

Another WWF report (not yet published) finds that very little response capacity exists in the Canadian Beaufort Sea and that successful recovery of oil from a ship accident is highly unlikely.[100] The impacts of a spill would be borne by the communities in the region, who depend on a healthy and clean marine waters for the majority of their food and whose cultural and spiritual well-being are tied to their environment. Very little equipment and personnel are available for a response in the Beaufort Sea.

The Canadian Coast Guard has not conducted a comprehensive assessment of its response capacity

[98] WWF Canada (2011). Western Arctic Oil Response Gaps. <http://assets.wwf.ca/downloads/western_arctic_oil_spill_response_gaps__march_2011_.pdf>
[99] WWF Canada (2010). Drilling for Oil in the Arctic: Too soon, too risky. <http://www.worldwildlife.org/what/wherewework/arctic/WWFBinaryitem18711.pdf>
[100] WWF Canada (2016). Ship-based Oil Spill Response Capacity in the Beaufort Sea. (Unpublished).

since 2000 and is unable to determine whether it has appropriate capacity.[101] There is mounting concern that regulations in all Arctic nations concerning oil spill prevention and response in ice-covered waters are inadequate and not sufficiently Arctic-tested.[102] In addition, even if sufficient standards are in place, how can an operator reassure the NEB that its contingency planning would be sufficient to protect the environment in the event of an accident if the required physical infrastructure and assets are unavailable to support the cleanup effort?

In southern waters, Canadian law requires ships to contract with a Response Organization that can provide equipment and personnel sufficient to clean up the amount of oil that a ship is carrying within a certain amount of time.[103] However, ships traveling north of 60 degrees latitude are exempt from these provisions under current shipping and oil and gas regulations.[104]

7.5 Define Environmental Assessment Boundaries

Under *CEAA*, the boundaries defining the environmental assessment area for multiple exploratory drilling projects in the Arctic need to be representative of the area and clearly defined based on strict, science-based criteria. Prior to 2012, *CEAA* required every exploratory offshore well to undergo an environmental assessment but the previous, Conservative government changed this requirement such that the new regulations under CEAA 2012 now cover a drilling program, which is defined as a series of wells in a given area, rather than individual wells. Thus only the first exploratory well "in an area set out in one or more exploration licences" requires an assessment. It is up to the NEB's discretion to define the boundaries of these areas meaning that multiple exploration licences can be rolled together into a single EA and the process for delineating a boundary is not clear, nor does it seem necessarily to be guided by scientific evidence regarding an area's biological or cultural importance.[105]

7.6 Update seismic testing regulations

Include provisions in Canadian regulations such as *COGOA* to greatly expand the 500-metre "shut down zones" for seismic surveys to ensure the safety of marine wildlife when conducting underwater seismic blasting operations. Seismic testing should not be permitted in areas of high biological or cultural importance, or in areas that have been flagged as candidates for conservation.

The impacts of seismic blasting on marine wildlife are known to be considerable but are not yet fully understood. Allowing seismic programs in areas of high biological or cultural importance is not

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[101] Office of the Auditor General of Canada (2010). 2010 Fall Report of the Commissioner of the Environment and Sustainable Development. <http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201012_01_e_34424.html>

[102] Ebinger, C., Banks, J. and A. Schackmann (2014). Offshore Oil and Gas Governance in the Arctic. Brookings Institute. <http://www.brookings.edu/~/media/Research/Files/Reports/2014/03/offshore-oil-gas-governance-arctic/Offshore-Oil-and-Gas-Governance-web.pdf?la=en>

[103] Canadian Shipping Act, 2001, section 167(1); Environmental Response Arrangements Regulations, SOR/2008-275.

[104] Environmental Response Arrangements Regulations, SOR/2008-275. <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2008-275/>

[105] Regulations Designating Physical Activities (SOR/2012-147). <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-147/FullText.html>

compatible with conservation objectives as it could violate the rights of the Inuit people and have catastrophic consequences for marine mammals. The NEB has acknowledged that the sound produced by underwater air guns can lead to serious sensory and physical disturbances in birds, marine mammals and fish.[106] The Board's mitigation policy of shutting down the blasting should any mammals be detected within 500 metres of the air gun is not supported by the scientific evidence. Ensuring compliance with this policy is difficult and research suggests that a 500 metre "shut down zone" is insufficiently small to adequately protect marine mammals from seismic impacts.

7.7 Adopt a policy on drilling in Ice

Canada should adopt a clear regulatory policy on drilling in or near sea ice. Until oil recovery and cleanup technologies in icy waters have improved and the interaction of oil and ice is better understood, drilling in the Canadian Arctic should be limited to regions where the sea is entirely, not just marginally, ice free during the summer months. All drilling operations should be ceased at least 45 days before the return of the "marginal" ice zone. Although such a policy would place severe restrictions on oil exploration in Lancaster Sound and the Beaufort Sea, it is consistent with the scientific consensus that the possibilities for oil spill contingency in icy waters are simply inadequate at the current time.

[106] NEB (2011). Canada Oil and Gas Operations Act Environmental Assessment Report for the Northeastern Canada 2D Seismic Survey (Baffin Bay/Davis Strait). Government of Canada. <https://www.neb-one.gc.ca/nrth/dscvr/2011tgs/nvssssmnt/nvssssmnt-eng.html>