SVALBARD AND CONFLICT MANAGEMENT IN A CHANGING CLIMATE: A RISK BASED APPROACH

John Ash (Scott Polar Research Institute, University of Cambridge)

Abstract

Conflict in the Arctic is nothing new, and Svalbard is a geographical confluence of factors that create the potential for inter-group violence. The purpose of this paper is to explore those factors, identifying approaches to the evaluation of their associated risk. The emphasis is on biomarine resources, which at present constitute the most likely focus for escalating disputes. Contributory factors, including the catalytic effects of climate change, will also be considered. Given the political progress that has been achieved recently, the most likely situation for an intense interstate conflict in the short term is one that spreads to the Arctic, rather than one igniting within it. However, as the century progresses, dormant problems relating to the Svalbard archipelago will combine with environmental, economic and political trends to exacerbate conflict risk. Traditionally, armed conflict has been viewed as a phenomenon that cannot be predicted. This view is identified as dangerously misleading. Using a risk based approach and noting advances in analytical techniques, representative scenarios in which conflict may occur are examined and prospective methods of risk management identified.

Keywords

Arctic; climate change; conflict; risk; Svalbard

Introduction

The Arctic and sub-Arctic regions are amongst the most hostile physical environments in the world.[1] It is hardly surprising therefore that as battlespaces,[2] they have proven to be amongst the most challenging and costly locations in terms of casualties on the planet.[3] Yet, as the global climate continues to change, the likelihood of conflict of all types increases (Hsaing, Burke and Miguel 2013) including violent conflict in the Arctic. The aim of this paper is to examine prospective scenarios in which such conflict may arise, and using Svalbard[4] as a focus, examine a risk-based approach to the management of geopolitical hazards. It is not suggested that Arctic conflict is imminent; indeed, political progress in recent years has been exemplary. However, the maintenance of that stability is a challenge that requires consistent endeavour and innovative thinking.

1 See Piantadosi (2003) for a comprehensive exploration of the effects of cold on human survival.

2 The term 'battlespace' will be applied here using the definition endorsed by NATO: "The environment, factors and conditions that must be understood to apply combat power, protect a force or complete a mission successfully. It includes the land, maritime, air and space environments; the enemy and friendly forces present therein; facilities; terrestrial and space weather; health hazards; terrain; the electromagnetic spectrum; and the information environment in the joint operations area and other areas of interest". (North Atlantic Treaty Organization 2016).

3 See Ash (2016a) and citations therein, particularly in relation to Operation Sandcrab and the Falklands war.

4 Throughout this paper, the term Svalbard will be used to denote the archipelago defined in the so-called Svalbard Treaty concerning Spitzbergen and signed in Paris 9th February 1920.

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Svalbard as a model for conflict management

The Svalbard archipelago has long been a site for conflict in the Arctic. In the 17th century the Nine Years' War – sometimes referred to as the War of the Grand Alliance – spilled over into the commercial activity occurring in the archipelago (Conway 1906, 217–222). 1693 saw an attack by two French ships on forty Dutch whaling vessels at Treurenberg Bay (now Sorgfjord). Thirteen of the Dutch ships were captured, the rest escaping (*ibid*.). In the 20th century, Svalbard once again saw conflict as allied and German forces fought to establish control over the collection of weather data (Schuster 1991). The Germans established a number of weather stations on the archipelago at various times during the Second World War, at one point mounting an amphibious assault to deny the Allies access to information vital to the prosecution of the war effort (*ibid*.). It is significant that in both of these historical cases, conflict did not ignite ***in*** the Arctic, but rather spread ***to*** the region. Moreover, while both conflicts were derived from political struggles, the portion of the violence associated with Svalbard centred on resources – biomarine resources and information. In the latter case, the physical location of Svalbard made it critical to observations that could be incorporated into synoptic charts for weather forecasts.

Svalbard is by no means the only site of historical conflict in the Arctic.[5] Archaeological evidence at Saunaktuk in Arctic Canada indicates violence at a societal level occurring as early as the 14th century (Melbye and Fairgrieve 1994). In older literature, both climate change and conflict have been cited as factors contributing to the decline of Norse settlements in Greenland (Birket-Smith 1928, 12). For a modern assessment by a leading researcher, see Jette Arneborg (2015, 268), who notes:

> The Thule Inuit appearance in the settlements was yet another stress factor for the Norse. The Thule Inuit have long ago been cleared of having wiped out the Norse … Still, with the recognition of the increased Norse dependence on the outer coast resources at the same time as the Inuit might have reached the settlements, the contacts between the Norse and the Inuit are worth reconsidering. A few Inuit raids, like that recorded in the Icelandic Annals (1379) when 'the skraelings [the Inuit] attacked the Greenlanders, killed 18 men and caught and enslaved two boys', … could have been fatal for the settlements, again seen in the light of the decreasing number of inhabitants.

The studies of Ernest S. Burch (2007) reveal raids and battles in Western Alaska during the early contact period (c1775-1850). Some 80 battles have been reconstructed from oral history, although dating is problematic (Mason 2012). Archaeological finds of slat-armour in the coastal region confirm the occurrence of warfare (*ibid*.). Relatively elementary weapons could prove effective in an Arctic context. In the 18th Century, the Chukchi resisted the power of Imperial Russia (Forsyth 1992, 143–151). By the 19th Century, the Bering Sea witnessed the northerly extent of the American Civil War as the confederate commerce Raider CSS Shenandoah attacked Union vessels (Baldwin 2007, 238–239, 241–243, 245–247, 249–253).

The 20th Century brought bitter conflict to the Arctic, both in the terrestrial and marine environments. The Winter War of 1939-40, fought between Finland and Russia, brought severe casualties. In the battle of Suomussalmi alone, the Russians lost some 27500 men

[5] See Ash (2016a) and citations therein for a previous overview of Arctic conflict.

to battle or cold weather fatalities (Gregory 1989, 110). In 1943, Operation Sandcrab was mounted to retake Attu in the Aleutian Islands from the Japanese. The allied invasion force, numbering more than 15,000 men, suffered 549 killed. Some 2,132 were taken out of action by nonbattle injuries (Pennell 2008). Over 1500 of the nonbattle injuries were cold related (US National Park Service, undated). Richard Woodman's (2007, 447) study of the Arctic convoys to resupply Russia with military materiel reveals the losses endured at sea.

Although only a subset of the extensive history of Arctic conflict, the Svalbard archipelago provides a useful example of the complex interaction of geopolitical and other phenomena that typify the challenges of maintaining peace as the climate changes. What was true of Svalbard as a prospective site for conflict in the 17th and 20th centuries remains true in the 21st: its location and natural resources, coupled with its legal history and status, make it a potential focus for violence at both the sub-national and international levels. By the same token, if peace can be preserved in Svalbard, it bodes well for conflict management in the Arctic as a whole.

The Arctic, Svalbard, and potential conflict

As climate change and its effects on the Arctic have gained wider attention, particularly ice ablation and the prospect of greater access in oceanic areas, there has been much comment on the potential for resource-related conflict (Young 2009, and citations therein). The correlation between resource availability and conflict is not a simple one, and has been disputed as a reliable predictive factor by some researchers (Koubi et al. 2014). In 2008, the Arctic Five[6] nations moved decisively to block calls for political influence on the region by other nations; in particular, to preclude any authority conferred by the establishment of a new treaty regime for the Arctic Ocean (Dodds 2013). Their deliberations, held at Ilulissat in Greenland, excluded Finland, Sweden and Iceland – all nations that possess territory within the Arctic Circle, although not in the Arctic Ocean littoral (*ibid*.). The discussion also occurred without representation from other parties within the Arctic Council, such as the indigenous organisations (*ibid*.). The outcome of the conference, the Ilulissat Declaration, expresses a determination to effect governance of the region by means of extant treaty law; specifically, the law of the sea. The law of the sea, as codified in UNCLOS, details the rights and responsibilities of states parties with regard to resources and the marine environment in oceanic areas abutting their coasts. It confers particular authority to nations whose shores border ice-adjacent waters.[7] Despite ice ablation, the most promising potential hydrocarbon deposits in the Arctic occur mostly within areas over which no territorial dispute exists.[8] For those hydrocarbons in disputed areas, Arctic states appear reluctant to mar valuable political relationships by contesting ownership. Indeed, it would be doubly unwise to do so, as oil companies have demonstrated a clear reluctance to prospect in such areas for fear of embroilment in costly legal disagreements (Howard 2009, 34). Hence, the present likelihood of resource wars over Arctic hydrocarbons appears small.

6 Canada, Denmark, Norway, Russia and the United States; the coastal nations of the Arctic Ocean.

7 Under UNCLOS Article 26, governments may levy fair charges for services to vessels such as icebreaking and pilotage in their territorial seas. Moreover, Article 234 empowers them to enforce nondiscriminatory laws for the prevention, reduction, and control of marine pollution from vessels in ice-covered areas within the limits of their Exclusive Economic Zones (EEZs).

8 Compare Gautier et al. (2008) Fig 1, with International Boundaries Research Unit (2015).

For the most intense types of conflict at the interstate level – open military action – the geographic location of Svalbard is of strategic value (Figure 1, see at the article's end), providing a position from which to launch attacks on maritime assets and block access both to the Barents and the Arctic Ocean. Figure 1 provides a simple illustration of the prospective hard power influence that might be exerted from Svalbard. The superimposed radii give an indication of surface to surface anti-shipping missile engagement ranges.[9] To apply such force, it would not be necessary to establish dominance over the entire archipelago; it would be enough to seize and hold tactically advantageous positions for sufficient time to achieve the desired military and political objectives. These engagement zones would be significantly enhanced if the shore based systems were employed to protect surface warships and submarines with their own missile systems.

This begs the question why conflict at the state level would spread to the Arctic. In the case of a European confrontation involving NATO and Russia, the Arctic is where Russian naval forces, and particularly the maritime strategic assets[10] of the Northern Fleet are based. Related to this factor, both sides would gain advantage from controlling access to the Greenland and Norwegian Seas, and to the maritime resupply routes between America and Europe.[11] In military terms, Svalbard is a pivot from which tactical barriers can be deployed against an opponent, cutting off access to key portions of the battlespace. Moreover, it provides an unsinkable base from which to conduct surveillance; a metaphorical hill overlooking a battlefield.

While Svalbard becomes desirable real estate during inter-state conflict, further issues arise as a result of the archipelago's political history. The Svalbard Treaty of 1920[12] is explicit in requiring not only the 'non-warlike' use of the territory, but also open access to its resources. This confers a rather diminished form of sovereignty[13] on Norway as the ruling state, and a complex set of security problems. Norway may not construct fortifications, naval ports or conduct military exercises within the Svalbard area as defined by the 1920 Treaty. Thus, its ability to mitigate conflict risk through deterrence is limited, and as access to the archipelago is relatively unrestricted, border control is less easy to impose. Svalbard's population includes a number of Russians, who work the coal mines and who are attempting to promote their principal settlement at Barentsburg as a centre for tourism (Klelkowski 2015; Statistics Norway 2016). This provides not only an environment in which military personnel could be concealed, but a potential casus belli,

9 The radii in Figure 1 are 350km, representing the maximum range of the Russian K-300P mobile coastal defence missile system as reported by Defence Minister of the Russian Federation Sergei Shoigu (Sputnik International 2016).

10 Principally, the ballistic missile armed submarines.

11 See Grove with Thompson (1991) for a full discussion of the development of NATO strategy for the reinforcement of Norway and the containment or defeat of Russian forces in war.

12 This term will be used to identify the 'Treaty between Norway, The United States of America, Denmark, France, Italy, Japan, the Netherlands, Great Britain and Ireland and the British overseas Dominions and Sweden concerning Spitsbergen signed in Paris 9th February 1920'. In modern times, 'Svalbard' has become increasingly used to denote the entire archipelago, with 'Spitzbergen' reserved as a reference to the principal island; for that reason only, 'Svalbard Treaty' will be used here. The use of 'Svalbard' in itself is political, as it alludes to an historical access of the landmass, which strengthens the Norwegian claim to sovereignty (Berg 2013).

13 It is acknowledged that 'Sovereignty' is in itself a complex concept that has evolved over time and continues to challenge political science to encompass it with an entirely compelling definition (See Ash 2016 b and citations therein). To preserve discussion within this paper, Philpott's 2001 proposal 'supreme authority within a territory', will be accepted here as an appropriate starting point.

as the Russians represent a prospective 'victim' population to be 'rescued' as occurred in Ossetia and the Ukraine.[14] Norway has attempted to keep interpersonal and economic relations with Russia separate from geopolitics in the Arctic (Hyman 2016). Such behaviour may have little benefit in a hybrid conflict situation. The comment: "'Truth,' it has been said, 'is the first casualty of war'" has been attributed to Philip Snowden[15] (Morel 1916). In hybrid warfare,[16] the truth is dead long before the first shot is fired.

A further consideration in the light of current Russian military doctrine[17] is that a pre-emptive occupation of key parts of the archipelago might be regarded as 'de-escalation' by the Russian military and political leadership. This may appear ironic, as offensive military action on Svalbard by Russia would almost certainly trigger action under Article 5 of the North Atlantic Treaty of 1949.[18] However, such an action may be viewed in the same light as other 'de-escalation' alternatives discussed in Russian doctrinal publications (Zagorski 2011). Russia appears to have abandoned its prohibition on nuclear first use in favour of a tactical strike option,[19] should Russian conventional forces be outmatched. Such a strike may be 'demonstrative' in nature. The aim would be to confront NATO forces with a choice – either to accept the *status quo ante bellum* or embark on an escalation into a devastating nuclear conflict (Zagorski 2011, 25). In contrast to a nuclear strike, a preemptive occupation of parts of Svalbard and the emplacement of anti-aircraft and anti-ship missile batteries would slam a door in the face of NATO at the commencement of hostilities without having to cross the nuclear threshold. Plans for such an occupation may already be in hand. Eirik Haugland, a head of Norwegian counter-espionage, has identified the landing point location of the underwater cable providing communications between Svalbard and mainland Norway as a target by foreign agents (Associated Press 2014). More recently, Stormark (2017) claims multiple sources in reporting that the Russian military exercise 'Zapad 2017' included a simulated invasion of Svalbard. Such a move by Russian forces would involve significant military and political risk, but is consistent with a perception that a sudden, aggressive demonstration of military power against larger or better equipped forces could 'de-escalate' a conflict.

Types of Arctic conflict

Conflict exists in many forms, and Svalbard is a potential focus for more than open military conflict at the state level. Other sources of risk include political violence at the sub-state level – terrorism – and disputes over biomarine resources. Additional prospective catalysts of conflict might be identified; a pandemic is one possibility. However, this paper particularly concerns itself with hazards associated with Svalbard and climate change; and examples are chosen accordingly.

14 Ironically, most of the inhabitants of Barentsburg are Ukrainian coal miners (Klelkowski 2015).

15 Introduction to *Truth and the War*, by E. D. Morel (1916), p. vii.

16 In hybrid warfare: "The adversary tries to influence influential policy-makers and key decision makers by combining kinetic operations with subversive efforts. The aggressor often resorts to clandestine actions, to avoid attribution or retribution." (Pindják 2014).

17 "The Military Doctrine of the Russian Federation" approved by Russian Federation presidential edict on 5 February 2010. See also Sokov (2014).

18 https://www.nato.int/nato_static/assets/pdf/stock_publications/20120822_nato_treaty_en_light_2009.pdf

19 "The Military Doctrine of the Russian Federation" approved by Russian Federation presidential edict on 5 February 2010. See also Sokov (2014).

Arctic terrorism is a threat that is taken seriously. Russia, for example, is in the process of establishing a number of counter-terrorism centres in various locations, including one at Murmansk (Marex 2015). It is reported to have conducted counter-terrorism exercises with new military units in the Arctic region (Barents Observer 2015). Canada and the US have also been explicit in identifying Arctic terrorism as a significant issue (Nincic 2012 and citations therein). Terrorism, including maritime terrorism, may take many forms, including hijacking and hostage taking for political purposes, direct attacks on vessels, the use of a ship as a weapon, using marine transport as a "vector" to carry goods and materiel for terrorist organizations, and sinking a vessel to block a chokepoint or important trade route (*ibid*.). As the focus of this paper is Svalbard, the case of a direct attack on a cruise vessel will serve to make the point. Of course, there is nothing new in terrorists attacking tourists, which both brings the insurgents the broad publicity they seek (Nacos 1994, 8) and harms the economies of polities they oppose. Cruise vessels, however, provide an opportunity for spectacular attacks, a point that has not escaped the attention of insurgents (Robertson et al. 2012). In the case of Arctic cruise tourism, the number of potential victims and the political statement represented by harming passengers from a relatively privileged demographic is compounded by the geographical remoteness of the location. An attack in a remote location has two effects; it increases the difficulty in deploying counter-terrorism and rescue forces in a timely manner. It also suggests that nowhere is safe from insurgent attack. In fact, the latter statement is deceptive, as insurgents only require an innocuous looking vessel and someone who can navigate to reach an Arctic objective such as Svalbard in summer.

An example of an attack of the sort considered here was undertaken against the MV Seaborne Spirit in 2005 in the Mediterranean (US Department of Homeland Security 2008, 14). The insurgents fired rocket propelled grenades[20] at the ship (*ibid*.). Fortunately, the assault was repulsed by acoustic devices (*ibid*.), but the points to be drawn are clear: attacking a cruise vessel does not require massive resources. The attackers do not need to get on board to achieve their aim, and if they manage to start a serious fire, the consequences could be severe.

The seas around Svalbard are fecund,[21] due to the physical oceanography of the region,[22] which supplies nutrient rich waters to nourish the marine food chain. This brings clear benefit, but also the potential for conflict, both at the interstate and sub-state levels. The potential for interstate conflict stems from disagreement regarding the interpretation of the 1920 Svalbard Treaty and its integration with the subsequent provisions of UNCLOS.[23] Specifically, this concerns the legal status of the fisheries claimed around the archipelago by Norway (Churchill and Ulfstein 2010). The Norwegian interpretation favours the view that their sovereignty of Svalbard confers the right to establish a non-discriminatory fisheries protection zone (FPZ) (*ibid*.). The FPZ, enacted in 1977,[24] extends 200nm from the shoreline (*ibid*.), although curtailed in places by interaction with

20 A type of anti-tank missile. The weapon uses a shaped explosive charge to penetrate armour.

21 See Misund et al., (2016) for an historical analysis of the area's biomarine productivity.

22 See Haug et al. (2016) for a discussion of the bioproductivity of Arctic waters, and the prospective effects of climate change.

23 United Nations Convention on the Law of the Sea (UNCLOS), 1833 UNTS 396, signed 10 Dec 1982, Montego Bay, Jamaica.

24 Royal Decree of 3 June 1977. Regulations on the Fishery Protection Zone around Spitsbergen. *Norsk Lovtidend*, 1977, Part 1, p508, cited in Churchill and Ulfstein (2010, 560).

other maritime boundaries.[25] Norway has also enlarged the territorial sea to 12nm.[26] Under this argument, the territorial sea alone should be subject to the non-discriminatory economic access provisions of the 1920 Treaty, and not the FPZ, to which the treaty does not apply (Churchill and Ulfstein 2010, 564-565 and citations therein). The Russian view contradicts this (*ibid*.), and while Norway grants fisheries licences to other nations for regulated use of the FPZ, including Russia, the legal status of the zone remains a point of contention. Canada and Finland appear originally to have given support to Norway's position, although that support appears subsequently to have been withdrawn (*ibid*.). Other treaty parties either concur with Russia that the Treaty applies beyond the territorial sea, reserve their position, or withhold public pronouncement on the subject (*ibid*.).

The risk of conflict at the sub-state level relates to Illegal, Unreported and Unregulated (IUU) fishing, sometimes referred to as pirate fishing; and it is a problem that confronts not merely Svalbard, but the global ocean. In some of the world's important fisheries, 30% of the catch is attributable to IUU operations (Trent, Williams and Buckley 2005, 4). To give an indication of the extent of the problem in Arctic waters, an estimated 100,000 tons of cod were caught illegally in 2005 alone (Burnett et al. 2008, 11). The value of this catch was some $350m (*ibid*.). With such large sums at stake, there is always the potential for violence when regulatory enforcement is applied.

Thus, Svalbard is a confluence of factors – geographical, historical and political - that make it the focus of conflict risk. These risks are likely to increase as the century progresses.

Climate change and the increased potential for conflict

It has been argued that the risk of terrorism in the Arctic is modest, or at least, comparatively less than the risk posed by non-terrorism related maritime incidents (Nincic 2012). The basis for such risk judgements will be examined in greater detail below. Certainly, the Arctic 5 have made exemplary political progress to date in securing peace and stability. Preserving that situation may require more action than re-action, since the risk of conflict arising in the forms noted above is likely to increase this century. Hsaing, Burke and Miguel (2013) in their statistical metastudy of the correlation between changes in climatic conditions and violence, find strong causal evidence linking climatic events to human conflict, including conflict at the intergroup level. Their defence of their findings (2014, in response to comments by Buhaug et al. 2014), is a robust one. The work of Hsaing and his colleagues requires further exploration, to develop an appropriate model to complement the mathematical analysis, and thereby properly to inform policy. Yet we may have at least some confidence in the inference that the world will become a more violent place as the planet continues to undergo climatic change. In the context of the types of conflict noted above in Svalbard, it may be concluded that the probability of violence will increase ***and*** the archipelago's strategic geography will not alter. Moreover, the level of tourism and fishing will also remain high or increase, against a general background of increased violence.

[25] A map illustrating the various maritime boundaries, created by the Norwegian Mapping Authority, may be found at: Norway's Maritime Borders. *BarentsWatch*, 20 May 2013. https://www.barentswatch.no/en/articles/Norways-maritime-borders/ .

[26] Act of 27 June 2003 No.57 relating to Norway's territorial waters and contiguous zone, sections 2 and 5, sections 2 and 5, reported in *Law of the Sea Bulletin* (LOSB), 2004, 54, p97. http://www.un.org/depts/los/doalos_publications/LOSBulletins/bulletinpdf/bulletin54e.pdf .

Larsen et al. (2014) identify climate change as a catalyst for a potential increase in cruise tourism in Arctic locations. Data compiled by the Association of Arctic Expedition Cruise Operators (AECO) indicate a more subtle trend, with Svalbard alone witnessing an increment in cruise passenger visits (reported in Nilsen 2014). Nonetheless, an increment in visits to Svalbard waters by cruise vessels provides an enlarged opportunity for terrorist attacks.

Capture fisheries will remain critical to satisfying the world's growing demand for protein as the 21st century progresses (Food and Agriculture Organization of the United Nations 2016). Earlier hopes that climate change would increase the overall productivity of the oceans now appear unfounded. Recent research suggest that increased predation at particular trophic levels, coupled with factors such as increased stratification in the water column and more oxygen depletion, will defeat temperature related phenomena that might otherwise enhance bioproductivity (Goldenburg et al. 2017). The catch concentrations of finfish will also move towards higher latitudes (Cheung et al. 2010), a phenomenon that is already being observed (Norwegian Ministry of Climate and Environment 2015, 19). With greater catch potential in Svalbard's waters, and increased demand for the product, we may expect a greater risk of IUU fishing – and a consequent increase in the risk of conflict in the region as government endeavours to retain control over the fishery.

Having evidence that the likelihood of conflict in a location is likely to increase is not the same as having specific information on which to take action. The management of risk rests in no small measure on the ability to predict it, and historically, this has proven a challenge for conflict risk.

Interstate conflict risk

The purview of this paper is to consider violent conflict that potentially results in human fatality. Of the conflict hazards alluded to above, interstate conflict is likely to give rise to the largest number of fatalities, and will be considered first. 'Interstate conflict' as applied here may fall short of the strict definition of war identified by Small and Singer (1982, 205–206, cited in Sarkees 2010).[27] However, in this paper it will refer to a societal process during which one or more fatalities is sustained amongst state appointed officials through the deliberate action of another state.

Traditionally, it has been held that conflict – particularly at the interstate level – cannot properly be evaluated in terms of risk. As Lindley-French and Boyer (2010, 663) note: "War is unpredictable, as are its consequences."

Ironically, thoughtless acceptance of this view constitutes a hazard in itself, as it implies that valid and valuable predictions concerning armed conflict cannot be made, and a policy based entirely on reaction may increase both the probability and severity of conflict harms. It is important to differentiate between event prediction and risk assessment (Woo 2002a). In a troublous world, national polities are obliged to make risk management decisions concerning armed conflict. Indeed, as Adam Smith noted in the *Wealth of Nations*[28] in regard to the functions of government, it is the primary responsibility: "The first duty of the sovereign, that of protecting the society from the violence and invasion of other independent societies…"

[27] Sustained combat, involving organized armed forces, resulting in a minimum of 1,000 battle-related fatalities (later specified as 1,000 battle-related fatalities within a twelve month period).

[28] The Wealth of Nations, Book V, Chap. 1, part 1.

In this context, we may make comparisons with protection against fire risks. It may not be possible to predict which particular buildings will suffer a fire, but the risk can be managed before (with fire precautions), during (with a fire brigade), and after a fire incident (with hospital treatment and insurance). Similarly, in the field of armed conflict, the risk can be reduced before the event, through diplomacy and deterrence; and during a campaign with armed forces. The risk may also be shared, through military alliances.

A great deal of research effort has been undertaken, particularly in respect to political violence, to develop risk assessment and crisis early warning systems (Abdollahian et al. 2006; Bueno de Mesquita 1997; Cioffi-Revilla and O'Brien 2007; Connery 2013; Davies and Gurr 1998; Davis 2014; Feder 2002; O'Brien 2002 and 2010; Reifel 2006). Since the end of the Cold War and the emergence of a more complex, highly dynamic political environment, NATO has moved from a threat-based to a risk-based process for planning and policy (Morgan 2015). At the national level, the UK is an example of a states party that employs a risk-based approach to security planning and procurement, with the National Security Council (NSC) identifying and categorising risks within a 3-tier priority system (HM Government 2015). The NSC created the National Security Risk Assessment 2015, an unclassified summary of which is published as an annex to the National Security Strategy and Strategic Defence Review 2015 (*ibid*.). In contrast to a security planning process based on external threat, or the capability of own forces, a risk-based approach focusses resource and procedural planning on the minimisation of harms.[29] It further supports comparative judgements of very different security risks,[30] while the assessment process itself develops understanding of the hazards under examination.[31]

The definition of risk is a topic to which many commentators have addressed themselves. Vaughan and Vaughan provide an excellent summary of various conceptions of risk (1996, 13 et seq.). Samuels and Gouldby (2009, 14-15 and citations therein) offer an overview of definitions by a number of commentators and recommend a simplified solution, which is reflected in the definition employed in this paper. They further counsel that: "…there is no unique specific definition for risk and any attempt to develop one would inevitably satisfy only a proportion of risk managers. Indeed this very adaptability of the concept of risk is one of its strengths" (Samuels and Gouldby 2009, 4).

Sarah Wolf (2011), speaking in the context of climate change and natural hazards, argues persuasively that differences between approaches based on vulnerability and risk do not rest on matters of concept, but of terminology.[32]

For the purposes of this paper, risk will be characterised as the product of a probability term, and a loss (Eq. 1). This choice has been made for two reasons. First, it is an approach to risk that is readily understood within government. Second, it facilitates comparison with the concept of threat.

[29] For an overview of the application of risk management in operational planning, see Latrash (1999).

[30] See for example, HM Government (2015).

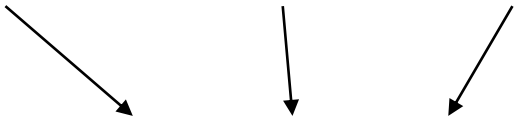
[31] For a discussion of the advantages of risk assessment in general, see Kolluru et al. (1996, 1.17 and 2.23).

[32] Aven, Renn and Rosa (2011, 1075) provide an examination of the ontological status of various definitions of the term 'risk'. They note that while the effects of vulnerabilities and barriers are properly part of risk calculations, they are not essential terms in defining the concept of risk.

$$\text{Risk} = \text{Probability} * \text{Loss} \qquad \text{(Eq. 1).}$$

Numerical values are ascribed to the probability of an undesired event per unit time, and the loss term is generally measured in money or in lives lost. J David Singer famously conceptualised Threat Perception as a combination of the Estimated Intent of a foreign power and its Estimated Capability (military capability) (Singer 1958, 94). While a distinct concept to that of risk, Singer's formulation of threat may be seen to hold parallels with the classical risk equation:

$$\text{Threat Perception} = \text{Estimated Intent} * \text{Estimated Capability} \qquad \text{(Eq. 2).}$$



$$\text{Risk} = \text{Probability} * \text{Loss} \qquad \text{(Eq. 1).}$$

The question arises how representative numerical values are to be ascribed to the terms of an equation depicting conflict risk. The loss term, particularly as that indicates possible human casualties, is something for which tools already exist. Prior to military operations, medical specialist staff have to prepare figures for probable casualties – the medical estimate.[33] This is used as a basis for planning medical support.

Ascribing a value to the probability term is something that has proven challenging to date. Judging if violence will break out is something of a holy grail in intelligence, not to mention foreign policy (Feder 2002). However, recent research indicates a promising way ahead. Bueno de Mesquita's Expected Utility Theory (EUT) grew out of a statistical study of conflict (Churchman 2005, 153-155; Bueno de Mesquita 1997). His approach, initially embodied into his Policon model, has three assumptions regarding the state actors who make decisions regarding commitment to violent action (Churchman 2005, 154); namely, that they:

1. Are instrumentally rational.

2. Consider options based on outcome probabilities multiplied by outcome utilities.

3. Choose the option with the highest expected utility.

Bueno de Mesquita is not suggesting that political and military leaders are necessarily making mathematical risk analyses per se (Churchman 2005, 155), nor is his approach an agent based model in a strict sense, although it does incorporate the degree of decision-maker preference for a particular objective and their relative authority within the polity

[33] For a comparative analysis of the accuracy of different approaches to this problem, see Gibson (2003).

(potential aggressor) under analysis (Bueno de Mesquita 2009). While his approach has its critics (Churchman, 2005, 155), it does enjoy the distinction of having achieved a reported predictive accuracy of almost 90% (Feder 2002).

EUT is not proposed as a replacement for subject matter specialists (Bueno de Mesquita 1997; 2009). Rather, Bueno de Mesquita's model is offered as an augmentation to the interpretative skills of subject experts in determining risk levels. Nor does this approach necessarily require detailed information of the sort collected by governments; the system may be applied with the use of open source information (Bueno de Mesquita 2009, 54-55). However, use of EUT to date suggests that a risk assessment can be made of the likelihood[34] of a foreign power taking recourse to violent action; and indeed, that the assessment will be of greater reliability than the judgements of subject matter specialists alone.[35]

Terrorism risk

"Subtle is the Lord, but malicious He is not."[36]

Albert Einstein's dictum is central to usefully applying risk assessment to terrorism risk. The hazards of nature can be subtle, but their eventuation may be predicated on a mathematical assumption that they constitute discrete, random variables. By contrast, terrorists are subtle *and* malicious (Woo 2002 b). For this reason, Brown and Cox (2011) argue that probabilistic risk assessment (PRA) of terrorism hazards may actually increase risk, creating analyses that are either self-defeating, or result in self-fulfilling scenarios, as the attackers are reasoning agents. Their alternative emphasises increasing the resilience of critical infrastructure (*ibid*.). In other words, mitigating the loss term in equation 1. However, they also identify the potential use of a probability set to accommodate the range of values, given that the knowledge base of the potential attackers is unknown (*ibid*.). Woo (2002 b) confirms that the loss term is essentially a complex engineering problem. However, speaking from an actuarial perspective, he proposes for 'showpiece scenario' terrorist attacks (within which one might include an assault on an Arctic cruise vessel), *relative* probability may be derived by treating the problem as a cost function (*ibid*). Planning time, personnel effort, technical problems, and the consumption of financial and material resources would be critical factors in determining the attractiveness or even the possibility of attacking specific targets (*ibid*.).

Woo is primarily concerned with macroterrorism (Woo 2002 a). This is defined within Willis et al. (2007) as an attack inflicting economic loss exceeding $1bn, or more than 100 fatalities, or over 500 injuries, or massively symbolic damage. Major (2002) notes that terrorists may not wish to maximise damage in terms of dollars or lives, preferring instead media air time as an objective. Clearly, identifying the goals of such organisations is significant in analysing the probability of a specific attack scenario (Woo 2002 a). Major discusses in detail a severity model that draws on game theory, and although he properly identifies the system's shortfalls, such an approach offers a way ahead in the

[34] The EUT model does not output a probability per se, but the most likely choice in decision processes with multiple actors of varying agency and attachment to a specific outcome (Bueno de Mesquita 1997).

[35] Feder (2002, 119) notes the ability of such model use to help avoid analytic traps, such as expecting the future to be like the past, and thereby failing to consider alternative outcomes.

[36] Albert Einstein Site Online: http://www.alberteinsteinsite.com/quotes/einsteinquotes.html

allocation of resources to counterterrorism and resilience. Woo (2002 b), by contrast, discusses terrorist organisation and takes a cost function approach to derive a frequency value for potential targets. Willis et al. (2007) derive informative findings from the application of the Probabilistic Terrorism Model developed by Risk Management Services Inc.[37] Specifically, they examine three types of problem; resource allocation, developing standard profiles of terrorism risk for specific cities, and in intelligence analysis, translating information about terrorist goals into surveillance targets.

There appears to be general agreement that no single model or approach is sufficient to evaluate the complexities of terrorism risk (Ezell et al. 2010; Haimes 2009). However, basing resource allocation on risk (Willis et al. 2005) offers the best means of informing decisions at present, and while significant challenges remain, a number of approaches to generating useful risk assessments are being explored (Brown and Cox 2011; Ezell et al. 2010; Major 2002; Willis 2007; Willis et al. 2005; Willis et al. 2007; Willis and LaTourrette 2008; Woo 2002 a and b).

IUU risk

Crime risk modelling has its own literature.[38] However, the value of the analysis may be marred by a variety of factors, including availability of data, confusion of the phenomena being measured, political agendas, an unwillingness to accept the relationship between the legitimate and illegitimate economies, and even inflated claims of value by researchers (Beare and Naylor 1999, 9). An innovative approach adopted recently begins from the perspective of crime as unlawful economic activity (Albanese 2008). Illegal drug supply in particular is an activity with interesting parallels with IUU fishing, since both are shadow activities accompanying legitimate markets, both may operate under market conditions, and both feature actors who are used to taking risks. One counterintuitive finding by Werb et al. (2010, 15) suggests that traditional policing – removing key perpetrators from the illegal drug market - may not be effective. Perversely, this may create financial incentives for others to enter the market and fill the vacuum (*ibid.*). Such knowledge is valuable in itself, if the intention of a polity is to ruin, or at least limit an illegal market. Albanese (2008, 268) notes the research identifying the utility of risk levels in determining a range of mitigating processes in enforcement, including the intensity of probation supervision, parole release guidelines and sentencing guidelines in criminal justice. Other interesting recent work with potential for application to the policing of IUU fishing may be found in Camacho-Collados and Liberatore (2015) in which the authors reports a decision support system that merges predictive policing capabilities with a patrolling district model.

Thus, in confronting an increased risk of conflict in Svalbard as the century progresses, there may be recourse to a range of predictive measures on which policy may be based with greater confidence. However, such information requires translation into policy and action if risks are to be managed.

[37] An insurance model for use in analysing macroterrorism (Willis et al. 2005).
[38] See for example Albanese (2008), Vander Beken (2004) and Tusikov (2011).

Conflict risk management

There are three guiding principles in risk management (Vaughan and Vaughan 1996), and each has its analogue in the case of Svalbard and conflict minimisation. These principles are tabulated below.[39]

RISK MANAGEMENT PRINCIPLE	SVALBARD CONFLICT ANALOGUE
Do not risk what you cannot afford to lose	Do not allow the increased risk of conflict associated with climate change to eventuate.
Do not risk a lot to save a little	Do not favour a 'do-nothing' approach as a default policy.
Always consider the odds	Use a risk-based approach to anticipate and manage prospective conflict situations.

Table 1: Risk Management Principles and their Analogues in Managing Conflict in the Svalbard Archipelago

The first principle is elementary: do not risk what you cannot afford to lose. The unaffordable loss in this case may be considered to be the peace and stability of the Arctic region, and although the focus of this paper is primarily Svalbard, as part of the Arctic geopolitical environment, the impact of an Arctic war could be catastrophic. In this regard, we should note that while the probability of such a conflict is low at present, a modest risk does not equate to no risk. Moreover, a low risk does not justify inaction if its low probability is to be maintained.

The second principle translates to the risk of inactivity when confronted with provocation. The 2005 incident in which the Russian trawler Elektron made a dash for Russian waters with two Norwegian fisheries inspectors aboard (Åtland 2010; Åtland and Ven Bruusgaard 2009) is one that is quoted as a hopeful indication that potentially serious events can be managed without escalation, or 'securitisation' as it is sometimes referred to.[40] Note that this is not an incident in which the Norwegians elected to do nothing. It contrasts with the British lack of action during the events leading to the Falkland Islands conflict of 1982. Socarras (1984-5) identifies that:

[39] Based on Vaughan and Vaughan (1996, 10-12, 41-2).

[40] In fact, security assets were deployed by both sides (Åtland and Ven Bruusgaard 2009). The Norwegian Coast Guard, itself part of the navy, deployed KV *Tromsø* (the original arresting vessel), KV *Svalbard*, KV *Harstad*, and KV *Nordkapp*, two coast Guard helicopters and a maritime patrol aircraft (*ibid*.). Plans were also laid to board the fleeing vessel using helicopter borne Special Forces, although these were aborted due to the weather and distance from shore (*ibid*.). For their part, the Russian Northern Fleet despatched the *Udaloy* class destroyer *Admiral Levchenko* to the margins of their territorial waters to ensure that Norwegian vessels did not enter, and to escort the Elektron towards Murmansk (Konovalov 2005, cited in Åtland and Ven Bruusgaard 2009). A 100,000 rouble penalty for illegal fishing was subsequently imposed (*Barents Observer* 2007). Contact was maintained between Norwegian and Russian authorities, both military and diplomatic (Åtland and Ven Bruusgaard 2009).

> …British signals conveyed an *animus derelinquendi* – a willingness to abandon - with respect to the Falklands, while Argentine signals conveyed increasing Argentine authority over the islands.

British signals included a lack of response when Argentina announced an intention to enforce fisheries protection in Falklands waters and then proceeded to act on that intention, detaining seven Soviet and two Bulgarian fishing vessels during September and October 1977 (*ibid*.). A Bulgarian sailor was wounded by Argentine fire during enforcement activity (*ibid*.). Of course, the Falkland Islands dispute is a longstanding one with a complex history. It might be argued that British disinterest in discharging sovereign authority over the Falklands was indicated in several ways, not the least of which was the decision to scrap the Antarctic Patrol Ship HMS Endurance without replacement (Briley 1997). However, Socarras' point is that a function of government exemplifying its sovereignty was being exercised by a rival claimant states party. Britain's inactivity was interpreted as a deliberate political statement.

The third principle: always consider the odds, is interpreted here as making studied choices in managing conflict risk. Advances noted above in augmenting the judgements of subject matter experts may prove beneficial in confronting the potential for conflict risk increment. For example, with respect to inter-state conflict risk, given the apparent descriptive power of the utility based approach (Bueno de Mesquita 1997), as evidenced by its predictive accuracy (Feder 2002), it would be unwise not to make use of the technique in making risk assessments.

A risk management approach to Arctic security policy

In the first instance, a risk management approach to deterring and defeating conflict may be informed by inversing the problem. That is, by asking the question: 'what would raise the risk from a potential adversary's perspective to a point at which they will not take an undesired course of action?' Where an adversary states party foresees a likelihood of political, human and economic loss that exceeds the tolerance levels of the principal actors, it is unlikely to engage in conflict.

In the case of sub-state actors, such as those engaged in IUU fishing in the Svalbard FPZ, they are in effect engaged in an unlawful business practice. When the mathematical product of the likelihood of detection[41] and potential losses (such as confiscation of catch, fines, imprisonment) exceeds the tolerance level of those involved, the activity will cease. Of course, risk tolerability is defined in part by the potential benefit of engaging in a hazardous activity. Where reward is high, the risk / reward balance is tilted and tolerability levels change. If, as the world population increases and their food aspirations raise, demand increases for finfish, then we may expect that the rewards of IUU fishing will increase, given constancy in other factors. We may further anticipate that the poleward shift in catch concentrations with climate change (Cheung et al. 2010) will bring increased IUU fishing activity with it to Svalbard's waters.[42]

[41] The term 'detection' is used here in the sense employed by the police service; that is, the discovery and apprehension of criminal activity.

[42] Even if catch levels do not increase substantially in the Svalbard FPZ, the relative depletion of other oceanic areas may bring about the same effect.

Historically, risk has been managed by the application of four general strategies, as illustrated by the graph at Diagram 1[43] (see at the article's end). In the context of Svalbard conflict risk, not all of these may be helpful. For example, if a risk were to be very likely[44] and extremely harmful, avoidance might not be possible. Consider a scenario in which IUU fishing reaches epidemic proportions and enforcement is failing in the face of unrelenting, and perhaps, armed perpetrators. The damage is such that the marine ecosystem approaches collapse. *Avoidance* - relinquishing sovereign responsibility over the Svalbard FPZ in an attempt to secure peace would not only be politically unacceptable, it might actually encourage further violence in the future.

Sharing a risk in this context by calling on a military alliance – a strategy more usually reserved for unlikely but very harmful risks, would be a potential solution. The NATO alliance would be a classic example of such a risk management device. However, a potentially significant issue associated with a massive criminal affront to Norwegian sovereignty in the Svalbard FPZ, is that it may be regarded as too small (or domestic) a problem to trigger NATO support under Article 5 of the North Atlantic Treaty (1949). Moreover, not all NATO nations agree with Norway's interpretation of the Svalbard Treaty, and the use of violence by IUU fishermen may not be viewed as an armed attack *per se* on Norway. Even if IUU incidents developed into a fish war, with a states party sending armed vessels to support the right of its nationals to fish the FPZ (see the scenario example below), the wording of the treaty does not commit its signatories necessarily to meet armed force with armed force.[45] Article 11 notes that: "…the Treaty shall be ratified and its provisions *carried out by the Parties in accordance with their respective constitutional processes."* The action 'deemed necessary' under Article 5 in response to an armed attack is subject to consideration both by national governments and between NATO representatives.

Retaining a risk means tolerating the harms a risk incurs, given the probability of eventuation. In political terms, it equates to the 'do nothing' option; and doing nothing or 'restraint' is a choice that will almost certainly be considered in any significant public political or administrative decision. Doing nothing as a polity that is confronted with a challenge to sovereignty, including crime,[46] may have significant consequences beyond the economic, as with Britain's choice not to react to Argentinian fisheries protection activities in Falklands waters (Socarras 1984-5). Thus, frequent minor loss events that in themselves may be economically tolerable should be calibrated in the broader context of state behaviour.

Mitigating a risk is to reduce its probability, its loss, or both. Recalling that the principal aim in deterring (minimising the probability of) conflict is to render the risk to the potential aggressor intolerable, there are number of intervention options available to a

43 After Vaughan and Vaughan (1996).

44 In this context, 'likely' should be glossed as 'frequent'.

45 Article 5 of the North Atlantic Treaty (1949) states that: 'The Parties agree that an *armed attack* against one or more of them in Europe or North America shall be considered an attack against them all and consequently they agree that, if such an *armed attack* occurs, each of them, in exercise of the right of individual or collective self-defence recognised by Article 51 of the Charter of the United Nations, will *assist* the Party or Parties so attacked by taking forthwith, individually and in concert with the other Parties, *such action as it deems necessary, including the use of armed force*, to restore and maintain the security of the North Atlantic area (italics added).

46 For a discussion of crime as an affront to sovereignty, see Ash (2016b).

state. These have been characterised under the acronym DIME (Kem 2007): diplomatic, informational, military and economic. To these have been added financial, intelligence and law enforcement (DIMEFIL) (*ibid.*). Clearly, some of these options may also be of benefit in minimising loss, for example, by reducing the duration of a period of conflict, or be used in combination to effect the mitigation of the probability and / or loss of the risk.

Application of risk management measures in practice – some examples

Table 2 offers a simple set of scenarios that illustrate potential conflict hazards and prospective mitigation approaches for Svalbard. Many of these may apply equally to other parts of the Arctic.

Conflict Scenario	Conflict Type	Management Strategy	Management Method	Subjective Probability Ranking
Fish pirates	IUU fishing	Mitigation	Policing and intelligence, and possible alliance	1
Jihad	Insurgency	Mitigation, Possible sharing	Policing and intelligence, and possible alliance	2
Fish wars	Foreign state intervention in prohibited fishing	Mitigation, Possible sharing	Intelligence, diplomacy, confrontation and possible alliance	3
The high ground	Interstate war	Mitigation and sharing	Intelligence, diplomacy, alliance and military action	4

Table 2: Conflict Risk Management Scenarios for the Svalbard Archipelago

Note that the ranking is subjective and denotes probability; not risk. Risk would have to incorporate a consideration of prospective loss.[47] Note also that the tabulated scenarios are illustrative, and not comprehensive.

[47] Such a calculation would be context dependent in the extreme. In the case of open warfare, for example, a conflict that escalated to a full nuclear exchange might irremediably harm the global environment: an existential risk to the human species.

In the first scenario, the mitigation of IUU fishing requires policing, and intelligence to inform the enforcement process. Mack (1996) has observed that: "Successful enforcement requires a high level of detection capability, procedures for inspection of proper gear and licenses, and the ability to arrest and apply sanctions." While on-board inspection and arrest are essential, considering the experience reported by Werb et al. (2010, 15) in tackling drug crime, a comprehensive, market-led approach may be necessary if the risk is to be fully addressed. This is for two reasons. First, in a dynamic market supplying a commodity for which the demand is projected to increase (World Bank 2013), removing by arrest some operators merely creates market opportunities for competitors and new entrants. Second, those engaged in IUU fishing are likely to be individuals with a high risk tolerance, perhaps hailing from communities with similar risk attitudes. All open water fishing, including legal catch activities, carries a relatively high professional risk of harms, including fatal injury.[48] Therefore, driving the risk to a point in excess of the tolerance levels of those engaging in IUU may require additional thought. For example, a high likelihood of arrest may be insufficient unless there was a complementary expectation that shipping insurance would be withdrawn from perpetrators (Soyer et al. 2017). Le Gallic and Cox (2005) propose a range of measures aimed at reducing revenues, increasing operating costs, and increasing the risks of engaging in IUU activities. Crucial to the success of such measures is the cooperation of flag and coastal states in creating a comprehensive legal environment (*ibid*.).

The ability to detect, identify and track vessels engaged in IUU operations may require remote sensing from satellites and drone based sensors, and the exchange of information on potential perpetrators and their vessels. Thus, intelligence in counter-IUU operations may well be a collaborative effort, but is not risk sharing per se, as the collaborating party does not bear a potential direct loss from eventuation. There may, however, be a measure of indirect loss, such as over-predation or ecosystem impact on straddling fish stocks. Ultimately, bringing about respect for the rule of law is likely to be in the joint interest of all polities, and collaboration in enforcement may also improve political relations between states parties, thereby reducing other conflict risk.

The second conflict scenario considered at Table 2 is terrorism. Once again, the strategy is primarily mitigation; with policing, particularly intelligence led policing, constituting the method. International cooperation therefore is critical. The possibility that the risk is shared arises if specific collaboration is disclosed and the terrorists attack the cooperating polity in retaliation. Exchange assets – personnel, aircraft and ships – may also be directly vulnerable.

The fish wars scenario is one that rests on three elements: the prospective increased availability of biomarine resources in Svalbard waters, consistent or increased global demand for the product, and the legacy dispute over interpretation of the Svalbard Treaty. Fish wars are conflicts in which unlikely antagonists take violent action against each other's flag vessels, and in some cases, sovereign platforms (Bailey 1996). Consider a case in which a states party – an extant Svalbard Treaty member - chooses to uphold by force the rights its fishermen claim to access in the Svalbard FPZ. The British provided such protection against the Icelandic Coast Guard in a series of conflicts (Ingimundarson 2003; Jónsson 1982). It is tempting to assume that diplomacy or legal action would prevail

[48] While fatal incident rates in fishing have declined by approximately 50% from 1980-2010 to 0.25-1.2 per 1000 man-years, the fatal accident rate compared with other industries is some 25 to 50 times higher, or worse (Jensen et al. 2014).

over armed conflict. Although the Svalbard Treaty itself contains no dispute resolution mechanism, states are under a duty to seek a solution to disputes by peaceful means, as enjoined under the Charter of the United Nations, Article 33(1), and Part XV of UNCLOS (Pedersen 2008). Unfortunately, the delegation of authority to third parties is viewed as an encroachment on sovereignty (*ibid*.), and state vessels such as warships and coast guard cutters do not merely fly flags, but are icons of sovereign authority – expressions of sovereignty by their mere presence.

A specimen case might feature the expanding role of China in the Arctic. The Chinese high seas capture fishery is the largest by volume in the world (Sala et al. 2018), with a global extent and over 800 distant water vessels. While its Arctic policy, recently released,[49] declares allegiance to the principles of international treaty law, it has demonstrated an imaginative interpretation of such law in the South China Sea. Of course, China is not the only states party that interprets international treaties to its own advantage, but as its economic and political influence in the Arctic grows, the question arises as to how far it would be prepared to go in order to satisfy its citizens' need for food. One might also cite Iceland and Spain as prospective belligerents, both of which nations have signalled an intention to take their cases against Norway to the International Court of Justice – and in both cases have chosen not to do so (Pedersen 2008, 187). Icelandic vessels of course were directly involved in confrontations with British warships during the Cod Wars (Ingimundarson 2003; Jónsson 1982). Spain deployed patrol vessels in protection of their fishing boats off the coast of Canada during the Turbot War (Gough 2009). At one point, the Canadian Prime minister authorised Canadian aircraft and ships to fire on Spanish naval vessels if they uncovered their guns (*ibid*., 70). McLaughlin Mitchell and Prins (1999) find that a large proportion of the militarized disputes between democracies post World War II involve fisheries, maritime boundaries and resources of the sea. Such disputes may be of short duration (*ibid*.). However, interstate conflict over biomarine resources have involved such violent and potentially fatal practices as ramming (Jónsson 1982) and gunfire (Bailey 1996, 257).

The final scenario considers a state of war that spreads to the Arctic and engulfs Svalbard as the belligerents press to access its geographic advantages and deny them to their opponents. The risk management strategies here are mitigation and sharing, applied by the use of political and military intelligence, diplomacy, and measures taken in alliance, including military action. Norway's principal security guarantor against and during war is NATO, and it has carefully cultivated its membership of the alliance, while simultaneously exercising a policy of non-aggression in its dealings with Russia[50] It provides no provocation to its neighbour, and no reasons to suspect that it is fortifying Svalbard contrary to the provisions of the 1920 Treaty, but its NATO membership provides both a deterrent to conflict and a means of resisting the potential military harms of a more powerful nation.

[49] For an English translation, see; China's Arctic Policy, The State Council Information Office of the People's Republic of China, January 2018. http://english.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm

[50] See Østhagen 2018 for a review on how mutual interest and the socialising of cooperative mechanisms have facilitated relations between Norway and Russia.

One point regarding balance in risk mitigation measures that bears noting in the case of Svalbard is that while adherence to the Article 9 provisions[51] may do much to reassure Russia that NATO is not encroaching on its borders, or compromising the freedom of movement and security of Russian military assets, such risk mitigation comes at a price. Specifically, the inability to fortify or reinforce the archipelago *in advance* constitutes a significant military disadvantage and undermines actions that might be needed to defend Norwegian interests in time of open war.

The peril of complacency

A superficial reading of recent history may seduce an observer into the view that promising political developments in the Arctic obviate the need for a studied, risk based approach to conflict management. This paper has taken a broad view of conflict at the sub-state and state levels. It should be evident that problems such as those engendered by IUU fishing, which are likely to be exacerbated by the oceanographic effects of climate change, have hitherto been managed peacefully in no small measure through the application of such risk mitigation measures as policing and diplomacy. Risk assessment has a particular benefit in evaluating the risk of (currently) low probability but high consequence hazards such as interstate violence. Such risk is dynamic, and fluctuates in response to a range of factors, including those influenced by the climate. Through its geostrategic and economic circumstances, Svalbard stands at the centre of potential inter-state conflict. It would be irresponsible to eschew a risk based approach as a resource in managing such violence.

Conclusions and implications for policy

This paper has examined aspects of Svalbard and the potential for conflict in a changing environment. Svalbard may be seen as a model for Arctic conflict and its management, not only because of the instances in which violence at the state level has visited the archipelago in the course of its history, but because it represents factors that relate to potential conflict in the modern era; such as the likelihood of war spreading *to* the Arctic, rather than igniting within the region.

Although there has been considerable focus on the potential for resource related violence, the correlation between resource availability and Arctic conflict – particularly in the context of climate change – is not a simple one. Considerable political progress has been made in the region. However, due to its strategic location, in an interstate conflict between NATO and Russia, Svalbard would be of pivotal importance. At the same time, it combines natural resources, legal circumstances that some may question, and a mixed population from different interested states parties.

Climate change will increase the probability of conflict at all levels from the criminal to insurgency and inter-state violence. However, a risk based approach using recent advances in analysis techniques offers the potential to manage the hazards more effectively. Applying a basic risk management approach to potential conflict scenarios related to Svalbard, this paper provides examples of how various risks may be addressed.

[51] Article 9 states that: "Subject to the rights and duties resulting from the admission of Norway to the League of Nations, Norway undertakes not to create nor to allow the establishment of any naval base in the territories specified in Article 1 and not to construct any fortification in the said territories, which may never be used for warlike purposes."

Risk analysis is also beneficial in managing a diverse range of risks; and where current political progress indicates a low likelihood of conflict, forms a safeguard against complacency with a potentially catastrophic outcome.

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FIGURES

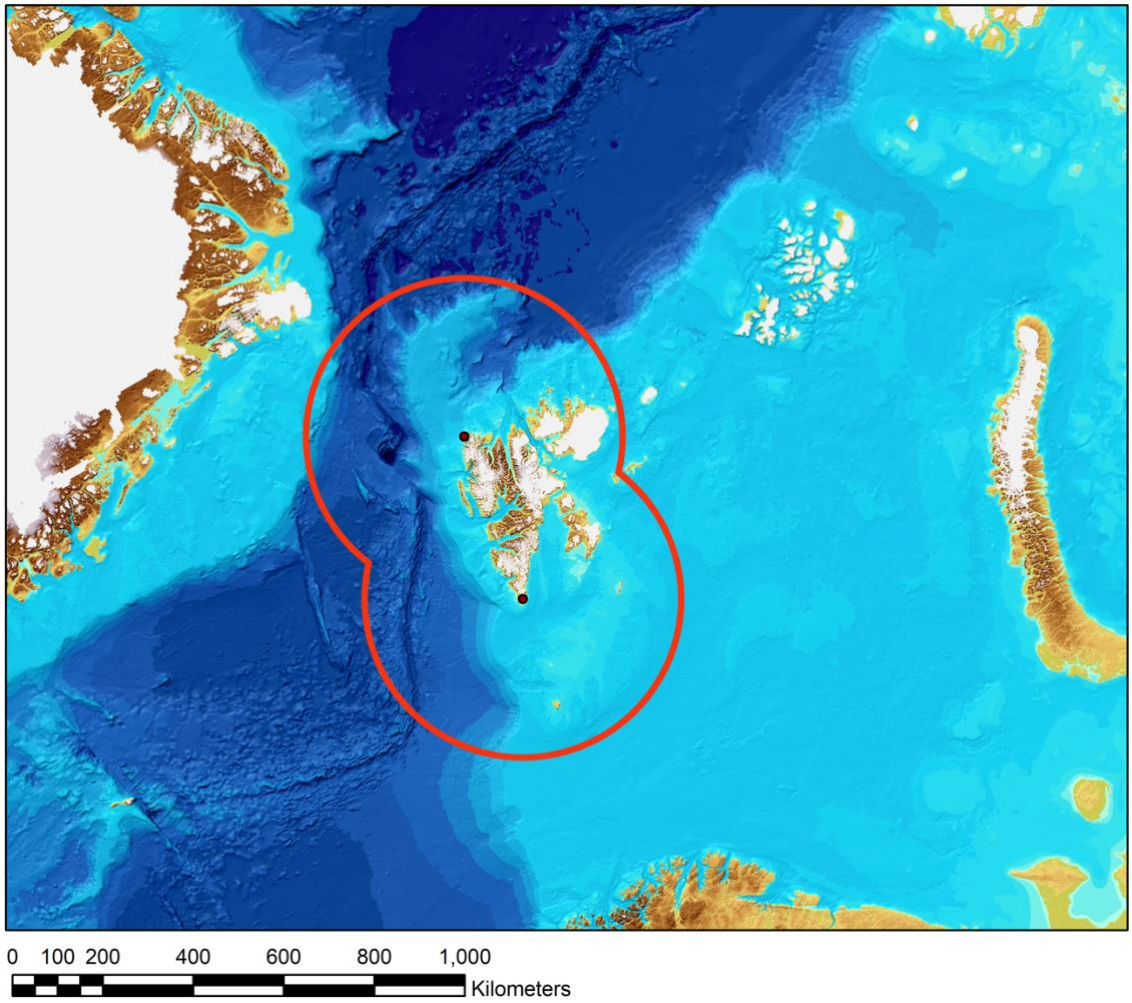

Figure 1. Bathymetry source: International Bathymetric Chart of the Arctic Ocean (IBCAO) version 3.0 (Jakobsson et al. 2012). Ice cover (off-white), from Randolph Glacier Inventory (RGI Consortium 2017).

DIAGRAMS

Diagram 1: Risk Management Strategies

<table>
<tr><td rowspan="2">PROBABILITY →</td><td>LIKELY AND LOW LOSS

REDUCE</td><td>LIKELY AND HIGH LOSS

AVOID</td></tr>
<tr><td>UNLIKELY AND LOW LOSS

RETAIN</td><td>UNLIKELY AND HIGH LOSS

SHARE</td></tr>
<tr><td colspan="3">LOSS →</td></tr>
</table>