

Is climate change an unforeseen, irresistible and external factor – a *force majeure* in marine environmental law?

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Abstract

Several environmental laws include provisions on natural causes or *force majeure*, which exempt States from their commitments if it can be proven that the failure to meet the commitment is due to factors outside their control. The European Union Marine Strategy Framework Directive (MSFD) has a pivotal role in managing EU marine waters. This paper analyses natural causes and *force majeure* provisions of the MSFD and other marine legislation, and addresses their interaction with climate change and its consequences, especially the effect on the obligation of ensuring seas are in Good Environmental Status. Climate change is an exogenic unmanaged pressure in that it emanates from outside the area being managed but in which the management authority has to respond to the consequences of climate change, such as sea level rise and temperature elevation, rather than its causes. It is suggested that a defence by a Member State of *force majeure* may be accepted if an event was proven to be due to an externality of control, irresistible and unforeseeable. The analysis contends that countering such a legal defence would centre on the fact that climate change is a well-accepted phenomenon, is foreseen with an accepted level of confidence and probability and is due to human actions. However, as yet, this has not been legally tested.

Keywords: EU Marine Strategy Framework Directive, Good Environmental Status, moving baselines, Acts of God.

1. Introduction

Marine ecosystem management aims to maintain natural ecological structure and functioning while at the same time ensure the ecosystem services from which society gains benefits are maintained (Atkins et al., 2011; Elliott 2011). There are many activities and pressures which require management (Borja et al., 2013) especially as these create hazards and risks to society (Elliott et al., 2014). Activities and pressures within an area are what may be termed endogenic management pressures in which causes and consequences have to be addressed. Superimposed on these are those from outside the management area (exogenic unmanaged pressures) for which their causes are not addressed at a local level but their consequences require to be addressed (Elliott 2011; Scharin et al., 2016).

Climate change can be regarded as an exogenic pressure on the biological, physical and chemical states of oceans and coastal zones (IPPC, 2014; Elliott et al 2015). The physical impacts include relative sea level rise leading to ‘coastal squeeze’, coastal adjustments and increases in the intertidal area and incursion into estuaries resulting in effects on ecosystem services such as fisheries (Elliott et al., 2015 and references therein). Chemical changes to the marine environment include decreased pH levels (i.e. acidification) and increased CO₂ leading to reduced growth of calcareous structures, macroalgae and macrofauna, changes to the water sediment and biogeochemistry impairing health of species and changes to overall ecosystem functioning. Biological changes emanate from physical and chemical changes reducing reproduction, community displacement and northward migration of species (Elliott et al., 2015).

Most of the plethora of marine environmental agreements and legislation aimed at controlling the adverse effects of human activities (Boyes and Elliott, 2014; Elliott 2014) can be regarded as being sectoral in that it influences specific activities or geographical areas (catchments, estuaries, sea regions, etc.). Hence, while there is increasing knowledge of how climate change will affect the marine and coastal environment, less is known about how climate change will affect marine legislation, management, protection and conservation. Given that marine management now aims to be holistic by accounting for all pressures and activities that may have a detrimental impact (Barnes, 2012; Boyes and Elliott, 2014), it must include the effects of both exogenic managed and exogenic un-managed pressures such as climate change. We have suggested elsewhere (Elliott et al 2015) that climate change confers risks that local management, and especially the implementation of European Directives, cannot easily accommodate: notably those that are unforeseeable, irresistible, external to the area being managed and can affect management. In particular, Elliott et al (2015) indicate that European Member States at risk of not meeting the long-term goal, in the Marine Strategy Framework Directive (MSFD 2008 (2008/56/EC)), of having their marine waters in Good Environmental Status (GEnS), must prove that this failure is outside their control or face potential infraction proceedings. The MSFD specifically accommodates such scenarios, providing in Article 14 for exceptions on the basis of factors *inter alia* beyond its control, i.e. natural causes and *force majeure*. Although such events may be a significant barrier to GEnS, they are not defined in the MFSD. This paper aims to interrogate these concepts in marine environmental management although the lessons here are pertinent to other environments. In particular, we consider whether a Member State will, in coming decades, have a legal defence that climate change or its specific consequences, constitutes *force majeure*.

2. Force majeure as a legal principle

Force majeure is a principle common to most legal systems and while usually associated with the law of contract or obligations, Table 1 shows its inclusion in marine environmental laws. In domestic law, *force majeure* may operate as a defence to a claim of contractual liability on the grounds that the

failure to perform an obligation was due to factors beyond the contracting party's control. It is also recognised as a general principle of international law and EU law, where it operates as a potential defence to liability for failure to perform obligations. Before considering how the concept operates specifically in EU law, and as regards marine environment law, the origins and parameters of *force majeure* need to be outlined as a general legal concept. This provides both context and more general guidance on how the concept can be used, especially given the typically minimal accounts of *force majeure* in EU marine legislation.

Box 1 Article 14, (1) of the MSFD, (2008) relating to exceptions

Marine Strategy Framework Directive, 2008
<i>Article 14</i>
Exceptions
<p>1. A Member State may identify instances within its marine waters where, for any of the reasons listed under points (a) to (d), the environmental targets or good environmental status cannot be achieved in every aspect through measures taken by that Member State, or, for reasons referred to under point (e), they cannot be achieved within the time schedule concerned:</p> <ul style="list-style-type: none"> (a) action or inaction for which the Member State concerned is not responsible; (b) natural causes; (c) force majeure; (d) modifications or alterations to the physical characteristics of marine waters brought about by actions taken for reasons of overriding public interest which outweigh the negative impact on the environment, including any transboundary impact; (e) natural conditions which do not allow timely improvement in the status of the marine waters concerned. <p>The Member State concerned shall identify such instances clearly in its programme of measures and shall substantiate its view to the Commission. In identifying instances, a Member State shall consider the consequences for Member States in the marine region or subregion concerned. However, the Member State concerned shall take appropriate ad-hoc measures aiming to continue pursuing the environmental targets, to prevent further deterioration in the status of the marine waters affected for reasons identified under points (b), (c) or (d) and to mitigate the adverse impact at the level of the marine region or subregion concerned or in the marine waters of other Member States.</p>

Although the concept of *force majeure* originated in Roman law, the modern doctrine is founded in French law, as stated in Article 1148 of the Code Civil. This provides that no damages are due where

the debtor has been prevented from conveying or doing that what he was obliged to as a result of *force majeure* or *cas fortuit* (a fortuitous event). This has similarities with the Roman law concepts of *custodia* (a form of custody/safekeeping that entails a high degree of responsibility) and *vis maior* ('superior force' or accident that cannot be foreseen or averted thereby relieving the custodian of liability), which were revised under the Napoleonic Code (Nicholas, 1995). *Force majeure* was developed to encompass government decrees, both domestic and foreign, as well as acts of war, floods, droughts, rare freezes, epidemics, strikes and riots. This catalogue makes it challenging to formulate statements regarding the requisites preceding its application. Although alien to the common law, including *force majeure* clauses in contracts has generated some jurisprudence on the construction of the term, including concepts of frustration or impossibility of performance.

Under international commercial law, the non-performance of a party is excused if they can prove that this was due to forces beyond his control and that were not foreseen at the time of concluding the contract; they do not, however, restrict the right of the party whom has not received performance to terminate the contract (Bonell, 2006). When the impediment causing *force majeure* is only temporary, then the performing party will be given a reasonable period of extra time for performance, depending on the nature of the interruption and its effect on the progress of the contract. Article 7.1.7. of the UNIDROIT (2010) Principles of International Commercial Contracts, states that the parties may further refine their definition of *force majeure*, thereby limiting or expanding its scope. They must also give notice of a failure to perform and the reasons for this within a reasonable period of time, failing which the other party may be entitled to damages.

Care is required when drawing upon the concept of *force majeure* as applied in the context of contracts since this is concerned with obligations on private parties as opposed to States. Accordingly, the parties may be able to shape the way the *force majeure* event affects performance of the contract. For example, commercial contracts increasingly prefer the lower threshold test of *impracticability* of performance, rather than *impossibility* (Augenblick and Rousseau, 2012). Furthermore, any questions of knowledge, foreseeability, externality and control, which are typical elements of *force majeure* (see below), must be evaluated quite differently to how they operate for States.

International law requires States to protect and preserve the marine environment, and prevent or minimize marine pollution (Boyes and Elliott, 2014) and breach of such obligations may incur liability, although it is more likely that States will firstly suffer political or diplomatic rebukes. International law recognizes several circumstances that preclude the wrongfulness of States for failing to comply with their international obligations, including *force majeure* (International Law Commission, 2001). The International Law Commission (ILC) defines *force majeure* as '*the occurrence of an irresistible force or of an unforeseen event, beyond the control of the State, making it materially impossible in the circumstances to perform the obligation*'.

As an example, the Basel Convention Protocol on liability and compensation for damage includes a *force majeure* clause outlining when liability will not apply (Table 1). For example, if an exporter vessel loses polychlorinated biphenyls, listed within Annex I of the convention, due to storm damage, then the exporter would be liable for damage (Art. 4, para. 1). However, if the exporter can prove that the event meets the criteria of paragraph 5, sub-section (b), he may not be liable. Due to climate change, storminess and storm surges are becoming more frequent and therefore may be considered to be foreseeable. If the event (the storm) was foreseeable, it could be avoided, for example, by the ship not sailing. In this case, the importance of weather forecasting together with ship logs indicating vessel sailing related to the storm forecast will define the case. If the storm surge was not forecast until the vessel had left port and there was no possible avoidance route, then the event was irresistible and insurmountable.

Thus there are three requirements for *force majeure*: (1) the act (or breach of obligation) must be the result of an irresistible force or an unforeseen event; (2) the event must be beyond the control of the State concerned, and (3) the event must render it materially impossible in the circumstances for the State to perform the obligation. The wrongful conduct is precluded so long as the situation of *force majeure* exists. Impossibility of performance may be caused by natural events, human intervention or a combination of the two and international law requires impossibility of performance, and not merely performance being rendered more difficult or burdensome. The ILC does not provide an exhaustive list of *force majeure* events, only illustrations: stress of weather, flood, earthquake or drought. Hence it may be questioned whether climate change per se is a *force majeure* event, or better regarded as a cause of specific events that may constitute *force majeure*.

The defence of wrongfulness does not apply if the situation of *force majeure* is due, either alone or in combination with other factors, to the conduct of the State invoking it, or if the State has assumed the risk of that situation arising. Although States cannot rely upon 'self-induced' *force majeure*, the situation must be due to the conduct of the State invoking it. This suggests a degree of intention and means that a State may rely upon *force majeure* in situations in which it has 'unwittingly contributed to the occurrence of material impossibility by something which, in hindsight, might have been done differently but which was done in good faith and did not itself make the event any less unforeseen' (ILC 2001: 78). As regards the assumption of the risk of *force majeure*, this could be done by a State or group of States (such as the European Union) explicitly and unequivocally agreeing in advance to accept the risk of a specific *force majeure* event.

Under EU law, *force majeure* has been recognised in two contexts. The first, and most developed area, concerns private actor exceptions to liability for breach of obligations (Schermers and Waelbroeck 2001). *Force majeure* was given limited recognition in the case of *Interkontinentale Fleischhandelsgesellschaft mbH & Co. KG v Commission of the European Communities* (1978, ECR 370) where a private party claimed *force majeure* after legislative changes prevented them from

completing a prior contract and they suffered damages. The Court rejected the application because there was no case of non-fulfillment of an obligation, only circumstances rendering its performance less favourable than before (*Interkontinentale Fleischhandelsgesellschaft mbH & Co. KG v Commission of the European Communities*, 1978, ECR 370). Following this case, the Commission adopted a narrow interpretation of *force majeure* (European Commission 1988). Lombardi (1997) notes: ‘the political imperatives of ensuring the success of the Union has led to the Court of Justice of the European Union (CJEU) construing the concept of *force majeure* narrowly, with the critical counterbalancing factor being undue hardship or sacrifice’. The Commission was equivocal as to whether *force majeure* was indisputably a general principle of law, but considered it to be an exception to the general rule of scrupulous compliance with legislative provisions, and observed that the same results could be achieved through the principle of proportionality. However, there do not appear to be any examples of this in practice. Finally, the Commission stated that evidence of *force majeure* must be incontrovertible. Some degree of flexibility is permitted in the application of *force majeure*, and so it is not limited to absolute impossibility of performance, but situations of non-performance that arise and which cannot be avoided by excessive sacrifice (Schermers and Waelbroek 2001).

The CJEU has been quite consistent in defining *force majeure* as ‘abnormal and unforeseeable circumstances, outside the control of the party relying thereupon, the consequences of which, in spite of the exercise of all due care, could not have been avoided.’ (*European Commission v Italian Republic* 2010, para 46). *Force majeure* has two constituent elements: an objective element, being ‘the occurrence of an event which cannot be influenced by the person who wishes to invoke this defence’, and a subjective element, ‘the exercise of all reasonable efforts by that person to avoid the consequences of the event in question’ (*European Commission v Federal Republic of Germany*, 2014 para 48-9). Both requirements must be satisfied but their application does vary with context. As stated by the Court in the *Schwarzwald Milch case* (1968, 386): ‘as the concept of *force majeure* is not identical in the different branches of law and the various fields of application, the significance of this concept must be determined on the basis of the legal framework within which it is intended to take effect’. Hence although the general parameters of *force majeure* can be transposed to other contexts, such as the MSFD, the concept has to be applied contextually, i.e. against the overall objectives of the specific piece of legislation and the role assigned in it to *force majeure* as an exception.

The second and, in the present context, more important application of *force majeure* is as an exception to the Member State legal commitment. Here a strict or narrow interpretation of *force majeure* also prevails. Thus, in the *Statistics of Road Transport case*, Italy was not entitled to rely upon *force majeure* for a failure to implement a directive on providing road transport statistics following the bombing of a processing centre, with the Court holding that the situation could have been remedied

after a period of six years (*European Commission v Italy*, 2012). A Member State, which encounters temporary and insuperable difficulties preventing it from complying with EU law, may plead *force majeure*, but only for the period necessary in order to resolve those difficulties (*European Commission v France*, 2001). The Court has consistently held that although *force majeure* may excuse a person from legal consequences of non-compliance with an obligation, ‘it can never create for the benefit of that operator a right not provided for in the relevant rules.’ (*Erpelding v Secrétaire d’État à l’Agriculture et à la Viticulture*, 1988). Thus *Force majeure* has been described as a shield not a sword (Parker 2013). Finally, when *force majeure* is raised, then any supervening difficulties must be specifically and clearly identified (*European Commission v Italian Republic* 2012, para 65).

In summary, under EU law the burden of proof establishing *force majeure* is on the party relying upon it resulting in situations of non-performance which cannot be avoided by excessive sacrifice. This must be caused by extraneous circumstances that are abnormal and unforeseeable, and which cannot be avoided by reasonable care, and which relate to the object and purpose of the law in question.

3. The Marine Strategy Framework Directive and *Force Majeure*

The MSFD details commitments for Member States to secure Good Environmental Status (GENS) for EU waters by 2020, to reduce adverse impacts and to protect, preserve and, where appropriate, restore the marine environment. It places particular emphasis on strategic action plans (Art 5 and Chapter II) and requires data gathering and assessment which, if done thoroughly, might limit the scope for claims of *force majeure* since contingencies ought to be built into management strategies, thereby precluding the claim that events were unforeseeable. Owing to the transboundary nature of many events that may constitute a claim and the interlinking of marine systems, Member states should indicate that the impacts of the *force majeure* event may not be limited to the individual State. As yet, there have been no cases or reported claims of exceptions on grounds of natural causes or *force majeure* in respect of the MSFD commitments, so it is not possible to categorically state how these would be handled either by the Commission or the CJEU. However, some general guidance can be provided.

The MSFD requires a careful balance between certainty and flexibility. On the one hand, the MSFD anticipates the existence of a transparent and coherent legislative framework giving importance to Commission level monitoring and control in order to avoid disparities and gaps in coverage (Cavallo et al., 2016). This may indicate strict control over *force majeure* claims and would be consistent with those cases before the CJEU concerning derogations from environmental commitment (*Commission v United Kingdom*, 1992). Certainty is important as the MSFD also contributes to Member State international commitments, including the United Nations Convention on Law of the Sea (UNCLOS), the Convention on Biological Diversity (CBD) and the Convention for the Protection of the Marine

Environment of the North-East Atlantic (OSPAR) (Boyes and Elliott, 2014). Given the interface between EU and international marine management, exceptions to MSFD commitments on grounds of *force majeure* should be consistent with international approaches to *force majeure*.

On the other hand, some flexibility in the application of the MSFD is required, including with respect to *force majeure* exceptions. First, marine systems are dynamic and vary naturally over time and space, ergo the regime for managing EU waters must be adaptive and flexible. This suggests flexible scope for *force majeure* due to exogenous changes in the state of the marine environment. Notably the chapeaux to the MSFD states that: ‘for reasons of *fairness and feasibility*, it is appropriate to make provision for cases where it would be impossible for a Member State to achieve the level of ambition of the environmental targets set or to achieve or maintain good environmental status’ (emphasis added). These two reasons indicate that the Directive attaches some weight to flexibility. Given the CJEU case law (see above), the CJEU will probably adopt a strict interpretation of exceptions or, at the very least, focus on ensuring that Member States comply with the procedural requirements of the Directive: that any non-performance is explained in the national programme of measures and this is communicated to the Commission. Fairness and flexibility enable Member States to plan for uncertainty rather than permit them to avoid responsibility altogether.

These ‘special cases’ include *force majeure* and are addressed in Article 14: a Member State may identify instances within its marine waters where environmental targets or GEnS cannot be achieved in every aspect through measures taken by that Member State. Within the Common Implementation Strategy for the MSFD (2008), *force majeure* is defined as exceptional circumstances which could not have reasonably been foreseen (e.g. armed conflicts, terrorist attacks and unforeseeable accidents). Natural causes are provided for separately and refer to ‘uncontrolled, random natural events such as floods, hurricanes, typhoons which, despite due diligence (prevention and disaster risk reduction measures) prevent reaching environmental targets and good environmental status in all its aspects’ (European Commission, 2014). There is no definitive statement that climate change is either a natural or an anthropocentric (or combined) phenomenon, although the IPCC give the probabilities of this (IPPC, 2014). This poses difficult questions about how to treat climate change as an exception since *force majeure* and natural events attract different conditions: natural events are uncontrolled (by any agent) whereas *force majeure* events tend to be those within the control of a third party. In addition, it is arguable that *force majeure* also attracts the above-mentioned conditions developed by the Commission and the CJEU. Critically, Member States must still exercise due diligence to avoid the consequences of either type of event and in both cases, such exceptional situations must be clearly identified in the Member State Programme of Measures (PoM) and reported to the Commission. Although not explained further, this presumably requires compelling scientific evidence of the circumstances constituting a natural cause or *force majeure*. This is important because it points towards particular rather than general explanations for non-compliance. Thus climate change may be

too general to be invoked as an exception, whereas specific impacts such as increased ocean temperature or changes in salinity may be more compelling. This would certainly be the case in respect of a failure to meet specific environmental targets. Exceptions given in the PoM are subject to review by the Commission under Article 16 of the Directive and so the Commission would have to challenge an exception or to engage in dialogue with Member States to ensure prospective compliance with the Directive. Finally, despite these special cases, Member States are not relieved from taking appropriate ad hoc measures to prevent a further deterioration of the waters, or to mitigate any adverse impacts on the waters at the level of the marine region or sub-region, or in the waters of other member States. Such ad hoc measures shall be integrated into PoM as far as possible. This ensures a degree of coherence on the management of EU waters despite the exceptional circumstances. The chapeau to the MSFD notes that the Commission will give ‘due consideration be given to the efficacy of any ad-hoc measures taken’. This suggests that the Commission is the principal arbiter of how *force majeure* and related measures should be addressed.

4. The effects of climate change on Member State MSFD Commitments:

4.1 Climate change being accommodated within force majeure/natural events:

There are three criteria required for *force majeure*: the event must be extraneous, abnormal or unforeseeable, and irresistible. Additionally, there is a burden of proof which the Member State relying upon the exception must discharge.

(i) Burdon of proof and *force majeure/natural events*:

The effects of climate change on the biological and physical environment are increasingly well-studied and documented (IPPC, 2014; Elliott et al., 2015 and references therein) and so there is little scientific doubt that climate change is occurring. However, less is known about how climate change will be addressed within existing regulatory regimes and how affects their application to marine management, protection and conservation. Marine management aims to encompass all pressures and activities that may have a detrimental impact on the marine environment (Elliott, et al., 2015), hence the combined effects of both exogenic managed pressures and exogenic unmanaged pressures such as climate change are important; the greatest challenge may be in separating such influences. It is especially difficult establishing a ‘signal’ due to exogenic un-managed pressures against the ‘background noise’ of natural variability and against in-situ pressures. It is also argued that such exogenic unmanaged pressures contribute largely to that background ‘noise’ (Elliott, 2011). Climate change causes particular problems due to it having cascade effects within the marine environment (Elliott et al., 2015). Legislation on the quality of the marine environment (e.g. the Marine Strategy Framework, Habitats, and Water Framework Directives (Boyes and Elliott, 2014)) takes a holistic approach, combining objectives, visions, descriptors and indicators for determining and addressing marine environmental change. By definition, these indicators and descriptors require baselines to be

established to determine if the area or ecological state is as is expected under given circumstances or whether it will change due to anthropogenic pressures (Borja, et al., 2013).

If, as raised in Elliott et al. (2015), climate change produces inaccurate or moving baselines, then it becomes difficult if not impossible to clearly detect the impacts of human induced changes. If baselines are inaccurate for descriptors and the effects of climate change cannot be distinguished from natural and other anthropogenic conditions and variations, then the burden of proof to establish *force majeure* due to climate change will prevent States from meeting the environmental commitments will be difficult to discharge.

The MSFD has 11 descriptors for determining GEnS listed in Annex I (Borja et al., 2013), none of which clearly state climate change as a pressure to assess although Descriptor 1 mentions climate as a prevailing condition. Descriptor 11 relates to energy but this is widely accepted as emphasising noise and vibration (Roberts et al., 2015) rather than warming. As such, acute energy inputs such as noise and localised warming (e.g. through thermal discharges from power plants), may be included whereas chronic changes are not covered. Climate change is only mentioned twice in the chapeau to the Directive paras (34 & 42), although it potentially affects every descriptor and hence the achievement of GEnS (Elliott et al, 2015). In order to achieve the required signal-noise ratio for achieving target driven legislation such as EU directives, assessment and monitoring requires a sufficiently a large data set to identify changes in both the ecosystem and regime providing a better baseline (Elliott, et al., 2015).

(ii) Foreseeability:

Lack of foreseeability in *force majeure* private law cases is critical as the defendant must not have been able to have foreseen the event and the risks that it entailed. However, the requirement of foreseeability is more difficult to apply to *force majeure* events and natural causes within environmental law. This is due to the fixed, but general terms of the exception provisions, and, more importantly, the dynamic and variable knowledge and sharing of information between states. Hence there is a strong relationship between foreseeability and the other elements of *force majeure*. In general, most natural events are foreseeable, so in practice, the issue is one of probability of affecting a specific location or practice, and of being able to manage the impact of such events. Kristl (2010) observes that the increasing knowledge of serious climatic events poses challenges for the application of ‘Act of God’ defence on negligence. The same logic applies to State environmental commitments since the increased frequency and intensity of extreme events makes them ‘more foreseeable’ and less likely to fall within the scope of *force majeure*/natural event exceptions. Foreseeability is communicated through a probabilistic assessment of an outcome (Table 2). Hence the importance of the probability indices used by the IPCC which identifies the scientific consensus on the

environmental, socio-economical and technical impacts of climate change (IPCC, 2014). This approach could be used to assess the legitimacy of a *force majeure* claim.

Table 2 The levels of confidence and likelihood used by the IPCC (2014)

Confidence terminology	Degree of confidence in being correct	Likelihood terminology	Likelihood/probability of the outcome
Very high	>9/10	Virtually certain	>99%
high	Approx. 8/10	Extremely likely	>95%
medium	Approx. 5/10	Very likely	>90%
low	Approx. 2/10	Likely	>66%
Very low	<1/10	More likely than not	>50%
		About as likely as not	33-66%
		Unlikely	<33%
		Very unlikely	<10%
		Extremely unlikely	<5%
		Exceptionally unlikely	<1%

For example, there is ‘medium confidence’ that warmer waters induced by climate change will increase harmful algal blooms and redistribute microbes responsible for diseases such as cholera (IPCC 2014). An increase in algal blooms would impact on the EU Member State ability to comply with both the EU WFD and MSFD. Arguably this ‘exogenous impact’ could provide the basis for a defence: that climate change and warmer waters have caused a sudden bloom of toxic algae leading to the accumulation of neuro-toxins in shellfish, eventually affecting higher predators, thus breaching GEnS across several descriptors. Furthermore, as these specific effects of climate change have been given medium confidence makes them likely to occur with 50% probability and therefore it may have reasonably been foreseen or expected when applying an holistic approach to management.

A court will consider foreseeability on a case-by-case basis (Wright, 2003). For example, an oil spillage may be regarded in general as a foreseeable event given the large number of tankers at sea. However if a court focused on the specific cause of the spillage, such as a technical malfunction, then the probability of identifying such a failing as the cause of a pollution incident may be considerably lower. In contrast, if a climate change-induced algal bloom occurred in the open ocean and tidal patterns caused the bloom to drift towards a shell-fishery, it could be deemed unforeseeable or foreseeable. If a court specifically inquired about the effects of the bloom on the shellfish, then it is likely to be found unforeseeable, particularly if that area does not have a history of toxin accumulation outbreaks in seafoods. However if the court adopts a focus on high level factors such as the IPCC predictions, it could decide that such an event was foreseeable.

(iii) Irresistibility:

Force majeure requires both the event and its *consequences* to have been unavoidable and insurmountable. These criteria are objective in that a reasonable person could not in those

circumstances have resisted or overcome the obstacle (Nicholas, 1995). The general effects of climate change are now widely regarded as inevitable, with the IPCC internationally-accepted evidence indicating warming oceans, melting icecaps and rising relative sea levels even given the targets agreed at the recent COP conference in Paris (European Commission, 2015). However unavoidable and insurmountable these events, when the criterion of irresistibility is combined with that of foreseeability, it requires that all reasonable steps are taken to avoid the consequences of such an event.

As the evidence is that climate change will occur, marine managers need to determine what steps should be taken to pre-empt and manage its impacts and would they be deemed 'reasonable' if a case was to arise. Determining what is reasonable depends upon the requirements of the legislation and the weight of evidence to show whether an action is practicable, for example whether it is economically feasible or technologically practical. The MSFD required (in 2012) Member States to complete an initial assessment as part of their Marine Strategy. Whilst completing this assessment if a Member State finds that an issue such as an acidification is affecting the ecosystem structure and functioning, thereby affecting the ability to achieve GEnS for several descriptors, the Member State could claim that acidification is a *force majeure* event. The MSFD requires the Member State to inform the Commission and take appropriate measures, i.e. to prevent further deterioration and mitigate the adverse impacts of acidification. However, with acidification in a sea area, the limited practical measures taken to regulate CO₂ uptake require combining national and international regimes such as the UN Framework Convention on Climate Change, 2001 (UNFCCC), action beyond the control of individual States. Hence, it could be argued at a regional sea level that there are no reasonable steps that could be taken to prevent the *force majeure* event.

(iv) Externality or Control:

The requirement of externality or control entails two challenging questions, firstly the fundamental nature of climate change as a phenomenon within human control and, secondly, the meaning of *control* on complex systems. The debate as to whether climate change is due to natural or anthropogenic factors could potentially determine the viability of a claim of *force majeure* since the events leading to the *force majeure* event must have been outwith the control of the party. Arguably, a party cannot rely upon *force majeure* if it was responsible for the situation. The IPCC has stated that it is extremely likely (>95% probable) that more than half of the observed changes in global surface temperatures can be attributed to the increase of greenhouse gases and anthropogenic forces combined between 1951- 2010 (IPCC, 2014). They have also noted that it is 'very likely' (90% probable) that anthropogenic forcing has contributed substantially to the rise in surface ocean temperature (0 -700m) and 'likely' (>66% probable) that human influences have affected the global water patterns including precipitation and ocean salinity. Hence, States cannot rely upon *force majeure* if the event was due,

either alone or in combination with other factors, to the conduct of the State invoking it (ILC 2001, Article 23(2)).

The meaning of control is complicated because although States are legal actors, they can only do things through human agents, either governmental or private. That States have legal responsibility or control is undoubtedly as a matter of international law, even if the limits of this are uncertain. Under customary international law, States have a duty not to cause harm to another State, including transboundary environmental injuries, and climate change appears to fall within this category (Tol & Verheyen, 2004). The ‘no harm rule’, in principle 2 of the Rio Declaration, 1992, following the 1972 Stockholm Declaration, declares that states can exploit their own resources using their own regulations but must ensure that activities under their jurisdiction should not cause harm or damage to areas outside their own jurisdiction (United Nations, 1992). The ‘no harm’ rule forms the basis of much of international environmental law including the United Nations Framework Convention on Climate Change, (1992) (UNFCCC) and the 1997 Kyoto Protocol which directly aim to tackle climate change. However, the exact boundaries and elements of the ‘no harm’ rule are not clearly defined (Tol & Verheyen, 2004). If a country sought to claim *force majeure* as a defence under these circumstances (damage to another state), scientific evidence will be fundamental to the defence in particular for cases in which the injured state is claiming third party liability for issues such as failing to achieve GEnS for the descriptors (see below regarding the Suez canal example).

Within the meaning of control, especially determining which acts are ‘external’, it necessary to understand the extent to which the acts of private persons (pollution by citizens and industry) can be attributed to a State (Tol & Verheyen, 2004). Although the Rio Declaration (1992) is clear that no harm should be caused by one State to another, it does not distinguish between the conduct of the State and the conduct of private persons (Tol & Verheyen, 2004), thus arguing both for and against state responsibility. The ILC Articles imply that the activity of private persons cannot always be attributed to the State (Tol & Verheyen, 2004) thus the pollution of international waters because of the negligence of a chemicals manufacturer would not necessarily incur the liability of the State. However since most industrial activities are licenced under domestic law, it is arguable that a State’s failure to maintain a system of control and oversight is within its responsibility (Tol & Verheyen, 2004). Here control is understood to be a systemic mechanism, reinforced through the international law requirement to exercise due diligence and a ‘diligent State’ takes action to prevent foreseeable significant damage, or at least minimize the risk of such harm. In the context of climate change, this requires domestic measures that ensure that the risks arising from anthropogenic causes of climate change are monitored and where appropriated controlled. Similarly, under EU law, the state is responsible for implementing and fulfilling the Directives and if they fail to exercise due diligence over the actions of citizens or companies then it is the Member State that faces infraction proceedings,

and which then has to take remedial action against the citizens or companies using national law and national governance bodies (Boyes and Elliott, 2014, 2015).

In addition to the requirement for GEnS under the MSFD, the Water Framework Directive requires Member States to achieve a good ecological status (GEcS) for inland, estuarine and coastal waters. Member States may become unable to achieve GEnS and GEcS for coastal waters due to changes to freshwater inputs caused by climate change but this may be complicated by anthropogenic water abstraction. The IPCC predict that climate change will increase freshwater inputs at high latitudes and those areas with glacial/snowmelt and that it will decline in lowland areas; however, the IPCC agree that this prediction has medium confidence (50% probability) with limited evidence. The freshwater input decline could lead to various coastal effects such as changes to salinity, species distribution, nutrient delivery, potential eutrophication, contaminant inputs and bioaccumulation (Elliott et al., 2015). Hence, to claim *force majeure* in such a scenario a Member State would have to prove scientifically that such changes were due to an event that was unforeseeable, beyond its control and not the result of anthropogenic effects such as abstraction.

5. Discussion

The analysis here suggests that it seems unlikely that climate change understood as a singular pressure could constitute a *force majeure* event. It is unlikely that it could be regarded as unforeseeable given widespread acceptance of the phenomena of climate change; for example, the contribution of greenhouse gases and anthropogenic changes to climate regimes and ocean temperatures have been stated respectively at >95% and 90% probable (IPCC 2014). However, the cascade effects of climate change may still constitute the basis of future claims although they may more difficult to sustain as the specific cause and effect relationships of climate change become better understood (Figure 1).

If climate change is accepted as anthropogenic then by definition it is not a 'natural' event, one that is 'external' to human or State control, a feature relying on whether individual States can control the causes or consequences of climate change. If global warming is accepted as caused by industrial development in western nations and then latterly in the developing world, then current governments could argue that they should not be blamed for the actions of their predecessors. However, in both legal and moral terms, the question of causes and effect and 'blame', especially inter-generational and historically, raises many difficulties (Weisbach, 2011; Barnard and Elliott, 2015). Hence it is not surprising that there are few if any clear legal precedents on liability for climate change. Although not legally tested, with increasing knowledge, climate change will also require Member States to undertake much more precautionary action. Given the significant uncertainties in assessing responsibility for and control over climate change, considerable weight is usually attached to technical expertise, especially in management regimes. However, with increased opinion of anthropogenic cause, there may be an increased duty of care and assumption of risks. Kristl (2010) observes that

using the classic approach to negligence as a model for a duty of care might lead agents to act in an economically inefficient way, i.e. to fund measures beyond those merely necessary to address the causes. The impossibility of predicting the specific effects of a natural event (e.g. the intensity of a hurricane) means that avoiding the worst-case scenario is the safest course of action to avoid liability for potential harm.

As emphasised here, climate change in general is beyond the control of individual States when managing a specific water body and it affects all seas thus creating international, regional and local management challenges. The cascade effect through the marine environment, leading to secondary and tertiary effects, is likely to increase the frequencies in which ‘typical’ *force majeure* events (floods, storm surges, hurricanes, etc.) occur (Kristl, 2010), hence causing an increase in *force majeure* claims. Yet, because of improved meteorological techniques and technologies, many of these events become increasingly foreseeable with better data thus increasing the predictability of events thereby a ‘snowball effect’ reducing the claim of *force majeure*. Hence climate and ocean models, including confidence and error estimates, will become key tools for management, both to protect the natural system and to test the burden of proof. If a State knew an event was occurring as predicted, then it must demonstrate that it took steps to mitigate the risks. In cases where the specific event was unexpected and insurmountable, prediction and forecasting systems will be required to show that to the best of the knowledge of the State that the event was not ‘predicted’ to affect it. Paradoxically, this may mean that the more *force majeure* occurs, and is developed as a legal concept, then the less likely it can be relied upon as a defence.

We previously suggested how the cascade effects of climate change may still be capable of constituting *force majeure* claims within MSFD implementation (Elliott et al. 2015). To our knowledge, *force majeure* has not been successfully given by a Member State as the reason for failure to achieve a Directive’s aims within the required period but this may change in the case of climate change upon achieving GEnS for the MSFD Descriptors (Elliott et al., 2015). For example, Descriptor 2 of the MSFD requires that ‘non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem’. Mediterranean EU Member States may be unable to achieve GEnS for this descriptor due to many non-indigenous species entering their waters via the Suez Canal. In 2015, it was estimated that 443 species of macrophytes, invertebrates and fish probably had entered the Mediterranean through the Suez Canal, 89 of which have now been recorded in other countries and some of which are impacting the environment and economy (Galil et al., 2015). Hence the states could claim *force majeure* given that species are moving both of their own volition from outside a Member State waters but enabled by the presence of a canal and by ballast-water transfer (both anthropogenic-proven) and exacerbated by the receiving water temperature increasing (due to climate change, anthropogenic-debatable).

The Suez case relies greatly on showing that climate change influences the spread of particular non-indigenous species; this will require a large database and a credible threshold to not only determine the failure to achieve a target (Borja et al., 2013). Determining the normal rate of species translocation and the factors determining its ability to migrate into a new system will create precedence in such a case. For example, if temperature increase has allowed a species to migrate then plausible scientific evidence will be required to show that temperature increase has accelerated species migration.

The Suez Canal example highlights the importance in the legislation of having large spatial and temporal monitoring but there is limited funding available for large-scale data collection (Borja and Elliott, 2013) and therefore many data sets are focused upon regional seas, pressure-based data and small catchment size data. Hence large-scale and transboundary events such as those that may be affected by a *force majeure* event will have to use small-scale data in assessment and scientific evidence (Borja et al., 2013). Furthermore, the difficulty faced by a Member State when trying to prove that an event was unforeseeable, irresistible and beyond their control is exacerbated by the highly variable nature of the marine environment and the difficulty of detecting a signal of anthropogenic change against a large background inherent variability (the ‘noise’ in the system). In addition, the MSFD (Annex V) monitoring programmes do not include the effects of climate change although they do allow monitoring programmes of measures to be revised at each 6-year reporting cycle. Hence a *force majeure* case may require greater monitoring. Furthermore, in addition to a gradual, chronic (i.e. climate) change invoking *force majeure*, extreme and rare acute events such as those that would constitute a *force majeure* event are just that (Smith, 2013).

Many of the EU environmental directives have a simple premise: ‘what is in an area or what should be there, has it been changed by human actions and, if so, then do something about it unless there are imperative and over-riding reasons not to do so’. Hence the reliance on defining and measuring against a baseline or reference condition. For example, the Water Framework Directive (2000/60/EC) (WFD), had 4 ways of defining a reference condition (baseline): a control as a similar area but without the human induced pressures, hindcasting to some pre-agreed baseline, predictive numerical modelling and, lastly, expert judgement. All four options have challenges and uncertainties (Borja, et al., 2013) but again showing the difficulty if the baseline is poorly defined or is moving.

As a further example, in relation to the Habitats Directive (92/43/EEC), *Acipenser naccarii* (Adriatic sturgeon, an Annex IV (a) species) is already limited within its choice of breeding ground and the confluence on the River Po is the remaining breeding ground (IUCN 2015). The basin is rapidly subsiding at rates of 0-7cm/year and there was a major flood disaster in 2000 (Cassardo et al 2001). The Habitats Directive may be breached multiple times in this case. However, the most relevant may be under Article 12(d), the deterioration or disturbance of breeding sites including by climate change: changes to erosion and deposition cycles through Relative Sea-level Rise and marine incursion into estuaries; bathymetric and substratum changes due to changes to the North Atlantic Oscillation and

Eastern Atlantic Oscillation rainfall and run-off patterns (Gillett et al., 2013) and the overriding public interest of improved flood defences which interfere with breeding sites. In the latter case (flood defence), the scientific evidence would need to indicate that this was required for public safety and the social and economic environment. With regard to the other effects, the criterion for *force majeure* may be more difficult to fulfil due to increased knowledge, i.e. increased certainty than an effect will occur.

In each of the above examples, a successful outcome of the case depends on proof that the criteria of foreseeability, irresistibility and externality are met. The scientific evidence for such cases will vary depending upon the breach (public interest/flood defence) and so risk analysis and monitoring will be essential to the defence. Without evidence of how climate change has increased the need for coastal or riverine flood defences, the case will fall because there would be no evidence to suggest that the alterations are essential for public safety.

As a way ahead, Pall et al. (2011) attributed the large scale flooding in England and Wales in 2000 to global anthropogenic greenhouse gas emissions and found that in 90% of cases emissions increased the risk of floods in 2000 by 20% and in 66% cases by more than 90%. They used a probabilistic event attribution framework in which thousands of climate models were generated under varying scenarios, some with greenhouse gas emissions, some realistic and then subjected to a run-off model to determine the flooding outcomes. Models such as this could be used to determine the burden of proof in *force majeure* events by proving the liability.

6. Conclusions:

1. There are no direct precedents for how a court would conduct a *force majeure* case on a State within marine environment law. The burden of proof (that climate change is out of the State control) in such cases will, as with other environmental instruments, be placed on those defending the case (the Member State).
2. Although not yet tested legally, climate change as a pressure may not constitute a *force majeure* event due to increased knowledge, an increased acceptance that it is anthropogenic and improved technologies making many of its effects foreseeable and hence *sensu stricto* non-natural. This is reinforced by the way in which, for example, the MSFD controls *force majeure* and natural cause exceptions through Member State programmes of measures.
3. *Force majeure* will become narrower in its application to adapt to the increased frequency that irresistible events will occur due to climate change such that the list of events that qualify as *force majeure* will be reduced.

4. However, the individual effects of climate change may still be treated as *force majeure* events, as long as it can be proven that the event meets the three requirements of *force majeure*: lack of control, irresistibility, non-foreseeability.

5. This incurs many challenges for marine management, such as the need for increased data collection and monitoring programmes upon not only managed pressures but also exogenic pressures such as climate change (i.e. an increased burden of proof).

6. This requires that Member States undertake a more comprehensive/holistic outlook of the marine environment to ensure that there is suitable evidence to support their claim should it be required.

7. In order for a Member State to provide such evidence and be successful in doing so, risk analysis, cost benefit analysis, extensive monitoring programmes and prediction and forecasting models will require frequent assessment and updating to suit the changing environment.

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Table 1 Governance examples including Force Majeure and its derivatives (verbatim text)

Jurisdiction	Statute	Wording in legislation
International	UNCLOS III	<p>Article 18 – meaning of passage 2. Passage shall be continuous and expeditious. However, passage includes stopping and anchoring, but only in so far as the same are incidental to ordinary navigation or are rendered necessary by <i>force majeure</i> or distress or for the purpose of rendering assistance to persons, ships or aircraft in danger or distress.</p> <p>Article 39: Duties of ships and aircraft during transit passage 1. Ships and aircraft, while exercising the right of transit passage, shall: (c) refrain from any activities other than those incident to their normal modes of continuous and expeditious transit unless rendered necessary by <i>force majeure</i> or by distress;</p>
	MARPOL 73/78	<p>Regulation 11: a. The discharge into the sea of oil and oily mixture necessary for the purpose of securing the safety of a ship or saving life at sea; or b. The discharge into the sea of oil or oily mixture resulting from damage to a ship or its equipment (I) Provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the discharge for the purpose of preventing or minimising the discharge; and (II) Except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result</p>
	Basel Convention: Protocol on liability and compensation for damage resulting from transboundary movements of hazardous wastes and their disposal	<p>Article 4: Strict liability 5. No liability in accordance with this Article shall attach to the person referred to in paragraphs 1 and 2 of this Article, if that person proves that the damage was: (a) The result of an act of armed conflict, hostilities, civil war or insurrection; (b) The result of a natural phenomenon of exceptional, inevitable, unforeseeable and irresistible character; (c) Wholly the result of compliance with a compulsory measure of a public authority of the State where the damage occurred; or (d) Wholly the result of the wrongful intentional conduct of a third party, including the person who suffered the damage.</p>

	<p>London Convention The 1996 Protocol to The prevention of marine pollution by dumping of waste and other matter, 1972</p>	<p><u>Article 8: Exceptions</u> 1. The provisions of articles 4.1 and 5 shall not apply when it is necessary to secure the safety of human life or of vessels, aircraft, platforms or other man-made structures at sea in cases of <i>force majeure</i> caused by stress of weather, or in any case which constitutes a danger to human life or a real threat to vessels, aircraft, platforms or other man-made structures at sea, if dumping or incineration at sea appears to be the only way of averting the threat and if there is every probability that the damage consequent upon such dumping or incineration at sea will be less than would otherwise occur. Such dumping or incineration at sea shall be conducted so as to minimize the likelihood of damage to human or marine life and shall be reported forthwith to the Organization.</p>
	<p>Civil Liability Convention 1969</p>	<p><u>Article III(2):</u> 'No liability for pollution damage shall attach to the owner if he proves that the damage: (a) resulted from an act of war, hostilities, civil war, insurrection or a natural phenomenon of an exceptional, inevitable and irresistible character...'</p>
	<p>ILC Articles on the Responsibility of States for International Wrongful Acts 2001</p>	<p><u>Article 23 Force majeure:</u> 1. The wrongfulness of an act of a State not in conformity with an international obligation of that State is precluded if the act is due to <i>force majeure</i>, that is the occurrence of an irresistible force or of an unforeseen event, beyond the control of the State, making it materially impossible in the circumstances to perform the obligation. 2. Paragraph 1 does not apply if: (a) the situation of <i>force majeure</i> is due, either alone or in combination with other factors, to the conduct of the State invoking it; or (b) the State has assumed the risk of that situation occurring.</p>
	<p>Convention on the Non-navigational Uses of Watercourses 1997</p>	<p><u>Article 27</u> <u>Prevention and mitigation of harmful conditions</u> Watercourse States shall, individually and, where appropriate, jointly, take all appropriate measures to prevent or mitigate conditions related to an international watercourse that may be harmful to other watercourse States, whether resulting from natural causes or human conduct, such as flood or ice conditions, water-borne diseases, siltation, erosion, salt-water intrusion, drought or desertification.</p> <p><u>Article 28</u> <u>Emergency situations</u> 1. For the purposes of this article, "emergency" means a situation that causes, or poses an imminent threat of causing, serious harm to watercourse States or other States and that results suddenly from natural causes, such as floods, the breaking up of ice, landslides or earthquakes, or from human conduct, such as industrial accidents. 2. A watercourse State shall, without delay and by the most expeditious means available, notify other potentially affected States and competent international organizations of any emergency originating within its territory. 3. A watercourse State within whose territory an emergency originates shall, in cooperation with potentially affected States and, where appropriate, competent international organizations, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects of the emergency.</p>

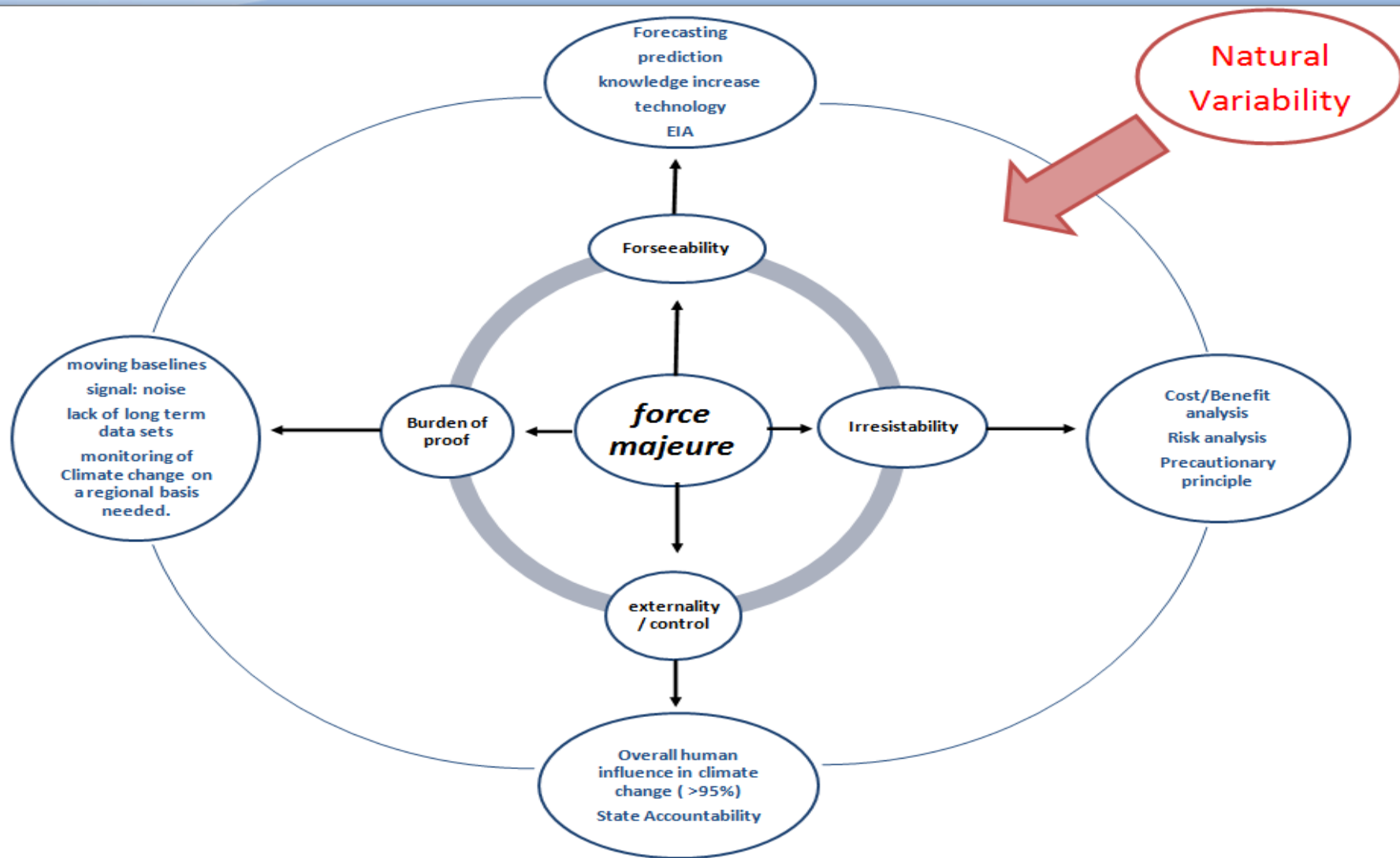
		4. When necessary, watercourse States shall jointly develop contingency plans for responding to emergencies, in cooperation, where appropriate, with other potentially affected States and competent international organizations.
EU	Water Framework Directive 2000/60/EC	(32) There may be grounds for exemptions from the requirement to prevent further deterioration or to achieve good status under specific conditions, if the failure is the result of unforeseen or exceptional circumstances, in particular floods and droughts, or, for reasons of overriding public interest, of new modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater, provided that all practicable steps are taken to mitigate the adverse impact on the status of the body of water. Article 4 6. Temporary deterioration in the status of bodies of water shall not be in breach of the requirements of this Directive if this is the result of circumstances of natural cause or <i>force majeure</i> which are exceptional or could not reasonably have been foreseen, in particular extreme floods and prolonged droughts, or the result of circumstances due to accidents which could not reasonably have been foreseen, when all of the following conditions have been met:
	Bathing Waters Directive 2006/7/EC	Article 3 7. During abnormal situations, the monitoring calendar referred to in paragraph 4 may be suspended. It shall be resumed as soon as possible after the end of the abnormal situation. New samples shall be taken as soon as possible after the end of the abnormal situation to replace samples that are missing due to the abnormal situation. Article 7 Management measures in exceptional circumstances Member States shall ensure that timely and adequate management measures are taken when they are aware of unexpected situations that have, or could reasonably be expected to have, an adverse impact on bathing water quality and on bathers' health. Such measures shall include information to the public and, if necessary, a temporary bathing prohibition
	Shellfish Directive 79/923/EEC	(8) Certain natural circumstances are beyond the control of the Member States and it is therefore necessary to provide for the possibility of derogating from this Directive in certain cases. Article 11 The Member States may derogate from this Directive in the event of exceptional weather or geographical conditions.
	Habitats Directive 92/43/EEC	Article 16 Provided that there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range, Member States may derogate from the provisions of Articles 12, 13, 14 and 15 (a) and (b): (a) in the interest of protecting wild fauna and flora and conserving natural habitats; (b) to prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property; (c) in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment; (d) for the purpose of research and education, of repopulating and re-introducing these species and for the breedings operations

		necessary for these purposes, including the artificial propagation of plants; (e) to allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species listed in Annex IV in limited numbers specified by the competent national authorities.
	Environmental liability 2004/35/CE	Article 4 (20) An operator should not be required to bear the costs of preventive or remedial actions taken pursuant to this Directive in situations where the damage in question or imminent threat thereof is the result of certain events beyond the operator's control. (1) This Directive shall not cover environmental damage or an imminent threat of such damage caused by: (a) an act of armed conflict, hostilities, civil war or insurrection; (b) a natural phenomenon of exceptional, inevitable and irresistible character.
	MSFD 2008/56/EC	Article 14 1. A Member State may identify instances within its marine water where, for any reasons listed under points (a) to (d), the environmental targets or good environmental status cannot be achieved in every aspect through measures taken by that member State, or, for reasons referred to under point (e), they cannot be achieved within the time schedule concerned: (a) action or inaction for which the Member State concerned is not responsible; (b) natural causes; (c) <i>force majeure</i> (d) modifications or alterations to the physical characteristics of marine waters brought about by actions taken for reasons of overriding public interest which outweigh the negative impact on the environment, including any transboundary impact; (e) natural conditions do not allow timely improvement in the status of the marine waters concerned
	Urban waste-water treatment 91/271/EEC	Article 8 1. Member States may, in exceptional cases due to technical problems and for geographically defined population groups, submit a special request to the Commission for a longer period for complying with Article 4. 2. This request, for which grounds must be duly put forward, shall set out the technical difficulties experienced and must propose an action programme with an appropriate timetable to be undertaken to implement the objective of this Directive. This timetable shall be included in the programme for implementation referred to in Article 17. 3. Only technical reasons can be accepted and the longer period referred to in paragraph 1 may not extend beyond 31 December 2005. 4. The Commission shall examine this request and take appropriate measures in accordance with the procedure laid down in Article 18. 5. In exceptional circumstances, when it can be demonstrated that more advanced treatment will not produce any environmental benefits, discharges into less sensitive areas of waste waters from agglomerations of more than 150000 p.e. may be subject to the treatment provided for in Article 6 for waste water from agglomerations of between 10000 and 150000 p.e. In such circumstances, Member States shall submit beforehand the relevant documentation to the Commission. The Commission will examine the case and take appropriate measures in accordance with the procedure laid down in Article 18.

	<p>2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC,</p>	<p><u>Article 29</u> 1. During the period referred to in Article 11(1), Member States may apply to the Commission for certain installations to be issued with additional allowances in cases of <i>force majeure</i>. The Commission shall determine whether <i>force majeure</i> is demonstrated, in which case it shall authorize the issue of additional and non-transferable allowances by that Member State to the operators of those installations. 2. The Commission shall, without prejudice to the Treaty, develop guidance to describe the circumstances under which <i>force majeure</i> is demonstrated, by 31 December 2003 at the latest. [COM (2003) 830 final provides further guidance on this: At para 113: ‘Circumstances of force majeure are, by their nature, difficult to anticipate. The Commission considers these to be exceptional and unforeseeable circumstances, which cause a substantial increase in annual direct emissions of greenhouse gases covered by Directive 2003/87/EC at an installation, which could not have been avoided even if all due care had been exercised. The circumstance must have been beyond the control of the operator of the installation concerned and of the Member State...’ Para 114: ‘Circumstances that the Commission may consider to be force majeure include notably natural disasters, war, threats of war, terrorist acts, revolution, riot, sabotage or acts of vandalism.’]</p>
National	<p>Marine and Coastal Access Act, 2009</p>	<p><u>141 Exceptions to offences under section 139 or 140</u> (d) was necessary in the interests of national security or the prevention or detection of crime, or was necessary for securing public health; (e) was necessary for the purpose of securing the safety of any vessel, aircraft or marine installation; (f) was done for the purpose of saving life. (2) Subsection (1) (e) does not apply where the necessity was due to the fault of the person or of some other person acting under the person’s direction or control. (3) A person is not guilty of an offence under section 139 by reason of doing anything that is an offence under section 140. (4) It is a defence for a person who is charged with an offence under section 140 to show that— (a) the act which is alleged to constitute the offence was— (i) an act done for the purpose of, and in the course of, sea fishing, or (ii) an act done in connection with such an act, and (b) the effect of the act on the protected feature in question could not reasonably have been avoided.</p>
	<p>Wildlife and Countryside Act, 1981</p>	<p><u>Part 1</u> (c) any act made unlawful by those provisions if he shows that the act was the incidental result of a lawful operation and could not reasonably have been avoided. (3) Notwithstanding anything in the provisions of section 1 or any order made under section 3, an authorised person shall not be guilty of an offence by reason of the killing or injuring of any wild bird, other than a bird included in Schedule 1, if he shows that his action was necessary for the purpose of— (a) preserving public health or public or air safety;</p>

		<p>(b) preventing the spread of disease; or</p> <p>(c) preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber, or fisheries</p>
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Figure 1: A conceptual model demonstrating the difficulties Member States may face in a *force majeure* cases due to the effects of climate change upon its



application based on the conclusions of this study.