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THE PROTECTION OF PLANTS IN INTERNATIONAL LAW, THEORY AND PRACTICE

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May 2017

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'THE PROTECTION OF PLANTS IN INTERNATIONAL LAW, THEORY AND PRACTICE'

SUMMARY

This thesis provides a comprehensive overview of international environmental law as it relates to plants. In doing so, it offers new perspectives on some of the key debates in the law, as well as on humanity's relationship with the natural world.

The first part of the thesis looks at the philosophical rationales for giving legal protection to plants. Drawing on the literature relating to value, different interpretations of the value of plants are identified, including instrumental, intrinsic and ecological. Each interpretation is then tracked in international conservation law and policy. An almost exclusively anthropocentric picture is revealed, and the implications of this for conservation policy and practice are discussed.

Attention then turns to global and regional approaches to protecting plants. First, the construction and content of key legal agreements are assessed against a range of criteria for effectiveness. Second, an analysis of the design and form of conservation mechanisms is conducted, focussing on the extent to which protected areas reflect the ecological needs of plants and the representativeness of lists of protected and endangered species. In each case the law is found to fall short, and proposals on how to address this are given.

In the third part of the thesis, how the law responds to some of the main threats to plants, namely climate change, international trade and alien/invasive species, is considered. Each impacts on plants in different ways and has been subject to very different legal responses. In each case, however, weaknesses can be identified that undermine the law's ability to adequately protect plants.

Finally, the extent to which the law supports and frustrates the work of conservation practitioners is examined. As well as offering practical reforms to make the law a better tool for practitioners, consideration is given to wider governance reforms to international environmental law.

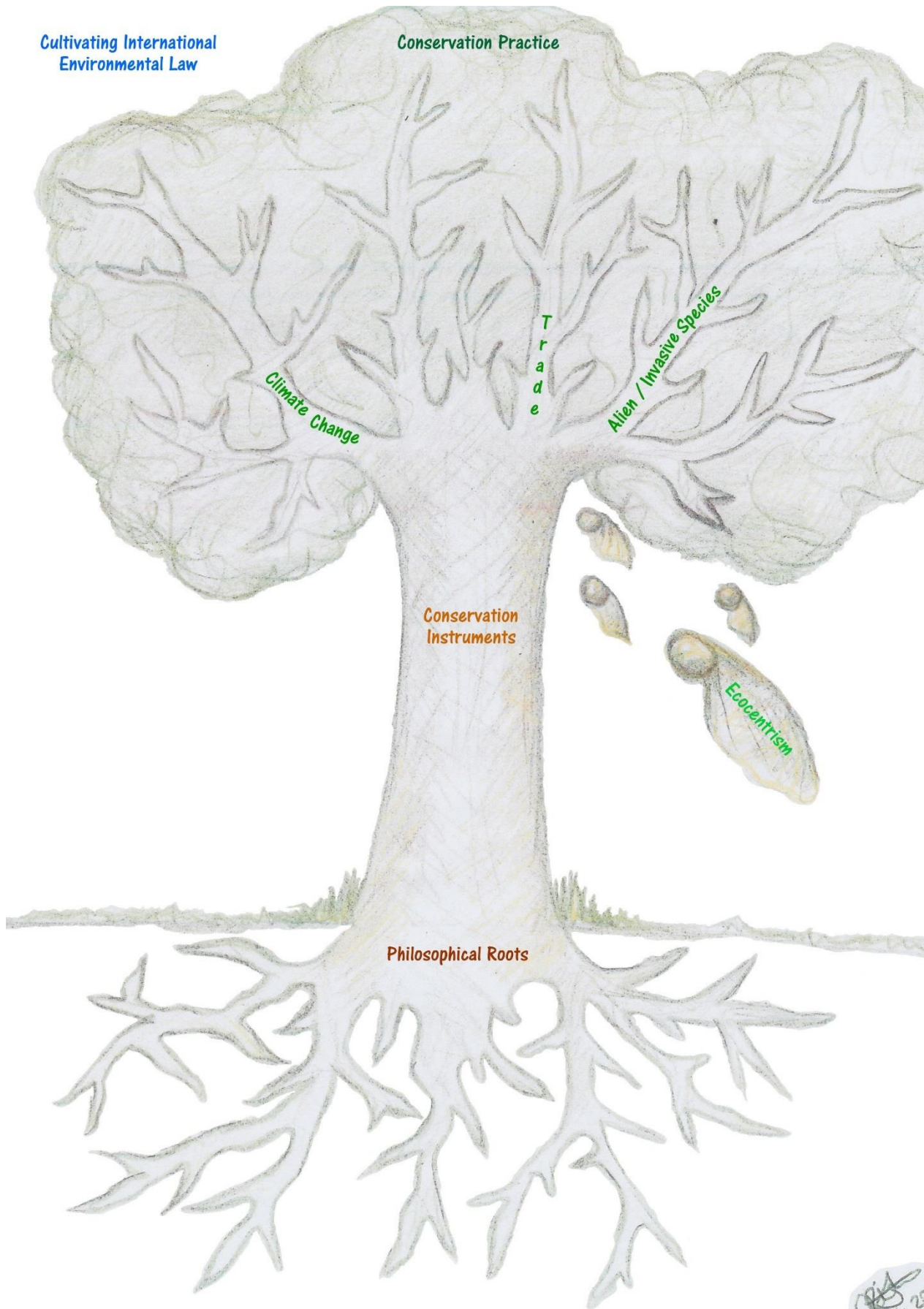


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INTRODUCTION: THE LEGAL AND ECOLOGICAL CONTEXT OF PLANT CONSERVATION

Why a Thesis about Plants?

Growing in the Giant Forest of Sequoia National Park, California, is General Sherman. Named after a general who fought for the Union in the American Civil War, this giant sequoia (*Sequoiadendron giganteum*) is one of the oldest and largest beings in the world. General Sherman began growing more than 2,500 years ago, predating Julius Caesar's march across the Rubicon by several centuries, and at around 275 feet from base to tip is nearly three times the length of a fully-grown blue whale. Elsewhere, there are microbiotic plants regulating and feeding the oceans. Hybrids are created by nature, scientists and amateur horticulturalists every day. These plants, in evolutionary terms, are the youngest organisms alive.

Plants are the most diverse beings on the planet. They have colonised some of the most inhospitable habitats, including the heights of the Himalayas and the most arid of deserts. Some lie dormant beneath the ground waiting for the necessary ecological trigger before growing, be this rainfall that may only occur once every few decades or a wildfire. Others have sophisticated means of acquiring their essential nutrients, including parasitic relationships with other plants and the trapping and digesting of insects. Plants are not just 'objects' in the environment, incapable of responding to external factors. Contrary to public perceptions, they are intuitively aware of their surroundings, possessing a greater capacity to 'sense' what is going on around them and to react accordingly.¹ Plants are also central to all aspects of human life. They are the first link in every food chain, they provide primitive shelter and sophisticated building materials,² are the basis of traditional and modern medicine and are embedded in the art and culture of human civilisation.³

Yet the world's plants are in danger. A recent study suggests that over a fifth of all species are at risk of extinction and the conservation status of many more remains unclear or unassessed.⁴ Despite being the ecological foundations of all life on Earth, plants receive little attention in law.

¹ A 2014 study, for example, found that one species, *Arabidopsis thaliana*, can effectively 'hear' when it is being eaten by sensing the acoustic vibrations caused by insects and will respond to the threat through chemical defences: H.M. Appel and R.B. Cocroft, 'Plants respond to leaf vibrations caused by insect herbivore chewing' (2014) 175 *Oecologia* 1257-1266.

² Scientists are currently exploring the potential of bamboo as a low-carbon construction material - <https://structuralbamboo.wordpress.com/> (last accessed 01/04/2017).

³ For example, see M. Denney and B. Mathew, 'A celebration of cyclamen in art', in B. Mathew (ed), *Genus Cyclamen: Science, Cultivation, Art and Culture* (Kew Publishing, 2012).

⁴ RBG Kew, 'The State of the World's Plants Report – 2016' (Royal Botanic Gardens, Kew, 2016), p. 59.

Often, plants are treated as a side issue to the conservation of animals, and in other cases are almost completely ignored. The last comprehensive review of plant conservation law was de Klemm's *Wild Plant Conservation and the Law*.⁵ Whilst an important resource when published, the present-day value of this work is debatable. De Klemm predates the 1992 Biodiversity Convention.⁶ His work also came before the major scientific advances that have enhanced our knowledge about some of the key drivers of plant diversity loss, and therefore the legal responses as well.

There are also important differences between de Klemm's work and the approach I adopt in this thesis. Most obviously, de Klemm offers insight into plant protection law at the national level.⁷ Due to the limitations of a thesis this has not been possible here, although, where relevant, examples have been provided of how international obligations have been implemented at the national level. Secondly, I link legal issues with conservation scholarship in a more comprehensive manner than de Klemm. Although primarily an investigation into the current state of plant conservation law, this work also explores the relationship between conservation law and conservation practice, with reforms proposed about how the former can be reformed for the benefit of the latter.

In this thesis, I intend to redress the bias against plants seen in legal literature by providing a contemporary appraisal of how international law seeks to protect plants. In doing so, I offer new perspectives on some of the key debates in international law, as well as on humanity's relationship with the natural world. International law has been chosen for two reasons. First, the conservation of biodiversity has been recognised as an issue of 'common concern of humankind' by the international community.⁸ It is therefore legitimate to ask what collective action is being and should be taken to protect an important component of that biodiversity. Second, many of the drivers of plant diversity loss, including climate change and the spread of alien species, require coordinated global responses if they are to be effectively addressed. Unilateral actions by States may deliver some short-term local gains, but will be insufficient to ensure the ecological integrity of the planet.

⁵ C. de Klemm, *Wild Plant Conservation and the Law* (IUCN Environmental Policy and Law Paper Number 24, IUCN, 1990).

⁶ Convention on Biological Diversity, Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992)

⁷ De Klemm, (n 5) chapters 1.1-1.4.

⁸ Preamble to the Biodiversity Convention.

A Brief Introduction to the Ecology of Plants:

Plants are one of the five kingdoms of the natural world (*Plantae*), the others being *Animalia*, *Fungi*,⁹ *Protoctista*¹⁰ and *Prokaryotae*.¹¹ They are typically multicellular autotrophic organisms capable of photosynthesis. Plants have evolved a myriad of adaptations enabling them to thrive in and support every ecosystem on the planet, but they all share the same basic requirements.

One essential need is water, although different plants require different types of water. Cacti, for example, survive on rainfall that may only fall once a year. Other species need their roots to be constantly and consistently moist, and others, particularly bulbous species, need water during their growing season but benefit from a dry summer rest. Water scarcity is becoming an increasing issue in plant conservation. Many areas are suffering periods of drought for longer and more often due to the impacts of climate change, adding further pressure to diminishing fresh water supplies.

Plants also need sunlight to fuel photosynthesis, the process through which water and carbon dioxide are converted into glucose, the plant's food. It might be assumed that all plants will always have access to sunlight, but this is not the case. Some plants, especially alien/invasive species, may dominate an ecosystem, limiting others' exposure to the sun.

Finally, all plants need pollinators to aid in their reproductive cycle, and it is here where the importance of adopting what has been classed an 'ecosystem approach'¹² to the legal protection of plants becomes clear. Many plants have evolved symbiotic links with their pollinators. *Cyclamen* seeds, for example, are coated in a sweet substance that attracts ants. Ants collect the seeds, transport them to their nests where they eat the sugary substance and leave the seed

⁹ Fungi receive even less attention in international law than plants, and, whether by ignorance or design, are explicitly excluded from many international conservation agreements. The 1973 Convention on International Trade in Endangered Species (CITES) (Washington, 3 March 1973, in force 1 July 1975, 993 UNTS 243), for example, is only concerned with trade in fauna and flora. Fungi are, however, arguably included within the remit of the Biodiversity Convention, as Article 2 refers to 'living organisms' rather than plants and animals.

¹⁰ Many species of algae are technically classified as belonging to the *Protoctista* kingdom, which include single- and simple multi-cellular species that typically live in water. However, the classification of algae is complicated, as some species closely resemble plants whilst others have more in common with animals. For the purposes of this thesis it is not strictly necessary to differentiate between the different types of algae, as laws that protect one type of marine organism can benefit the others.

¹¹ Single-celled primitive species that contain no nucleus, i.e. bacteria. Given the obvious practical difficulties in protecting species that are invisible to the naked eye, *Prokaryotae* are not protected by the law. They are however subject to some form of regulation, for example where the bacteria in question causes disease and its potential pathways and carriers are therefore monitored.

¹² Consensus has yet to be reached over what exactly an ecosystem approach should entail, however. See V. de Lucia, 'Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law' (2015) 27 *Journal of Environmental Law* 91-117.

untouched. These relationships are one reason why plant conservation is particularly challenging. It is not the case that a plant can simply be moved to a new location if its previous habitat is lost or damaged, as there are no guarantees that its pollinators will follow. The new location, assuming it also provides the nutrients and water necessary for the plant to survive, may not be suitable for the pollinator. There may, for example, be another species that preys on the pollinator, suppressing its numbers to the extent that too few individuals are pollinated for the plant species to be sustainable.

From a governance perspective, however, it is unnecessary to formulate a scientifically-accurate definition of 'a plant'. There are certain preconceptions of what a plant is that suffice for the purposes of conservation law, evidenced by the absence of scientific definitions of plants in international instruments. What is more relevant in the context of law and policy is how our understanding of plants' roles in different ecosystems has evolved. As I discuss in the next section, conservation science, driven by our growing understanding of ecology and ecosystemic relationships, has undergone a paradigm shift in recent decades. This has not, however, been matched by a similar transformation in the design and application of international conservation instruments, which is arguably one of the reasons why the law is unable to effectively address current ecological challenges.

Core Themes and Thesis Structure:

An analysis of how international environmental law protects plants could encompass the entirety of international environmental law, as well as other important areas of public international law. To focus the analysis, this thesis therefore concentrates on three core themes. The first relates to the tensions between anthropocentrism and ecological values. It is argued throughout this work that the near-constant prioritisation of how plants can be used for the benefit of humans prevents a more ecologically-sound approach to their protection being adopted in international law. This is linked with the second core theme: the prevalence and dominance of the principle of permanent sovereignty over natural resources in international environmental law. In nearly every international instrument discussed in this work, there is a reference to this customary norm of international law, qualifying the obligations of States set out in these instruments and limiting the extent to which international law can compel States to exploit their natural resources in a sustainable, and ecologically-sensitive, manner.

Combined, these two factors – anthropocentric values and permanent sovereignty – have resulted in a body of law fundamentally incapable of providing effective protection to plants.

The objectives of the law are framed in anthropocentric terms, and States are afforded considerable discretion when deciding how to achieve these. The law's ability to protect plants is also undermined by its failure to keep pace with the rapidly developing fields of ecology and conservation science, the third theme in this work. The evolution of ecology has been traced by Mace. During the 1960s a 'conservation for itself' paradigm prevailed, and emphasis was on preserving seemingly untouched areas of wilderness.¹³ The 1940 Western Hemisphere Convention,¹⁴ and its emphasis on national parks and strict wilderness reserves, is an example of a 'conservation for itself' instrument. In the 1970s and 80s, as awareness of the impact human activities were having on nature increased, 'nature despite people' conservation emerged. 'Here, the focus is on threats to species and habitats from humans, and on strategies to reverse and reduce them. Ideas concerning minimum viable population sizes and sustainable harvesting levels, as well as intense debates about community-based management and the sustainable use of wildlife stem from this period and persist to the present'.¹⁵ Such concerns are reflected in the debates over what direction the 1946 International Convention on the Regulation of Whaling¹⁶ should take during the same period.¹⁷ A major shift in thinking occurred in the 1990s and rather than individual habitats and species, ecosystems became the object of conservation action, 'with the goal of providing sustainable benefits for people in the form of ecosystem goods and services – "nature for people"'.¹⁸ The Biodiversity Convention was the international legislative response to this,¹⁹ but that the Contracting Parties have found it necessary to develop habitat- and issue-specific thematic programmes suggests that integrated conservation thinking cannot be easily translated into integrated conservation law and policy. Finally, the past decade has seen the emergence of 'people and nature', which 'emphasizes the importance of cultural structures and institutions for developing sustainable and resilient interactions between human societies and the natural environment'.²⁰ In other words, conservation policy should not focus on protecting ecosystem services per se, but the broader framework of interactions within and between people and nature so as to enhance the capacity of nature as a whole to deliver these services.

¹³ G. Mace, 'Whose conservation?' (2014) 345 *Science* 1558-1560.

¹⁴ Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, Washington, 12 October 1940, in force 1 May 1942, 161 UNTS 193.

¹⁵ Mace, (n 13) 1558.

¹⁶ Washington, 2 December 1946, in force 19 November 1948, 161 UNTS 72 (as amended 19 November 1956, 338 UNTS 336).

¹⁷ P. Birnie, 'International Legal Issues in the Management and Protection of the Whale: A Review of Four Decades of Experience' (1989) 29 *Natural Resources Law* 903-934.

¹⁸ Mace, (n 13).

¹⁹ M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law*, (2nd edition, Cambridge University Press, 2010) p. 594.

²⁰ Mace, (n 13) 1559.

International environmental law, however, largely remains stuck between the first and second phases. This failure to evolve can be linked to the practical and political difficulties in reopening negotiations on international agreements as well as the dominance of anthropocentricity and State sovereignty. The consequences of this outdated perception of the rationales behind conservation action will become apparent during the course of this work.

The thesis is structured in four parts, which at the very beginning of this work were presented through the image of a tree. From its philosophical roots the law has grown through a series of global and regional conservation instruments. Branching out from this core have been responses to specific issues and challenges, which have required bespoke legal instruments. All of this supports and may be included within the broader canopy of conservation practice. Meanwhile, alongside mainstream law and policy we see the seeds of ecocentric reforms, as environmentalists seek alternatives to the broken status quo.

I begin by considering why it is that international law should protect plants, focussing on how different interpretations of the value of plants are expressed in international law and policy. The picture that is revealed is overwhelmingly anthropocentric, and it is argued that this impedes the development of a more ecologically-conscious body of law.

Part two of the thesis sets out the core international legal framework for plant conservation. In chapter two, the usual critiques of the Biodiversity Convention are re-examined as to how they impact on plants. Unsurprisingly, the frequent use of soft language and targets, coupled with significant State discretion, make it very difficult for adequate legal protection for plants to be achieved at the global level. The weaknesses of the Biodiversity Convention, both generally and in relation to plants specifically, would not be as significant an issue if they were supplemented by a comprehensive and robust regional system of conservation instruments. However, in chapter three regional treaties are tested against a number of measures of effectiveness and are found to fall short.

Chapters four and five deal with regions of the world that are not automatically associated with a diverse flora: the polar regions and marine and other aquatic environments. Perhaps unsurprisingly, plants in these areas have not received as much attention as their temperate and terrestrial counterparts, with early attempts at environmental regulation being of no practical relevance. Yet there are signs that the law in these regions is becoming increasingly aware of the need to protect polar and marine flora.

In part three, attention turns to how international law responds to some of the main threats to plants. Chapter six deals with climate change, which poses an existential threat to many plants.

The law's response is analysed both in terms of the capacity of conservation law to respond to the impacts of climate change and how, using mountain flora as a case study, the law protects some of the most vulnerable plant species from climate change. At the same time, plants have been given a key role in helping humans to tackle and reverse climate change. The extent to which the law supports plants in this role is also considered in chapter six.

Climate change can be described as an issue that has a general and indiscriminate impact. International trade, in comparison, has a more limited but potentially just as devastating effect on individual species. In chapter seven, how two trade regimes approach the conservation of plants is examined. First, the environmental jurisprudence of the World Trade Organisation is traced to identify its implications for trade-restricting national policies intended to protect plants. The second part of chapter seven is concerned with CITES, arguably one of the strongest plant conservation instruments due to the intelligent responses it has developed to particular challenges. This chapter also offers interesting insights on the relationship between environmental protection and State sovereignty. In most of the regimes discussed in this work, the principle of State sovereignty is being used as a shield to prevent international environmental obligations infringing on States' ability to develop freely. In the World Trade Organisation disputes, however, State sovereignty is generally being asserted to enable States to pursue national environmental agenda that are not necessarily compatible with international trade rules. Equally, through CITES States have agreed to suspend their sovereignty in a very specific context – trade in endangered species. This has led to some tensions between importing States, which tend to be rich developed States, and exporter States, which are often developing States reliant on the exploitation of their natural resources for their economies.

One threat to plants that is growing in significance is alien/invasive species. Climatic changes and other anthropogenic activities, including trade, make it easier for alien species to spread. At the same time, other destabilising impacts, such as the over-exploitation of certain species, has removed biological controls on other species, allowing them to dominate their ecosystem. How the law responds to these challenges, and the appropriateness of these responses in terms of the protection of plants, varies according to the regulatory context. This is addressed in chapter eight, which also considers how international law addresses plant disease. Here, inconsistencies between conservation practice and the law are particularly acute, as disease is not even identified in the main conservation instruments as a driver of biodiversity loss.

In the final part of the thesis, chapter nine considers how international law impacts on the work of conservation practitioners. Consideration is given to what reforms are necessary, both to

specific aspects of international law and also its broader governance framework, to better enable the law to facilitate on-the-ground conservation. The theory of resilience thinking, which focusses on how promoting collaboration between actors in a given network can allow for a more responsive and experientially-led model of governance,²¹ will be used to frame these proposals. One of the critiques that emerges during the course of this work is that traditional top-down regulation seen throughout international environmental law can result in a greater focus on conservation outputs, such as inventories of species and targets, rather than positive conservation outcomes. By emphasising what different actors, including States, local communities and conservation practitioners, can contribute to conservation projects, resilience thinking could potentially address some of the weaknesses in traditional regulatory approaches and deliver genuine improvements in the conservation status of plants. Examples will be identified throughout the thesis highlighting where there is space for such an approach to emerge. By way of conclusion, I offer some thoughts on how more ecocentric reforms could be introduced into international law, and what the consequences could be if humanity's relationship with plants does not fundamentally change.

As the research progressed, it became clear that it encompassed more issues than were possible to cover within the limits of a thesis. Consequently, it was necessary to omit discussion of several points, which although academically interesting and relevant in the broader context of the links between conservation law and conservation practice, were not as pertinent to a study about plants. For example, chapter nine initially included a section on de-extinction, i.e. the scientific process of bringing a species back from extinction. However, this practice is still in its infancy, and has yet to be applied to plants,²² and so was excluded from the final draft of this work. In other cases, a choice had to be made between different regimes for use as case studies. Both the 1997 International Plant Protection Convention²³ and the 2004 Convention for the Control and Management of Ships' Ballast Waters,²⁴ for example, provide insights into the regulation of alien/invasive species in international law. As there was only space for discussion of one, the 1997 Convention was selected because of its more direct relevance to plants.

The conclusions of the excluded sections were similar to those reached throughout this thesis. Specifically, emphasis on the anthropocentric values of nature, coupled with the prioritisation

²¹ D. Chandler, *Resilience: The Governance of Complexity* (Routledge, 2014).

²² H. Pilcher, *Bring Back the King: The New Science of De-Extinction* (Bloomsbury, 2016).

²³ In force 2 October 2005, amending the 1951 Convention (Rome, 6 December 1951, in force 3 April 1952, 150 UNTS 67, as revised by the FAO Conference in 1979). Text available at: <https://www.ippc.int/en/core-activities/governance/convention-text/>.

²⁴ International Convention for the Control and Management of Ships' Ballast Water and Sediments (London) 13 February 2004, to enter into force on 8 September 2017, IMO Doc. BWM/CONF/36.

of State sovereignty, frustrates the development of a more ecologically-sound body of international conservation law.

PART 1: THE PHILOSOPHICAL FOUNDATIONS OF THE LEGAL PROTECTION OF PLANTS

I

THE VALUE OF PLANTS IN INTERNATIONAL ENVIRONMENTAL LAW

Nature in Society:

In 1988 Ehrenfeld observed: 'That it was considered necessary to have a section in this volume devoted to the value of biological diversity tells us a great deal about why biological diversity is in trouble'.¹ That conservationists feel compelled to justify their actions over twenty-five years later partly explains why efforts to halt the continuing loss of biodiversity have failed.² Despite the growing evidence linking the ecological health of the planet with humanity's ability to survive and prosper, the natural world is simply not valued by society in the same way as other, arguably less existentially-vital, assets and entities. Rather than as the foundation of all life on Earth, the flora, fauna and natural entities that comprise the natural world are considered as mere resources to be exploited for anthropocentric purposes.

At the international level, the law's apparent inability to engage with the deeper values of nature can be explained by charting the development of the modern legal order and the principle of permanent sovereignty over natural resources. Schrijver links the rise of permanent sovereignty to a range of factors prevalent in the 1940s which, when taken together, left little room for environmental considerations. These include the critical need for energy and food supplies during the Second World War, the rise of multinational corporations and the desire of newly formed and independent States to exert their economic self-determination.³ That permanent sovereignty initially found expression in General Assembly Resolutions⁴ rather than any formal treaty instrument has not precluded it from being recognised as customary international law,⁵

¹ D. Ehrenfeld, 'Why Put a Value on Biodiversity?', in E.O. Wilson (ed), *Biodiversity* (National Academy Press, 1988), p. 212.

² Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montreal, 2014).

³ N. Schrijver, *Sovereignty Over Natural Resources: Balancing Rights and Duties* (Cambridge University Press, 1997), in particular chapters 2 and 3.

⁴ Resolution 1803(XVII) Permanent Sovereignty over Natural Resources, Resolution 3201(S-VI) Declaration on the Establishment of a New International Economic Order and Resolution 3281(XXIX) Charter of Economic Rights and Duties of States.

⁵ *Texaco v Libyan Arab Republic* (1978) 17 ILM 3, para. 59.

and it has since been given effect in various binding and non-binding instruments.⁶ Given this overwhelming international consensus on the need to secure sovereignty for States over the natural environment within their borders, and a sovereign right to continue to exploit resources outside national jurisdiction, it is not surprising that the natural world, including all living and non-living, tangible and intangible things, has been reduced to ‘resources’.⁷

Recent developments in international law, however, suggest that it is possible to reinterpret permanent sovereignty in light of an emerging principle of sustainable use. An early indication of this was seen in Judge Weeramantry’s Separate Opinion in *Gabčíkovo-Nagymaros*,⁸ in which he suggested that the right to development was constrained by environmental limitations.⁹ More recently, in 2011 the International Tribunal for the Law of the Sea held that States are under certain positive duties when conducting activities in the Area.¹⁰ These include obligations of due diligence, the need to adopt a precautionary approach, the use of best environmental practices and the completion of an environmental impact assessment.¹¹ Combined, these indicate that States cannot operate freely in the Area without taking into account the environmental impacts of their activities and adopting measures to mitigate these.

Similarly, in the 2013 *Kishenganga Arbitration*,¹² which concerned a dispute between India and Pakistan about India’s Kishenganga Hydro-Electric Project and its possible impacts on flow of the Indus River, it was stated that principles of international environmental law must be taken into account when interpreting legal instruments, including instruments that predate developments in environmental law. Reaffirming their earlier ruling that ‘States have “a duty to prevent, or at least mitigate” significant harm to the environment’, the Court of Arbitration read a requirement of ensuring an ‘environmental flow’ of the river into the Indus Waters Treaty, which governed

⁶ For example, see Article 193 of the 1982 UN Convention on the Law of the Sea (Montego Bay, 10 December 1982, in force 16 November 1994, 21 ILM 1261 (1982)) and Principle 2 of the 1992 Rio Declaration on Environment and Development (31 ILM 874 (1992)).

⁷ There are few definitions of ‘natural resources’ in multilateral environmental agreements, but an example can be found in Article V of the 2003 African Convention on the Conservation of Nature and Natural Resources (Revised Version, not in force): “‘Natural Resources’ means renewable resources, tangible and non-tangible, including soil, water, flora and fauna and non-renewable resources’. Text available at: <http://www.au.int/en/treaties/african-convention-conservation-nature-and-natural-resources-revised-version> (last accessed 01/04/2017).

⁸ *Gabčíkovo-Nagymaros (Hungary/Slovakia)* (1997) ICJ Reports 7.

⁹ *ibid.*, p. 92-95.

¹⁰ *Responsibilities and obligations of States with respect to activities in the Area*, Advisory Opinion, 1 February 2011, *ITLOS Reports 2011*, p. 10.

¹¹ *ibid.*, para. 131-137 and 141-150.

¹² *Indus Waters Kishenganga Arbitration (Pakistan v India)*, Final Award of the Court of Arbitration, 20th December 2013.

the two States' use of the watercourse.¹³ A further interesting point in the decision was that the Court, whilst accepting that there is no single method for assessing the potential environmental impacts of a particular project, determined that the more in-depth and holistic ecosystem analysis conducted by Pakistan was in principle a more appropriate tool than the more limited assessment undertaken by India, which focussed on a single factor, i.e. the habitat available for certain species of fish.¹⁴ This suggests not only that sustainable use is becoming increasingly important in the interpretation of international law, but so too is the use of ecosystem approaches when assessing possible environmental impacts.

Finally, in his Separate Opinion to the *Whaling in Antarctica Case*, Judge Cançado Trindade highlighted the increasing importance attached to ideas of intergenerational equity seen in both international environmental law and public international law more broadly.¹⁵ Thus, sustainable use may be seen as applying not only to current generations, but future generations as well.

Whilst such developments are welcome, and support Schrijver's assertion that the principle of permanent sovereignty has evolved to reflect ideas of sustainable use,¹⁶ their practical value in the context of plant conservation is limited. First, these are relatively recent judicial decisions and much of the law discussed in the work evolved at a time when a more nuanced interpretation of permanent sovereignty was not possible. Whilst developments in international environmental law will be taken into account in contemporary interpretations of dated regimes, there remain structural flaws within specific treaty provisions that may in part be attributed to States' desire protect their rights of permanent sovereignty.¹⁷ Second, given the continued importance the international community places on economic growth, it is debatable whether these specific cases are enough to instigate the scale of reforms needed across all areas of law and policy in a timely manner if the ecological deterioration of the planet is to be slowed or reversed. That the nationally determined contributions for emission reductions put forward by

¹³ *ibid*, para. 111-112.

¹⁴ *ibid*, para. 99.

¹⁵ *Whaling in the Antarctic (Australia v Japan: New Zealand Intervening)* (2014) ICJ Reports 226, paras. 41-45 of the Separate Opinion. Note that whilst the majority of the Court found that Japan's scientific whaling programme fell outside the scope of Article VIII of the 1946 International Convention for the Regulation of Whaling (Washington, 2 December 1946, in force 10 November 1948, 161 UNTS 72 (as amended 19 November 1956, 338 UNTS 336)) and therefore constituted commercial whaling in violation of the Convention's Schedule, they did so after analysing the design and implementation of the programme in light of its stated scientific objectives, rather than on grounds relating to intra and intergenerational equity (see para. 223-233 of the judgment).

¹⁶ Schrijver, (n 3) chapter 4.

¹⁷ See, in particular, the discussions in chapters 2 and 3.

States under the 2015 Paris Agreement¹⁸ to the UN Framework Convention on Climate Change¹⁹ fall short of what is believed necessary to limit the global temperature rise to what is considered ecologically safe suggests that they are not.²⁰

It is not enough to say that society needs to reassess how it values the natural world however. There must first be consensus about what the value of nature actually is, and what value(s) we wish to protect through international law. In this chapter I explore the nature of value and some of the reasons why it has proven difficult to establish a clear and concise understanding of the concept. I then look at why reaching this understanding is essential. It is argued that for there to be long-term, targeted conservation strategies, society, both at national and international levels, must reach a consensus on how the natural world is to be valued. In setting out what is discussed in this chapter, it is important to note what is not. In particular, it does not attempt to measure or quantify value. There is a substantial body of scholarship on the various approaches to measuring value,²¹ but for my purposes it is more important to establish the type of value that we assign to plants, rather than the degree of value, as it is this which will determine what conservation strategies are most likely to succeed.

The main part of the discussion focusses on what I consider to be the five principal interpretations of value: instrumental, inherent, intrinsic, ecological and negative.²² This is by no means an exhaustive list. Korsgaard, for example, identifies four types of value: final, instrumental, intrinsic and extrinsic.²³ There are also other sub-categories of value that I include in my five broader titles. Taking a restrictive approach to defining value is not to criticise the way others have interpreted the value of nature. One of the failings of conservation law to date is the failure of policy makers, conservationists and the wider public to form a consensus on what value we as a society, both globally and within States, wish to assign to nature. Constantly changing understandings of what the value of nature is leads to constantly changing shifts in

¹⁸ FCCC/CP/2015/L.9/Rev.1, in force 4 November 2016.

¹⁹ 1992 UN Framework Convention on Climate Change (New York, 9 May 1992, in force 24 March 1994, 1771 UNTS 107).

²⁰ UNFCCC, 'Synthesis Report on the Aggregate Effect of the Intended Nationally Determined Contributions, Note by the Secretariat, FCCC/CP/2015/7.

²¹ For example see C. Bruni, R. Chance and P. Shultz, 'Measuring Values-Based Environmental Concerns in Children: An Environmental Motives Scale' (2012) 43 *The Journal of Environmental Education* 1-15, P. Weesie and J. van Andel, 'An Integrated Framework for the Instrumental Valuation of Nature' (2008) 16 *Restoration Ecology* 1-4 and J. Clark, 'Corncrakes and Cornflakes: The Question of Valuing Nature' in Y. Guerrier, N. Alexander, J. Chase and M. O'Brien (eds), *Values and the Environment: A Social Science Perspective* (Wiley, 1995).

²² My starting point for the definitions of value is the discussion of the nature of value in M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law* (2nd edition, Cambridge University Press, 2010), chapter 3.

²³ C. Korsgaard, 'Two Distinctions in Goodness' (1983) XCII *The Philosophical Review* 169-195.

policies, which prevents the long-term strategies that are required for effective conservation.²⁴ Limiting this discussion to five definitions of value is intended to provide a clear template within which we can begin to find this consensus.

Finally, attention turns to how the different interpretations of value are expressed in key conservation instruments and the Outcome Report of the 2012 UN Conference on Sustainable Development, 'The Future We Want'.²⁵ It is argued that if the values that underpin international environmental law and policy are primarily anthropocentric, ecocentric goals of protecting all of nature for its own sake²⁶ and advocating laws that are based on ecological rather than anthropocentric criteria²⁷ are less likely to be achieved.

The Nature of Value:

The concept of 'value' is a nebulous one, but for the purposes of this discussion a useful definition is provided by Harrison, Burgess and Clark:

[E]nvironmental values engender conflicts over choices and demand the rationalisation of courses of action. *Values* are the reasons given for actions. They are invoked to account for, and to make judgements about, the actions of individuals and institutions whilst, at the same time, finding embodiment in social organisation.²⁸

In short, they are the reasons, justifications and objectives of law, policy and actions. From this definition, a number of key elements can be drawn. Firstly, they inform the choices we make. When actions are taken, either by individuals or collectively, they are influenced by our values. Context is one of the key factors determining the relative weight we afford particular values at any given time. As Chase and Panagopoulos put it, 'When driving one wants good roads, when picnicking good views'.²⁹ The writers also highlight the relevance of identity: 'a communist identity is necessarily associated with collective rather than individualistic values; religious identities are associated with spiritual values, business identities with financial values and so

²⁴ Ehrenfeld, (n 1) p. 214.

²⁵ A/RES/66/288, 11 September 2012.

²⁶ A. Naess, 'The Shallow and the Deep, Long-Range Ecology Movements: A Summary' (1973) 16 *Inquiry* 95-100.

²⁷ C. Cullinan, *Wild Law: A Manifesto for Earth Justice* (2nd edition, Green Books, 2011).

²⁸ C. Harrison, J. Burgess and J. Clark, 'Capturing Values for Nature: Ecological, Economic and Cultural Perspectives', in J. Holder and D. McGillivray (eds), *Locality and Identity: Environmental Issues in Law and Society* (Ashgate Publishing, 1999), p. 87.

²⁹ J. Chase and I. Panagopoulos, 'Environmental Values and Social Psychology: A European Common Market or Common's Dilemma?', in Guerrier, Alexander, Chase and O'Brien (eds), (n 21) p. 71.

on'. Context again takes on an important role where, as in Chase and Panagopoulos' example, an individual is both religious and a businessman.

Secondly, not only do they inform our choices but values are the justifications for those choices as well. This is particularly true of public policy relating to the environment, with Parker noting that 'Democratic values are often used as foundational in discussion of values in policy'.³⁰ Although the premise is relatively uncontroversial, finding a sufficiently democratic process in which to identify those values that should inform public policy has proven difficult.³¹

The locus of value is just as complex as the nature of value, and will depend on the interpretation of value that is being applied.³² It has been located in, inter alia, ecosystems,³³ habitats and landscapes,³⁴ species,³⁵ individual organisms³⁶ and genes.³⁷ There are contrasting views about this. Some argue that nature is devoid of internal value, and any value it has is what has been attributed to it by humans.³⁸ There is a degree of truth in such arguments, but again understanding the context is crucial. English, for example, discusses the value of ancient places.³⁹ Although such places might represent scientifically interesting phenomena, or particularly rich areas of biodiversity, any cultural or spiritual value they might have stems from human disciplines, traditions and beliefs.⁴⁰ Others, in comparison, such as advocates of deep ecology, reject this idea and instead see nature as having intrinsic value regardless of its worth or use to humanity.⁴¹

³⁰ J. Parker, 'Enabling Morally Reflective Communities: Towards a Resolution of the Democratic Dilemma of Environmental Values in Policy', in Guerrier, Alexander, Chase and O'Brien (eds), (n 21) p. 36.

³¹ *ibid*, p. 37 et seq.

³² Bowman, Davies and Redgwell, (n 22) p. 68.

³³ Weesie and van Andel, (n 21).

³⁴ C. Winter, 'The Intrinsic, Instrumental and Spiritual Values of Natural Area Visitors and the General Public: A Comparative Study' (2007) 15 *Journal of Sustainable Tourism* 599-614.

³⁵ For example, the spiritual value of whales to indigenous tribes: S. Harrop, 'Impressions: Whales and Human Relationships in Myth, Tradition and Law', in P. Brakes and M. Peter Simmonds (eds), *Whales and Dolphins: Cognition, Culture, Conservation and Human Perceptions* (Earthscan, 2011).

³⁶ F. Mathews, *The Ecological Self* (Routledge, 1991).

³⁷ R. Dawkins, *The Selfish Gene* (30th anniversary edition, Oxford University Press, 2006).

³⁸ H. Rolston III, 'Are Values in Nature Subjective or Objective?', in R. Elliot and A. Gare (eds), *Environmental Philosophy* (Open University Press, 1983) p. 135-136.

³⁹ P. English, 'Space and Time: The Genus Loci of Ancient Places', in J. Holder and C. Harrison (eds), *Law and Geography* (Oxford University Press, 2003).

⁴⁰ *ibid*.

⁴¹ Naess, (n 26).

Why is Understanding Value Important?

It has been persuasively argued that it is our collective failure to appreciate the non-anthropocentric value of nature that is one of the causes of the decline in biodiversity, or as Rolston puts it: ‘Something gone sour at the fact/value distinction is one of the roots of the ecological crisis’.⁴²

Rolston’s comments are, in my view, too simplistic. A more nuanced approach to simply attributing the decline of biodiversity in part to anthropocentrically-focussed conservation policies is to say that it is society’s failure, at both national and international levels, to agree on a set of environmental values on which long-term conservation efforts can be based, be these anthropocentric or otherwise. Commentators argue that what is required is consistency in our view on the value of nature in order to provide a solid basis for long-term conservation strategies.⁴³ Successive governments have argued the need for a long-term strategy, with support from across the political and social spectrum, for developing their country’s infrastructure. The same approach needs to be adopted in relation to the infrastructure of the natural world. Including as many stakeholders as possible will be crucial to enabling universal adoption of any values that are agreed,⁴⁴ although Parker makes the valid point that ‘It is important to aim for values we can *respect* rather than values which we can *agree* with’.⁴⁵ Equally important, these values must be such that the ecological integrity of the planet is protected.⁴⁶ The difficulty, as Redclift argues, is that finding a new set of values to underpin society would mean abandoning the values which have enabled humanity to thrive. This problem is compounded because ‘many of those who espouse environmental concerns refuse to acknowledge that it is the way in which human societies are organised, and structured, which determines environmental problems’.⁴⁷

This is not to say that changes in values will always undermine environmental protection. Harrop has traced how changes in the way in which we value whales has driven the evolution of the

⁴² Rolston III, (n 38) p. 136.

⁴³ P. Angermeier, ‘The Natural Imperative for Biological Conservation’ (2000) 14 *Conservation Biology* 373-381; I. Brook, ‘Restoring landscapes: the authenticity problem’ (2006) 31 *Earth Surface Processes and Landforms* 1600-1605 and Ehrenfeld, (n 1).

⁴⁴ Harrison, Burgess and Clark, (n 28) p. 88.

⁴⁵ Parker, (n 30) p. 45.

⁴⁶ A. Ross, ‘Modern Interpretations of Sustainable Development’ (2009) 36 *Journal of Law and Society* 32-54. See also K. Bosselmann, *The Principle of Sustainability: Transforming Law and Governance* (2nd edition, Routledge, 2017), particularly chapter 2.

⁴⁷ M. Redclift, ‘Values and Global Environmental Change’, in Guerrier, Alexander, Chase and O’Brien (eds), (n 21) p. 9.

International Convention for the Regulation of Whaling⁴⁸ from a regime primarily concerned with supporting the whaling industry to one that is focussed on the conservation and even welfare of whales.⁴⁹ However, such changes in value are not conducive to long-term conservation policies. Ehrenfeld goes as far as to say that 'This is the opposite of the value system needed to conserve biological diversity over the course of decades and centuries',⁵⁰ and it is debatable whether the Whaling Convention would have been more successful at ensuring either the absolute protection of whales or their sustainable exploitation had it committed itself to just one of these goals.⁵¹

A further reason why understanding the values that underpin conservation law and policy is important is that if nature is viewed as having purely anthropocentric value, trade-offs with other anthropocentric considerations completely divorced from the ecological importance of nature could be facilitated. The incommensurable values of ecological health on the one hand and economic growth on the other becomes commensurable through economic expression. That is to say that whilst ideals such as 'ecological health' and 'economic growth' will remain incommensurable, purely anthropocentric valuations of the natural world enables such things to be weighed against each other. For example, although the value of a clean and healthy river cannot be measured against the value of the jobs created by building a chemical works next to it, by ignoring its ecological value and only focussing on its anthropocentric value trade-offs become possible. In this case, local residents could decide that the river is of greater value as a place for the chemical works to dump its waste than as a safe place to go swimming. The river has been damaged without any consideration given to its role as part of the ecosystem because its ecological value was not acknowledged.

Finally, approaching the issue from a more pragmatic position, understanding what values are attached to certain entities and places enables those responsible for their management and conservation to better target their plans and strategies. In a 2007 study, Winter found that the environmental values of visitors to natural areas varied considerably.⁵² Some held a spiritual connection with nature, whilst others saw it merely as a place for recreation. Winter concludes:

The knowledge of these values increases the capacity of tourism planners, managers and marketers to [provide benefits for the tourism industry, tourists and the natural

⁴⁸ International Convention for the Regulation of Whaling, Washington, 2 December 1946, in force 10 November 1948, 161 UNTS 72 (as amended 19 November 1956, 338 UNTS 336).

⁴⁹ S. Harrop, 'From Cartel to Conservation and on to Compassion: Animal Welfare and the International Whaling Commission' (2003) 6 *Journal of International Wildlife Law and Policy* 79-104.

⁵⁰ Ehrenfeld, (n 1) p. 214.

⁵¹ Bowman, Davies and Redgwell, (n 22) p. 196-197.

⁵² Winter, (n 34).

world] through education and through more sophisticated marketing and product design.⁵³

It is not just in relation to the management of specific sites where values play a role in shaping decision-making and management practices. Values can also inform broader policies and strategies, including highly complex and contentious issues. Drawing on the work of Meadows,⁵⁴ Mosimane et al argue that ‘understanding the mental models in use by various stakeholders in a particular social-ecological system provides an opportunity to change policy and management’.⁵⁵ In their case mental models were established in relation to human-wildlife conflict in Namibia. The writers argue that this understanding will be ‘fundamental to developing effective responses’.⁵⁶ Although the study uses the terminology of ‘mental model’, the definition of this adopted from Senge shows clear links with the definition of value outlined above, namely a relationship with an individual’s perceptions of the world, and a framework for their actions and decisions.⁵⁷

Thus it is clear that finding a consensus on what we mean by ‘value’ when discussing nature is crucial in establishing targeted long-term conservation strategies. In reality, seemingly contradictory yet equally valid valuations of nature will need to be reconciled, taking into account the interests of the actors involved and the specific context.⁵⁸ This, however, is by no means straightforward, as the following overview of different interpretations of value demonstrates.

Interpretations of Value:

Instrumental Value:

A discussion of instrumental value, i.e. direct value to humans, brings the highly complex nature of different value types into focus. In the first instance, it is possible to distinguish between

⁵³ *ibid*, 612.

⁵⁴ D. Meadows, *Leverage Points: Places to Intervene in a System* (The Sustainability Institute, 1999).

⁵⁵ A. Mosimane et al, ‘Using mental models in the analysis of human-wildlife conflict from the perspective of a social-ecological system in Namibia’ (2013) 48 *Oryx* 64-70.

⁵⁶ *ibid*.

⁵⁷ P. Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (Doubleday-Currency, 1990), p. 163, cited in Mosimane et al, (n 55).

⁵⁸ M. Foschi and T. West, ‘In whose interest? Instrumental and intrinsic value in biodiversity law’, in M. Bowman, P. Davies and E. Goodwin (eds), *Research Handbook on Biodiversity and Law* (Research Handbook in Environmental Law Series, Edward Elgar, 2016).

commodity⁵⁹ and utility⁶⁰ instrumental value. With regard to the former, something can be said to have commodity value 'if it can be made into a product that can be bought or sold in the marketplace'.⁶¹ Utility value refers to a direct use to which a natural resource may be put. In this regard, Murphy highlights the utility of plants in urban environments:

Benefits include amelioration of climate, because foliage in cities contribute to the reduction of ambient temperatures. Large trees and shrubs reduce wind velocity and reduce evaporation of soil moisture. Plants are also useful in architecture, erosion control, watershed protection, wastewater management, noise abatement, and air pollution control.⁶²

In international environmental law both forms of instrumental value are readily identifiable. The 1902 Convention for the Protection of Birds Useful to Agriculture⁶³ is an obvious example. Similarly, the utility value of the genetic resources of plants and animals forms the basis of the Nagoya Protocol on Access and Benefit Sharing⁶⁴ to the 1992 Convention on Biological Diversity.⁶⁵

Beyond these immediate or direct forms of instrumental value is the indirect instrumental value a species might have. For example, although a farmer may have no direct use of the grass growing in his fields, it holds indirect instrumental value as it provides grazing for his sheep. In international environmental law, indirect instrumental value is recognised in provisions that call for the protection of habitats that are crucial for species with direct commodity or utility value. The 1979 Convention for the Conservation and Management of the Vicuna,⁶⁶ for example, is concerned with conserving vicuna for primarily instrumental purposes,⁶⁷ but the Contracting Parties are required to establish protected areas that support vicuna populations.⁶⁸ The habitat of the vicuna thus has indirect instrumental value.

⁵⁹ B. Norton, 'Commodity, Amenity and Morality: The Limits of Quantification in Valuing Biodiversity', in Wilson (ed), (n 1).

⁶⁰ D. Murphy, 'Challenges to Biodiversity in Urban Areas', in Wilson (ed), (n 1).

⁶¹ Norton, (n 59) p. 201.

⁶² Murphy, (n 60) p. 73.

⁶³ Paris, 19 March 1902, in force 20 April 1908, 4 IPE 1615.

⁶⁴ Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization, Nagoya, 29 October 2010, in force 12 October 2014, C.N.782.2010.TREATIES-1.

⁶⁵ Convention on Biological Diversity (Rio de Janeiro) 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992).

⁶⁶ Lima, 20 December 1979, in force 19 March 1982, IELMT 979:94.

⁶⁷ Article 1 states: 'The Signatory Governments agree that conservation of the vicuna provides an economic production alternative for the benefit of the Andean population and commit themselves to its gradual use...'

⁶⁸ Article 5.

Assigning instrumental value to nature is further complicated because virtually everything has potential instrumental value. This assigns value according to what uses a particular species might be put if future research uncovers a new use or attribute that could be exploited for the benefit of humanity. This so-called 'option value' is defined by Norton as 'the present benefit of holding open the possibility that some species we might eradicate today may prove valuable in the future'.⁶⁹ It is easy to dismiss this as pure conjecture, but the recent studies into the possibility of new cancer treatments derived from *Colchicum autumnale* highlight exactly what we might be losing as we allow species to go extinct.⁷⁰ It is the importance of potential discoveries such as this that lead many commentators to advocate policies that ensure flexibility for future decision-makers. Goodin discusses the merits of a 'reversibility' principle as an alternative basis for environmental decision-making to the cost/benefit analyses that tend to predominate.⁷¹ This principle demands that no decision is taken if it entails irreversible consequences or closes off other possible options. He does not say that other options should be readily available if circumstances change, for example that they all be reasonably affordable, merely that they remain a potential alternative. To demonstrate his point, he refers to Rochlin's example⁷² of putting radioactive waste somewhere from which it can be retrieved should an incident occur, rather than in a location where it would be impossible to address any issues.⁷³ Whilst this approach has obvious advantages, there is a risk that it be used to justify an environmentally harmful status quo. For example, renewable energy sources remain technically viable even as both developed and developing countries continue to invest in fossil fuels.

Brown Weiss identifies the conservation of options as one element of intergenerational equity, believing that 'Conserving the diversity of the natural and cultural resource base is designed to give our descendants a robust and flexible heritage with which to try and achieve a decent and healthy life'.⁷⁴ She goes on to argue:

The principle of conserving options rests on the premise that diversity, like quality, contributes to robustness. This can be seen in the contribution of biological diversity to the robustness in ecosystems. If diverse strains and species are present in an ecosystem and the system is perturbed, some strains and species will survive and multiply. While

⁶⁹ Norton, (n 59) p. 202.

⁷⁰ G. Sivakumar, 'Colchicine semisynthetics: Chemotherapeutics for cancer? (2013) 20 *Current Medicinal Chemistry* 892-898.

⁷¹ R.E. Goodin, 'Ethical Principles for Environmental Protection', in Elliot and Gare (eds), (n 38).

⁷² *ibid*, p. 7.

⁷³ For Rochlin's full discussion see G. Rochlin, 'Nuclear Waste Disposal: Two Social Criteria', (1978) 195 *Science* 23-31.

⁷⁴ E. Brown Weiss, 'Intergenerational equity: A legal framework for global environmental change', in E. Brown Weiss (ed), *Environmental Change and International Law: New Challenges and Dimensions* (United Nations University Press, 1992), p. 402.

the distribution of the biological population may change, the ecosystem remains viable.⁷⁵

Protecting plants on the basis of their potential or option value thus not only ensures they are available for possible future exploitation for the benefit of humanity, but strengthens the resilience of natural systems. A connection is made with contemporary economic theory in which 'diversity is primarily viewed as a means of spreading risks to avoid reliance on only one investment or industry'.⁷⁶ However, the potential utility and commodity value of nature forms the basis of key criticisms of economists' attempts to reduce the entirety of nature to a single monetary figure.⁷⁷ Carleton Ray is also critical of using potential instrumental value as a reason for conserving biodiversity:

[T]he point is often made that since the potential medical or economic value of a species cannot often be predicted, we must save them all. This is clearly impossible, and it may also be illogical.⁷⁸

It is illogical because, as Norton demonstrates, assessments of potential value are inevitably founded on guesswork and unknown unknowns:

Calculations of [potential] value can only be begun after we identify a species, guess what uses that species might have, place some dollar value on those uses, and estimate the likelihood of such discoveries occurring at any future date.⁷⁹

This is based on an even more basic assumption that we know what it is that we are looking at. There are numerous examples of plants that are the subject of disagreements over which species they belong to, or which have been reclassified following genetic research. To give just one example, in 2004 a study was published in which a number of species of *Leucojum* were reclassified as *Acis*.⁸⁰

Despite the difficulties in assigning potential instrumental value, international environmental law has shown itself willing to recognise it. Numerous examples can be found in the preambles

⁷⁵ *ibid.*

⁷⁶ *ibid.*, p. 403. A similar belief underpins the theory of agroecology, i.e. agricultural systems, both in terms of individual farms but also the agricultural sector as a whole, should be designed so as to promote diversity. This will help to safeguard agricultural production against, for example, extreme climatic variations. See F. Caporali, 'History and Development of Agroecology and Theory of Agroecosystems', in M. Monteduro et al (eds), *Law and Agroecology: A Transdisciplinary Dialogue* (Springer, 2015).

⁷⁷ Ehrenfeld, (n 1) p. 214-215.

⁷⁸ G. Carleton Ray, 'Ecological Diversity in Coastal Zones and Oceans', in Wilson (ed), (n 1) p. 47. Note Carleton Ray is not suggesting that we should not protect all species, only that we should not justify efforts to save them all on the basis of their potential instrumental value.

⁷⁹ Norton, (n 59) p. 202.

⁸⁰ A. Davis et al, 'Phylogenetic analysis of *Leucojum* and *Galanthus* (Amaryllidaceae) based on plastid *matK* and nuclear ribosomal spacer (ITS) DNA sequences and morphology' (2004) 246 *Plant Systematics and Evolution* 223-243.

of conservation agreements, such as the 1968 African Convention on the Conservation of Nature and Natural Resources,⁸¹ in which the Contracting Parties say they are ‘fully conscious of the *ever-growing importance* of natural resources from an economic, nutritional, scientific, educational, cultural and aesthetic point of view’ (emphasis added).

Inherent Value:

Like instrumental value, inherent value is wholly anthropocentric. However rather than being based on what a species can be used or sold for, inherent value is more esoteric in nature. This makes it conceptually harder to define. Inherent value has been linked to, inter alia, cultural and religious beliefs,⁸² spiritualism,⁸³ psychological benefits,⁸⁴ educational benefits,⁸⁵ appreciation of wild and natural places,⁸⁶ personal discovery and improvement,⁸⁷ recreation,⁸⁸ aesthetic enjoyment and amenity⁸⁹ and morality.⁹⁰ In international law, the 1972 World Heritage Convention⁹¹ is the manifestation of inherent value, as the definition of ‘natural heritage’ in Article 2 demonstrates.

Clearly inherent value can be many things to many people, and this is partly the reason why it has proven difficult to set out a clear, unified definition of value on which conservation law and policy can be based. For my purposes the defining characteristics of inherent value are firstly, that the natural entity in question is valued for an anthropocentric reason and, secondly, there is no direct exploitation of the entity, such as removing it from the environment or as the result of a commercial transaction.

Whilst differing in the source of the perceptions of value, what inherent value shares with instrumental value is an unmitigated anthropocentric focus. That these two interpretations of

⁸¹ Algiers, 15 September 1968, in force 9 October 1969, 1001 UNTS 3.

⁸² P. Halder, ‘Animals and the future salvation of the world’, in A. Philippopoulos-Mihalopoulos (ed), *Law and Ecology: New Environmental Foundations* (Routledge, 2011).

⁸³ Winter, (n 34).

⁸⁴ J. Stuttie, ‘Wilderness: A Medium for Improving Psychological Health’ (1984) 4 *The Environmentalist* 295-299.

⁸⁵ J. Talbot and S. Kaplan, ‘Perspectives on Wilderness: Re-Examining the Value of Extended Wilderness Experiences’ (1986) 6 *Journal of Environmental Psychology* 177-188.

⁸⁶ Brook, (n 43)

⁸⁷ *ibid.*

⁸⁸ Winter, (n 34).

⁸⁹ Murphy, (n 60).

⁹⁰ Norton, (n 59).

⁹¹ Convention for the Protection of the World Cultural and Natural Heritage, Paris, 16 November 1972, in force 17 December 1975, 27 UST 37, 11 ILM 1358 (1972).

value are prevalent in international environmental instruments is therefore unsurprising.⁹² Questions, however, have been raised over the adequacy of such approaches in providing a sound basis for conservation law, in part because they are at the root of our exploitation of nature. Ehrenfeld is particularly critical, suggesting that by reducing nature to an anthropocentric measure of value 'we merely legitimize the process that is wiping it out'.⁹³ In the more specific context of efforts to satisfy anthropocentric values of nature in urban spaces through city parks and other green spaces, instrumental and inherent values have also been challenged on ecological grounds. Whilst the artificial selection and planting of trees and plants may 'fulfil many of the aesthetic and utilitarian roles that natural habitats offer... their establishment and maintenance costs tend to be high, since few of the self-regenerating functions of natural ecosystems are available'.⁹⁴

On the other hand, instrumental and inherent values clearly have a role to play in promoting the conservation of plants and biodiversity generally. In an international legal context it has been suggested that anthropocentric values of nature have been 'deliberately accentuated with a view to persuading developing countries in particular that their own long-term interests are best served by a commitment to conservation, rather than unrestrained exploitation'.⁹⁵ Nevertheless, given the concerns expressed above over linking nature with purely anthropocentric meanings of value, it is legitimate to ask whether there are alternative interpretations of value on which legal provisions for the protection of plants and nature can be based.

Intrinsic Value:

One such alternative is intrinsic value. This is based on the mere fact of something's existence and that fact alone. As Ehrenfeld describes,

[I]t does not depend on the properties of the species in question, the uses to which particular species may or may not be put, or their alleged role in the balance of global ecosystems. For biological diversity, value *is*. Nothing more and nothing less.⁹⁶

This makes intrinsic value a powerful tool for environmentalists, as it changes the nature of the debate:

⁹² See 'Anthropocentricity in International Environmental Law and Policy' below.

⁹³ Ehrenfeld, (n 1) p. 213.

⁹⁴ Murphy, (n 60) p. 73.

⁹⁵ Bowman, Davies and Redgwell, (n 22) p. 66.

⁹⁶ Ehrenfeld, (n 1) p. 214.

The onus of justification is no longer with those who wish to protect the environment, but rather it is shifted onto those who wish to exploit nature. This is clearly the strength of the intrinsic value approach: the recognition of such values places a break on the wanton destruction and exploitation of human nature. The isolation of a value that resides in nature challenges the attitude that nature is valuable only in so far as it is directly useful to humanity.⁹⁷

A further advantage of intrinsic value is that it treats all parts of the natural world equally, without applying anthropocentric prejudices. This is illustrated by the International Union for the Conservation of Nature's Red List, 'where entry of each species has equivalence, i.e. each threatened species receives equal coverage without prejudice to its taxonomic status'.⁹⁸ Beyond the listing of species in instruments such as the Red List, however, it is clear that the different aspects of the natural world are not viewed equally. As Dawkins observes:

[T]hink of the furore if Jane Goodall returned from Gombe stream with photographs of wild chimpanzees building their own houses, well roofed and insulated, of painstakingly selected stones neatly bonded and mortared! Yet caddis larvae, who do precisely that, command only passing interest. It is sometimes said, as though in defence of this double standard, that spiders and caddis larvae achieve their feats of architecture by "instinct". But so what? In a way this makes them all the more impressive.⁹⁹

These differing public perceptions, which are based largely on inherent value, specifically appreciation and awe of more charismatic species, point conservationists towards particular species. This reflects the work by Winter on using values to aid in marketing efforts,¹⁰⁰ and therefore could be considered good practice. However, the targeting of species which will attract the most public support will often result in the neglect of other species that are equally important from an intrinsic perspective, and possibly more important from an ecological one.¹⁰¹ This is not to say that such species should not be the subject of conservation action, as many of the world's most treasured species are facing extinction.¹⁰² The point is that using criteria based on inherent value to determine which species receive most attention from conservationists introduces a bias that cannot be justified on intrinsic or ecological grounds.

One interpretation of intrinsic value that is increasingly popular is linked to autopoiesism,¹⁰³ which focusses on an entity's capacity for 'self-production or self-renewal'.¹⁰⁴ 'These are

⁹⁷ G. Smith, *Deliberative Democracy and the Environment* (Routledge, 2003), p. 9.

⁹⁸ M. Samways, 'Conserving Invertebrates: How Many can be Saved, and How?' in N. Leader-Williams, W. Adams and R. Smith (eds) *Trade-offs in Conservation: Deciding What to Save* (Wiley-Blackwell, 2010), p. 99.

⁹⁹ See chapter 3 for further discussion on the merits of listing as a conservation mechanism.

⁹⁹ Dawkins, (n 37) p. 239.

¹⁰⁰ See (n 52).

¹⁰¹ L. Douglas and G. Winkel, 'The flipside of the flagship' (2014) 23 *Biodiversity and Conservation* 979-997.

¹⁰² <http://reports.zsl.org/top-10/> (last accessed 01/04/2017).

¹⁰³ Bowman, Davies and Redgwell, (n 22) p. 63.

¹⁰⁴ *ibid.*

accordingly seen as ends *in themselves*, rendering them worthy of moral consideration in their own right', ¹⁰⁵ which is in line with Korsgaard's definition of 'final value'.¹⁰⁶ Grounding intrinsic value in autopoiesis is open to criticism however. Firstly, it may be read as excluding some non-living entities from its application. Whilst a river may be seen as having a capacity for self-renewal through its hydrological cycle, it is difficult to apply this trait to other non-living natural features, such as rock formations. This limited application is contrary to the tenets of many ecocentric theories.¹⁰⁷ These theories also more readily accept the intrinsic value of ecological categorisations higher than that of individual members of particular species,¹⁰⁸ but this is not possible if intrinsic value is based strictly on autopoiesism:

Certainly everything which is of value... is located within the biosphere, and the systems of the biosphere are necessary for the protection of all these creatures. But that does not give the biosphere or its systems intrinsic value. Rather, it shows them to have instrumental value, since what is of value in its own right is causally dependent on them.¹⁰⁹

Turning to the other end of the biological scale, this limitation of autopoietic intrinsic value also means it cannot be reconciled with the views of those who advocate the intrinsic value of genes. Dawkins argues that organisms merely represent 'vehicles' for collections of gene, each one vying to ensure it is passed on to future organisms.¹¹⁰ Such views have not gone unchallenged however.¹¹¹

An alternative way to view intrinsic value is to equate it with moral value.¹¹² Again this is flawed. It reintroduces an anthropocentric measure because morality is a purely human concept. The difference between moral and intrinsic value is subtle, but nevertheless important. To say that something has moral value is to say that I, as a human who understands the concept of morality, deem a tree, for example, to be worthy of moral consideration and I will therefore not cut it down. Recognising the intrinsic value of that tree however is to say that I will not cut it down because it has value in and of itself independent of my personal valuation of it. My reason for

¹⁰⁵ *ibid.*

¹⁰⁶ Korsgaard, (n 23).

¹⁰⁷ Including deep ecology (A. Leopold, *A Sand County Almanac and Sketches Here and There* (Oxford University Press, 1949), wild law (Cullinan, (n 27)) and advocates of rights for nature (C. Stone, *Should Trees Have Standing? Law, Morality and the Environment* (3rd edition, Oxford University Press, 2010)).

¹⁰⁸ See Naess, (n 26).

¹⁰⁹ R. Attfield, *The Ethics of Environmental Concern* (2nd edition, University of Georgia Press, 1991) p. 159, cited in Bowman, Davies and Redgwell, (n 27) p. 73. Note for my purposes Attfield's use of the term 'instrumental' should instead be read as 'ecological'.

¹¹⁰ Dawkins, (n 37), in particular see chapter 13.

¹¹¹ Bowman, Davies and Redgwell, (n 22) p. 70-71.

¹¹² B. Paterson, 'Ethics for Wildlife Conservation: Overcoming the Human-Nature Dualism' (2006) 56 *Bioscience* 144-150.

not cutting down the tree is not because I believe it has some moral worth on the basis of an anthropocentric measure of morality, but the mere fact of its existence. A more straightforward distinction between moral and intrinsic value can be drawn from Norton's work. He believes that, like instrumental and inherent value, moral value can change with times and circumstances.¹¹³ The ongoing debate about refugees demonstrates this, with judgements about whether it is 'right' for the West to accept refugees and in what numbers being reconsidered in light of the pressures on national infrastructure and concerns over security. Intrinsic value, on the other hand, will remain constant for as long as the 'thing' in question exists.

In addition to the theoretical difficulties associated with defining 'intrinsic value', there are also practical difficulties in relying on it as the justification for conservation. Firstly, when discussing the preamble of the 1983 World Charter for Nature,¹¹⁴ which states 'Every form of life is unique, warranting respect regardless of its worth to man', Harrop points out that this 'ostensibly suggests that we should embrace the *Anopheles* mosquito and other forms of life that are an anathema to humans'.¹¹⁵ Notwithstanding the ethical questions of actively conserving a species that spreads malaria, there would be obvious practical difficulties for conservation organisations to raise public support for such a cause.

Secondly, adhering to a code of practice founded on intrinsic value would undermine the conservation of ecosystems, as it would preclude the use of important management practices. To use Harrop's example:

Culling may be part of a strategy to defeat disease transmission, to prevent hybridization or to control burgeoning populations of a species. In these cases, culling may be the only effective conservation strategy to preserve either genetic integrity in wild species or ecological balance.¹¹⁶

Harrop is discussing the divergence of views between conservation scientists on the one hand and advocates of animal welfare on the other, noting that 'the welfarist considers the goal of maintaining genetic diversity to be subordinate to securing freedom from suffering'.¹¹⁷ It is also equally true that intrinsic value would place paramountcy on the protection of individual animals and plants, in some cases to the detriment of the wider ecosystem. Some commentators have argued that the reason humanity pursues conservation is because of the intrinsic value of

¹¹³ Norton, (n 59) p. 202.

¹¹⁴ A/RES/37/7, 28 October 1982.

¹¹⁵ S. Harrop, 'Trade-offs between Animal Welfare and Conservation in Law and Policy', in Leader-Williams, Adams and Smith (eds), (n 98), p. 122.

¹¹⁶ *ibid*, p. 128.

¹¹⁷ *ibid*.

nature, including natural processes and ecological interrelations.¹¹⁸ This is perhaps true of those directly involved in conservation work,¹¹⁹ and certainly, as already noted, a number of ecocentric theories are grounded on non-anthropocentric perceptions of the value of nature.¹²⁰ However, intrinsic value, if interpreted to mean value *independent* of worth to anything else, requires each individual plant, animal, habitat and natural entity to be viewed in isolation. Thus, it would not be necessary for any in situ conservation efforts to be made for the intrinsic value of nature to be respected.¹²¹ We could instead rely on institutions such as zoos, botanic gardens and artificial ecosystems, such as those at the Eden Project,¹²² to ensure the continued survival of species. Limiting the conservation of plants to such places, however, would be to fatally undermine the Earth's capacity to support life. Modern conservation law now recognises the importance of adopting a holistic approach, focussing on habitats and ecosystems rather than just species, and it seems perverse that the philosophical rationale of such developments still very much appears to be targeted at parts rather than wholes.

A possible explanation for this can be found by looking at the development of modern environmental law. Early international conservation treaties were primarily issue-, species- or habitat-specific. To take one example, the 1973 Convention on International Trade in Endangered Species¹²³ is only concerned with the impacts of international trade on the conservation status of species. It was not until the Biodiversity Convention that an intentionally holistic approach to conservation was adopted at an international level, a point which is emphasised by the Convention's broad definition of 'biological diversity'.¹²⁴ It is ironic, then, that in order to give effect to the more integrated approach envisaged by the Biodiversity Convention the Parties have found it necessary to adopt working programmes specific to different regions, habitats and species.¹²⁵ What is instead required is an understanding of value which is neither formulated on purely anthropocentric criteria, nor divorced from the interconnections within the natural world. My answer to this is ecological value.

¹¹⁸ M. Soulé, 'What is conservation biology?' (1985) 35 *BioScience* 727-734.

¹¹⁹ Angermeier, (n 43) and K.S. van Houtan, 'Conservation as Virtue: a Scientific and Social Process for Conservation Ethics' (2006) 20 *Conservation Biology* 1367-1372.

¹²⁰ (n 107).

¹²¹ The emphasis of deep ecologists on the biosphere would overcome this problem but, as noted above, deep ecology's interpretation of intrinsic value is not without fault.

¹²² <http://www.edenproject.com> (last accessed 01/04/2017).

¹²³ Washington, 3 March 1973, in force 1 July 1975, 993 UNTS 243.

¹²⁴ Article 2.

¹²⁵ P. Sands and J. Peel, *Principles of International Environmental Law* (3rd edition, Cambridge University Press, 2012) p. 461-464.

Ecological Value:

Ecological value is assessed in terms of the role something plays in supporting the health and functioning of its ecosystem. 'Here, "proper functioning" reflects the functioning of (subsets of) living nature or ecosystems according to their ecological or evolutionary optimum... Any (set of) living species has ecological value through its contribution to the functioning of the ecosystem it is part of, by means of ecological processes such as food-web interactions, competition, predation and facilitation'.¹²⁶

Our understanding of this value will be founded on scientific research, and this research will be subject to human priorities, interpretations and faults. Crucially, however, ecological value 'must be informed by the biological sciences and cannot be asserted by an anthropocentric discipline'.¹²⁷ Equally, whilst it is true to say that much will 'depend on the state of the art of the relevant disciplines',¹²⁸ this does not detract from the central premise that ecological science is a better basis for attributing value than anthropocentric priorities of commodity or use. To put it another way, a distinction is drawn between the process by which something's ecological value is assessed, which is inherently anthropocentric, and the acceptance that this value stands regardless of any anthropocentrically-informed perceptions of the value of the natural entity in question. Despite this, a true reading of the ecological value of nature itself provides an anthropocentric reason to compel humanity to conserve as much of it as possible. As Ehrlich observes: 'the most important anthropocentric reason for preserving diversity is the role that microorganisms, plants, and animals play in providing free ecosystem services, without which society in its present form could not persist'.¹²⁹

Arguably there are no examples in international environmental law of instruments that are founded on a purely ecological understanding of the value of nature. When read in the wider context of the instrument in question, statements that purport to acknowledge the ecological value of nature are grounded in a desire to meet anthropocentric ends. For example, although the Preamble of the 1971 Convention on Wetlands of International Importance¹³⁰ acknowledges 'the fundamental ecological functions of wetlands as regulators of water regimes and as habitats supporting a characteristic flora and fauna', it also states that 'wetlands constitute a resource of

¹²⁶ Weesie and van Andel, (n 21) 3.

¹²⁷ *ibid.*

¹²⁸ *ibid.*

¹²⁹ P. Ehrlich, 'The Loss of Diversity: Causes and Consequences', in Wilson (ed), (n 1) p. 21-22. See also Bowman, Davies and Redgwell, (n 22) p. 62.

¹³⁰ Ramsar Convention on Wetlands of International Importance Especially as Waterfowl habitat, Ramsar, 2 February 1971, in force 21 December 1975, 996 UNTS 245.

great economic, cultural, scientific, and recreational value', and that waterfowl 'should be regarded as an international resource'.

Grounding our efforts to conserve plants and the rest of nature in ecological value overcomes some of the weaknesses of other interpretations of value identified above. For example, there is no need for the same degree of scientific certainty that is assumed when assessing potential instrumental value, as a distinction can be drawn between *understanding* the role a species or habitat plays in its ecosystem, for which we must turn to biologists and other experts, and *acknowledging* that species and habitats have a role to play. Ecological value mandates that all of nature performs a specific function, some more critical than others, and it is for this reason that we must seek to conserve every species and habitat.

More importantly from a conservation perspective, ecological value will be free from the problems caused by constantly changing policies, which are vulnerable to shifts in public mood and economic fortunes. In addition to the more practical problems to which this gives rise, there is a more significant, and not necessarily inconceivable, danger posed by basing our conservation efforts on social perceptions of nature:

If the value derived is to rest on preferences, rather than being something the conservationist is able to *disclose* as a source of value regardless of any human preferences, there might (with a change in fashion) be no reason to preserve, conserve or restore anything of nature.¹³¹

Admittedly the biological science on which the ecological value of something is based will be subject to change as well, but such changes will be the result of new evidence following scientific research, not the changing priorities of a population and its governments.

Negative Value:

So far, the discussion has focussed on positive values that nature has, both for people and for itself. However negative values are equally commonplace, and just as important for understanding the law's relationship with the natural world. Something that detracts or undermines a positive value, either for humans in the case of instrumental and inherent value or the natural world in terms of ecological value, can be said to have negative value. By definition it is impossible for something to have negative intrinsic value. If the definition of intrinsic value outlined above is accepted, i.e. that it is based solely on the simple fact of something's existence,

¹³¹ Brook, (n 43) 1604.

then whatever traits or activities something has or takes will be part of what defines its intrinsic value. Even monocarpic species of plants such as *Saxifraga longifolia*, which dies after setting seed¹³² and could therefore be said to undermine its own existence, does not have negative intrinsic value. Despite being the precursor to its death, this natural process is part of what the plant is and therefore contributes to its intrinsic value.

Historically, international environmental law readily applied negative instrumental value to certain species. Article II of the 1900 Convention for the Preservation of Wild Animals, Birds, and Fish in Africa¹³³ called for the reduction in population sizes of animals such as lions, otters, many large birds of prey and poisonous snakes, which were classified as ‘harmful animals’,¹³⁴ and not worthy of protection.¹³⁵ Although international environmental law has moved on from ecologically incoherent concepts such as ‘harmful animals’, it is still possible to identify contemporary examples of negative instrumental value. Alien/invasive species which damage crops, for example, have negative instrumental value.

Negative inherent value is conceptually harder to define. An animal or plant that is feared in a certain culture, for instance if it is associated with death or misfortune, nevertheless has inherent value because of its place in that culture. To have negative value it would have to be seen as detracting from that culture, rather than simply being associated with negative ideas, aspects or events. The easiest way to define negative inherent value is by reference to alien species. In the United Kingdom, the native red squirrel (*Sciurus vulgaris*) went into sharp decline following the introduction of grey squirrels (*Sciurus carolinensis*) from North America. This is mainly due to the reds’ vulnerability to the squirrel pox virus carried by the greys.¹³⁶ In areas where red squirrels are still found, aggressive conservation measures are taken to preserve them, in part because of the inherent value people find in seeing the native squirrel. In comparison, where red squirrels have long since been driven out, grey squirrels have taken on an inherent value of their own. As such, it is possible to argue that negative inherent value is in

¹³² See M. McGregor, *Saxifrages: A Definitive Guide to the 2000 Hybrids & Cultivars* (Timber Press, 2008) p. 59-60.

¹³³ Convention destinée à assurer la conservation des diverses espèces vivant à l’état sauvage en Afrique qui sont utiles à l’homme ou inoffensives, London, 19 May 1900, 4 IPE 1607.

¹³⁴ For the complete list see Schedule V of the Convention.

¹³⁵ F. Situma, ‘Africa’s Potential Contribution to the Implementation of International Environmental Law’ (2000) 10 *Transnational Law and Contemporary Problems* 385-422.

¹³⁶ J. Chantry et al, ‘European red squirrel population dynamics driven by squirrelpox at a gray squirrel invasion interface’ (2014) 4 *Ecology and Evolution* 3788-3799.

some cases only a short-term phenomenon. As society comes to accept the new species in the place of the old one it takes on an inherent value of its own.¹³⁷

Negative ecological value may be attributed to species that undermine the functioning of an ecosystem. This is also best explained in relation to alien and invasive species. Studies have shown that an established population of Japanese Knotweed (*Fallopia japonica*) can severely reduce water flow in streams, thereby undermining the health and functioning of the ecosystem.¹³⁸ Following this line of thought to its logical conclusion, humanity has arguably the greatest level of negative ecological value, given the massive ecological effects we have had around the globe. On the other hand, there are also examples of where we are attempting to undo some of this damage, and take on ecological value of our own. In the United Kingdom, by annually culling deer herds in Scotland we have adopted the role of now extinct native predators, although such activities should be carried out only with careful preparation and continuous monitoring.¹³⁹

Anthropocentricity in International Environmental Law and Policy:

Having identified five overarching categories of value – instrumental, inherent, intrinsic, ecological and negative – I now look at how these values are reflected in international environmental law and policy.

That a particular provision in a treaty says that States are conscious of or respect a particular type of value in nature does not necessarily mean that the rest of the instrument will reflect it. The preamble to the Biodiversity Convention opens with a recognition of ‘the intrinsic value of biodiversity’ and continues by noting ‘the importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere’, i.e. the ecological value of nature. However, the rest of the Preamble, as well as the operational part of the Convention, mainly focus on the instrumental value of nature. The Preamble states that biodiversity ‘is of critical importance for meeting the food, health and other needs of the growing world population’. Similarly, Article 1 of the Convention states that its objectives are: ‘the conservation of biological

¹³⁷ Note that I am not excluding the possibility that the new species will continue to hold negative value for some individuals, even if the majority of society no longer does.

¹³⁸ D. Vanderklein, J. Galster and R. Scherr, ‘The impact of Japanese knotweed on stream baseflow’ (2014) 7 *Ecohydrology* 881-886.

¹³⁹ V. Trenkel, ‘Exploring red deer culling strategies using a population-specific calibrated management model’ (2001) 62 *Journal of Environmental Management* 37-53.

diversity, the sustainable use of its components and the fair and equitable utilization of genetic resources’.

References to the importance of conservation do not per se tell us anything of the value being attached to the ‘thing’ being conserved. In the Biodiversity Convention, frequent use is made of the phrase ‘conservation and sustainable use of biodiversity’. ‘Sustainable use’ clearly relates to the instrumental value of biodiversity. In comparison, ‘conservation’ by itself does not imply any recognition of the ecological or intrinsic value of nature. Indeed, that it is nearly always coupled with ‘sustainable use’ could be read to mean that the purpose of conservation is to enable the continual exploitation of biodiversity. The same can be said of the ‘indicative list of categories’¹⁴⁰ of important biodiversity contained in Annex I. Ecological and arguably even intrinsic value, if ‘unique’ is read in this way, are recognised, but the categories listed in the Annex are primarily anthropocentric in nature.

The suggestion that for the Biodiversity Convention conservation is a means for perpetuating sustainable use is also supported by the absence of any definition of ‘conservation’ in the treaty text, even though ‘sustainable use’ is defined:

“Sustainable use” means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.¹⁴¹

This is a sound definition of ‘sustainable use’ and one that places clear emphasis on the need for any exploitation of the natural world to not undermine its long-term survival. The lack of definition of ‘conservation’ however means that there is no counter-balance to this. This issue is further compounded by the use of soft language, rendering the provisions in the treaty virtually unenforceable.¹⁴²

One instrument that is primarily concerned with the inherent value of nature is the 1972 World Heritage Convention. This provides for the listing of particular cultural and natural sites as world heritage if they are considered to be of ‘outstanding universal value’.¹⁴³ Brook makes the point that values are ‘relational’.¹⁴⁴ What one person considers to be of significant value may be meaningless to another. This raises the question of whose value counts? Under the World

¹⁴⁰ Article 7.

¹⁴¹ Article 2.

¹⁴² R. Ward, ‘Man or Beast: The Convention on Biological Diversity and the Emerging Law of Sustainable Development’ (1995) 28 *Vanderbilt Journal of Transnational Law* 823-833, 827.

¹⁴³ Articles 1 and 2 respectively.

¹⁴⁴ Brook, (n 43).

Heritage Convention it is, firstly, the States', through their submission of candidate sites,¹⁴⁵ secondly either the IUCN for natural sites or ICOMOS for cultural ones, as these organisations determine whether a proposed site has 'outstanding universal value',¹⁴⁶ and lastly the World Heritage Committee, which has the final say on what sites are listed as World Heritage.¹⁴⁷ No role is provided for the public in this process, either in the Operational Guidelines or the Convention itself, which suggests that for the purposes of the Convention the values they place on particular sites are irrelevant.¹⁴⁸ This is important as it relates to one of the objectives of the Convention, namely 'the transmission to future generations of the cultural and natural heritage',¹⁴⁹ the explicit reference to which marks the World Convention out from other multilateral conservation instruments.¹⁵⁰ If by 'future generations' the Convention refers to the descendants of a certain group in society who value a specific site, it could be a powerful means of protecting deeply held inherent values founded on the culture and traditions that are located in those sites. However, the lack of role for the public in the listing process suggests this is not the case. Instead a more accurate reading of the Convention is to say that 'future generations' is merely a generic term that goes no further than to say that future human beings should have the opportunity to appreciate certain sites that have met particular criteria set by experts at a particular point in history. As such, the Convention is merely sustainable development in another guise, but rather than resources that can be exploited for material gain it is resources that provide less tangible benefits that are being bequeathed to future generations.

Some treaties, such as the 1997 International Plant Protection Convention,¹⁵¹ are founded on the negative value of other entities. In this case, it is the negative value of 'pests of plants and plant products'.¹⁵² The reference to plant products clearly shows that one of the goals of the Convention is to protect the instrumental value of plants. On reading the Preamble of the Convention it might be thought that it is also concerned with safeguarding the ecological value

¹⁴⁵ Article 11(1).

¹⁴⁶ UNESCO World Heritage Centre, *Operational Guidelines for the Implementation of the World Heritage Convention* (2016), para. 31(e).

¹⁴⁷ Article 11(2).

¹⁴⁸ Although the public may have a role in any national procedures for selecting sites to be submitted by a State for inclusion in the World Heritage List.

¹⁴⁹ Article 4.

¹⁵⁰ C. Redgwell, 'Protecting Natural Heritage and Its Transmission to Future Generations', in A.A. Yusuf (ed), *Standard-setting in UNESCO Volume I: Normative Action in Education, Science and Culture* (UNESCO Reference Works Series, UNESCO Publishing / Martinus Nijhoff Publishers, 2007).

¹⁵¹ In force 2 October 2005, amending the 1951 Convention (Rome, 6 December 1951, in force 3 April 1952, 150 UNTS 67, as revised by the FAO Conference in 1979). Text available at: <https://www.ippc.int/en/core-activities/governance/convention-text/>. For detailed discussion of the International Plant Protection Convention see chapter 8.

¹⁵² Article I(1).

of plants, as it stresses the need to prevent the introduction of pests into endangered areas.¹⁵³ However the definition of ‘endangered area’ contained in Article II shows that such a reading would be false:

an area where ecological factors favour the establishment of a pest whose presence in the area will result in *economically important loss*; (emphasis added)

Another instrument concerned with the negative value of a non-human entity is the Cartagena Protocol on Biosafety.¹⁵⁴ This seeks to regulate the risks of the transboundary movement of living modified organisms (LMOs), which, if released, ‘may have adverse effects on the conservation and sustainable use of biological diversity’.¹⁵⁵ If the interpretation of ‘conservation and sustainable use’ outlined above is accepted, i.e. that for the purposes of the Biodiversity Convention conservation is a means of facilitating sustainable use, this must be considered to be a reflection of negative instrumental value, as it refers to the risk LMOs pose to the ability of humans to continue to exploit species that might be endangered by their release. If, on the other hand, conservation for conservation’s sake was the purpose of the Biodiversity Convention, the Cartagena Protocol could be read as a response to the negative ecological value of LMOs, for example if their release risked undermining the health and functioning of an ecosystem by outcompeting indigenous flora. Once again this highlights the importance of understanding the context in which expressions of value operate, and for the Cartagena Protocol this context is the human desire to continue to exploit the natural world, albeit in a manner that is equitable to States and communities of origin.

All of the instruments discussed so far have been in the form of legally binding agreements. Non-binding instruments are, however, an equally important part of international environmental law. What can be concluded from a comparison of the 1972 Stockholm Declaration on the Human Environment¹⁵⁶ and the 1992 Rio Declaration on Environment and Development is that in the intervening twenty years the international community had not developed any greater appreciation of the non-anthropocentric value of nature. Both instruments place human interests above those of nature, with Stockholm making the erroneous declaration: ‘Of all things in the world, people are the most precious’,¹⁵⁷ and Rio stating ‘Human beings are at the centre of concerns for sustainable development’.¹⁵⁸ Both instruments also highlight the importance of

¹⁵³ Recital 1.

¹⁵⁴ Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal, 29 January 2000, in force 11 September 2003, 39 ILM 1027.

¹⁵⁵ Article 1.

¹⁵⁶ A/CONF/48/14/REV.1.

¹⁵⁷ Recital 5.

¹⁵⁸ Principle 1.

‘resources’. Principle 2 of Rio reiterates the principle of permanent sovereignty, and Principle 2 of Stockholm states:

The natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

It might be presumed that, unlike the Stockholm and Rio Declarations, the 1982 World Charter for Nature is not wholly anthropocentric, and one provision in the Preamble of the Charter certainly indicates this:

Every form of life is unique, warranting respect regardless of its worth to man...

However, this is an anomaly in an otherwise wholly anthropocentric document. As Harrop observes, ‘the body of its substantive text is practically qualified by many propositions that support the mainstream institutional agenda and traditional conservation approaches describing, among other things, optimal sustainable use and the need to conserve natural resources for the purposes of maintaining generational equity’.¹⁵⁹

The instruments examined above, as well as many others, may be forgiven for only reflecting the anthropocentric values of nature because they were largely negotiated at a time when our understanding of the ecological crises of the Earth was in its infancy. The same cannot be said of the ‘The Future We Want’,¹⁶⁰ the outcome report of the 2012 UN Conference on Sustainable Development. The underlying theme of the conference was a need to develop a new understanding of the concept of sustainable development,¹⁶¹ and this manifested itself as ‘the green economy’. As Morrow observes, however, ‘the green economy’ was merely a new formulation of sustainable development, i.e. a concept that enabled the constant prioritisation of development over environmental concerns. ‘Given that this conception of the “green economy” nailed its colours even more firmly to this mast, there was little reason for optimism in its ability to deliver the necessary paradigm shift in the relationship between humanity and the environment’.¹⁶²

¹⁵⁹ S. Harrop, ‘Climate Change, Conservation and the Place for Wild Animal Welfare in International Law’ (2011) 23 *Journal of Environmental Law* 441-462, 447.

¹⁶⁰ (n 25). Unless otherwise stated, all paragraph references in this section refer to this document.

¹⁶¹ K. Morrow, ‘Rio+20, the Green Economy and Re-orienting Sustainable Development’ (2012) 14 *Environmental Law Review* 279-297.

¹⁶² *ibid*, 287.

The first point to note in relation to 'The Future We Want' is that humans are still afforded paramourcy.¹⁶³ However, 'The Future We Want' is notable because of its recognition that some States and cultures do not view the natural resources simply as something to be exploited, but as Mother Nature:

We recognize that planet Earth and its ecosystems are our home and that "Mother Earth" is a common expression in a number of countries and regions, and we note that some countries recognize the rights of nature in the context of the promotion of sustainable development.¹⁶⁴

Morrow cites the inclusion of this reference to Mother Earth as cause for optimism, as 'At the very least it will open up debate and allow space to challenge hegemonic orthodox scientific, political, social and economic views of the human/nature relationship'.¹⁶⁵ Whilst Morrow's comments are valid, the impact this single reference will have on future international environmental law and policy, which, as demonstrated above, has to date been driven by predominately anthropocentric concerns, is debatable. Further, a number of statements in the report have the effect of separating human concerns from the realities of the natural world. A distinction is often made between the use of natural resources and the conservation of ecosystems, with no acknowledgement that in reality they refer to the same thing.¹⁶⁶

Evidence of this is found in paragraphs 39 and 40 of 'The Future We Want'. Language such as harmony *with* nature, rather than harmony *in* nature maintains the separation of humanity from the natural world:

39. ...We are convinced that in order to achieve a just balance among the economic, social and environmental needs of present and future generations, it is necessary to promote harmony with nature.

40. We call for holistic and integrated approaches to sustainable development that will guide humanity to live in harmony with nature and lead to efforts to restore the health and integrity of the Earth's ecosystem.

While these are laudable goals it is doubtful they will ever be achieved. The reason for this is not a lack of willingness to take action, but because States have primarily acted on the basis of the instrumental value of the natural world. This becomes clear when we turn to the relatively brief section in 'The Future We Want' on the environmental element of sustainable development. Here expressions of ecological and intrinsic value are conspicuous by their absence. Instead

¹⁶³ Para. 6.

¹⁶⁴ Para. 39.

¹⁶⁵ Morrow, (n 161) 296.

¹⁶⁶ For example, see para. 4.

much of the discussion is focussed on the role of the UN Environment Programme and how its operations can become more efficient.¹⁶⁷

Similar observations can be made in relation to the biodiversity section of 'The Future We Want'.

Paragraph 197 states:

We reaffirm the intrinsic value of biological diversity, as well as the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its critical role in maintaining ecosystems that provide essential services, which are critical foundations for sustainable development and human well-being.

Both intrinsic and ecological value are mentioned, but given the overwhelming focus on the instrumental value of nature in the report, a similar conclusion to that of Harrop in relation to the World Charter for Nature can be reached.¹⁶⁸ The anthropocentricity of paragraph 197 is further underlined by its emphasis on the negative instrumental value of declining biodiversity:

We recognize the severity of the global loss of biodiversity and the degradation of ecosystems and emphasize that these undermine global development, affecting food security and nutrition, the provision of and access to water and the health of the rural poor and of people worldwide, including present and future generations.

It appears that the negative ecological value of the consequences of the degradation of ecosystems is of no importance in 'The Future We Want'.

In summary, it is clear that international environmental policy, as expressed in 'The Future We Want', is just as anthropocentric as international environmental law. Analysis of the Report suggests this is in no small part due to the way in which sustainable development has been interpreted. Whilst in theory it mandates equality between environmental protection, economic development and social equity, in practice it is human preoccupations with development that dominate. Further, the concept of sustainable development not only permits but encourages, even demands, the prioritisation of anthropocentric concerns. This is manifested in 'The Future We Want', which grounds international environmental policy in the instrumental value of nature. 'Taken as a whole, the [Future We Want] seems to advocate its further objectification and commodification of the environment, reaffirming its subservience to human development'.¹⁶⁹

¹⁶⁷ Para. 88.

¹⁶⁸ See (n 159) above.

¹⁶⁹ Morrow, (n 161) 294.

Conclusions:

Values are unique and subject to various influences, most notably context. A lion may have inherent value as the 'King of the Jungle' to a young child in the United Kingdom, but negative instrumental value to an African farmer as a threat to his livestock. As such, it is not surprising that the value of nature has taken on many guises. From an anthropocentric perspective nature has both instrumental and inherent value, and it is expressions of these values that are most commonly found in international environmental law. In comparison, the intrinsic value of nature has largely been limited to discussion by ecocentrists, albeit with one or two exceptions.

All three of these value types should be considered flawed as the defining interpretation of value for the purposes of conservation. Instead, the ecological value of nature must be recognised. Every aspect of nature has a role to play in supporting the ecological systems that have enabled humanity to flourish, and our lack of understanding of what these roles are means we put these systems at risk. 'The guessing game is really Russian Roulette. Each species lost without serious consequences has been a blank in the chamber. But how can we know before we pull the trigger?'¹⁷⁰

Although only a relatively small number of sources have been discussed in this work, it is clear that there is a definite and dominate anthropocentric trend in international environmental law and policy, and this is primarily founded on the instrumental value of nature. This has manifested itself in two ways. In environmental agreements, it is through an emphasis on a State's right and desire to exploit the natural resources found both within and beyond its jurisdiction. Even in soft law instruments, which have no binding legal effect, States have highlighted the instrumental value of the exploitation of nature. The second way anthropocentric values of nature are given effect is through sustainable development. As it is currently conceived, environmental protection does not provide an effective counter-weight to economic development, and instead the benefits of acting on the instrumental value of nature both legitimise and encourage the status quo.

The dominance of anthropocentric interests in the text of international environmental law and policy does not preclude ecological and intrinsic values being respected. The evolution of the international whaling regime is evidence of this, and it is therefore not impossible that over time other conventions will evolve into more ecological, or at least less anthropocentric, regimes. In the short-term however, the dominance of instrumental values indicates that conservationists

¹⁷⁰ Norton, (n 59) p. 205.

need to adjust their priorities if the decline in biodiversity is to be halted, or even slowed. Studies have shown that knowing the values of a particular section of society enables more targeted public awareness and education strategies to be developed.¹⁷¹ Winter's study focussed on visitors to natural areas, but it could legitimately be applied to the negotiations of international conservation instruments. This might mean that, rather than strict protection, conservationists argue for the sustainable management of natural resources in binding treaties with stringent controls put in place to avoid over-exploitation. This would no doubt be met with criticism by those who advocate the absolute protection of nature. However, in the long-term if States are willing to accept the stronger controls on sustainable use argued for by conservationists because this is in accordance with their values, it might prove to be of greater benefit to the natural world than measures that purport to provide strict protection but are in practice undermined because States act on values that are contrary to such measures.

¹⁷¹ Winter, (n 34).

PART 2: THE INTERNATIONAL LEGAL FRAMEWORK FOR THE CONSERVATION OF PLANTS

II

GLOBAL APPROACHES TO THE CONSERVATION OF PLANTS

Biodiversity as an Issue of Common Concern:

International law refers to biodiversity by a number of terms, and these have varying degrees of legal significance.¹ It has already been demonstrated how it is the instrumental value of nature, expressed through the principle of permanent sovereignty over natural resources, that underpins the majority of international conservation law and policy. Framing nature in terms of State sovereignty implies that conservation is primarily an issue for individual States, as central to the principle of permanent sovereignty is that States are free to 'exploit their own resources pursuant to their own environmental policies'.² Yet a number of environmental instruments also recognise, at least in preambular statements, that biodiversity conservation is an issue that can transcend the limitations of States' borders and is a legitimate area of common concern.³ Inevitably, this causes some tension in international conservation policies, with the desire of States to safeguard their sovereignty having to be reconciled with the growing assertiveness of the wider international community in environmental matters.⁴

This tension is manifested in the 1992 Convention on Biological Diversity. In this chapter, I argue that the design and direction of the treaty's regime, including the system of thematic programmes, cross-cutting issues and major groups that have been developed to supplement the broad provisions of the Convention's text,⁵ frustrate its ability to effectively conserve plants. Any collective concern in the conservation of biodiversity has been subordinated to the apparently inviolable principle of permanent sovereignty.

¹ P. Birnie, A. Boyle and C. Redgwell, *International Law & the Environment* (3rd edition, Oxford University Press, 2009), p. 657-662.

² Article 3 of the Convention on Biological Diversity Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992).

³ Birnie, Boyle and Redgwell, (n 1) p. 657.

⁴ M. Bowman, 'The Nature, Development and Philosophical Foundations of the Biodiversity Concept in International Law', in M. Bowman and C. Redgwell (eds), *International Law and the Conservation of Biological Diversity* (International Environmental Law & Policy Series, Kluwer Law International, 1996).

⁵ <https://www.cbd.int/programmes/> (last accessed 01/04/2017).

The second part of the chapter focusses on a key plant biome: forests. The instruments that have been put in place to guide international action in the conservation of forests highlight the extent to which environmental imperatives give way to the sovereignty of States. Ultimately, I conclude that the narrow interests of States, based primarily on the short-term considerations of the instrumental value of nature, have left global conservation instruments fundamentally incapable of protecting plants and the natural world.

The 1992 Convention on Biological Diversity:

The Biodiversity Convention is the only global instrument that attempts to take a holistic, cross-sectoral approach to the conservation of nature. It constitutes ‘an attempt to internationalise, in a more comprehensive and inclusive way, the conservation and sustainable use of nature, based on the concept of biological diversity’.⁶ The definition of ‘biological diversity’ in Article 2 of the Convention is sufficiently broad to include individual specimens and species of plants, their genetic material and their wider place in habitats and ecosystems.⁷ This all-encompassing approach contrasts with earlier conservation instruments, which primarily apply to species and habitats. However despite its noted potential,⁸ the Convention has not lived up to expectations. ‘The Convention on Biological Diversity fails to address the problems it was meant to remedy. It declined to institutionalise the common responsibility of humanity to protect biodiversity, rejected the extension of state responsibility for damage to the global commons, and effectively spurned the concept of sustainable development’.⁹ Guruswamy puts forward three arguments in support of these criticisms. First, the Convention abandons the concept of sustainable development as defined in the Brundtland Commission Report¹⁰ by prioritising economic concerns over environmental protection.¹¹ Second, it fails to impose any real obligations on States, and those obligations that might be enforceable do not contribute towards the goal of reducing biodiversity loss. Third, and an issue that links the first two, the approach to conservation envisaged by the Convention is one that favours national sovereignty over global responsibility.¹² This is most notable through the assertion of permanent sovereignty over

⁶ A. Boyle, ‘The Rio Convention on Biological Diversity’, in Bowman and Redgwell (eds), (n 4) p. 33.

⁷ R. Rayfuse, ‘Biological Resources’, in D. Bodansky, J. Brunnée and E. Hey (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2007), p. 366.

⁸ Birnie, Boyle and Redgwell, (n 1) p. 612.

⁹ L. Guruswamy, ‘The Convention on Biological Diversity: A Polemic’, in L. Guruswamy and J. McNeely (eds), *Protection of Global Biodiversity: Converging Strategies* (Duke University Press, 1998), p. 351.

¹⁰ WCED, *Our Common Future* (Brundtland Report) (Oxford University Press, 1987) 43.

¹¹ Guruswamy, (n 9) p. 352-355.

¹² *ibid*, p. 355.

natural resources in both the Preamble and Article 3. These are recurring themes in the following analysis of the Convention.

Conservation in the Convention:

Conservation in the Biodiversity Convention is primarily governed by Articles 8 and 9, which deal with in situ and ex situ conservation respectively, and the provisions on sustainable use in Article 10. The merits of these have been extensively discussed elsewhere¹³ and so only a brief overview is provided here.

In chapter one I argued that for the Biodiversity Convention conservation is a means to the end of perpetuating the exploitation of nature. Article 10 supports this position. This contains sensible provisions designed to regulate the sustainable use of biological resources. For example, Article 10(a) requires States, 'as far as possible and as appropriate', to integrate conservation and sustainable use considerations into national decision-making. But nothing in this Article, nor indeed the whole Convention, accepts the possibility that use of a species might not be sustainable. This can be seen in the environmental assessment provisions in Article 14.¹⁴ Where adverse environmental impacts of a particular project are identified States are only required, again 'as far as possible and as appropriate', to take these into account.¹⁵ These very broad provisions afford States significant discretion in their implementation of the Convention, and do not, therefore, constitute a substantive norm to restrain the excesses of exploitation.¹⁶ It is unsurprising, therefore, that the Convention has been unable to halt the global decline of biodiversity loss.¹⁷

Article 8 outlines the in situ conservation measures that States should take. These include establishing protected areas, regulating the exploitation of biodiversity both within and outside protected areas, rehabilitating and restoring damaged ecosystems, controlling the spread of

¹³ M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law* (2nd edition, Cambridge University Press 2010), chapter 17; P. Le Pestre, 'Studying the effectiveness of the CBD', in P. Le Pestre (ed), *Governing Global Biodiversity: The Evolution and Implementation of the Convention on Biological Diversity* (Ashgate, 2002); A. Boyle, (n 6) and L. Warren, 'The Role of *Ex Situ* Measures in the Conservation of Biodiversity', in Bowman and Redgwell (eds), (n 4).

¹⁴ N. Craik, *The International Law of Environmental Impact Assessment* (Cambridge University Press, 2008), chapter 4.

¹⁵ Article 14(b).

¹⁶ S. Johnston, 'Sustainability, Biodiversity and International Law', in Bowman and Redgwell (eds), (n 4) p 53-56.

¹⁷ Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montreal, 2014). See also WWF/ZSL, 'Living Planet Report 2016: Risk and resilience in a new era' (WWF International, 2016).

invasive species, protecting indigenous knowledge of biodiversity and legislating to protect endangered species. At first glance these constitute a comprehensive regime for the conservation of wild flora and fauna. However, the Convention is now infamous for the qualifications and weak language used in its provisions, most notably ‘as far as possible and as appropriate’, which afford States significant discretion when implementing the Convention and render it unenforceable.¹⁸ To give effect to these provisions the Contracting Parties have developed a number of programmes of work on the principal biomes and key issues, such as the ecosystem concept and threats to biodiversity. Whilst considerable work is being taken under these initiatives, it is ironic that to take action under a Convention designed to represent a new holistic approach to conservation States have found it necessary to revert to the traditional sectoral approach, albeit one with unifying themes and concepts.

A list of actions to be taken for the ex situ conservation of nature is contained in Article 9, including the creation of seedbanks, and measures to facilitate the reintroduction of species into the wild. Again, these are conditioned by the phrase ‘as far as possible and as appropriate’. Importantly, Article 9 makes it clear that the ex situ measures are to ‘complement’ the in situ measures in Article 8. Whether the Biodiversity Convention is right to prioritise in situ conservation over ex situ measures is debatable, not least because implementation of Article 8 has been inadequate. Herkenrath observes that often the location of protected areas is determined by the absence of a human population to avoid conflict, rather than the presence of endangered species or habitats. Further, failure to properly manage these areas once they are established can result in their loss or damage due to incompatible land-uses.¹⁹ A better approach would be to give in situ and ex situ conservation parity of esteem. This would not address the problems highlighted by Herkenrath, which relate to the implementation of the Convention. However, it would reflect that in some cases ex situ measures may be the only way to guarantee a species survival.

As noted above, the remit of the Biodiversity Convention extends to the conservation of ecosystems, and therefore requires consideration of the interactions within and between species and habitats. For Brooks, Jones and Virginia the concept of the ecosystem has been instrumental in the development of environmental law, believing that ‘Since 1970, there has

¹⁸ S. Harrop, ‘Biodiversity and Conservation’, in R. Falkner (ed), *The Handbook on Global Climate and Environment Policy* (John Wiley & Sons, 2013), p. 42-44.

¹⁹ P. Herkenrath. ‘The Implementation of the Convention on Biological Diversity – A Non-Government Perspective Ten Years On’ (2002) 11 *Review of European Community and International Environmental Law* 29-37.

been an *episodic coevolution* of ecology and environmental law'.²⁰ Tarlock is equally clear on the influence the ecosystem concept has had, noting that it has 'profoundly influenced the development of domestic and international "nature" protection programmes, from the reduction of greenhouse gases to biodiversity conservation'.²¹ However, he notes that there is an absence of substantive legal norms relating to the protection of ecosystems, resulting from 'little formal recognition of ecosystems as distinct objects of legal protection'.²² On the one hand it could be argued that this does not apply to the Biodiversity Convention. Article 8 not only calls upon States to 'promote' the protection of ecosystems,²³ but also their restoration.²⁴ On the other hand, the value of this in terms of legal protection is doubtful given the weak nature of the provision.

This all-encompassing approach to biodiversity conservation has been highlighted as one of the Convention's main strengths.²⁵ McGraw, however, suggests that its extensive remit undermines its ability to achieve real results.²⁶ Studies showing that the status of the world's biodiversity continues to decline support this position.²⁷ In reality, the Biodiversity Convention is generating significant outputs through the development of national strategies and international targets, but few outcomes in the form of conservation success. Further, it is argued that the extensive scope of the Convention has made it difficult to communicate its message to the wider public. 'In essence, biodiversity does not offer an uncomplicated formula that advocates can explain to policy makers in straightforward terms and that journalists can encapsulate in headlines for public consumption'.²⁸ I question whether this is accurate. Whilst true that the damage being caused to the complex relationships between all forms of life on Earth cannot be neatly summarised in a tabloid headline, the potential extinction of iconic species such as the tiger or polar bear is a clear and succinct message that indicates something has gone fundamentally wrong in our relationship with nature.

Regardless, it is clear that the Convention is failing to achieve results in terms of conservation success, and this can be attributed to the absence of any direct reference to the drivers of

²⁰ R. Brooks, R. Jones and R. Virginia, *Law and Ecology: The rise of the ecosystem regime* (Ashgate, 2002), p. 3.

²¹ D. Tarlock, 'Ecosystems', in Bodansky, Brunnée and Hey (eds), (n 7) p. 575.

²² *ibid.* p. 576.

²³ Article 8(d).

²⁴ Article 8(f).

²⁵ Birnie, Boyle and Redgwell, (n 1).

²⁶ D. McGraw, 'The Story of the Biodiversity Convention: From Negotiation to Implementation', in Le Pestre (ed), (n 13).

²⁷ Secretariat to the Convention on Biological Diversity, (n 17).

²⁸ D. McGraw, 'The CBD – Key Characteristics and Implications for Implementation' (2002) 11 *Review of European Community and International Environmental Law* 17-28, 24.

biodiversity loss, save for a brief preambular reference, in the Convention's text. This omission from the Convention would not be as significant an issue had a series of protocols addressing these drivers been developed. As they have not, the Convention is impotent in the face of the ever-growing challenges of, amongst other factors, the impacts of climate change,²⁹ trade³⁰ and alien/invasive species and disease.³¹ It is little more than a forum for discussion, and the absence of binding, quantifiable targets does nothing to address this concern.

The Aichi Biodiversity Targets and Setting Conservation Priorities:

In the absence of meaningful obligations regarding the conservation of biodiversity, the Biodiversity Convention has instead relied upon a series of targets as a soft means of encouraging States to take action to protect biodiversity. The initial 2010 Target, 'to achieve by 2010 a significant reduction of the current rate of biodiversity loss',³² was considered unambitious and too vague to have any real effect.³³ It came as no surprise, therefore, when the Third Global Biodiversity Outlook³⁴ showed that not only had the target not been met, but pressures on biodiversity had continued to grow. Further, at a global level not one of the sub-targets had been met.

The response of the international community was to establish a new Strategic Plan for Biodiversity, running from 2011-2020, and a new set of 2020 Targets (the Aichi Targets).³⁵ These are global targets to which national action by States contribute, rather than specific targets for States themselves to achieve. The repeated use of targets has been associated with the need to gather quantitative data to guide conservation action.³⁶ However, given the immediacy of the threat facing much of the world's biodiversity, calls have been made to adopt a new approach that instead relies on existing data.³⁷ Concerns raised above regarding the soft nature of the obligations in the Biodiversity Convention are highlighted by the Aichi Targets, which must be

²⁹ Chapter 6.

³⁰ Chapter 7.

³¹ Chapter 8.

³² Decision VI/26, 'Strategic Plan for the Convention on Biological Diversity, UNEP/CBD/COP/DEC/VI/26, 2002.

³³ S. Harrop and D. Pritchard, 'A hard instrument goes soft: The implications of the Convention on Biological Diversity's current trajectory' (2011) 21 *Global Environmental Change* 474-480.

³⁴ Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 3* (Montreal, 2010), p. 17.

³⁵ Decision X/2, 'The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets', UNEP/CBD/COP/DEC/X/2, 29 October 2010, Annex.

³⁶ Harrop and Pritchard, (n 33).

³⁷ *ibid*; M. Danielson et al 'Biodiversity monitoring in developing countries: what are we trying to achieve?' (2003) 37 *Oryx* 407-409.

seen as aspirations *of* States, not obligations *on* States. No legal consequences will result from a failure to meet the targets, and in the likely event of failure the global community will probably only produce yet another strategy for 2030.³⁸ ‘This failure to create obligations may prove to be the greatest impediment to achieving the targets in that, by making implementation optional, the [2020 Strategic Plan] is capable of being overridden by competing state priorities generally driven by short-term political interests’.³⁹

Turning to progress towards specific targets, the Fourth Global Biodiversity Outlook reveals a mixed picture, although on balance it is one that suggests failure is more likely than success. To date, the international community has only been successful in meeting Target 16, which relates to the adoption and operation of the Nagoya Protocol.⁴⁰ For most of the other targets, it is estimated that current progress is insufficient if they are to be met by their deadlines. Of particular concern are the assessments on Targets 5 (deforestation and habitat degradation) and 12 (preventing extinction). With regards to the former it is noted that ‘Habitats of all types, including forests, grasslands, wetlands and river systems, continue to be fragmented and degraded’, which casts doubt over the national implementation of the Biodiversity Convention regime. Similar comments are made in relation to extinction rates, with ‘no sign overall of reduced risk of extinction’.⁴¹

The inability of the Aichi Targets to effect real change in the state of biodiversity is perhaps not surprising given the scientifically flawed basis on which they were set. To give just one example, the target to protect 17% of the terrestrial area⁴² was based on political expediency, as it was the figure that States could agree on, rather than a sound scientific analysis of what percentage of the Earth would constitute ecological representativeness.⁴³ Furthermore, the use of targets can result in an ever more complicated and technical process, compounded by a need to develop

³⁸ Arguably, this approach of setting global targets but relying on voluntary national action to achieve them is now being expanded into other areas of international environmental law. Under the 2015 Paris Climate Change Agreement (FCCC/CP/2015/L.9/Rev.1), for example, States are called on to make ‘nationally determined contributions’ (Article 3) towards the global targets of keeping global temperature rises to below 2°C and close to 1.5°C (Article 2). Whether this approach will be any more successful in the context of climate change, where there are similar issues relating to developing States’ right to develop and utilise natural resources freely, remains to be seen.

³⁹ S. Harrop, ‘“Living In Harmony With Nature”? Outcomes of the 2010 Nagoya Conference of the Convention on Biological Diversity’ (2011) 21 *Journal of Environmental Law* 117-128.

⁴⁰ Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization, Nagoya, 29 October 2010, in force 12 October 2014, C.N.782.2010.TREATIES-1.

⁴¹ Secretariat of the Convention on Biological Diversity, (n 17) p. 18-22. This is examined further in the context of European flora in the next chapter.

⁴² Target 11.

⁴³ F. Larsen, W. Turner and R. Mittermeier, ‘Will protection of 17% of land by 2020 be enough to safeguard biodiversity and critical ecosystem services?’ (2015) 49 *Oryx* 74-79.

indicators to measure progress.⁴⁴ Some work is being done in this regard, but the vague and open nature of many of the targets make establishing quantifiable standards against which progress can be measured difficult.⁴⁵ Finally, the use of global, rather than national targets, creates a ‘free-rider’ problem. Whilst this is a recognition that some States have greater capacity to designate large areas of land for conservation than others, it also means that there is no objective national standard against which a State’s efforts can be assessed.

There are a range of methodologies for setting conservation priorities. Several studies focus on the presence of endemic species. Myers et al identify biodiversity hotspots, where significant numbers of endemic species are facing severe habitat loss. Their findings reveal that 44% of vascular plant species are in twenty-five of these hotspots, comprising only 1.4% of land surface area of the Earth.⁴⁶ Protecting these areas should therefore be a priority, particularly if the international community is serious about protecting 75% of the most important areas for plants in each ecological region.⁴⁷ According to Myers et al, only 38% of the area representing these hotspots is designated as a protected area. In some cases these are little more than ‘paper parks’, and provide no real protection to the biodiversity within their borders.⁴⁸ Joppa et al also use endemic species as a way of prioritising areas for protection. Their approach is based on the accumulation of the density of endemic species in gradually larger areas, leading to a very different list of priority areas.⁴⁹ Pouget et al are critical of approaches based on the assessment of species, and instead highlight the importance of phylogeography. They argue that ‘Historically isolated sets of populations are likely to have distinct evolutionary potential: their existence is the consequence of past evolutionary processes that occurred within populations, shaping genome diversity and structuring genetic variation’.⁵⁰ At the other end of the ecological scale, Benavent-González et al believe assessing the ecological viability and representativeness of plant communities can be used to complement species-orientated approaches to setting conservation priorities. ‘Plant communities reveal far more information than plant species alone

⁴⁴ Harrop and Pritchard, (n 33).

⁴⁵ D. Tittensor et al, ‘A mid-term analysis of progress toward international biodiversity targets’ (2014) 346 *Science* 241-244.

⁴⁶ N. Myers et al, ‘Biodiversity hotspots for conservation priorities’ (2000) 403 *Nature* 853-858.

⁴⁷ Target 5 of the Global Strategy for Plant Conservation, *infra* (n 71).

⁴⁸ Myers et al, (n 46).

⁴⁹ L. Joppa et al, ‘Achieving the Convention on Biological Diversity’s Goal for Plant Conservation’ (2013) 341 *Science* 1100-1103.

⁵⁰ M. Pouget et al, ‘Spatial mismatches between plant biodiversity facets and evolutionary legacy in the vicinity of a major Mediterranean city’ (2016) 60 *Ecological Indicators* 736-745.

because they are a highly informative indicator of the status of other elements of biological and abiotic diversity'.⁵¹

That there are multiple ways in which conservation priorities can be determined, each identifying very different targets for action, suggests that the arbitrary approach through which the Aichi Targets were set might be of some benefit. An arbitrary target reflecting political consensus does not have to justify itself based on scientific evidence. There is a valid debate over whether protecting 17% of the Earth's terrestrial area is sufficient,⁵² but it is better that this target is set so that States can move onto consider how they wish to identify those areas to be protected, rather than be caught up in the interminable international negotiations that would result from an effort to try and find a scientific methodology that enjoys universal support. Given the sovereign interests at stake, there is a risk that each State would advocate whichever methodology resulted in the smallest burden for them. There are also more general considerations relating to due process. Conferences of the Parties are accountable only to the extent that they represent the governments accepted by each State's population. Significant resentment would be caused if this distant decision-making body was to dictate which areas within a State were to be protected, especially if it impacted on local and national economies. Leaving the question of what areas should be protected to a national level of decision-making enables local concerns and priorities to be considered, at least to the extent that national rules on public participation allow. This, however, is predicated on the assumption that there is adequate implementation of the Biodiversity Convention at the national level, and the extent to which this is happening is questionable.

Implementation, Compliance and Enforcement:

UNEP has asserted that it is a lack of implementation of multilateral environmental agreements that is the leading cause for continuing biodiversity loss.⁵³ The extent to which this is true in relation to the Biodiversity Convention, however, is debatable as it falsely assumes that compliance and effectiveness are the same thing. Mitchell draws a distinction between the two, noting that a State can comply with a specific provision, but this act of compliance will not be

⁵¹ A. Benavent-González, A. Lumbreras and J. Molina, 'Plant communities as a tool for setting priorities in biodiversity conservation: a novel approach to Iberian aquatic vegetation' (2014) 23 *Biodiversity Conservation* 2135-2154, 2145.

⁵² Larsen, Turner and Mittermeier, (n 43).

⁵³ UNEP, 'Compliance with and Enforcement of Multilateral Environmental Agreements' (UNEP/GC/24/INF/23). For further analysis of this issue see W. Bradnee Chambers, *Interlinkages and the Effectiveness of Multilateral Environmental Agreements* (United Nations University Press, 2008).

effective if it is not related to the objective of the treaty.⁵⁴ In the case of the Biodiversity Convention, the production of national strategies and reports in compliance with Article 6 does not address the key drivers of biodiversity loss, and so cannot directly contribute to the Convention's overall goal of protecting biodiversity. The key factor undermining the Biodiversity Convention's effectiveness in this regard is that it is doubtful that it was ever intended to be enforced at an international level.⁵⁵ The provisions are drafted in such a way as to make compliance inevitable and enforcement virtually impossible. The inclusion of language such as 'as far as possible and as appropriate' suggests that reconciling north/south tensions between States was more important during negotiations than concluding a workable agreement.⁵⁶ It is certainly the case that the South took full advantage of the fact that much of the world's biodiversity is under their jurisdiction.⁵⁷ It also illustrates the success of States in concluding an agreement that facilitated compliance by legitimising the status quo. Mitchell highlights both of these issues, noting that 'Ambiguity may reflect agreements reached despite sincere differences about a specific rule's content – "papering over" – or efforts to accrue environmental praise by agreeing to terms that appear to require behavioural change but prove sufficiently vague to allow business as usual'.⁵⁸ The Biodiversity Convention can, therefore, be seen as reinforcing the principle of permanent sovereignty over natural resources, with global aspirations being made to conform to narrow national interests, rather than national interests being changed to meet global obligations. The use of global rather than national targets, discussed above, is just one example. This problem is compounded by the lack of a robust system of institutional oversight, which marks the Biodiversity Convention out as different from other environmental treaties, such as the Convention on International Trade in Endangered Species (CITES)⁵⁹ and the World Heritage Convention.⁶⁰

Similarly, and again unlike other treaties, there is no specific provision in the Biodiversity Convention that deals with implementation. Instead Article 23 calls on the Conference of the Parties to keep the implementation of the Convention under review. No subsidiary bodies

⁵⁴ R. Mitchell, 'Compliance Theory: An Overview', in J. Cameron, J. Werksman and P. Roderick (eds), *Improving Compliance with International Environmental Law* (Earthscan, 1996), p. 6.

⁵⁵ This section is mainly concerned with theoretical aspects of implementation and compliance. Practical issues, including requisite features of an effective compliance system, are discussed in the next chapter.

⁵⁶ J. Speth, 'International Environmental Law: Can It Deal with the Big Issues?' (2004) 28 *Vermont Law Review* 779-796.

⁵⁷ McGraw, (n 28).

⁵⁸ Mitchell, (n 54) p. 7.

⁵⁹ Convention on International Trade in Endangered Species of Fauna and Flora, Washington, 3 March 1973, in force 1 July 1975, 993 UNTS 243, Articles XI and XII.

⁶⁰ Convention for the Protection of the World Cultural and Natural Heritage, Paris, 16 November 1972, in force 17 December 1975, 27 UST 37, 11 ILM 1358 (1972), Articles 8-14.

permitted by this Article have been created. In contrast, detailed provisions on implementation can be found in Articles 10 and 13 of the UN Framework Convention on Climate Change⁶¹ and 22 and 27 of the Desertification Convention.⁶²

This would not be as significant an issue had the Contracting States adopted a series of legally binding protocols setting out detailed provisions on key aspects of biodiversity conservation, but this has not happened. To date only two protocols have been adopted. Whilst this is a notable success given their politically sensitive subject matter, liability in the transboundary movement of living modified organisms and access to biological genetic resources and the benefits resulting from that access are hardly the most pressing issues covered by the Biodiversity Convention. This is partly due to the failure of States to agree binding rules, which has led to the proliferation of non-binding instruments under the regime. However, it is also attributable to the design of the regime itself.

Susskind and Ozawa highlight a number of weaknesses in the convention-protocol approach in international environmental law. First, the negotiation process prevents rather than facilitates genuine debate of the problem and potential solutions. States often misrepresent their positions, either to gain greater benefits from the negotiations or reduce any burden that might be imposed. Further, there is a fear that discussion of an option constitutes commitment to it, and so there is rarely open discussion of all the options, something which was observed in the Biodiversity Convention negotiations.⁶³ This shuts down the scope of debate and is exacerbated by States often fixing their positions before negotiations even begin. Second, the nature of the issues being addressed in environmental agreements mean that disagreement between States is highly likely. This might be because of scientific uncertainty, with States relying on conflicting, but perhaps equally valid, scientific data, or because uniform standards will impact on States differently, for example if regulations are imposed on a resource that is central to one State's economic interests but not another's. Third, the convention-protocol approach fails to adequately address the issue of enforcement. 'Ad hoc negotiations sponsored by a less-than-powerful agency of the United Nations will never be able to overcome the resistance to

⁶¹ United Nations Framework Convention on Climate Change, New York, 9 May 1992, in force 24 March 1994, 1771 UNTS 107.

⁶² Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, Paris, 17 June 1994, in force 26 December 1996, 33 ILM 1328, see P. le Pestre, 'The Convention on Biological Diversity: Negotiating the Turn to Effective Implementation' (2002) 3 *Canadian Journal of Policy Research* 92-98.

⁶³ M. Chandler, 'Selected Issues of Interest to the International Lawyer' (1993) 4 *Colorado Journal of International Law and Policy* 141-174.

instituting a comprehensive multilateral system for ensuring compliance'.⁶⁴ In contrast to the Biodiversity Convention, for example, the World Trade Organisation has been afforded considerable non-compliance and dispute settlement powers,⁶⁵ the difference being that these powers are there to protect States' economic interests by ensuring other States do not gain a competitive trade advantage.⁶⁶

A number of reforms are proposed by Susskind and Ozawa to address these problems. In the pre-negotiation phase States are encouraged to hold informal talks with others that have similar interests, for example the States with large areas of rainforest under their jurisdiction, to agree a joint negotiating position. Changes to the negotiating process itself are also suggested. Rather than there being one formal negotiating text there could be several, with it being made clear that discussion of one did not mean that a State was committing to it. More ambitious is the suggestion that treaty provisions be made conditional on certain circumstances existing at either international or national levels.⁶⁷ In a treaty concerned with protecting plants these might take the following form:

States will establish a network of protected areas with the aim of conserving and ensuring the sustainable use of its native flora.

At the end of a ten-year period States will compile a list of native plant species that have declined by more than 25%. All uses of those plants will be prohibited and the areas in which they are found will be made into strict reserves where all activities that contribute to those species' decline will be prohibited.

These provisions are obviously not perfect. The 25% threshold is purely arbitrary and would need clarifying. For example, would it mean 25% of the population, potential habitat, known range or something else? Also, exceptions on the prohibition of use could be allowed, such as to enable research into the species or to consider local needs, and guidance on what activities might contribute to a species' decline would need to be provided. They would also require sufficient data to establish a baseline, and ongoing monitoring by an independent and authoritative body to determine whether the threshold had been met.⁶⁸ However they illustrate the advantages of responsiveness and flexibility of this conditional approach to treaty-making. Further, such an approach might encourage greater levels of compliance as States would act to

⁶⁴ L. Susskind and C. Ozawa, 'Negotiating More Effective International Environmental Agreements', in A. Hurrell and B. Kingsbury (eds), *The International Politics of the Environment* (Oxford University Press, 1992), p. 149-155.

⁶⁵ M. Chandler, (n 63).

⁶⁶ Not all environmental regimes lack robust non-compliance provisions. See, for example, the discussion of CITES in chapter 7.

⁶⁷ Susskind and Ozawa, (n 64) p. 155-163.

⁶⁸ *ibid*, p. 161.

avoid the imposition of more burdensome obligations should they fail to protect their native flora.

Taking the above into account, it appears that UNEP's suggestion that the reason biodiversity is continuing to decline is a result of poor implementation of environmental treaties is inaccurate. In terms of the Biodiversity Convention's failure this is more likely to be due to a desire of States to reduce the burden of any obligations, and inherent design flaws. However, this might be being disingenuous to the Convention as its focus is on action at a national level to achieve biodiversity goals. Cynically, this is merely a reflection of States' interests in protecting their sovereign rights to exploit the natural resources found in their territories. On the other hand, except in areas beyond national jurisdiction, conservation action must be taken by States operating through domestic legal mechanisms and so the Convention's approach is arguably correct. National implementation of the Biodiversity Convention is primarily achieved through National Biodiversity Strategies and Action Plans (NBSAP), although it is for States to decide what form these take. Article 6 permits States to either develop specific plans for this purpose, or adapt pre-existing conservation strategies.

The purpose of these national strategies and plans is to ensure the achievement of global conservation goals by each Contracting Party taking appropriate actions relevant to their specific fauna, flora and national priorities. However, Herkenrath's assessment of the NBSAPs reveals several flaws in the Biodiversity Convention's approach to implementation. First, as noted above there has been a failure to ensure effective implementation of the treaty's substantive measures, most notably in relation to the creation of protected areas. Second, and by way of further explanation of the first point, there is a serious lack of sufficient data to guide positive conservation action, and efforts to address this are undermined by a lack of capacity. Consequently, much of the focus of national conservation action has been on assessing the status of biodiversity in the relevant jurisdiction, but assessment is not the same as protection, as the continuing decline of biodiversity illustrates. There is also a mismatch between the holistic approach envisaged by the Biodiversity Convention and political and administrative reality at a national level. Often the government department responsible for implementing the Convention will lack the political clout to influence policy in other relevant areas, particularly those concerning national economic interests.⁶⁹

To summarise, the Biodiversity Convention is plagued by vague obligations, weak language and a lack of robust compliance and enforcement mechanisms to ensure effective implementation

⁶⁹ Herkenrath, (n 19).

by States. The consequence is a regime incapable of addressing the very real threats to biodiversity. In 1996 Boyle wrote that ‘It will not be clear for some time whether the Convention provides a viable framework for real progress or is merely an exercise in political symbolism’.⁷⁰ As far as the Convention itself is concerned, the past twenty years indicate that ‘political symbolism’ is an accurate description. Arguably, the same conclusion can be reached over the treaty’s initiatives specifically concerned with the protection of plants.

The Global Strategy for Plant Conservation:

In 2010, the Conference of the Parties adopted the Updated Global Strategy for Plant Conservation,⁷¹ which is to run from 2011-2020 alongside the Aichi Biodiversity Targets. It comprises five objectives, each with a number of subsidiary targets. For many of these targets success is difficult to quantify. For example, Target 2 is that the conservation of all known plant species should be assessed ‘as far as possible’. The inclusion of this phrase renders the Target meaningless as it does not actually require any action be taken for it to be achieved. However far assessment efforts have gone by 2020 they will only have been what were ‘as far as possible’.

The Strategy is interesting because unlike the other instruments discussed here and in the previous chapter, it implicitly allows for the possibility that a species of plant may be conserved regardless of any direct value to humans:

Our vision is of a positive, sustainable future where human activities support the diversity of plant life (including the endurance of plant genetic diversity, survival of plant species and communities and their associated habitats and ecological associations), and where in turn the diversity of plants support and improve our livelihoods and well-being’.⁷²

This vision is supported to an extent by the Strategy’s targets, although it is clear from the first paragraph of Decision X/17 that its primary focus remains anthropocentric in nature:

Recognizing the critical role of plants in supporting ecosystem resilience, provision of ecosystem services; adapting to and mitigating environmental challenges *inter alia*, climate change, and for supporting human well-being.

The level of detail concerning the implementation of the Strategy⁷³ is minimal, especially when compared with that of the Forest Ecosystem Restoration Initiative discussed below.

⁷⁰ Boyle, (n 6) p. 49.

⁷¹ Decision X/17, ‘Consolidated update of the Global Strategy for Plant Conservation 2011-2020’, UNEP/CBD/COP/DEC/X/17, 29 October 2010.

⁷² *ibid*, Annex, para. 1.

⁷³ *ibid*, para. 14.

Nevertheless, that a strategy dedicated to the conservation of plants exists is welcome. It calls for global, regional, national and subnational plans to be put in place in accordance with national biodiversity action plans, and acknowledges that national targets will vary depending on the flora and priorities of each State.

A broad approach is taken by the Strategy. It includes targets relating to the gathering of scientific data concerning the conservation status of all plant species,⁷⁴ habitat and species approaches to conservation,⁷⁵ the sustainable exploitation of plants⁷⁶ and public awareness and engagement.⁷⁷ Like the Aichi Targets, progress on the Strategy's targets is mixed, with those targets requiring multiple stakeholder action proving harder to accomplish than those that can be achieved through unilateral action by interested parties.⁷⁸ This has been seen in the United Kingdom, where initial 'gentleman's agreements' to take action to implement the Strategy have not been followed through,⁷⁹ constituting further evidence of the weakness of a non-binding approach to biodiversity conservation. Botanical gardens are playing a leading role in implementing the Strategy,⁸⁰ particularly those targets that relate to horticulture and public education.⁸¹ In comparison, targets relating to sustainable use, which is not a traditional area of concern for botanic gardens, suffer from poor levels of implementation.⁸²

Where implementation is being achieved, it is possible to question whether it is resulting in progress towards the Strategy's targets, particularly the targets relating to in situ and ex situ conservation of flora under Objective II. With regards to in situ measures, studies have shown that many of the most important areas for plant diversity are not covered by protected area regimes.⁸³ Research on the ex situ conservation of plants leads to similar conclusions. It is estimated that only half of plant species endemic to Greece are represented in ex situ conservation activities. Further, for those species that have been collected, in most cases all the material of a species is kept in the same place, leaving it vulnerable to freak events, such as

⁷⁴ Objective I.

⁷⁵ Objective II.

⁷⁶ Objective III.

⁷⁷ Objectives IV and V.

⁷⁸ E. Radford, 'How to embed an international policy into the political context of the UK and Europe with reference to the implementation of the Convention on Biological Diversity *Global Strategy for Plant Conservation*' (2011) 166 *Botanical Journal of the Linnean Society* 261-266.

⁷⁹ *ibid.*

⁸⁰ See chapter 9.

⁸¹ S. William et al, 'Why are some biodiversity policies implemented and others ignored? Lessons from the uptake of the Global Strategy for Plant Conservation by botanic gardens' (2012) 21 *Biodiversity Conservation* 175-187.

⁸² J. Donaldson, 'Botanic garden science for conservation and global change' (2009) 14 *Trends in Plant Science* 608-613.

⁸³ Larsen, Turner and Mittermeier, (n 43).

climatic control failures or human error. Even where a species is stored in a seedbank or botanic garden, for most species the material is not suitable for use in reintroduction programmes.⁸⁴ This is in some ways more concerning than the failure to ensure the botanical representativeness of protected areas. The assumption underpinning *ex situ* conservation is that the genetic material being stored in botanical gardens, seed banks and similar institutes is an accessible resource that can be used to restore a species if their wild populations are no longer viable. If this is not true, then urgent action must be taken to remedy this to ensure that any future reintroduction programmes are successful.

Corollaries to both the *in situ* and *ex situ* conservation targets are the targets in Objective I of the Strategy: 'Plant diversity is well understood, documented and recognised'. There is an online list of all known species of flora,⁸⁵ but this is far from complete, with many areas, particularly in the tropics, still requiring assessment.⁸⁶ Methodologies have been proposed that would enable States to develop online databases of all known flora within their territories.⁸⁷ Even if this were to be achieved, however, such lists would not provide information on the conservation status required by Target 2, and is therefore of limited use in setting conservation priorities to achieve the targets under Objective II.⁸⁸ For this, the most comprehensive data source is the IUCN Red List,⁸⁹ but compared with other taxa the assessment of flora is relatively poor.⁹⁰ As a result, 'many published analyses are making very strong assumptions based on very limited data'.⁹¹ Failure to achieve Target 2 has had knock-on effects for other targets in the Strategy, particularly in the identification of priority species for Target 7: the *in situ* protection of at least 75% of known threatened species.⁹² Many endangered species are being found outside protected areas, as these have already been designated on the basis of the limited data that was available at the time. Broader conservation strategies are therefore required if Target 7 is to be

⁸⁴ N. Krigas, V. Menteli and D. Vokou, 'Analysis of the *ex situ* conservation of the Greek endemic flora at national, European and global scales and of its effectiveness in meeting STRATEGY Target 8' (2014) 148 *Plant Biosystems* DOI: 10.1080/11263504.2014.988194.

⁸⁵ <http://www.theplantlist.org/> (last accessed 01/04/2017).

⁸⁶ G. Krupnick, 'Conservation of Tropical Plant Diversity: What Have We Done, Where Are We Going?' (2013) 45 *Biotropica* 693-708.

⁸⁷ J. Victor et al, 'Creating an Online World Flora by 2020: a perspective from South Africa' (2014) 23 *Biodiversity Conservation* 251-263. For further discussion, see chapter 9.

⁸⁸ J. Miller et al, 'Addressing target two of the Global Strategy for Plant Conservation by rapidly identifying plants at risk' (2012) 21 *Biodiversity Conservation* 1877-1887.

⁸⁹ The merits and operation of the Red List are discussed in the next chapter.

⁹⁰ N. Brummitt, S. Bachman and J. Moat, 'Applications of the IUCN Red List: towards a global barometer for plant diversity' (2008) 6 *Endangered Species Research* 127-135.

⁹¹ Krupnick, (n 86).

⁹² *ibid.*

achieved.⁹³ Further, even if a species is identified as endangered, and its habitat is designated as a protected area, it will need to be actively managed to ensure its continued survival rather than be subject to a 'benign neglect' approach to conservation.⁹⁴

Forest Biodiversity:

Responsibility for forest regulation is shared between a number of international organisations, including the Biodiversity Convention, the UN Food and Agricultural Organisation's Committee on Forestry and the International Tropical Timber Organisation. There is little coordination between these organisations.⁹⁵ Efforts to develop a more coherent regime for forest conservation have failed, not least because of the acute interest of States in protecting their sovereign rights to exploitation.⁹⁶ This issue is compounded by the links between deforestation and other social problems, including poverty, unsustainable agricultural practices, lack of capacity to achieve environmental goals and foreign debt.⁹⁷

There were some hopes that the Biodiversity Convention would evolve to become the primary instrument concerned with forest conservation through the adoption of a forest protocol. This has not happened, and is unlikely to do so. This is in part due to the different perceptions of the value of forests, not just in terms of biodiversity but socioeconomic ones as well, which leads some to conclude that, ironically, the Biodiversity Convention is too narrow an instrument for it to effectively address all issues relating to forests.⁹⁸ These values, however, according to Eikermann, are precisely why an international convention on forests is needed. They deliver significant benefits not just for the States in which they are found but for the entire planet and all States therefore have an interest in ensuring their protection and sustainable use.⁹⁹

Two instruments were adopted by States at the 1992 Rio Conference that are relevant to the conservation of forests. The first is the unfortunately named 1992 Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation

⁹³ R. Chazdon et al, 'Beyond reserves: A research agenda for conserving biodiversity in human-modified tropical landscapes' (2009) 41 *Biotropica* 142-153.

⁹⁴ Krupnick, (n 86).

⁹⁵ Bowman, Davies and Redgwell, (n 13) p. 637.

⁹⁶ R. Tarasofsky, 'The Global Regime for the Conservation and Sustainable Use of Forests: An Assessment of Progress to Date' (1996) 56 *Heidelberg Journal of International Law* 668-684.

⁹⁷ *ibid.*

⁹⁸ *ibid.*

⁹⁹ A. Eikermann, *Forests in International Law: Is There Really a Need for an International Forest Convention?* (Springer, 2015).

and Sustainable Development of All Types of Forests (the 1992 Forest Principles).¹⁰⁰ That ‘non-binding’ is included in the title demonstrates the zealotry of States in ensuring the Principles would not have any legal effect whatsoever. In comparison to the approach taken in other instruments adopted in 1992, the 1992 Forest Principles do not identify forest conservation as a global concern, but instead present it as a national issue. Principle 2(a) says that ‘States have the sovereign and inalienable right to utilise, manage and develop their forests in accordance with their development needs’, and Principle 3(a) states that it is ‘national policies and strategies’ that should be the framework for conservation and management activities. The fifteen principles do little more than assert that national management of forests should contribute towards their sustainable development. The practical use of the 1992 Forest Principles in instigating and directing international action is therefore doubtful.¹⁰¹

Chapter 11 of Agenda 21,¹⁰² the second instrument adopted at Rio relevant to forests, sets out four programme areas for forest conservation and management:

- A. Sustaining multiple roles and functions of all types of forests, forest lands and woodlands
- B. Enhancing the protection, sustainable management and conservation of all forests, and the greening of degraded areas, through forest rehabilitation, afforestation, reforestation and other rehabilitative means
- C. Promoting efficient utilisation and assessment to recover the full valuation of the goods and services provided by forests, forest lands and woodlands
- D. Establishing and/or strengthening capacities for the planning, assessment and systematic observations of forests and related programmes, projects and activities, including commercial trade and processes

Objectives are outlined for each, as are activities and means of implementation. The means of implementation are similar across the four programme areas, concentrating on financial resources, scientific and technological capabilities, human resource development and capacity building. Evidently, a wide-ranging strategy is envisaged by Agenda 21 with regards to forests. Taking the human resource limb of the means of implementation for programme area B as an example, this includes both the training of specialists in all aspects of forest conservation as well as improving public awareness of the impacts and drivers of deforestation.¹⁰³ However, as the above assessment of Aichi Target 5 shows, the global community has so far failed to take sufficient action to conserve forests and reverse the global rate of deforestation and forest degradation.

¹⁰⁰ 13 June 1992, 31 ILM 881 (1992).

¹⁰¹ P. Sands and J. Peel, *Principles of International Environmental Law* (2nd edition, 2012), p. 497.

¹⁰² Eikermann, (n 99) p. 49-60.

¹⁰³ Agenda 21 (UNCED, *Report*, I (1992)), para. 11.18.

Instead of a protocol, at its sixth meeting in 2002 the Conference of the Parties to the Biodiversity Convention adopted its Expanded Programme of Work on Forest Biological Diversity.¹⁰⁴ This consists of Three Programme Elements, twelve goals, twenty-seven objectives and 130 activities. An in-depth review of the implementation of the Expanded Programme took place between March 2006 and May 2007. The key findings of this report include:

- Information submitted by States and international organisations suggests that the Expanded Programme is a useful component of the range of instruments available to tackle biodiversity loss.
- However, forest biodiversity continues to decline. Obstacles to implementation of the Expanded Programme include lack of data, lack of capacity and a lack of coordination.
- Deforestation and forest degradation are the main causes of forest biodiversity loss, with rates either remaining the same or increasing.
- National implementation strategies do not take adequate account of the need to address the impacts of climate change on forests.
- The total area of protected forest has increased, but connectivity between protected areas is limited.¹⁰⁵

Despite the work that has been undertaken in this initiative, recent studies show that deforestation rates remain high,¹⁰⁶ indicating that the international community has failed to take the necessary steps to reduce, and reverse, the decline in forest biodiversity. This is also highlighted in the Fourth Biodiversity Outlook.¹⁰⁷

In 2014 the Republic of Korea, through its Korea Forest Service, announced that it was establishing the Forest Ecosystem Restoration Initiative (FERI)¹⁰⁸ to assist States in achieving Aichi Targets 5, 11 and 15.¹⁰⁹ This was in response to both the Hyderabad Call for a Concerted Effort on Ecosystem Restoration¹¹⁰ and the Decision on Ecosystem Restoration adopted at the

¹⁰⁴ Decision VI/22, 'Forest biological diversity', UNEP/CBD/COP/DEC/VI/22, 2002, Annex.

¹⁰⁵ Note by the Executive Secretary, 'In-Depth Review of Implementation of the Programme of Work on Forest Biological Diversity', UNEP/CBD/SBSTTA/13/3, 13 November 2007.

¹⁰⁶ For example, see N. Rodriguez et al 'Patterns and Trends of Forest Loss in the Columbian Guyana' (2012) 44 *Biotropica* 123-132 and C. Bianchi and S. Haig 'Deforestation Trends of Tropical Dry Forests in Central Brazil' (2013) 45 *Biotropica* 395-400.

¹⁰⁷ Secretariat to the Convention on Biological Diversity, (n 17).

¹⁰⁸ Note by the Executive Secretary, 'Forest Ecosystem Restoration Initiative', UNEP/CBD/COP/12/INF/19, 29 September 2014.

¹⁰⁹ *ibid*, para. 4.

¹¹⁰ Available at: <https://www.cbd.int/doc/restoration/Hyderabad-call-restoration-en.pdf> (last accessed 01/04/2017).

twelfth Conference of the Parties.¹¹¹ FERI is a six-year initiative and is comprised of the following elements:

1. Capacity-building
 - Workshops (driven by demand from Parties)
 - Learning exchanges at regional and subregional levels
 - Identification, translation, development and adaption tools for use by Parties
 - Technical clinics
2. Implementation support
 - Direct support to countries to carry out assessments of degradation and restoration potential, in the framework of Aichi Targets 5, 11 and 15. This funding could be used by countries to leverage funding from other sources for implementation of restoration activities.
3. Technical support and cooperation
 - International/global technical support networks – coordination mechanism among different regions and initiatives
 - Regional support hubs/“centres of excellence” – building on the technical and scientific cooperation networks envisaged under the [Biodiversity Convention]
4. Expert process
 - Meetings of expert and scientific groups on issues related to forest ecosystem restoration¹¹²

FERI, then, is a circular process, primarily based on learning from experiences that feedback into future forest restoration efforts.¹¹³ Technical and financial support is provided to developing States in both undertaking restoration activities, but also in accessing additional support from sources other than those backed by FERI. Ultimately it is hoped that FERI will achieve three outcomes: the capacity of developing States to undertake restoration activities will be enhanced, there is improved implementation of restoration activities, and these activities are profiled and supported.¹¹⁴ Whether FERI will succeed where other similar initiatives have failed remains to be seen.

One of the primary intended outcomes of FERI is that ‘the capacity of developing countries to undertake restoration activities is raised’.¹¹⁵ It is therefore notable that no targets from Aichi Strategic Goal E, which relates to implementation, are included within the immediate scope of FERI. Fulfilling the three goals prioritised by FERI will arguably not be possible without acting to achieve a majority of them. All of the Aichi Targets, for example, will require action to be taken on Aichi Target 20, the target relating to the provision of funds and other resources. Similarly,

¹¹¹ Decision XII/19, ‘Ecosystem conservation and restoration, UNEP/CBD/COP/DEC/XII/19, 17 October 2014.

¹¹² *ibid*, para. 9.

¹¹³ By doing so, FERI supports the networks central to the resilience thinking model of governance that is explored further in chapter 9.

¹¹⁴ *ibid*, para. 10.

¹¹⁵ Note by the Executive Secretary, (n 108).

the three Targets under Strategic Goal A represent the broader social framework which is necessary for biodiversity protection to not only be successful, but to be seen as a legitimate concern for public bodies. In this case, the lack of specificity again becomes an issue. For example, what is meant by the word ‘people’ in Target 1?¹¹⁶ It would be fair to assume that the membership of a conservation organisation such as Fauna & Flora International¹¹⁷ is aware of the ‘values’ of biodiversity and how it could be used sustainably. Is this alone enough to consider Target 1 to have been achieved, or is it necessary to reach beyond an educated elite or committed support and ensure those that rely on biodiversity for their essential needs are informed? A recent assessment on progress towards achieving Target 1 shows some worrying trends. Whilst people consider biodiversity to be important for humanity’s well-being, they do not see how protecting biodiversity contributes to their own well-being. Similarly, biodiversity loss is recognised as a global problem but not a local concern,¹¹⁸ making it difficult to build public support and consensus in strategies designed to reduce deforestation.

Operating alongside the forest initiatives overseen by the Biodiversity Convention is the 2007 Non-Legally Binding Instrument on All Types of Forests, which was adopted by the parties to the UN Forum on Forests, a subsidiary body of the UN Economic and Social Council. Whilst this instrument shares the same fundamental weaknesses of the 1992 Forest Principles, namely that it is non-binding and emphasises that forest conservation is a matter for individual States to decide, it ‘represent[s] a more clearly drafted reflection of the evolution of an international consensus in response to the challenge of sustainable forest management and arresting forest loss and degradation’.¹¹⁹ Paragraph 6, for example, addresses a number of issues, including promoting efficient use of forest products, protecting indigenous knowledge of forests, financing and other resources and integrating forest management plans with other national development plans. However, international consensus on how best to tackle the drivers of deforestation remains elusive.

Conclusions:

The Biodiversity Convention is an instrument plagued by internal contradictions. It supposedly ‘internationalises’ conservation concerns, but relies on national action. It has one of the

¹¹⁶ ‘By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably’.

¹¹⁷ <http://www.fauna-flora.org/>.

¹¹⁸ Secretariat to the Convention on Biological Diversity, (n 17) p. 33.

¹¹⁹ Sands and Peel, (n 101) p. 499.

broadest remits of any multilateral environmental agreement, yet save for a brief preambular reference there is no mention of any of the drivers of biodiversity loss. It seeks to adopt a holistic approach to conservation, but the Contracting Parties have found it necessary to develop habitat and issue-specific programmes of work to direct action. There is no doubt that the Convention could evolve into a powerful regime, despite its inherent weaknesses. The mechanisms are there to develop legally-binding protocols on important conservation issues and to ensure the proper global oversight of these. However, at present there is no indication that the Contracting Parties are going to change their approach of non-binding programmes and targets. Guruswamy warns against idolising the Biodiversity Convention's strengths while ignoring its flaws, although his suggestion for wholesale reforms to the Convention to re-orientate it as a forests instrument has its own problems.¹²⁰ Not only would it risk undoing the action that has been taken under the Convention, but experience in global forestry regulation suggests the resulting instrument would be anything but binding.

Whatever direction global conservation regulation takes in the future, the principal reform needed is to redefine the objectives to reflect actual conservation measures, rather than simply documenting the disappearance of nature. Compliance does not necessarily equate to effectiveness, and it has been noted by Harrop that the only real obligation in the Biodiversity Convention is the submission of annual reports in Article 26. His prediction that 'the [Biodiversity Convention] may ultimately be remembered only for its efficiency in gathering information to simply observe – rather than prevent – the relentless decline of biodiversity'¹²¹ is in danger of becoming true.

¹²⁰ Guruswamy, (n 9) p. 355-357.

¹²¹ Harrop, (n 18) p. 49.

III

REGIONAL APPROACHES TO PROTECTING PLANTS

Regional Conservation Instruments and ‘Effectiveness’:

International environmental law has seen the adoption of several regional conservation treaties. Taking a regional approach to conservation has the advantage of enabling a more tailor-made approach to regulation, one which is sympathetic to the ecological and geopolitical circumstances of the region.¹ Accommodation of particular concerns, however, is not the same as offering effective protection. Indeed, where these concerns are economic in nature, giving too much weight to them may frustrate conservation efforts. In the previous chapter a number of issues with the global approach to plant conservation under the 1992 Convention on Biological Diversity² were raised, and an effective network of regional conservation instruments could go a long way to addressing these. However, as the following discussion shows, such a network does not exist and the law is flawed in many respects.

For the purposes of this analysis ‘effectiveness’ is defined in three ways. First and most simply is the geographic scope of the law; is every plant covered by a regional agreement?³ Second is the construction of the conservation instruments. There is extensive literature on what makes a ‘good’ environmental treaty and regional conservation instruments will be assessed against criteria drawn from this. Third, to what extent do the criticisms that have been levied against the listing of species and the designation of protected areas apply to these mechanisms as they have been conceived in the regional conservation instruments? The law will not be effective at protecting plants if the means through which this is to be achieved are flawed.

The regional conservation instruments examined in this chapter⁴ are:

- The 1940 Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere⁵

¹ P. Sands and J. Peel, *Principles of International Environmental Law* (3rd edition, Cambridge University Press, 2012), p. 479.

² Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992).

³ This chapter only addresses regional agreements that apply in temperate terrestrial areas. The protection of polar and marine flora is discussed in chapters 4 and 5 respectively.

⁴ These have been taken from the ‘Regional Wildlife Regulation’ section in M. Bowman, P. Davies and C. Redgwell, *Lyster’s International Wildlife Law* (2nd edition, Cambridge University Press, 2010). See Appendix 1 for the ratification status of these instruments.

⁵ Washington, 12 October 1940, in force 1 May 1942, 161 UNTS 193.

- The 1968 African Convention on the Conservation of Nature and Natural Resources (Algiers)⁶
- The 1976 Convention on Conservation of Nature in the South Pacific (Apia)⁷
- The 1979 Convention on the Conservation of European Wildlife and Natural Habitats (Bern)⁸
- The 1985 Association of South East Asian Nations Agreement on the Conservation of Nature and Natural Resources (ASEAN)⁹

The Geographic Scope of Regional Conservation Agreements:

The following maps illustrate the potential and actual geographic scope of the conservation agreements listed above. The potential scope is based on the membership of the international organisations in which the instruments are deposited.¹⁰ Actual coverage has been determined by the ratifications of the conservation instruments by the member States of these organisations. States that have only signed the agreements have not been included as, according to general treaty law, they are not bound by the instruments' specific obligations.¹¹ States that are too small to appear on the map are listed in Appendix 1.

⁶ Algiers, 15 September 1968, in force 9 October 1969, 1001 UNTS 3. The 1968 Convention has been selected because it is the treaty that is currently in operation in Africa. The more recent 2003 African Convention on the Conservation of Nature and Natural Resources has only received thirteen of the required fifteen ratifications for it to enter into force. The text of the revised version is available at: <http://www.au.int/en/treaties/african-convention-conservation-nature-and-natural-resources-revised-version>.

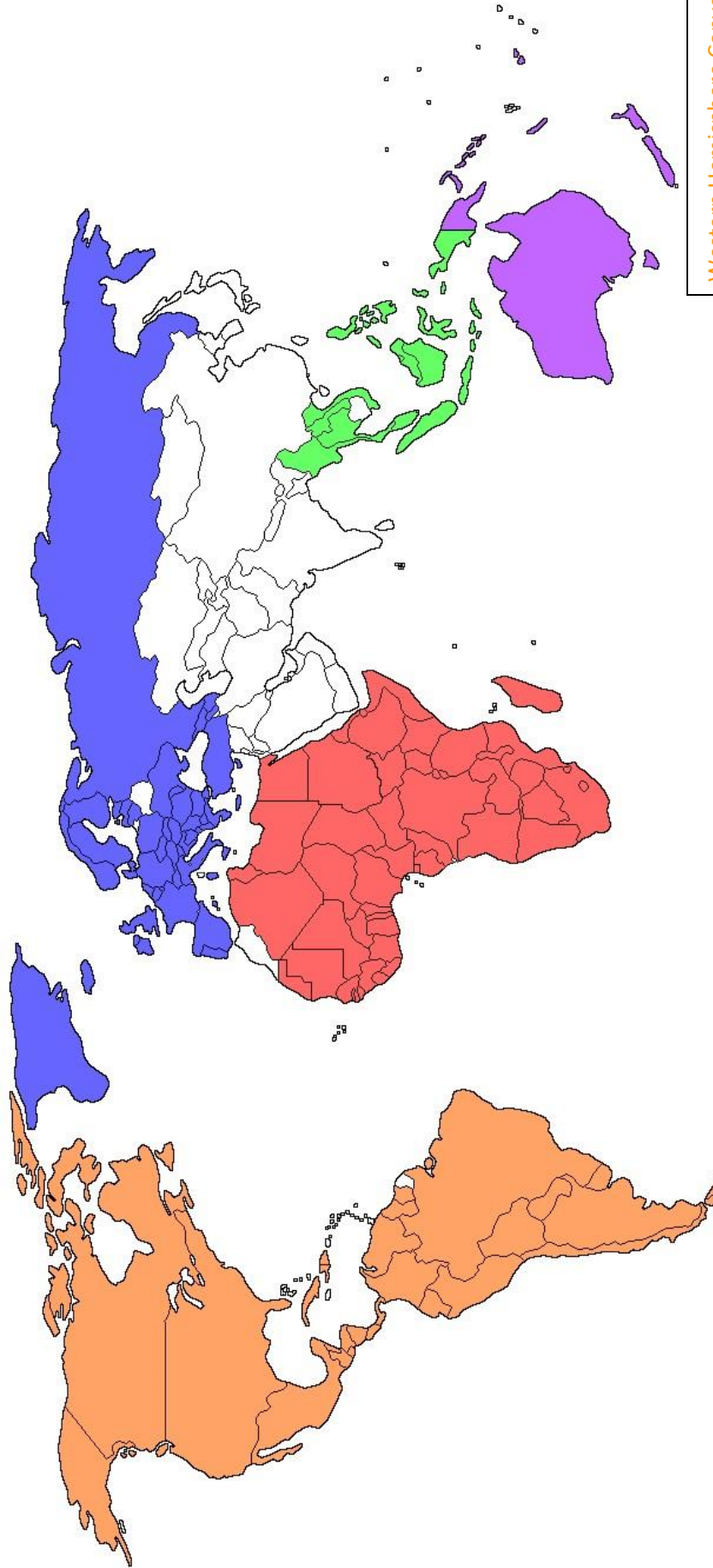
⁷ Apia, 12 June 1976, in force 28 June 1990, IELMT 976:45. Note the application of this treaty was suspended in 2006.

⁸ Bern, 19 September 1979, in force 1 June 1982, UKTS 56 (1982).

⁹ Kuala Lumpur, 9 July 1985, 15 EPL 64 (1985) (not in force).

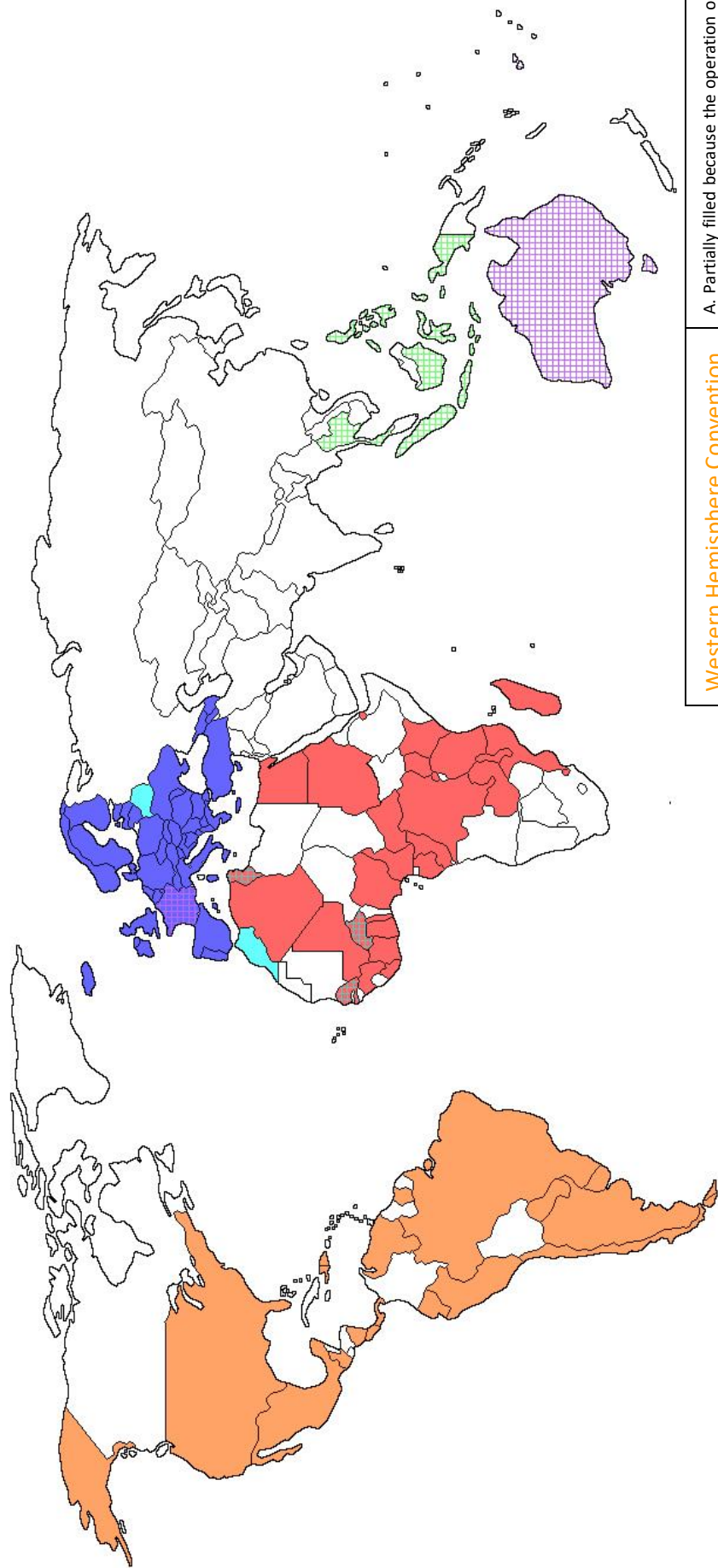
¹⁰ See Appendix 1.

¹¹ J. Crawford, *Brownlie's Principles of International Law* (8th edition, Oxford University Press, 2012), p. 372.



Western Hemisphere Convention
African Convention
Apia Convention
Bern Convention
ASEAN Agreement

MAP 1: POTENTIAL SCOPE OF REGIONAL CONSERVATION INSTRUMENTS



Western Hemisphere Convention	<p>A. Partially filled because the operation of the Convention was suspended in 2006. France has also ratified the Apia Convention.</p> <p>B. Lighter blue indicates ratifications from non-Council of Europe States. Some African States have ratified both the African and European Conventions.</p> <p>C. Partially filled because the Convention has yet to enter into force.</p>
African Convention	
Apia Convention ^A	
Bern Convention ^B	
ASEAN Agreement ^C	

MAP 2: ACTUAL SCOPE OF REGIONAL CONSERVATION INSTRUMENTS

Looking at these maps, the most obvious gaps in the regional protection of plants are the Middle-East and central Asia, in which no instruments exist. Geopolitical instability is the likely explanation for this. Both the deteriorating humanitarian and diplomatic situation in the Middle-East and the growing tensions between some of the major States in central Asia, particularly India and China,¹² mean that there is simply not the requisite political will to conclude a multilateral agreement on nature conservation.

The failure of States to ratify the 1985 ASEAN Agreement and the suspension of the 1976 Apia Convention also means that plants in these areas are not protected at a regional level. Even if Apia had remained in force, its ratification by only five States means that it would have been of limited effect. One of the reasons behind the suspension was the universal participation of the potential Parties with the Convention of Biological Diversity,¹³ but as noted in the previous chapter, that is a flawed regime and so should not be seen as a reasonable alternative to regional action.

There is a second instrument operating in the South Pacific that is relevant here: the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region.¹⁴ This is primarily concerned with reducing pollution but Article 14 also provides for the protection of flora and fauna:

The Parties shall, individually or jointly, take all appropriate measures to protect and preserve rare or fragile ecosystems and depleted, threatened or endangered flora and fauna as well as their habitat in the Convention Area. To this end, the Parties shall, as appropriate, establish protected areas, such as parks and reserves, and prohibit or regulate any activity likely to have adverse effects on the species, ecosystems or biological processes that such areas are designated to protect. The establishment of such areas shall not affect the rights of other Parties or third States under international law. In addition, the Parties shall exchange information concerning the administration and management of such areas.

This is a very general obligation and a poor substitute for a dedicated conservation instrument, but it has the notable advantage of being in a treaty that is actually in force. Twelve States have ratified the Noumea Convention.¹⁵

With forty-five out of forty-seven States ratifying it, the 1979 Bern Convention benefits from the highest number of ratifications, and the highest percentage of ratifications. Only two members

¹² T-S. Fang, *Asymmetrical Threat Perceptions in India-China Relations* (Oxford University Press, 2014).

¹³ Bowman, Davies and Redgwell, (n 4) p. 386-387.

¹⁴ Noumea, 25 November 1986, in force 22 August 1990, 26 ILM 38 (1987).

¹⁵ Australia, Cook Islands, Federated States of Micronesia, Fiji, France, Marshall Islands, Nauru, New Zealand, Papua New Guinea, Samoa, Solomon Islands and the United States.

of the Council of Europe, Russia and San Marino, have not ratified it. However, that Russia has not ratified the treaty is significant because it significantly reduces the Convention's geographic range. This, coupled with Canada's failure to ratify the Western Hemisphere Convention and the reservation that Denmark has to the European Convention precluding its application to Greenland, severely limits the regional protection given to Arctic flora.¹⁶

The agreement that applies to the largest geographic area is the Western Hemisphere Convention. However, significant areas of rainforest, the most diverse biome in the world, in Bolivia and Columbia are not protected by the Convention. Neither is the majority of flora found on the Caribbean islands, as the only island State to ratify the Convention is Trinidad and Tobago. Similar comments can be made about the 1968 Algiers Convention. Although over half of the African Union States have ratified the treaty there are noticeable areas in which it does not apply, particularly in the southern, north and eastern parts of the continent. Importantly, however, much of the African rainforest, which is primarily located in the Congo river basin, is covered by that Convention.

Taking all the above into account, the overall conclusion has to be that in terms of geographic scope there is no comprehensive system of conservation agreements operating at a regional level in international law. There are significant gaps where no instrument exists at all, and the failure of States to ratify those instruments that do exist has limited the protection they offer to plants. Given the weaknesses identified in the global regime in the previous chapter, it is unlikely that global conservation law will be able to compensate for this.

The Construction of Regional Conservation Agreements:

A number of characteristics have been identified as necessary if a multilateral environmental agreement is to be effective, i.e. achieve its stated objectives.¹⁷ The principal ones include:

1. Obligations that are expressed in mandatory language.¹⁸
2. Obligations concerning, and the facilitation of, implementation at the national level.¹⁹

¹⁶ There is however extensive international cooperation in the Arctic, which is examined in the next chapter.

¹⁷ R. Mitchell, 'Compliance Theory: Compliance, Effectiveness, Behaviour Change in International Environmental Law', in D. Bodansky, J. Brunnée and E. Hey (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2007).

¹⁸ G. Shaffer and M. Pollack, 'Hard vs. Soft Law: Alternatives, Complements, and Antagonists in International Governance' (2010) 94 *Minnesota Law Review* 706-799.

¹⁹ R. Stewart, 'Instrument Choice', C. Redgwell, 'National Implementation' and L. Boisson de Chazournes, 'Technical and Financial Assistance', all in Bodansky, Brunnée and Hey (eds), (n 17).

3. A system of supranational oversight, enforcement and dispute settlement.²⁰

In the previous chapter, it was noted that the general nature of the provisions in the Biodiversity Convention, as well as the discretion it affords to States in deciding what action is to be taken, renders it virtually unenforceable. Similar weaknesses undermine the effectiveness of the regional conservation agreements, as the provisions set out below illustrate. As a result, the instruments being discussed here are examples of the 'legal soft law' described by Chinkin.²¹ That the inclusion of 'soft' provisions is sometimes the only way that consensus can be reached by the negotiating States²² does not detract from the criticism of the unenforceability of the instrument. When evaluating the law a distinction must be drawn between compromises made to facilitate the negotiation process and the merits of the final agreement. Whilst the argument that an agreement, however flawed, is better than no agreement is valid, it has also been suggested that the weaknesses of the Biodiversity Convention has meant that it has done more harm than good to global conservation efforts.²³ Indeed, that the States' participation with the Biodiversity Convention was cited as a reason for suspending the operation of the Apia Convention suggests that more action would have been taken at the regional level had this global regime not existed.

Related to the issue of the mandatory, or otherwise, nature of obligations contained in any conservation agreement is the position that it is afforded in the hierarchy of international regimes. One of the fundamental weaknesses of the Biodiversity Convention is that it does not, in most circumstances, affect the rights afforded to States by other regimes.²⁴ Similar provisions exist in both the ASEAN Agreement²⁵ and the Western Hemisphere Convention,²⁶ and so the same observations can be made. These provisions legitimise inaction by subordinating conservation concerns to other interests, notably trade and economic ones. This is also further evidence of States' desire to prevent the global conservation agenda from undermining their sovereign right to exploit natural resources.

²⁰ T. Treves et al (eds), *Non-Compliance Procedures and Mechanisms and the Effectiveness of International Environmental Agreements* (Asser Press, 2009); M. Fitzmaurice and C. Redgwell, 'Environmental Non-Compliance Procedures and International Law' (2000) 31 *Netherlands Yearbook of International Law* 35-65.

²¹ C. Chinkin, 'The Challenge of Soft Law: Development and Change in International Law' (1989) 38 *International & Comparative Law Quarterly* 850-855.

²² P. Dupuy, 'Soft Law and the International Law of the Environment' (1991) 12 *Michigan Journal of International Law* 420-435.

²³ R. Adam, 'Missing the 2010 Biodiversity Target: A Wake-up Call for the Convention on Biodiversity?' (2010) 21 *Colorado Journal of International Environmental Law and Policy* 123-166.

²⁴ Article 22.

²⁵ Article 29.

²⁶ Article X(1).

There are two issues relevant to the implementation of international conservation law. First, there must be sufficient resources available to the States, particularly developing States and States with significant areas of biodiversity. Creating a protected area may involve the purchasing of land rights, work to restore degraded habitats, reintroducing previously common species and removing alien species, employing scientists to monitor the site, management and administrative staff, patrols and armed guards, and a public awareness campaign. It might also be necessary to provide training and other capacity-building components to local residents. There are significant resources available to developing States in fulfilling their obligations under the Biodiversity Convention,²⁷ but none of the regional conservation agreements explicitly provide for the establishment of a specific fund to aid with their implementation. This is not a major issue, however, due to the near-universal participation of States in the Biodiversity Convention regime,²⁸ although concerns have been raised over whether the Global Environment Facility, the financial mechanism that supports States in the implementation of a number of environmental treaties, has sufficient resources to meet growing environmental challenges.²⁹

Secondly, there must be obligations to implement the international instrument in national law. These can take many forms³⁰ and for current purposes the most important are obligations regarding national policies and strategies, requirements to designate competent national authorities to oversee work done in pursuit of a treaty's objectives, commitments to international minimum standards and duties to cooperate in certain activities.

Obligations relating to national policies and strategies are commonly made in relation to land-use and development planning. Article 4 of the Bern Convention states:

The Contracting Parties in their planning and development policies shall have regard to the conservation requirements of the areas protected under [Article 4(1)], so as to avoid or minimise as far as possible any deterioration of such areas.

Similar provisions are found in Articles IV and V of the 1968 Algiers Convention, and Article 2 of the ASEAN Agreement. The designation of a national authority is required by Article XV of the Algiers Convention and Article 23 of the ASEAN Agreement. No such requirement exists in the Apia or the Bern Conventions, but both require States to compile lists of either endangered or protected species.³¹ Likewise, States party to the Western Hemisphere Convention submit their

²⁷ Boisson de Chazournes, (n 19).

²⁸ <https://www.cbd.int/information/parties.shtml> (last accessed 01/04/2017).

²⁹ A.S. Miller, 'The Global Environment Facility and the Search for Financial Strategies to Foster Sustainable Development' (2000) 24 *Vermont Law Review* 1229-1244. For further discussion of funding in international environmental law see chapter 9.

³⁰ Redgwell, (n 19) p. 939-940.

³¹ See Articles V(2) and 11(3) respectively.

own lists of protected species for inclusion in the treaty's Annex.³² This has a similar effect as requiring the designation of a competent national authority as it ensures that some action is taken, or at least considered, following ratification.

International minimum standards are found in the definitions of protected areas.³³ This is useful to the extent that it provides a template for States when establishing a protected area, although, as the discussion below illustrates, there are issues in the way in which protected areas have been implemented by States.

The most significant way in which the regional conservation treaties mandate national implementation is by requiring cooperation in scientific and conservation activities. The most comprehensive provision in this regard is contained in Article 18 of the ASEAN Agreement:

(1) The Contracting Parties shall cooperate together and with the competent international organizations with a view to coordinating their activities in the field of conservation of nature and management of natural resources and assisting each other in fulfilling their obligations under this Agreement.

(2) To that effect, they shall endeavour

- (a) to collaborate in monitoring activities;
- (b) to the greatest extent possible, coordinate their research activities;
- (c) to use comparable or standardized research techniques and procedures with a view to obtaining comparable data;
- (d) to exchange appropriate scientific and technical data, information and experience, on a regular basis;
- (e) whenever appropriate, to consult and assist each other with regard to measures for the implementation of this Agreement.³⁴

This cooperation in scientific research and monitoring is crucial in enhancing the effectiveness of the regional conservation regimes at protecting plants. 'Faced with broad consensus among competent experts on the description and diagnosis of a (severe) environmental problem, governments more often do, in fact, take some kind of collective action'.³⁵ Whilst this has resulted in notable results in other environmental regimes, including ozone protection and the regulation of transboundary air pollution,³⁶ the same cannot be said of the regional conservation agreements, as the discussions on designation and listing below illustrate.

³² Article VIII.

³³ Article I of the Western Hemisphere Convention, Article III of the 1968 Algiers Convention and Article I of the Apia Convention.

³⁴ See also Articles VI of the Western Hemisphere Convention, XVI of the 1968 Algiers Convention, VII of the Apia Convention and 11 of the Bern Convention.

³⁵ S. Andresen and J. Skjærseth, 'Science and Technology: From Agenda Setting to Implementation', in Bodansky, Brunnée and Hey (eds), (n 17) p. 190.

³⁶ *ibid*, p. 191.

Even if the regional conservation agreements had mandatory obligations, they would remain ineffective without a robust system for non-compliance and enforcement. Enforcement is also a crucial stage of implementation; it can either give the stamp of approval to the way a State has chosen to implement a treaty, or highlight where implementation has been insufficient or incorrect.³⁷ Sands identifies three factors that must inform any discussion of compliance with environmental treaties: the growing demands of States for an ever-diminishing supply of natural resources; that international environmental obligations affect national economic interests and to renege on the former is to gain a competitive advantage in the latter; and the changing nature of environmental obligations as States take on greater treaty commitments.³⁸ The issue of compliance is significant because ‘non-compliance by States... limits the overall effectiveness of environmental treaties, undermines the international legal process and contributes to conflict and instability in the international system’.³⁹

Institutional frameworks to provide oversight of compliance with the regional conservation treaties are conspicuous by their absence. There are no institutions created by the Western Hemisphere Convention, and the South Pacific Commission referred to in the Apia Convention is little more than an information provider.⁴⁰ The creation of an Organisation of National Conservation Services is permitted by Article XV of the 1968 Algiers Convention, but only if the Contracting States do not designate a national authority to oversee the implementation of the Convention. No such organisation has been established. Article 22 of the ASEAN Agreement outlines various functions to be performed by its Secretariat, including the convening of meetings and the communication of information, but not enforcement action. A similar set of functions is given to the Secretariat of the Bern Convention in Article 14. However, it is only responsible for ‘following the application’ of the Convention, not enforcing it, and it may only make recommendations to the Parties for measures to be taken to achieve the Convention’s objectives. The limited enforcement role given to international institutions has been attributed to the sovereign interests of States, which underlines ‘the fundamental tension between the juridical reality of States’ territorial sovereignty over their natural resources and the physical reality of ecological interdependence’.⁴¹

³⁷ J. Wettestad, ‘Monitoring and Verification’, in Bodansky, Brunnée and Hey (eds), (n 17).

³⁸ P. Sands, ‘Compliance with International Environmental Obligations: Existing International Legal Arrangements’, in J. Cameron, J. Werksman and P. Roderick (eds), *Improving Compliance with International Environmental Law* (Law and Sustainable Development Series, Earthscan, 1996), p. 51.

³⁹ *ibid*, p. 52.

⁴⁰ Article VIII.

⁴¹ Sands, (n 38) p. 55.

The question of enforcement by one State against another is more complex. Often the extent of a State's right to take such action will be outlined in the text of the instrument in question but, and in contrast to regimes such as international human rights law, environmental treaties are rarely explicit on this.⁴² This is certainly true for regional conservation agreements, none of which contain clear provisions detailing when one State may take enforcement against another. Dispute settlement provisions are contained in Article XVIII of the 1968 Algiers Convention, 18 of the Bern Convention and 30 of the ASEAN Agreement but these are largely limited to consultation and negotiation. Both the Western Hemisphere Convention and the Apia Convention are silent on dispute settlement. Only the Algiers Convention and the Bern Convention allow for the creation of ad hoc arbitration tribunals in the event of a dispute. Sands argues, however, that a failure by a State to meet its treaty obligations will be grounds enough for another State to act, particular where the treaty addresses 'issues of concern to all mankind'.⁴³ Biodiversity protection arguably comes into this category, the preamble to the Convention on Biological Diversity saying as much. However, this comes into conflict with the principle of permanent sovereignty over natural resources, which has been recognised having customary status.⁴⁴ Schrijver argues that permanent sovereignty has evolved to contain an element of sustainable use,⁴⁵ but this is such a vague concept that it is unlikely to be regarded as solid grounds for unilateral enforcement action by one State against another. On the other hand, support for this proposition can be found in Judge Cançado Trindade's Separate Opinion to the recent International Court of Justice *Antarctic Whaling Case*, in which he highlights a trend in international environmental law that increasingly recognises the importance of conservation and sustainable use not only for current generations, but future generations as well.⁴⁶

To summarise, the regional conservation instruments discussed here fail to meet any of the criteria that have been identified as necessary for a regime to be effective. Very few of the obligations are expressed in mandatory terms, and States are afforded significant discretion in their interpretation and application. This issue is compounded by the implementation requirements being limited to the designation of a national authority to be responsible for the broad conservation remit of the instruments. Even if the agreements had mandatory obligations

⁴² *ibid*, p. 54.

⁴³ *ibid*, p. 54.

⁴⁴ *Texaco v Libyan Arab Republic*, (1978) 17 ILM 3, para. 59.

⁴⁵ N. Schrijver, *Sovereignty Over Natural Resources: Balancing Rights and Duties* (Cambridge University Press, 1997), chapter 4.

⁴⁶ *Whaling in the Antarctic (Australia v Japan: New Zealand Intervening)* (2014) ICJ Reports 226, Separate Opinion of Judge Cançado Trindade, para. 41-47.

the regimes as currently composed are toothless, lacking any explicit enforcement powers for either the relevant international institutions, where they exist, or the States themselves.

The Relationship between Regional Conservation Agreements and Conservation Practice – Designating Protected Areas:

The designation of protected areas in which nature is, theoretically at least, under less pressure has been the cornerstone of conservation since its modern-day conception in the nineteenth century.⁴⁷ The first protected areas were game reserves in Africa, imposed to facilitate the colonial pastime of hunting following concerns that prized trophies were becoming harder to find.⁴⁸ From the outset these were not without problems. '[I]n many areas they were no more than a palliative to the problem of loss of wildlife. They worked, but only while development pressures were slight: push them and their boundaries moved'.⁴⁹

Protected areas remain central to conservation efforts, and are found in all the regional conservation agreements. The 1940 Western Hemisphere Convention identifies different types of protected area, in which varying degrees of human interference and activity are permitted. A similar system of protected areas is found in the 1968 Algiers Convention. In strict nature reserves any activity involving the direct or indirect exploitation of nature is prohibited and access, including by air, is controlled.⁵⁰ The Apia Convention distinguishes between national parks, which are open to the public, and national reserves, which afford 'various degrees of protection to the natural and cultural heritage according to the purposes for which they were established'.⁵¹ Article 3(3) of the ASEAN Agreement merely says that States will 'endeavour' to create protected areas to protect endangered and endemic species. These rather open provisions do not represent the same international minimum standard as that found in the other instruments. The Bern Convention does not even expressly require the establishment of protected areas, except for habitats important to migratory species.⁵² Article 4(1) only requires 'appropriate and necessary legislative and administrative measures to ensure the conservation of the habitats of the wild flora and fauna species... and the endangered natural habitats'. This obligation could be met by simply incorporating a requirement to consider the conservation

⁴⁷ W. Adams, *Against Extinction: The Story of Conservation* (Earthscan, 2004), p. 76-82.

⁴⁸ *ibid*, p. 22-25.

⁴⁹ *ibid*, p. 76.

⁵⁰ Article III(d)(1). This provision is replaced by Annex II in the 2003 African Convention.

⁵¹ Article I(c).

⁵² Article 4(3).

value of an area in land-use and planning procedures. Protected areas are mentioned in Article 4(2), but this does not impose any obligation as to their creation and would have no effect if States opted not to use protected areas when implementing the Article.

For plants, the size and number of protected areas is, to an extent, irrelevant.⁵³ Instead what is more important is the ecological representativeness of the areas. It is here where there are the strongest grounds for challenging the effectiveness of the protected areas envisaged by the treaties at conserving plants. The international community is on course to meet its target of protecting 17% of land and inland waterways by 2020.⁵⁴ However, it is estimated that no more than 23% of the areas identified as important for biodiversity are protected,⁵⁵ again highlighting the arbitrary nature of the 17% target as it can be achieved without delivering any real benefit for biodiversity. Case studies from around the world illustrate this. In eastern Africa significant proportions of a range of natural vegetation types were found to be at risk from increasing human pressures.⁵⁶ Similarly, in the United States a study found that the coverage of protected areas is almost the opposite of what is actually needed, with most protected areas being in the west but the species in need of that protection, including the majority of tree species, being in the south-east.⁵⁷ Even where designated areas do cover important areas for biodiversity it is possible to question their effectiveness at protecting that biodiversity. In Indonesia, for example, it was found that protected areas were unable to reduce rates of deforestation. Increased monitoring and non-designation techniques, such as the granting of logging concessions, have been recommended as ways of trying to address this problem.⁵⁸

There are also problems with designation as a concept. It is possible that the dogmatic reliance on designation as the primary means of conservation is one of the reasons why the Biodiversity Convention has struggled to create a coherent and effective regime, as it implies that conservation is a distinct land use, comparable to the siting of a waste treatment plant. This in turn creates the impression that designation equates to conservation requirements being met, 'making it harder to achieve integrated policies that cut across economic sectors and make a

⁵³ In comparison, for animals the size of protected areas is an important factor, particularly for migratory species and animals that require large territories in which to hunt.

⁵⁴ Secretariat to the Convention on Biological Diversity, 'Global Biodiversity Outlook 4' (Montreal, 2014), p. 82-85.

⁵⁵ D. Juffe-Bignoli et al, 'Protected Planet Report 2014: Tracking progress towards global targets for protected areas' (UNEP-WCMC, 2014), p. iii.

⁵⁶ P. van Breugel et al, 'Environmental Gap Analysis to Prioritize Conservation Efforts in Eastern Africa' (2015) 10 *Plos One* e0121444.

⁵⁷ C. Jenkins et al, 'US protected lands mismatch biodiversity priorities' (2015) 112 *Proceedings of the National Academy of Sciences of the United States of America* 5081-5086.

⁵⁸ C. Brun et al, 'Analysis of deforestation and protected area effectiveness in Indonesia: A comparison of Bayesian spatial models' (2015) 31 *Global Environmental Change* 285-295.

difference to... policies'.⁵⁹ Going further, designation may actually lead to environmental degradation, as the protection of one area may be seen as legitimising the excessive exploitation of another.⁶⁰

An additional basis for criticising the designation of protected areas is 'island theory'. In short, island theory argues that isolated patches of habitat – equated to islands – are less able to support a sufficiently diverse range of wildlife to enable the ecosystem to flourish.⁶¹ There are two elements to this. First is the often arbitrary process of determining what area should be protected, as these can be the result of financial and social considerations rather than ecological criteria.⁶² Second, the designation of 'islands' of habitat means that individual members of species are isolated, leading to a degeneration in genetic diversity and ultimately extinction, first at a local level but then globally.⁶³ The European Union's Natura 2000 network of protected areas is intended to overcome these issues, but this was by no means a novel feature of the Habitats Directive.⁶⁴ A similar idea was mooted in relation to game reserves in Africa in the early twentieth century.⁶⁵ However, despite its ecological advantages, no such approach can be seen in any of the regional conservation agreements. Furthermore, given the difficulties the European Union has had in creating a comprehensive ecological network⁶⁶ it is debatable whether such requirements would be effectively implemented even if they did exist.

Evidence on the ecological representativeness of the global network of protected areas varies. In terms of individual sites, there appears to be greater diversity inside protected sites compared to the surrounding area, although numbers of endemic species are largely equivalent.⁶⁷ Overall, however, the ecological representativeness of protected sites has been questioned. The 2014 Protected Planet Report concludes:

Recent studies show that the additional areas required to achieve a fully representative global protected area network is substantial, especially in light of competing land (and

⁵⁹ W. Adams, *Future Nature: a vision for conservation* (revised edition, Earthscan, 2003), p. 116.

⁶⁰ *ibid.*

⁶¹ R.H. MacArthur and E.O. Wilson, *The Theory of Island Biogeography* (Princeton University Press, 1967).

⁶² Adams, *Future Nature*, (n 59) p. 116.

⁶³ *ibid.*, p. 118-119.

⁶⁴ Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora OJ L 206, 22.7.1992, p. 7-50.

⁶⁵ Adams, (n 47) p. 5-6.

⁶⁶ N. de Sadeleer, 'EC Law and Biodiversity', in R. Macrory (ed), *Reflections on 30 Years of EU Environmental Law: A High Level of Protection?* (Europa Law Publishing, 2005), p. 363-364.

⁶⁷ C.L. Gray et al, 'Local biodiversity is higher inside than outside terrestrial protected areas worldwide' (2016) 7 *Nature Communications* DOI: 10.1038/ncomms12306.

sea) uses. It may not be possible to include all known gaps in protected areas, and therefore alternative approaches for conservation are also needed.⁶⁸

There are several alternatives that could be pursued, although these still have an element of designation at their core. The report gives a number of suggestions, one of the more interesting being the inclusion of areas managed by indigenous communities.⁶⁹ However for this to work there must be an effective regime in place that protects both substantive indigenous rights to land, and their procedural rights to engage in decision-making procedures. The extent to which this exists is questionable.⁷⁰

With regards to the specific needs of plants, it is possible to question the appropriateness of those instruments that apply the same provisions to both fauna and flora. We see this in Article V of the Western Hemisphere Convention, Article V of the Apia Convention and Articles 3, 4 and 5 of the ASEAN Agreement. Article 6 of the ASEAN Agreement, however, is dedicated to forests and vegetation cover. The Bern Convention has separate provisions for the protection of species of fauna⁷¹ and flora,⁷² but habitat protection for both is covered in Article 4. A similar approach can be seen in the 1968 Algiers Convention, with Article VI specifically addressing flora but more general provisions on species and habitat protection found in Articles VIII and X respectively. The provisions listed here do not require that the same measures be adopted for fauna and flora; instead States are called on to adopt measures appropriate for each. However, not separating them implies a degree of ignorance over the ecological functions of the two. This also risks institutionalising the belief that both can be effectively protected using the same design and form of protected areas. Cultural theories of environmental assessment suggest that by requiring those involved in decision-making procedures to systematically consider the environmental impacts of proposed projects and activities, this consideration gradually becomes second-nature and the procedures themselves become more environmentally-focussed as a result.⁷³ A cultural theory of conservation would suggest that by coupling fauna and flora together in the same provisions these regional agreements are encouraging 'one size fits all' conservation efforts. However, plants and animals occupy fundamentally different ecological niches, and therefore have very different requirements. As the designation of

⁶⁸ Juffe-Bignoli et al, (n 55) p. 40.

⁶⁹ *ibid*, p. 48.

⁷⁰ B.J. Richardson and D. Craig, 'Indigenous Peoples, Law and the Environment', in B.J. Richardson and S. Wood (eds), *Environmental Law for Sustainability* (Hart Publishing, 2006).

⁷¹ Articles 6 and 7.

⁷² Article 5.

⁷³ R. Bartlett, 'Ecological Reason in Administration: Environmental Impact Assessment and Green Politics', in R. Paehlke and D. Torgerson (eds), *Managing Leviathan: Environmental Politics and the Administrative State*, (2nd edition, Broadview Press, 2005).

protected areas has become the principal means of conservation, the obvious issue to examine is space: a plant does not need the same amount of space as an elephant. Much smaller areas can be set aside, which will be easier to monitor and less restrictive on other development priorities. Attention would of course have to be paid to the ecological connections between the protected site and the wider area, for example if it relies on a river for its water, but there are examples in the law of how this could be achieved.⁷⁴

The increased use of micro-reserves finds support in a study investigating the protected area coverage of arid zones of the Iberian Peninsula. It found that virtually all the areas of botanical interest were unprotected, and advocated the creation of a series of micro-reserves to remedy this.⁷⁵ Not only would this network protect a larger number of species as it would cover lots of small areas with high biodiversity rather than one large area with relatively poor biodiversity, but it would also promote awareness of this otherwise neglected habitat.⁷⁶

The Relationship between Regional Conservation Agreements and Conservation Practice – Listing Species:

Alongside the designation of protected areas, the designation of protected species through the compilation of lists is a principal mechanism for the conservation of nature.⁷⁷ These lists may consist of species that warrant special protection either because they are at risk of extinction,⁷⁸ or could potentially be at risk of extinction if some form of protection is not put in place.⁷⁹ One of their strengths is that they focus attention on particular species.⁸⁰ Ideally this will be because they are at risk, but in other cases they might be of particular cultural significance. Listing proved particularly useful for conservation organisations lacking the financial resources and capacity to promote across-the-board conservation: ‘The most effective, and emotive, subjects for public conservation campaigns were individual species of animals’.⁸¹ However, focussing on flagship

⁷⁴ For example, see Article 3 of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment OJ L 26, 28.1.2012, p. 1-21, Article 3.

⁷⁵ These micro-reserves would, however, need to be sufficiently large to minimise ‘edge effects’ and close enough together to enable genetic exchange – P.S. Ashton, ‘Conservation of Biological Diversity in Botanical Gardens’, in E.O. Wilson (ed), *Biodiversity* (National Academy Press, 1988), p. 269.

⁷⁶ A. Mendoza-Fernández et al, ‘Threatened plants of arid ecosystems in the Mediterranean Basin: a case study of the south-eastern Iberian Peninsula’ (2014) 48 *Oryx* 548-545.

⁷⁷ Adams, (n 47) p. 129-132.

⁷⁸ For example, the IUCN Red List: <http://www.iucnredlist.org>.

⁷⁹ Appendix II of CITES includes species that are not currently at risk of extinction, but may become extinct unless international trade in those species is controlled – see Article II(2)(a).

⁸⁰ N. Collar, ‘The reasons for Red Data Books’ (1996) 30 *Oryx* 121-130.

⁸¹ Adams, (n 47) p. 131.

species is not without cost, and studies have found that the successful promotion of one species has resulted in a lack of support for others.⁸²

The only official list of endangered species that is globally accepted is the International Union for the Conservation of Nature's Red List (the IUCN Red List). This classifies species according to their conservation status, ranging from 'extinct' to 'least concern'.⁸³ Early versions of the Red List were beset with problems. In particular, the lack of any objective criteria meant that assessments were undermined by subjective and political considerations.⁸⁴ These were addressed through extensive consultations and the IUCN Red List is now recognised as 'one of the most effective sources of information for conservation planners'.⁸⁵ There is evidence to suggest that use of the IUCN Red List is increasing, although the added practical value of it being referred to in a greater number of journal articles is questionable.⁸⁶

In 2004, the World Conservation Congress passed a resolution calling on States to make greater use of the Red List and its criteria in national conservation planning, but it is clear that this has not been widely followed.⁸⁷ For the regional conservation agreements examined here, including the 2003 Algiers Convention, this resolution came too late. None of them refer to the Red List and instead there is a haphazard and inconsistent approach to listing. The Annex to the Western Hemisphere Convention is not a single list of endangered species, but separate lists submitted by the Contracting Parties. They vary considerably and the result has been described as 'particularly confusing'.⁸⁸ There are no formal criteria for inclusion and as such the Annex constitutes a collection of unilateral statements of intent rather than a coherent conservation strategy. Article V(2) of the Apia Convention requires States to compile national lists of endangered species, but this is now meaningless following the suspension of the Convention. The 1968 Algiers Convention has an Annex containing a list of protected species, but its representativeness is highly doubtful.⁸⁹ The Annex only includes three plant species⁹⁰ but there

⁸² L. Douglas and G. Winkel, 'The flipside of the flagship' (2014) 23 *Biodiversity and Conservation* 979-997.

⁸³ IUCN Red List Categories and Criteria (Version 3.1: Second edition) – available at: <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria#definitions> (last accessed 01/04/2017).

⁸⁴ A. Rodrigues et al, 'The value of the IUCN Red List for conservation' (2006) 21 *Trends in Ecology and Evolution* 71-76.

⁸⁵ J. Lamoreux et al, 'Value of the IUCN Red List' (2003) 18 *Trends in Ecology & Evolution* 214-215.

⁸⁶ Rodrigues et al, (n 84).

⁸⁷ For example, see the critique of Brazil's listing process in M. Moraes et al 'Categorizing threatened species: an analysis of the Red List of the flora of Brazil' (2014) 48 *Oryx* 258-265.

⁸⁸ Bowman, Davies and Redgwell, (n 4) p. 250.

⁸⁹ Article X(2) of the 2003 African Convention provides for the creation of appendices listing species warranting protection.

⁹⁰ *Welwitschia bainesii*, *Encephalartos laurentianus* and *E. septentrionalis*.

are over 4,700 African species on the IUCN Red List, just over 2,500 of which are classified as vulnerable or above.⁹¹ The Appendices of the 1985 ASEAN Agreement are just as poor, with only one genus⁹² out of over 3,100 IUCN-listed species. Over 1,400 of these are at least vulnerable.⁹³ Whether the compilation of more accurate lists would result in better protection for plants in these areas is debatable however. An in-depth study of Appendix I of the Bern Convention, which lists the species of flora that warrant special protection according to Article 5 of the Convention, suggests listing has only a limited impact in terms of conservation success. This can be seen in the conservation status and population trends of European flora, as well as a correlation of the two.

First, conservation status (charts 1 and 2).⁹⁴ One of the Red List's strengths is that it focusses attention on the key species that require urgent conservation action,⁹⁵ and this is reflected in the Bern Convention in two ways. First, the majority of species on the Red List that have not been included in the Appendix are classified as 'least concern' or 'lower risk / least concern'. The Convention has excluded many species which do not appear to require any dedicated conservation efforts. Second, nearly two-thirds of the species listed in Appendix I are classified as 'vulnerable' or worse by the IUCN. This should not be seen as a positive aspect of the Convention, but rather as a testament to the failure of the States party to it. The Convention has been in force for over thirty years but many of the plants it set out to protect remain at risk of extinction.

Nearly 40% of species in the Appendix have not been assessed by the IUCN, and so it is unclear how at risk of extinction they are.⁹⁶ This might be evidence of a very precautionary approach being taken but a comparison of the correlations between the population trends and conservation statuses of species included and excluded from the Appendix, discussed below, suggests otherwise.

⁹¹ <http://www.iucnredlist.org>, using the following criteria in the advanced search option: plantae; North Africa (excluding Morocco, which is not a member of the African Union); EX, EW, CR, EN and VU.

⁹² *Rafflesia*.

⁹³ <http://www.iucnredlist.org>, using the following criteria in the advanced search option: plantae; south and south-east Asia (refined to only include ASEAN Member States); EX, EW, CR, EN and VU.

⁹⁴ See Appendix 2 for the corresponding data tables of the charts in this chapter.

⁹⁵ Rodrigues et al, (n 84).

⁹⁶ For comparison purposes these are not included in chart 1 – see the data table in Appendix 2.

Chart 1: IUCN classification of species that have not been included in Appendix I (%)

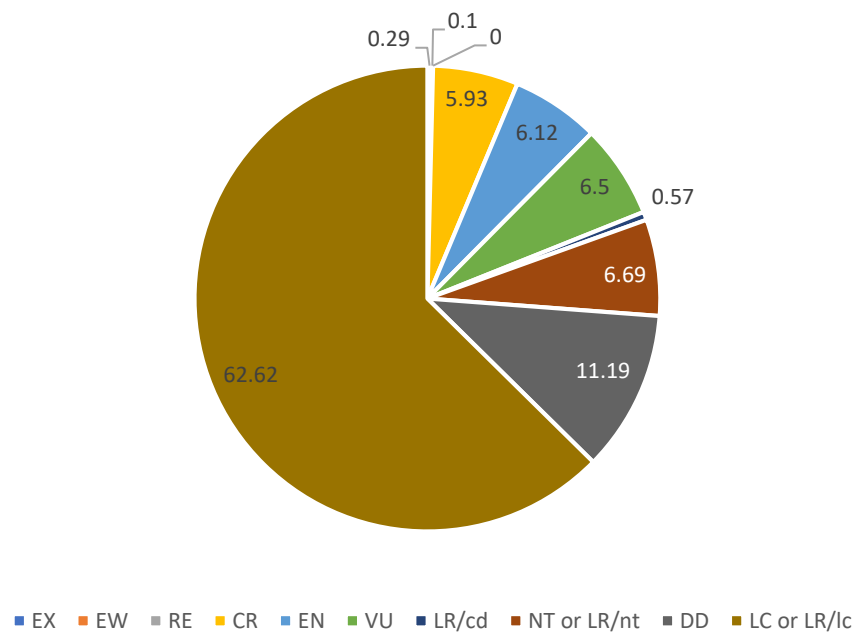
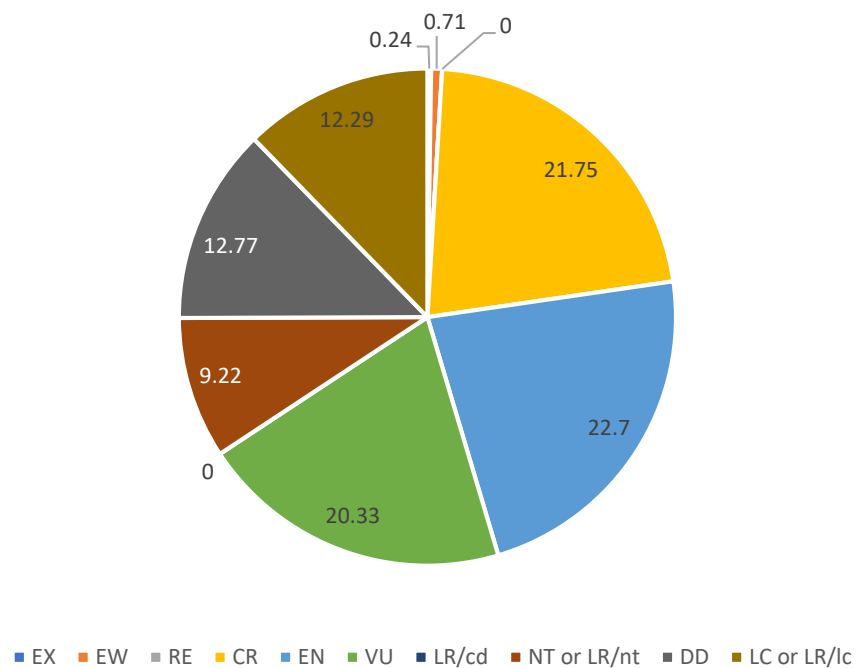


Chart 2: IUCN classification of species listed in the Appendix (%)



Turning to population trends (charts 3 and 4), it appears that being included in Appendix I has little positive impact. Less than 5% of species in Appendix I are increasing, and less than 25% are stable. In comparison, nearly 40% of species' populations are decreasing, more than double that of the species that are not included in the Appendix. On the one hand this suggests that the

Appendix is targeting the right species, but on the other it demonstrates a lack of conservation success. Equally, the population trend of a similar proportion of species included and excluded from the Appendix is unknown, which suggests that being included in the Appendix is unlikely to result in any greater efforts to learn more of the status of a species. Should this comparison be repeated in ten years' time the significant proportion of species that are declining suggests that charts 1 and 2 above would look very different, with many more species classified as 'endangered', 'critically endangered' or 'extinct'.

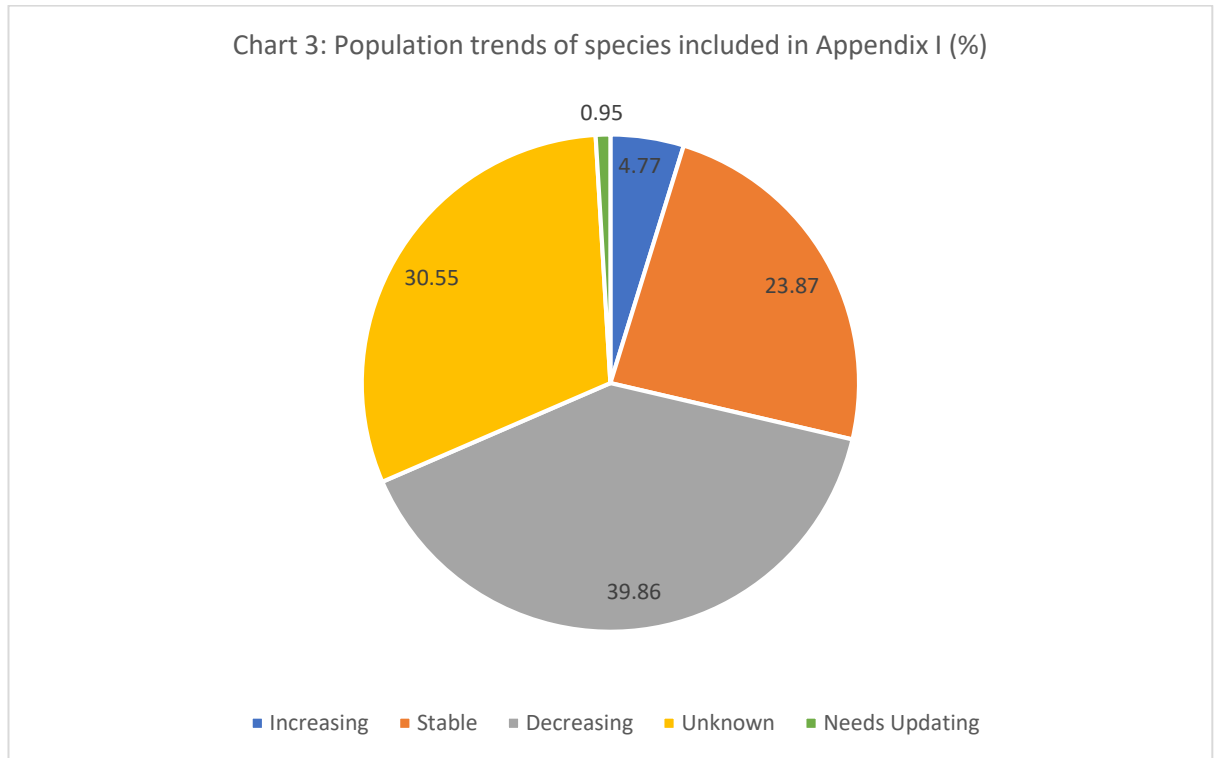
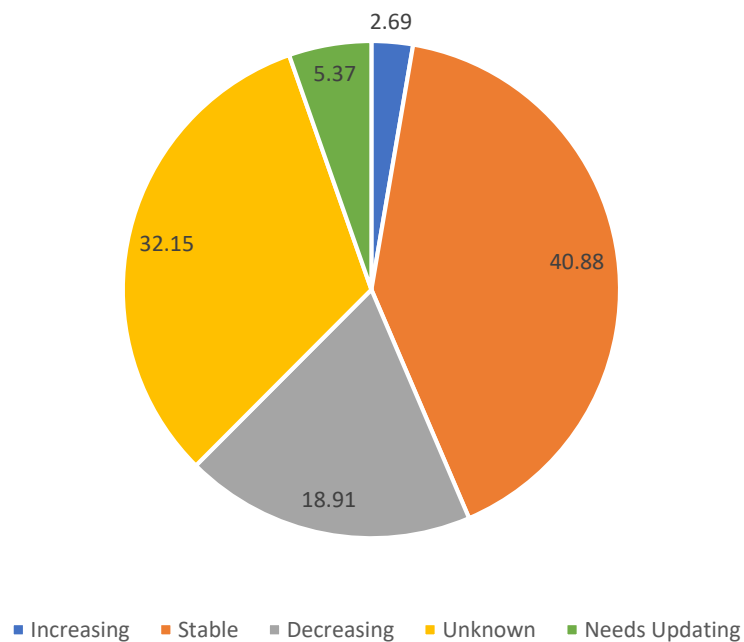


Chart 4: Population trends of species that are not included in Appendix I (%)



Finally, comparing the conservation status with the population trend of species gives a clear indication of the failure of the Bern Convention to effectively conserve Europe's flora. Similar observations as those above can be made in relation to species with increasing and stable populations (charts 5a and 6a, 5b and 6b). The Bern Convention has excluded a large number of species not believed to be at risk, but little progress has been made in improving the conservation status of the species that are listed in the Appendix. For those species with an increasing population this is not a major concern, although there is little room for complacency as over 70% of species in this category are classified as vulnerable or worse. There is greater need for action for the species with a stable population, particularly the 18% classified as 'critically endangered', to ensure they do not begin to decline.

Chart 5a: Conservation status of species with an increasing population included in Appendix I (%)

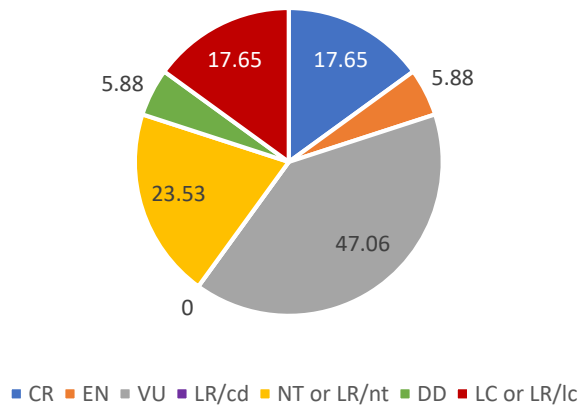


Chart 6a: Conservation status of species with an increasing population not included in Appendix I (%)

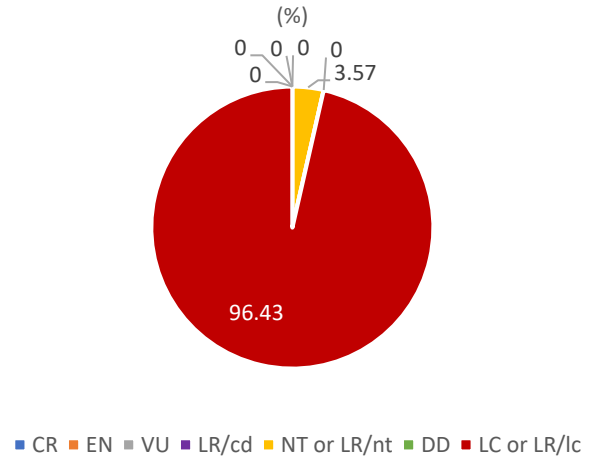


Chart 5b: Conservation status of species with a stable population included in Appendix I (%)

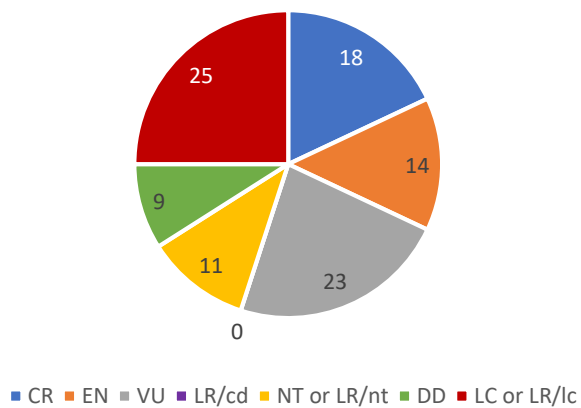
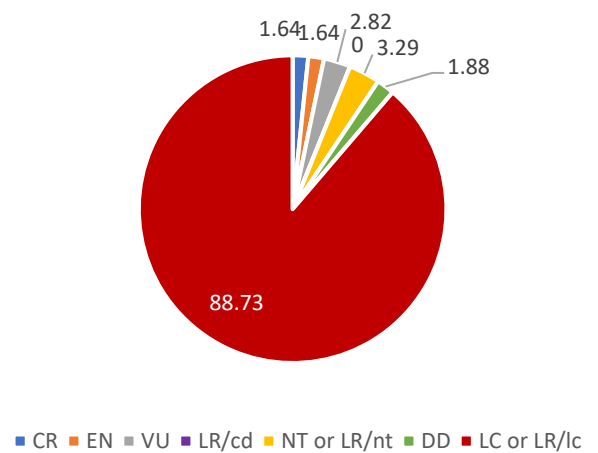
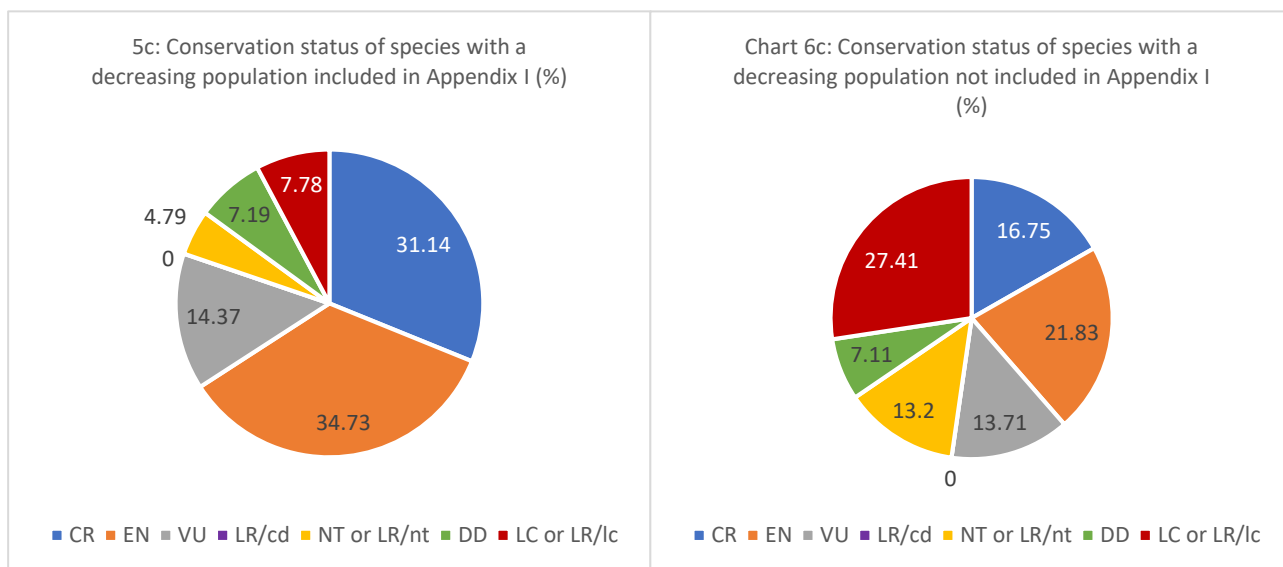


Chart 6b: Conservation status of species with a stable population not included in Appendix I (%)



The conservation status of species with a decreasing population is the clearest illustration of the failure of the Bern Convention (charts 5c and 6c). Nearly three-quarters of the species evaluated by the Red List that are not included in Appendix I are classified as either 'data deficient', or 'near threatened' and worse. Whilst an argument can be made that it is unnecessary to include species that are only 'near threatened' in the Appendix when they have a stable or an increasing population, one cannot be made for species that are declining. That they are declining may suggest that they will soon be at risk of extinction. Whether including these species in the

Appendix would bring any benefit is doubtful however, as over 80% with a declining population listed in the Appendix are classified as vulnerable or worse.



Around half of species with an unknown population trend not included in the Appendix are classified above 'least concern', indicating that many species which are considered to be at risk, but with uncertainty over whether that risk is increasing or decreasing, are not covered by the Convention (charts 5d and 6d). For species with a population trend that needs updating this figure rises to over 73% (charts 5e and 6e). Urgent action, therefore, is needed to clarify and update the conservation status of these species. The capacity for the Bern Convention to achieve this, however, is limited. The only provision addressing scientific research is Article 11(1)(b), under the Supplementary Provisions Chapter of the Convention:

(1) In carrying out the provisions of this Convention, the Contracting Parties undertake:

...

(b) to encourage and co-ordinate research related to the purposes of this Convention.

This is unlikely to fill any gaps in our understanding of the conservation status of endangered flora, as it does not even require States themselves to undertake research, only that they 'encourage' it. However, an argument can be made that scientific evaluation of the conservation status of species falls under the obligation to take the 'appropriate and necessary legislative and administrative measures' required by Article 5. Positive and targeted conservation action cannot be undertaken without a proper, or at least better than current, understanding of the status of the species listed in Appendix I.

Chart 5d: Conservation status of species with an unknown population included in Appendix I (%)

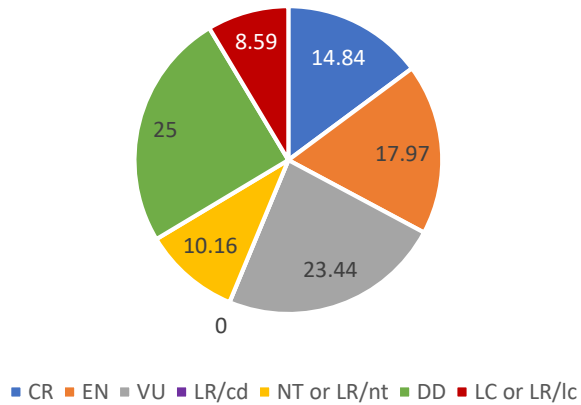


Chart 6d: Conservation status of species with an unknown population not included in Appendix I (%)

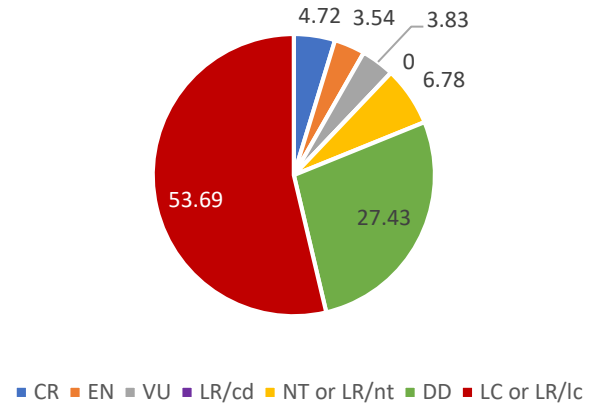


Chart 5e: Conservation status of species with a population trend that needs updating that are included in Appendix I (%)

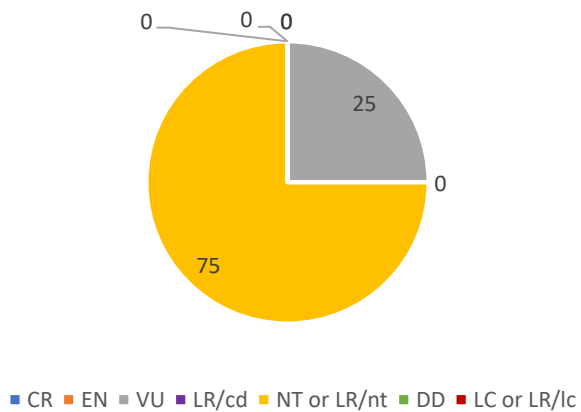
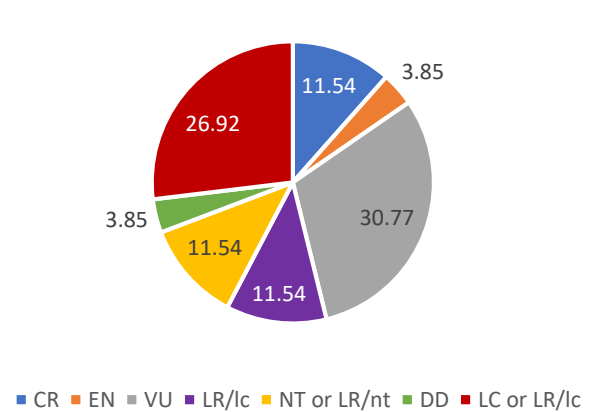


Chart 6e: Conservation status of species with a population trend that needs updating that are not included in Appendix I (%)



Overall, two conclusions can be drawn from this data. First, Appendix I is not an accurate representation of the conservation status of European flora, at least according to the IUCN Red List. Whilst it is true that a significant proportion of the species not included are not believed to be at risk of extinction, a large number, particularly of species with declining populations, are not covered by the Convention. Second, and arguably more importantly, the Bern Convention is not an effective conservation instrument for plants because it is failing to instigate the level of action needed to improve the conservation status of Europe's flora. Any conservation success is in spite of inclusion in Appendix I, rather than because of it. Despite being in operation for over thirty years, more than half of the European flora included in both the Red List and the Appendix

are classified as 'vulnerable' or worse and less than a third have a population trend that is either increasing or stable.

This can be attributed to the differing emphasis of the two lists. The criteria of the IUCN Red List make it clear that it is concerned with endangered species, whilst Appendix I has been described by the Convention's Secretariat as a list of protected species.⁹⁷ The difference is subtle but important and becomes apparent when comparing the listing criteria. For the IUCN Red List, detailed guidelines have been published outlining both the classifications and the criteria against which all species are assessed. This is primarily quantitative in nature and relates to, inter alia, changes in population size, actual population size and geographic range.⁹⁸ In comparison, no official listing criteria exist for the Bern Convention. The original list was merely a reflection of the consensus that could be achieved at the time.⁹⁹ Article 17 of the Convention outlines the procedure through which changes to all the Appendices can be made,¹⁰⁰ and in 1997 guidelines were agreed for the amendment of the lists.¹⁰¹ These call on States to 'take into account' the ecological function of the species and the threats facing it, but do not impose any thresholds at which a species must be submitted for listing. This goes a long way to explaining how so many species identified as endangered by the IUCN Red List are not in Appendix I.

A very simple reform which would address this would be to directly refer to the IUCN Red List in the instrument, although this could result in greater political pressure being placed on the IUCN's listing decisions.¹⁰² The current Article 5 of the Bern Convention states:

Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild flora species specified in Appendix I...

A more responsive provision, which would not be hamstrung by the need to constantly revisit a document appended to the Convention through formal treaty procedures, would be as follows:

⁹⁷ Report of the 25th Meeting of the Standing Committee, T-PVS(2005) 20, para. 3.1.

⁹⁸ IUCN Red List Categories and Criteria, (n 83).

⁹⁹ Bowman, Davies and Redgwell, (n 4) p. 304.

¹⁰⁰ A proposal must be submitted at least two months before the next meeting of the Standing Committee, and must be approved by two-thirds of the Contracting Parties.

¹⁰¹ Recommendation 56 (1997).

¹⁰² G.M. Mace et al, 'Quantification of Extinction Risk: IUCN's System for Classifying Threatened Species' (2008) 22 *Conservation Biology* 1424-1442.

Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild flora species classified as “vulnerable” or above on the IUCN Red List.¹⁰³

This could be supported by a second provision that adopts a precautionary approach for those species not yet classified as endangered or for which there is a lack of data:

Each Contracting Party shall monitor the conservation status of the wild flora species classified as “near threatened” or “data deficient” and take appropriate and necessary legislative and administrative measures to ensure their conservation status does not decline.

Due to the substantial number of species classified as ‘data deficient’ that have an unknown population trend, precaution has a very important role to play. There is no mention of the precautionary principle in the Bern Convention, nor indeed in any of the regional conservation agreements reviewed in this chapter. The question of definition is key when discussing a practical application of the precautionary principle.¹⁰⁴ Often the literature focusses on the differences between strong and weak interpretations.¹⁰⁵ The former says that no action must be taken unless it can be proven to have zero risk, and the weak interpretation mandates that scientific uncertainty is not a justification for either potentially harmful action or delaying positive action. The principle is more nuanced than this simple strong/weak dichotomy however. Von Schomberg draws a distinction between the principle as a regulatory tool and the political decision to invoke the principle in relation to a particular issue.¹⁰⁶ In the proposed provisions above the political decision would be to apply the principle in the field of conservation, and the regulatory aspect is the obligation to monitor and protect those species for which there is insufficient data to accurately assess their conservation status. In this way, the principle also constitutes a rationale for acting¹⁰⁷ – here the lack of data is the reason for the monitoring and protection.

The fundamental concept behind the precautionary principle is scientific uncertainty. It is therefore necessary to know exactly what level of uncertainty there must be, and over what,

¹⁰³ This is reflective of the resilience thinking approach examined in chapter 9. By fostering links between different actors, in this case States and the IUCN, a provision such as this could allow for more targeted, and therefore possibly efficient and effective, conservation action.

¹⁰⁴ D. Dana, ‘The Contextual Rationality of the Precautionary Principle’ (2009) 35 *Queen’s Law Journal* 67-96.

¹⁰⁵ N. Sachs, ‘Rescuing the Strong Precautionary Principle from Its Critics (2011) *University of Illinois Law Review* 1285-1338; C. Sunstein, ‘Beyond the Precautionary Principle’ (2003) 151 *University of Pennsylvania Law Review* 1003-1058; and J. Applegate, ‘The Taming of the Precautionary Principle’ (2002) 27 *William and Mary Environmental Law and Policy Review* 13-78.

¹⁰⁶ R. von Schomberg, ‘The Precautionary Principle: Its Use Within Hard and Soft Law’ (2012) 2 *European Journal of Risk Regulation* 147-156.

¹⁰⁷ *ibid.*

before it can be effectively used.¹⁰⁸ In the current context this is relatively easy to determine: it is uncertainty over the conservation and population status of certain species. In other areas, notably climate change, deciding where to apply the precautionary principle is problematic. Should it be to anthropogenic contributions to climate change, the scale of the impacts of climate change, the rate these will manifest, the location of these impacts, their timescale or the costs of their mitigation? And what action should be taken when a precautionary threshold is met, and by who? The key point is that scientific uncertainty is not the same as scientific ignorance: the precautionary principle does not apply to the latter because the word 'uncertainty' implies there is some base level of understanding.¹⁰⁹ The precautionary principle then is more than just an abstract concept that is applied once to any given situation. It is instead an ongoing process that may operate in the context of conservation as follows:

1. There is uncertainty over the conservation status of species X.
2. The precautionary principle mandates action to monitor this species, research to determine its status and measures to protect the species to ensure that it does not go extinct whilst this is conducted.
3. Data is collected and the level of uncertainty is reduced.
4. There are three possible actions. Further protective measures are introduced because the evidence suggests species X is endangered, the measures are scaled back because the species is shown to be thriving, or further research is undertaken because uncertainty over its status remains.

The principle should be applied with some caution. Moyle argues that in some scenarios applying the precautionary principle could have perverse consequences for biodiversity. The reason for this is that the rationale behind the principle is to avoid harm above a certain threshold, depending on how it is defined. Any potential gains are irrelevant. Moyle uses a case study of the Chatham Island black robin in New Zealand to illustrate this. The robin population had declined to only seven birds, which were moved to an island reserve where 120,000 trees were planted to provide suitable habitat. This was considered insufficient, however, and a decision was made to cross-foster the robin with another species, i.e. move the eggs laid by the robins to the nest of another species so that the robin would lay a second clutch, thereby doubling the robin's rate of reproduction. The change in strategy was successful, but would not have happened had the precautionary principle been applied. As the reserves had proven successful in the past the precautionary principle would have demanded that no change in

¹⁰⁸ *ibid.*

¹⁰⁹ *ibid.*

strategy was made until it could be shown that it would not increase the risk of extinction to the robin.¹¹⁰

In reality, of course, the precautionary principle is rarely the only factor taken into consideration. Decisions often constitute some form of cost-benefit analysis,¹¹¹ and in the case of the robin the possibility of doubling the rate of increase in the species outweighed the possible risks. Moyle's central point is that the precautionary principle should be seen as part of broader strategies, for example based on adaptability, which allow changes to be made in the light of new knowledge and experience.¹¹² This could be achieved if the principle was integrated into the conservation measures contained in conservation instruments. As noted above, however, there is no mention of the precautionary principle in any of the regional conservation agreements currently in operation. Recourse must therefore be made to other sources. Principle 15 of the 1992 Rio Declaration¹¹³ states:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

The reference to a 'precautionary approach' is not a representation of the process set out above but a result of the determination of the United States to not identify it as a principle.¹¹⁴ Neither is there a useful definition contained in customary international law. Whilst certain aspects of precaution, such as transboundary environmental assessment, are arguably custom,¹¹⁵ its various and contended definitions indicate that the principle per se is not customary law. In its 2010 *Pulp Mills* judgment, the International Court of Justice only said that a precautionary approach might be relevant in the interpretation of the agreement between Argentina and Uruguay.¹¹⁶

Despite the need for a clear and implementable precautionary principle no such concept exists, and it is unlikely that one will materialise soon. This does not however detract from the

¹¹⁰ B. Moyle, 'Making the Precautionary Principle Work for Biodiversity: Avoiding Perverse Outcomes in Decision-Making Under Uncertainty', in R. Cooney and B. Dickson (eds), *Biodiversity & the Precautionary Principle: Risk and Uncertainty in Conservation and Sustainable Use* (Earthscan, 2005), p. 164-166. The role of the precautionary principle in conservation is discussed further in chapter 10.

¹¹¹ B. Dickson, 'Fairness and the Costs and Benefits of Precautionary Action', in Cooney and Dickson (eds), *ibid.*

¹¹² Moyle, (n 110) p. 170. For further discussion on adaptive management in conservation see chapter 9.

¹¹³ 1992 Rio Declaration on Environment and Development, 31 ILM 874 (1992).

¹¹⁴ J. Wiener, 'Precaution', in Bodansky, Brunnée and Hey (eds), (n 17) p. 601.

¹¹⁵ See Judge Weeramantry's Separate Opinion in *Gabčíkovo-Nagymaros (Hungary v Slovakia)* (1997) ICJ Reports 7, at 111.

¹¹⁶ *Pulp Mills on the River Uruguay (Argentina v Uruguay)* (2006) ICJ Reports 113, para. 164.

argument that a link should be made between Appendix I of the Bern Convention, and indeed all regional conservation agreements, and the IUCN Red List. The Red List provides the flexibility and (relatively) up-to-date information that is difficult to achieve in an international legal instrument. Unfortunately, due to the apparent difficulties in reaching political consensus on what species should and should not be included in Appendix I,¹¹⁷ this new approach, which takes political considerations out of the equation, is unlikely to be adopted.

Conclusions:

The effectiveness of regional conservation law at protecting plants has been tested in three ways: geographic scope, the construction of the conservation instruments, and the extent to which these instruments reflect and respond to the weaknesses of designation and listing as conservation techniques. In each case the law has been shown to be inadequate. Significant areas of the globe are not covered by a regional agreement, either because one does not exist or because it is not in force. The instruments also fail to meet the criteria of mandatory obligations, obligations regarding national implementation and provision for international oversight and enforcement. With regards to the conservation mechanisms, the agreements adopt a flawed model of designating protected areas, both in conceptual and practical terms. Finally, only the Bern Convention contains anything that approaches a comprehensive list of endangered plants, but a considerable number of endangered species have been excluded, and those that have been included are not showing any signs of improvement in terms of conservation status or population trend. In short, regional conservation law is not effective at protecting plants. To address this situation the law must become more flexible. Key reforms include direct references to both the IUCN Red List and the precautionary principle in the operational part of the instruments' texts, with provisions mandating a more adaptable, information-driven approach to conservation.

¹¹⁷ Bowman, Davies and Redgwell, (n 4) p. 304.

IV

THE PROTECTION OF PLANTS IN THE POLAR REGIONS

Plants at the Poles:

Unsurprisingly, the flora of the polar regions¹ is comparatively poor in terms of diversity compared to more temperate zones. Nevertheless, plants grow in these extreme environments. It is estimated that there are around 900 vascular plants in the Arctic, 700 species of bryophytes and 2000 lichens. Fewer species are thought to exist in Antarctica. Only two flowering species have been found, around 120 bryophytes and 200 lichens.² On the basis of their intrinsic value, these plants warrant the same protection as species found elsewhere. As the foundation of all life in the polar regions, they have significant ecological value as well.

International law has adopted distinct approaches to the polar regions. For both regions, however, it is the inhospitable nature that makes sustained human habitation challenging, if not impossible, and the vulnerability of polar ecosystems that have rendered conventional international legal approaches inappropriate.

Plants in the Antarctic Treaty System:

The Antarctic Treaty System comprises the 1959 Antarctic Treaty,³ its 1991 Environment Protocol,⁴ the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR),⁵ 1972 Convention for the Conservation of Antarctic Seals,⁶ the defunct 1988 Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA)⁷ and other

¹ For the purposes of this chapter the polar regions are as defined by the Conservation of Arctic Flora and Fauna Working Group Designated Working Area (infra (n 27)), illustrated in the CAFF 2015-2017 Work Plan, and in Article VI of the Antarctic Treaty (infra (n 3)). Note that Convention on the Conservation of Antarctic Marine Living Resources (infra (n 5)) extends as far north as the Antarctic Convergence, and therefore although the 1991 Environment Protocol (infra (n 4)) also only applies to 60° south, its reference to the need to protect associated ecosystems suggests that its application could be extended. See D. Rothwell, *The Polar Regions and the Development of International Law* (Cambridge University Press, 1996), p. 22-23.

² R. Seppelt. 'Phytogeography of Continental Antarctic Lichens' (1995) 27 *Lichenologist* 417-431.

³ Washington, 1 December 1959, in force 23 June 1961, 402 UNTS 71.

⁴ Protocol on Environmental Protection to the Antarctic Treaty, Madrid, 4 October 1991, in force 14 January 1998, 30 ILM 1461 (1991).

⁵ Canberra, 20 May 1980, in force 7 April 1982, 19 ILM 841 (1980).

⁶ London, 1 June 1972, in force 11 March 1978, 11 ILM 251 (1972).

⁷ Wellington, 2 June 1988, not in force, 27 ILM 868 (1988).

non-binding instruments, including Recommendations adopted by the Antarctic Treaty Consultative Parties and Conservation Measures adopted under CCAMLR. The original Antarctic Treaty was never intended to be a static instrument. 'Rather, the potential existed for an evolving regime that could cope with a variety of Antarctic management issues which the Treaty was unable to deal with or which had not been foreseen at the time of its negotiation'.⁸ For the conservation of flora this has been crucial, as early approaches to protecting the Antarctic environment were flawed in respect of plant conservation.

There are no direct references to the Antarctic environment in the 1959 Antarctic Treaty. However certain provisions, including the prohibition on nuclear explosions and the disposal of radioactive waste in Article V, and Article IX, which allows Consultative Parties to put forward measures on, inter alia, conserving the living resources of Antarctica, have an obvious environmental element.⁹ Deliberate measures to protect the Antarctic environment were first enacted at the third Antarctic Treaty Consultative Meeting through the 1964 Agreed Measures for the Conservation of Antarctic Fauna and Flora.¹⁰ The Agreed Measures reveal a bias in favour of animals, a reflection of the comparative lack of knowledge and interest in Antarctic flora. In particular, the construction of Article VI(1) of the Agreed Measures limited its application to fauna:

Each Participating Government shall prohibit within the Treaty Area the killing, wounding, capturing or molesting of any native mammal or native bird, or any attempt at any such act, except in accordance with a permit.

Significant advances were made in the Environment Protocol, which extends protection to the environment within the area covered by the Antarctic Treaty.¹¹ Although this was unsurprising, it is unfortunate that the negotiating parties did not instead apply the Protocol to the area covered by CCAMLR, which would have included the marine environment up to the Atlantic Convergence and been more in line with the ecosystem approach of the Antarctic Treaty System.¹² This ecosystem approach, driven in part by the fragility and complexity of the Antarctic ecosystems,¹³ is evident in the Protocol's objective:

⁸ Rothwell, (n 1) p. 110.

⁹ C. Redgwell, 'The Protection of the Antarctic Environment and the Ecosystem Approach', in M. Bowman and C. Redgwell (eds), *International Law and the Conservation of Biological Diversity* (Kluwer Law, 1996), p. 112.

¹⁰ Recommendations III-VIII, available at: http://www.ats.aq/devAS/ats_meetings_meeting.aspx?lang=e (last accessed 01/04/2017).

¹¹ Article 3(1).

¹² Rothwell, (n 1) p. 142.

¹³ B. Boczek, 'The Protection of the Antarctic Ecosystem: A Study in International Environmental Law' (1983) 13 *Ocean Development and International Law* 347-425.

The Parties commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science.¹⁴

This is enhanced by the Environmental Principles contained in Article 3. What is significant is that the negotiating States decided to recognise the intrinsic value of Antarctica in the operational part of the instrument, making the Environment Protocol unique in international environmental law. This is followed by a list of consequences that States should plan to avoid when carrying out activities in the Antarctic Treaty area.¹⁵

The Environment Protocol is a framework instrument, with its provisions being elaborated on in a number of Annexes. For the purposes of the current discussion the most relevant of these are Annex II (the protection of flora and fauna) and Annex V (protected areas).¹⁶ Annex II of the Protocol largely mirrors the 1964 Agreed Measures, but places greater emphasis on protecting the diversity of flora and invertebrates.¹⁷ This is evident in a number of provisions. First, the definition of 'take' and 'taking' in Article 1(g) includes the removal or damage of 'such quantities of native plants that their local distribution or abundance would be significantly affected'. Similarly, the conditions on the issuing of permits are now phrased so as to be relevant to plants, rather than just animals as was the case in the 1964 Agreed Measures. Further, plants may now be included in the list of protected species in Appendix A of the Annex, although no plant species is currently included in the Appendix. It should be noted that the objective of permits is to minimize, rather than eliminate, harmful interference, which, with regard to plants, is defined as 'significantly damaging concentrations of native terrestrial plants by land aircraft, driving vehicles, or walking on them, or by other means'.¹⁸ The lack of guidance on what constitutes 'significantly damaging' and a 'concentration' of native plants is problematic, but the existence of a permitting system means at least some consideration will be given to the harm human activity will cause to Antarctica's flora. Another notable feature of Annex II compared to the 1964 Agreed Measures is that it has included environmental protection in the list of emergencies

¹⁴ Article 2.

¹⁵ Article 3(2).

¹⁶ For a discussion of Annexes I, III and IV see C. Redgwell, 'Environmental Protection in Antarctica: The 1991 Protocol' (1994) 43 *International and Comparative Law Quarterly* 599-634. Annex VI – Liability Arising from Environmental Emergencies – which was adopted a later date, is examined in M. Johnson, 'Liability for Environmental Damage in Antarctica: The Adoption of Annex VI to the Antarctic Environment Protocol' (2006-2007) 19 *Georgetown International Law Review* 33-55.

¹⁷ M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law* (2nd edition, Cambridge University Press, 2010) p. 372.

¹⁸ Article 1(h)(v).

that would justify derogation from the Annex, and the protection of an important population of an endemic plant species would arguably be covered by this.

Annex V of the Protocol streamlined the previously complicated system of protected areas¹⁹ by creating two new categories: Antarctic Specially Protected Areas (ASPAs) and Antarctic Specially Managed Areas (ASMAs). Article 3(2) provides a non-exhaustive list of the types of areas that should be designated, and this also goes some way in addressing the bias against flora seen in the 1964 Agreed Measures. For example, Article 3(2)(d) calls on States to include ‘the type locality or only known habitat of *any species*’ in the ASPA network (emphasis added). An important feature of Annex V is the requirement that the proposed area of an ASPA or ASMA must be ‘of sufficient size to protect the values for which the special protection or management is required’. Redgwell considers this to be a ‘positive development’, as it marks a change in emphasis from the need to reduce the interference that designation has on other Antarctic uses seen in the 1964 Agreed Measures.²⁰

The Conservation of Arctic Flora:

The international regime operating in the Arctic differs significantly from that of Antarctica. There is no general multilateral conservation treaty,²¹ and international cooperation in environmental protection did not take on any meaningful form until the 1990s when it became clear that certain environmental issues, particularly the impacts of industrialisation, could not be effectively addressed unilaterally.²² In 1991 the Arctic States²³ adopted the non-binding Arctic Environmental Protection Strategy (AEPS).²⁴ Like CCAMLR and the Antarctic Environment Protocol, the AEPS adopts an ecosystem approach, albeit as part of a wider sustainable development paradigm.²⁵

¹⁹ Redgwell, (n 16).

²⁰ *ibid*, 632.

²¹ There is though one species-specific treaty: the 1973 Agreement on the Conservation of Polar Bears 13 ILM 13 (1974). See Bowman, Davies and Redgwell, (n 17) p. 351-353.

²² *ibid*, p. 354.

²³ Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States.

²⁴ Arctic Environmental Protection Strategy, Declaration on the Protection of the Arctic Environment (Rovaniemi, June 1991). See Rothwell, *The Polar Regions and the Development of International Law*, (n 1) p. 231-242.

²⁵ See para. 2.2. of the AEPS.

To coordinate AEPS activities the Arctic Council was established in 1996.²⁶ The six Working Groups of the Council reflect a much broader environmental agenda than the primarily pollution-focussed AEPS. The most relevant of these in the current discussion is the Working Group on the Conservation of Arctic Flora and Fauna (CAFF).²⁷ As with other regional conservation instruments the primary measures employed by CAFF are species and habitat protection. The value of these in terms of the conservation of Arctic flora is questionable however. The three species-specific strategies adopted by CAFF relate to birds,²⁸ and although over 400 protected areas²⁹ have been created ‘progress across ecosystems and habitats has been patchy’.³⁰ In comparison, the non-legally binding framework for marine protected areas developed by the Protection of the Arctic Marine Environment Working Group are highly relevant to plants. Within the ‘Strengthen Ecological Resilience’ objective of the Framework, for example, States are called on to protect:

Pristine areas that safeguard core ecosystem characteristics and offer long-term sustainable conservation that can balance possible impacts from future developments in other areas, or have a role as refugias in anticipated changed conditions.³¹

This goes further than other ecosystem approaches seen in environmental instruments. First, it encourages the protection of important ecosystems to enable the Earth to cope with anthropogenic impacts, rather than merely for posterity. Second, it implies the importance of a precautionary approach by promoting the protection of sites so that alternative habitats are available for species if, for example, their former range is altered by climate change. If this approach was adopted more broadly, not only in the AEPS but also other conservation regimes, it would be a significant improvement in how plants are protected in international law.

Unlike other regional arrangements there is a dedicated Flora Group operating within CAFF, which ‘promotes, encourages and coordinates the international conservation of Arctic flora,

²⁶ 1996 Declaration on the Establishment of the Arctic Council, Ottawa, 19 September 1996, 35 ILM 1382. In addition to the Arctic States France, Germany, Poland, Spain, the Netherlands and the United Kingdom have observer status, there are also six participants from indigenous tribes and representatives from relevant NGOs.

²⁷ <https://www.caff.is/> (last accessed 01/04/2017). The other Working Groups are: Arctic Contaminants Action Programme, Arctic Monitoring and Assessment Programme, Emergency Prevention, Preparedness and Response, Protection of the Marine Arctic Environment and the Sustainable Development Working Group.

²⁸ The ivory gull (*Pagophila eburnean*), eider ducks (*Somateria*) and murre (*Uria*).

²⁹ In 1996 CAFF created the Circumpolar Protected Areas Network to ensure the full range of Arctic habitats and ecosystems were protected. See: http://www.caff.is/index.php?option=com_content&view=article&id=716&Itemid=1118 (last accessed 01/04/2017).

³⁰ Bowman, Davies and Redgwell, (n 17) p. 355.

³¹ PAME, ‘Framework for a Pan-Arctic Network of Marine Protected Areas’ (April 2015), Annex IV, p. 33.

vegetation, and habitats as well as research activities'.³² The CAFF Flora Group has a broad programme of work, part of which is the compilation of national endangered plant lists, in accordance with IUCN criteria, to provide a clearer picture on how plant populations are changing.³³ In addition to this, the Flora Group is participating in the Global Observation Research Initiative in Alpine Environments (GLORIA),³⁴ which monitors the impacts of climate change on high mountain ecosystems. To date, seven GLORIA sites have been designated in the Arctic, and a further four are planned.³⁵ Although neither of these initiatives have any legal effect, and will not per se protect plants, they perform an important function. In the short-term the scientific data will inform conservation decisions, whether these are taken at regional or national levels, and also provide longer-term insights into how the environment of Arctic flora is changing as a consequence of climate change.

An Arctic Treaty?

An ongoing debate in polar law is the merits, or otherwise, of an Arctic treaty. Watson is a keen advocate, arguing that a stronger regional regime is needed to both address the sovereignty disputes that have arisen out of the increased accessibility of Arctic resources and to mitigate any further environmental impacts.³⁶ Verhaag goes further, and argues that a global rather than regional treaty is needed because it is global problems that are affecting the Arctic.³⁷ Jarashow, Runnels and Svenson, in contrast, believe that although an Arctic treaty would go some way in addressing the environmental problems of the region, it would be unable to reconcile the sovereignty disputes over Arctic resources.³⁸

In my view, an Arctic treaty, whether global or regional in nature, would be of little added value either to Arctic flora or the wider Arctic environment. The previous discussions on other regional conservation treaties and the 1992 Convention on Biological Diversity³⁹ suggest that any conservation obligations imposed would have little legal effect, and so the situation would be

³² <http://www.caff.is/flora-cfg/about-cfg> (last accessed 01/04/2017).

³³ <http://www.caff.is/flora-cfg/rare-plants> (last accessed 01/04/2017).

³⁴ <http://www.gloria.ac.at/> (last accessed 01/04/2017).

³⁵ <http://www.caff.is/flora-cfg/gloria-sites> (last accessed 01/04/2017).

³⁶ M. Watson, 'An Arctic Treaty: A Solution to the International Dispute over the Polar Region' (2009) 14 *Ocean and Coastal Law Journal* 307-334.

³⁷ M. Verhaag, 'It Is Not Too Late: The Need for a Comprehensive International Treaty to Protect the Arctic Environment' (2003) 15 *Georgetown International Environmental Law Review* 555-579.

³⁸ M. Jarashow, M. Runnels and T. Svenson, 'UNCLOS and the Arctic: The Path of Least Resistance' (2007) 30 *Fordham International Law Journal* 1587-1652.

³⁹ Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992).

no different than the soft means already at the disposal of the Arctic Council Working Parties. Further, unlike Antarctica the Arctic is subject to national jurisdiction, and as all the Arctic States are party to a regional instrument, or to the Biodiversity Convention, or to both, an Arctic treaty would simply be replicating what States have already agreed to do. The argument that the Arctic is unique because of the unusual features of the polar environment is valid, but there has already been an adequate response to this through the creation of the Arctic Council. The Council, through its administration of the AEPS and the creation of the Working Groups, has demonstrated that it has the means and political support to enable scientific research and the agreement of guidance to aid in the management of the Arctic environment. Yes, more should and could be done to conserve Arctic flora, for example CAFF could develop species strategies for key arctic flora, but this criticism is equally true, if not more so, of every other conservation instrument that currently exists.

Conclusions:

The ecosystem approach prevalent in both Arctic and Antarctic environmental regulation has provided a framework for the protection of plants in areas where, perhaps understandably, their conservation has been overlooked. In Antarctica, prior to the adoption of the 1991 Environment Protocol it was only through the ecosystem concept that general protection was afforded to plants. More recent developments have, however, redressed this. Plants are now afforded the same status as animals in the Antarctic Treaty System, their habitats can be designated as protected areas and they may also be listed as protected species.

In the Arctic, certain aspects of the AEPS are revolutionary in international environmental law. PAME's promotion of protected areas as important refuges for biodiversity, rather than merely exhibits of once common ecosystems, represents a much more adaptable body of law than is evident in either the Biodiversity Convention or other regional conservation agreements. Equally, creation of a dedicated Flora Group within CAFF means that the particular challenges of plant conservation in this region are addressed. Both of these features should be adopted more broadly in international environmental law.

V

THE PROTECTION OF MARINE AND FRESHWATER PLANTS

Plants in Aquatic Ecosystems:

Plants are not only important in the terrestrial biosphere. Between five and ten thousand species of red algae are believed to exist and a similar number of green algae.¹ The algae include, but are not limited to, many species of seaweed and, like their terrestrial counterparts, form the foundations of their ecosystems.² Additionally, more complex vascular plants may be found growing in all aquatic environments, providing important sources of food and shelter for a range of other species, as well as the infrastructure for aquatic habitats.

This chapter begins by considering global and regional approaches to protecting these plants. Particular attention is paid to the conservation of marine biodiversity found in areas beyond national jurisdiction. Conservation in this arena is particularly challenging as it must be reconciled with the seemingly inviolable principle of the freedom of the high seas and States'. This constitutes a further expression of State sovereignty that conditions and limits conservation action. The chapter concludes by looking at a second key plant biome – wetlands. Here we see how some of the issues raised above in relation to global and regional conservation may be addressed in such a way as to offer better legal protection for plants.

Global Approaches to Protecting Marine Flora:*The 1982 UN Convention on the Law of the Sea:*

There is no explicit mention of marine flora in the 1982 UN Convention on the Law of the Sea (LOSC).³ This is perhaps not surprising given the historic lack of scientific attention paid to marine

¹ The third type of algae – brown algae – are considered to be more closely related to animals than plants, and so strictly speaking this chapter does not apply to them. In practice, however, any protection afforded to red and green algae will also benefit brown algae in the same area.

² T. Walker, *Plant Conservation: Why It Matters and How It Works* (Timber Press, 2013), p. 22-26.

³ UN Convention on the Law of the Sea, Montego Bay, 10 December 1982, in force 16 November 1994, 21 ILM 1261 (1982). As the vast majority of States have ratified the Law of the Sea Convention, it should be noted that a few, most notably the United States, have not. Such States may, however, be subject to the four Geneva Conventions that preceded the 1982 Convention. See Y. Tanaka, *The International Law of the Sea* (Cambridge University Press, 2012), p. 21-24.

biodiversity, beyond the commercially important fish and mammal species.⁴ However several of the general obligations concerning the marine environment found in Part XII of the Convention are relevant. First, there is the duty to 'protect and preserve' the marine environment in Article 192. This is not limited to the marine environment within the control of the State and so applies to the high seas as well.⁵ Of particular importance is Article 194(5):

The measures taken in accordance with this Part [XII] shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.

That an ecosystem approach, albeit one that was probably not intended by the negotiators,⁶ is taken by the LOSC is welcome, as protecting marine ecosystems will not be possible without providing for the protection of marine flora.⁷ It should be noted, however, that the provision only applies to 'rare or fragile' ecosystems, and so comparatively abundant and thriving habitats will not be covered by the provision. It has been argued that to ignore commonplace species in conservation regulation has a negative impact on the conservation of biodiversity as a whole,⁸ and arguably the same applies to the marine environment. Whilst true that the general obligation in Article 192 has no such qualification, and therefore applies to all marine biodiversity, this is a poor substitute for an explicit requirement to preserve either marine ecosystems or marine flora. Further, Article 194(4) does not permit any 'unjustifiable interference' with any lawful activities carried out by other States, and given the importance attached to the freedom of the high seas it is unlikely that ships can be excluded from travelling through specific areas.⁹ Further, given the common interest¹⁰ the international community has in the marine environment 'it cannot be sustained that a State has a right to engage in a specific marine activity simply because it enjoys freedom of the sea, without being ready to consider the

⁴ G. Carleton Ray, 'Ecological Diversity in Coastal Zones and Oceans', in E.O. Wilson (ed), *Biodiversity* (National Academy Press, 1988), p. 37.

⁵ N. Oral, 'Protection of vulnerable marine ecosystems in areas beyond national jurisdiction: Can international law meet the challenge?', in A. Strati, M. Gavouneli and N. Skourtos (eds), *Unresolved Issues and New Challenges to the Law of the Sea: Time Before and Time After* (Martinus Nijhoff, 2012).

⁶ D. Freestone, 'The Conservation of Marine Ecosystems under International Law', in M. Bowman and C. Redgwell (eds), *International Law and the Conservation of Biological Diversity* (Kluwer Law International, 1996), p. 103.

⁷ D. Freestone and S. Salman, 'Ocean and Freshwater Resources', in D. Bodansky, J. Brunnée and E. Hey (eds), *The Oxford Handbook of International Law* (Oxford University Press, 2007), p. 340.

⁸ S. Harrop, 'Conservation regulation: a backward step for biodiversity?' (1999) 8 *Biodiversity and Conservation* 679-707.

⁹ R. Wolfrum and N. Matz, 'The Interplay of the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity' (2000) 4 *Max Planck Yearbook of United Nations Law* 445-480.

¹⁰ Article 136 LOSC explicitly recognises the resources of the deep seabed as the common heritage of mankind. Although the same does not apply to the high seas, the Preamble to the Biodiversity Convention states that 'the conservation of biological diversity is a common concern of humankind'.

different views, if any, of other interested States'. Included in the interests that must be taken into account are those relating to protection of the marine environment.¹¹

Between 2006 and 2015 an Ad Hoc Working Group of the UN considered the issue of biodiversity conservation in areas beyond national jurisdiction, ultimately recommending that a new implementation agreement to the LOSC be developed.¹² It is hoped that this agreement would provide for a more coherent approach than is currently possible under the system of numerous regimes and organisations whose remit extend into the high seas. As Freestone observes, protection is possible through this sector-by-sector approach, but a lack of coordination between the different institutions involved can impede progress.¹³ A new, legally binding, agreement could go a long way in addressing the issues identified in global approaches to marine conservation. It remains to be seen, however, whether such an agreement would impose the necessary constraints on the freedom of the high seas.

Marine Protection in the Biodiversity Convention:

In theory, the Biodiversity Convention¹⁴ applies equally to both terrestrial and marine life. Article 2 explicitly includes 'marine and other aquatic ecosystems' within its remit. However, even in the context of the criticisms that have been levied against the treaty regime as a whole, its approach to the conservation of marine biodiversity is particularly weak. Freestone argues that there is an inherent bias against marine biodiversity in the Convention, which, although perhaps understandable given the comparative lack of understanding of marine ecology, has rendered it largely ineffective in relation to marine conservation. 'In fact the whole approach of the Convention – directed as it is to finance and biotechnology issues and arguably, to a concept of national ownership of biological resources based on assumptions about endemic species – bypasses some of the key issues of marine biodiversity conservation'.¹⁵ Scully goes further than this, suggesting that the Biodiversity Convention is actually 'a setback' for the conservation of

¹¹ T. Scovazzi, 'Marine Protected Areas on the High Seas: Some Legal and Policy Considerations' (2004) 19 *The International Journal of Marine and Coastal Law* 1-17, 7.

¹² Recommendations of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction – UN Doc A/69/780*, 3 February 2015.

¹³ D. Freestone, 'Governance of Areas Beyond National Jurisdiction: An Unfinished Agenda of the 1982 Convention?', in J. Barrett and R. Barnes (eds), *UNCLOS at 30 and Beyond* (British Institute of International and Comparative Law, 2015).

¹⁴ Convention on Biological Diversity, Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992).

¹⁵ Freestone, (n 6) p. 91-92.

marine biodiversity.¹⁶ This is debatable, but it is certainly the case that the Convention was a missed opportunity to refocus marine conservation from the short-term interests in ensuring the perpetual exploitation of economically important species¹⁷ to a more long-term ecosystemic approach.

The Conference of the Parties adopted an elaborated programme of work on marine and coastal biodiversity in 2004.¹⁸ Its vision illustrates the anthropocentric perception of the value of nature held by the international community, in this case driven by the national economic interests in the exploitation of the marine world.¹⁹ This is balanced to an extent by the explicit incorporation of the ecosystem approach into the programme. It is noted that 'The success of the programme of work also relies on scientific research aimed at providing understanding of the functioning of the broader ecosystem in terms of its component parts and their connectivity'.²⁰ This goes some way in answering Scully's criticism of the Biodiversity Convention, although the content of a Conference of the Parties Decision should not be seen as completely remedying issues with the treaty per se. Also important in the programme of work is the recognition of the need to adopt a precautionary approach.²¹ Implementation of the programme is envisaged primarily at the national and local levels, but also through regional and global institutions when relevant.²² Participation from a wide range of stakeholders in the implementation of the programme is encouraged.²³

The elaborated programme of work consists of a number of programme elements, one of the most pertinent being programme element 2: marine and coastal living resources.²⁴ However in this element's operational objectives a serious flaw in its construction can be identified:

To promote ecosystem approaches to the conservation and sustainable use of marine and coastal living resources, including the identification of key variables or interactions, for the purpose of assessing and monitoring, *first, components of biological diversity;*

¹⁶ T. Scully, 'The Protection of the Marine Environment and the UN Conference on Environment and Development', *The Law of the Sea: New Worlds, New Discoveries*, Proceedings of the 26th Annual Conference of the Law of the Sea Institute, Genoa, 22-25 June 1992, cited in Freestone, *ibid*, p. 91.

¹⁷ Wolfrum and Matz, (n 9).

¹⁸ Decision VII/5, 'Marine and coastal biological diversity', UNEP/CBD/COP/DEC/VII/5, 13 April 2004, Annex.

¹⁹ *ibid*, para. 1.

²⁰ *ibid*, para. 4.

²¹ *ibid*.

²² *ibid*, para. 5.

²³ *ibid*, para. 6.

²⁴ The other programme elements are: 1) implementation of integrated marine and coastal area management; 2) marine and coastal protected areas; 4) mariculture; 5) invasive species and 6) general activities.

*second, the sustainable use of such components; and, third, ecosystem effects.*²⁵
(emphasis added)

To succeed in ensuring the effective conservation of marine plants, and marine biodiversity generally, any ecosystem effects should first be identified, in accordance with the precautionary approach, and then their sustainable use can be more accurately determined. By apparently prioritising sustainable use over ecosystem effects, a further reflection of the dominant economic interests in international conservation policy, the ability of the Biodiversity Convention regime to protect marine flora is undermined.

As with terrestrial conservation, one of the principal means of protecting the marine environment is through protected areas. States are obliged, at least in theory, to consider creating marine protected areas within their jurisdiction by Article 8(a) of the treaty. Marine protected areas are also addressed in programme element 3 of the elaborated programme of work on marine and coastal biodiversity. However, this in no way constitutes a framework, or even a proposal for a framework, facilitating the creation of a global network of marine protected areas. As with the Aichi Biodiversity Targets, the emphasis is primarily on national and regional measures that will feed into global objectives.²⁶ More concerning, however, is the Contracting Parties' apparent denial of responsibility for protecting the marine environment beyond State jurisdiction. The only suggested activity in operational objective 3.2 is:

To support any work of the United Nations General Assembly in identifying appropriate mechanisms for the future establishment and effective management of marine protected areas beyond national jurisdiction.

It is clear from this statement that the Contracting Parties do not consider the protection of the marine environment in areas outside national jurisdiction to fall within the remit of the only holistic global conservation instrument. This must inevitably lead to further questions over whether the Biodiversity Convention is fit for purpose.²⁷

Freestone advocates the adoption of a new protocol to the Biodiversity Convention to address its inherent weaknesses in relation to marine biodiversity.²⁸ To be effective in this regard such a protocol would need to do two things. First, it would have to establish a framework, similar to the International Seabed Authority, to ensure the equitable sharing of benefits arising from the exploitation of biological resources found in areas beyond national jurisdiction. Second, it would

²⁵ Operational objective 2.1.

²⁶ Operational objective 3.1.

²⁷ See chapter 2.

²⁸ Freestone, (n 6) p. 107.

have to clarify the relationship between States' rights under the law of the sea with the environmental objectives of the biodiversity regime. These would overcome the concerns raised above about the dominance of the freedom of the high seas and the jurisdictional-focus of the Biodiversity Convention. Scovazzi goes further than this and argues that a new treaty for the protection of marine areas in the high seas should be negotiated. Key elements of this treaty would include a procedure through which important marine areas would be identified on the basis of common criteria, including ecological value, and then a set of protective measures that would be adopted on a case-by-case basis. He recognises that the convention would only be binding on the ships flying the flag of Contracting Parties, but points out that 'every State is already under the obligations arising from customary international law and from the LOSC to protect and preserve rare or fragile ecosystems, wherever they are located, and to co-operate in this regard'.²⁹ Whether this would be sufficient to protect a site from a third-party ship determined to exercise its right of innocent passage, particularly if its flag State disputed the scientific basis on which the area was designated, is debatable.

Developments in international law to date, however, suggest that a new instrument is unlikely to appear. The emphasis of the Parties to the Biodiversity Convention is on non-binding initiatives rather than new protocols,³⁰ and as there is near universal participation with the biodiversity regime, that a marine protocol has not emerged suggests there is an absence of the international consensus required to formulate a new treaty. As such, the primary international instrument for the conservation of marine flora will remain the LOSC. Whilst this has some advantages, including the ecosystem approach evident in Part XII, the weaknesses outlined above suggest that global regulation of the marine environment is unable to afford sufficient protection to marine flora. Consequently, notwithstanding the possibility of the negotiation a new implementation agreement under the LOSC for biodiversity beyond national jurisdiction, action is likely to be required at the regional level.

Regional Approaches to the Conservation of Marine Flora:

UNEP's Regional Seas Programme was established in 1974 'to address the degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environment'.³¹ There are currently thirteen programmes operating under the remit

²⁹ Scovazzi, (n 11), 17.

³⁰ S. Harrop and D. Pritchard, 'A hard instrument goes soft: The implications of the Convention on Biological Diversity's current trajectory' (2011) 21 *Global Environmental Change* 474-480.

³¹ <http://www.unep.org/regionalseas/about/default.asp> (last accessed 01/04/2017).

of UNEP,³² and an additional five independent regional seas initiatives.³³ The focus of this chapter is on the Mediterranean programme³⁴ as it is one of the more comprehensive instruments in terms of marine biodiversity protection.³⁵

Importantly, the 1995 Protocol on Specially Protected Areas and Biological Diversity allows for the creation of protected areas that are partly or wholly in the high seas. This facilitates the protection of migratory species and also, to a certain extent, overcomes the absence of a supranational body capable of overseeing the conservation of marine biodiversity in areas beyond national jurisdiction.³⁶ Articles 2(3) and 3(6) of the Protocol facilitate marine protection in areas where maritime boundaries are contested in recognition of the fact that whilst protective measures should not impact on contentious issues of sovereignty, neither should the absence of agreement on maritime boundaries preclude protective action.³⁷ This is one of the key strengths this regional regime has over global marine treaties. Articles 2(3) and 3(6) have enabled the participating States to move beyond issues of sovereignty and develop a more robust conservation regime. In comparison, global regimes, including both the Biodiversity Convention and LOSC, are mired in technical debates over the relationships between different legal obligations and principles, and little is actually being achieved in the conservation of marine biodiversity.

The 1995 Protocol is intended to 'protect, preserve and manage' important natural and cultural areas and also threatened and endangered species of flora and fauna.³⁸ The principal means of achieving this is through the creation of specially protected areas.³⁹ Article 6 outlines the protection measures that States should take in relation to these areas. It is qualified by reference to international law, which suggests that the same concerns relating to the priority of the right of innocent passage raised above apply. However, in the 1995 Protocol this is balanced by an

³² Of these, the programmes operating in the Caribbean, East Asian Seas, Eastern Africa, Mediterranean, North-West Pacific and Western African regions are administered by UNEP. The programmes in the Black Sea, North-East Pacific, Red Sea and Gulf of Aden, ROPME Sea Area, South Asian Seas, South-East Pacific and Pacific are administered by other regional bodies.

³³ These cover the Antarctic, Arctic, Baltic Sea, Caspian Sea and North-East Atlantic.

³⁴ Specifically, the 1995 Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 10 June 1995, in force 12 December 1999) to the Convention for the Protection of the Marine Environment and Coastal Region of the Mediterranean (Barcelona, 16 February 1976, in force 12 February 1978, 15 ILM 290 (1976)). The text of the Protocol is available at: <http://www.rac-spa.org/protocol>.

³⁵ M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law* (2nd edition, Cambridge University Press, 2010), p. 388.

³⁶ Scovazzi, (n 11).

³⁷ *ibid.*

³⁸ Article 3.

³⁹ Article 4.

explicit reference to the need to regulate the passage of ships through protected areas.⁴⁰ Further, Article 6(a) requires States to take measures with the aim of ‘strengthening... the application of the other Protocols to the [Mediterranean] Convention *and of other relevant treaties*’. This provides sufficient scope for the Protocol to overcome the issues resulting from the general nature of the LOSC environmental provisions, and also the weak obligations of the Biodiversity Convention. Finally, the Protocol also adopts both an ecosystem and precautionary approach by requiring ‘the regulation and if necessary prohibition of any other activity or act likely to cause harm or disturb the species or that might endanger the state of conservation of the ecosystems or species’.⁴¹

In addition to the specially protected areas, Contracting Parties are required to produce a list of Specially Protected Areas of Mediterranean Importance (SPAMIs). Sites may be listed because, inter alia, of their importance for conserving biodiversity, because they contain ecosystems specific to the Mediterranean or that host endangered species, or because of their inherent value.⁴² The protection afforded to SPAMIs is not as detailed as the provisions concerning specially protected areas. However, there is again an indication that a precautionary approach should be adopted as States are prohibited from authorising and undertaking ‘any activities *that might* be contrary to the objectives for which the SPAMIs were established’.⁴³ (emphasis added)

Protection of endangered species is addressed in Part III of the 1995 Protocol, which calls for both national and cooperative measures. A general obligation to protect all species of flora and fauna is imposed by Article 11(1), and States are also required to compile national lists of endangered species.⁴⁴ With regards to protected plant species, States must:

regulate, and where appropriate, prohibit all forms of destruction and disturbance, including the picking, collecting, cutting, uprooting, possession of, commercial trade in, or transport and exhibition for commercial purposes of such species.

Like the conservation measures in Article 8 of the Biodiversity Convention, this provision is qualified by the phrase ‘where appropriate’. However, there is a subtle but important difference between the two regimes. Whereas the Biodiversity Convention subjects all conservation action to the judgement of a State as to whether it is possible and appropriate, the 1995 Protocol mandates a basic level of regulation for all endangered species and only affords discretion over whether to impose absolute prohibitions on the exploitation of a species. Although no detail is

⁴⁰ Article 6(c).

⁴¹ Article 8(h).

⁴² Article 8(2).

⁴³ Article 8(3)(b).

⁴⁴ Article 11(2).

given on what specific measures this regulation should entail, arguably a failure to impose any regulation at all would constitute a violation of the Protocol.

In addition to the national lists, Annexes II and III to the Protocol list endangered or threatened species, and species whose exploitation is regulated. The Contracting Parties are required to cooperate in adopting protection measures for the species included in the Annexes. With regard to Annex II, 'the maximum possible protection and recovery' of the listed species,⁴⁵ including of their habitats is mandated.⁴⁶ For the species listed in Annex III States, 'in cooperation with competent international organizations', one of the most important being the Convention on International Trade in Endangered Species (CITES),⁴⁷ must adopt measures to ensure their conservation whilst controlling their exploitation.⁴⁸ Exemptions to these provisions may only be granted for research purposes 'necessary to ensure the survival of the species or to prevent significant damage'. Whilst an exemption to enable research into the conservation of a species is sensible, the exemption to avoid 'significant damage' affords significant discretion to States and could lead to conservation objectives being subordinated to socioeconomic interests. For example, does 'significant damage' only refer to physical damage to property, or could a State invoke this provision if an endangered species is found in a site that had been designated for a development considered to be vital to a State's economic prosperity?

To summarise, the 1995 Protocol provides a comprehensive framework for the protection of marine flora, both in terms of individual species and wider habitats and ecosystems. It provides a model that should be adopted on a global scale,⁴⁹ preferably within the conservation remit of the Biodiversity Convention but, failing that, a new conservation instrument. Whilst renewed action under the LOSC is welcome, it remains debatable whether the conservation values of designated sites would be given appropriate weight in this regime should conflicts with the freedom of the high seas, and the rights States enjoy under that freedom, arise.

The Conservation of Flora in Wetlands:

Wetlands are crucial components of the natural world and constitute some of the most important areas for biodiversity, ecosystem services and natural resources. In addition to being

⁴⁵ Article 12(2).

⁴⁶ Article 12(3).

⁴⁷ Convention on International Trade in Endangered Species of Fauna and Flora, Washington, 3 March 1973, in force 1 July 1975, 993 UNTS 243.

⁴⁸ Article 12(4).

⁴⁹ Scovazzi, (n 11).

home to a huge variety of fish, birds, reptiles, invertebrates, mammals and plants, they regulate flooding, absorb and utilise sediments, nutrients and toxicants and provide water to around three billion people.⁵⁰ 'Yet in spite of these vital functions, wetlands in many parts of the world have been destroyed at an alarming rate in recent decades by excessive extraction, drainage, land reclamation and pollution'.⁵¹ The international response to this, largely driven by the International Waterfowl Bureau in the 1960s, is the 1971 Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (Ramsar)⁵² – the first, and still the only, binding global instrument concerning a specific habitat.⁵³ One of the principal strengths of the Convention is its expansive definition of 'wetland' in Article 1(1). This includes 'riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands'.⁵⁴ Since coming into force the Convention has been shown to have been relatively successful in protecting the world's wetlands.⁵⁵ Challenges remain, however, particularly in addressing climate change⁵⁶ and alien/invasive species.⁵⁷

As with other international conservation instruments, the Ramsar Convention relies on the designation of sites as its primary mechanism.⁵⁸ Article 2(1) calls on States to 'designate' suitable wetlands for inclusion in the Ramsar network. There are a number of points to note about this obligation. First, States may unilaterally decide which sites are to be included. This is in contrast to the procedure under Article 11 of the 1972 World Heritage Convention,⁵⁹ in which States propose sites for listing but it is the World Heritage Committee that decides whether or not to

⁵⁰ Bowman, Davies and Redgwell, (n 35) p. 403.

⁵¹ *ibid.*

⁵² Ramsar, 2 February 1971, in force 21 December 1975, 996 UNTS 245.

⁵³ There are of course other agreements designed to protect different habitats. However, the forest conservation instruments are non-binding (see chapter 2) and the instruments concerning the conservation of mountains only apply to specific regions. Two such treaties have been established: the Convention on the Protection of the Alps (Salzburg, 7 November 1991, in force 6 March 1995, 1917 UNTS 135 (1992) and the 2003 Framework Convention on the Protection and Sustainable Development of the Carpathians (text available at: <http://www.carpathianconvention.org/the-convention-17.html>).

⁵⁴ Article 2(1). More detailed guidance on the different classifications of wetlands under the Ramsar Convention can be found in COP Resolution VII.11, 'Strategic framework and guidelines for the future development of the List of Wetlands of International Importance' (10 May 1999), Appendix A.

⁵⁵ G. Castro et al, *The Ramsar Convention: Measuring Its Effectiveness for Conserving Wetlands of International Importance* (World Bank/WWF, 2002), para. 19.

⁵⁶ L. de Stefano et al, 'Defining adaptation measures collaboratively: A participatory approach in the Doñana socio-ecological system, Spain' (2017) 195 *Journal of Environmental Management* 46-55.

⁵⁷ V. Batanjski et al, 'Critical legal and environmental view on the Ramsar Convention in protection from invasive plant species: an example of the Southern Pannonia region' (2016) 16 *International Environmental Agreements* 833-848.

⁵⁸ E. Goodwin, 'Conservation of Coral Reefs Under the Ramsar Convention on Wetlands' (2006) 9 *Journal of Wildlife Law and Policy* 1-31.

⁵⁹ Convention for the Protection of the World Cultural and Natural Heritage, Paris, 16 November 1972, in force 17 December 1975, 27 UST 37, 11 ILM 1358 (1972).

include them in the World Heritage List.⁶⁰ One possible explanation for this is the greater instrumental values wetlands hold compared to the natural and cultural heritage sites that are the concern of the World Heritage Convention. These instrumental values are more closely aligned to the interests of States,⁶¹ particularly in the ecosystem services and natural resources that can be exploited in wetlands, and find expression in the assertion of State sovereignty in Article 2(3) of the Ramsar Convention.

More importantly, the obligation in Article 2(1) extends to designation only. There is no requirement that notified sites enjoy protected status, or that protected status must follow listing.⁶² There is mixed evidence on whether designation of a Ramsar site alone is enough to protect it without additional national safeguards. In Italy, the inclusion of two privately owned sites in the Ramsar List created the political momentum necessary to enable their protection at the national level, and in New Zealand the presence of a listed wetland on a site implied a minimum level of conservation value, which led to it being administered by the Department of Conservation rather than the local government. However, in Greece the threats to unprotected Ramsar sites are an ongoing issue.⁶³ As was observed in relation to the Biodiversity Convention, therefore, the extent to which the Ramsar Convention will be able to protect wetland-flora will depend on how well it has been implemented at the national level.

Turning to the listing criteria, the starting point is Article 2, which calls on States to designate 'suitable wetlands' on the basis of their 'international significance in terms of ecology, botany, zoology, limnology or hydrology'. Although priority is given to wetlands that are important habitat for waterfowl, the very broad definition of 'wetland' employed by the Convention, and the wording of Article 2, means that wetlands may benefit from the Convention regardless of the presence of waterfowl. This is an important feature in the context of plant conservation. In the previous chapter I demonstrated how the construction of early conservation measures in Antarctica excluded the majority of plant species from their application. More detailed guidance has been provided by the Ramsar Conference of the Parties⁶⁴ and there are now nine criteria

⁶⁰ Article 11.

⁶¹ T. Atherton and T. Atherton, 'The Power and the Glory: National Sovereignty and the World Heritage Convention' (1995) 69 *Australian Law Journal* 631-649.

⁶² COP Resolution VII.11, (n 54) Annex, para. 41.

⁶³ Bowman, Davies and Redgwell, (n 35) p. 410-411.

⁶⁴ COP Resolution VII.11, (n 54) and supplemented by Resolutions VIII.10, 'Improving implementation of the Strategic Framework and Vision for the List of Wetlands of International Importance' (26 November 2002), IX.1, 'Additional scientific and technical guidance for implementing the Ramsar wise use concept' (1 January 2005) and X.20, 'Biogeographic regionalization in the application of the Strategic Framework for the List of Wetlands of International Importance: scientific and technical guidance' (4 November 2008). A consolidated version can be found in Ramsar Secretariat, *Handbook 17: Designating Ramsar Sites* (4th edition, 2010), Annex II.

categorised into two groups: sites containing representative, rare or unique wetland types (criterion 1), and sites of international importance for conserving biodiversity (criteria 2-9). A number of these are either directly or indirectly relevant to plants. Criterion 2, for example is:

A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

For each of these, more details are provided on the considerations States should take into account when identifying sites for inclusion in the Ramsar List, and these reveal the strength of the Ramsar regime as a means of protecting plants. Taking Criterion 2 as an example, the most important point to note is that this refers directly to other conservation mechanisms, namely the IUCN Red List, Appendix I of CITES and the Appendices of the Convention on Migratory Species.⁶⁵ States are called on to designate any wetland that supports species listed in these instruments as a Ramsar site.⁶⁶ This illustrates how the regional conservation instruments discussed in chapter three should operate as constituent parts of a more cohesive international conservation regime. It utilises other sources of information on the conservation status of different species, avoiding the resource-intensive, and sometimes repetitive, process of gathering scientific data, enabling States to take more concrete action to achieve conservation outcomes.⁶⁷ Further, Criterion 2 prioritises sites that host ecosystems at risk from changing conditions, whether the consequence of climate change or other factors. States are encouraged not only to protect these sites because they have high conservation value themselves, but also because they might be ‘functionally critical to the survival of other (perhaps rarer) communities or particular species’.⁶⁸ This is a further recognition of the interconnectedness of the natural world, and enhances the potential of the Ramsar Convention to be a truly comprehensive conservation instrument. A common wetland that hosts a common species of waterfowl might not per se warrant protection, but could nevertheless fall within the Ramsar listing criteria if, for example, that waterfowl is the principal source of food for a rare and endangered bird of prey or maintains ecological balance by keeping potentially invasive plant species in check.

There are two tiers to the protection afforded by the Ramsar Convention, although as noted above these fall short of actually applying a protected status to listed sites. Under Article 3(1) States must ‘formulate and implement their planning so as to promote the conservation of the

⁶⁵ Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 23 June 1979, in force 11 November 1983, 19 ILM 15 (1980).

⁶⁶ Ramsar Secretariat, (n 64) p. 85.

⁶⁷ This is a further example of how a resilience thinking approach could be incorporated more broadly into international environmental law. Specifically, the sharing of data between actors would allow for a more efficient use of limited conservation resources.

⁶⁸ Ramsar Secretariat, (n 64), p. 85-86.

wetlands included in the List', and they are under a general obligation 'as far as possible' to encourage the 'wise use' of all wetlands, regardless of whether they are listed, in their territory. This raises similar issues to the phrase 'sustainable use' found in the Convention on Biological Diversity, and indicates that, like the 1992 Convention, conservation is a means to the end of perpetuating use. Here, however, the socio-historic context is very different, as many wetlands have been subject to, and indeed owe their existence to, human management over hundreds of years. 'The adoption of a "preservationist" stance would, indeed, make very little sense in this context, since the key ecological characteristics of many wetlands (such as the blanket peat bogs of upland Britain, which are the product of prehistoric forest clearance) have in fact been significantly created for human purposes'.⁶⁹ Further, there is now extensive guidance on identifying wetlands on the basis of their conservation value, and Ramsar has generally proven successful at ensuring the conservation of wetlands,⁷⁰ albeit with regional variation,⁷¹ as well as encouraging their restoration.⁷² The same cannot be said of the Biodiversity Convention.

Conclusions:

In 1988 Carleton Ray highlighted the potential consequences of human ignorance and indifference to the vast majority of marine biodiversity:

The last fallen mahogany would lie perceptibly on the landscape, and the last black rhino would be obvious in its loneliness, but a marine species may disappear beneath the waves unobserved and the sea would seem to roll on the same as always.⁷³

So far humanity has been fortunate as any marine species that have disappeared have not had a demonstrable impact on the wider global ecosystem. The problem will be when a species that is fundamental to the regulation of the Earth's life-supporting systems vanishes, and as the foundations of marine ecosystems it is likely that this species will be a plant. International environmental law, however, is incapable of affording adequate protection of marine flora. The Biodiversity Convention has renounced any responsibility, and within the LOSC regime it is likely that environmental concerns will always be second to the right of innocent passage.

⁶⁹ Bowman, Davies and Redgwell, (n 35) p. 415.

⁷⁰ Castro et al, (n 55).

⁷¹ V. Batanjski et al, (n 57).

⁷² R. Gardner, 'Rehabilitating Nature: A Comparative Review of Legal Mechanisms that Encourage Wetland Restoration Efforts' (2003) 52 *Catholic University Law Review* 573-620.

⁷³ Carleton Ray, (n 4) p. 45.

For marine flora beyond the limits of wetlands, the 1995 Mediterranean Protocol provides a template that should be adopted at an international level. Its principal advantages address the weaknesses of the global regimes, particularly the greater emphasis on environmental considerations in designating and managing protected areas. However, despite its application to the high seas, the problem of regulating third party States determined to exercise their right of innocent passage remains. It is this issue above all else that must be addressed if marine flora, and the wider marine environment, is to be adequately protected.

The Ramsar Convention, through the provisions on wise use, first seeks to protect and enhance the instrumental values of wetlands, developed through centuries of wetland management practices, and uses conservation as a means to achieve this end. Nevertheless, it has proven reasonably successful at protecting the world's wetlands, and, as a corollary to this, the flora inhabiting those sites as well. Its key strengths lie in its detailed listing criteria, which explicitly refer to the IUCN Red List and other sources in international law, making Ramsar one of the more responsive treaty regimes.

Ramsar is by no means perfect, however. Beyond formal guidance on the listing of suitable sites, and a 'hands-off' approach to international oversight of national implementation measures, the regime contains few binding obligations concerning the conservation of either plants or the wider natural environment. At the very least, the treaty should be amended so as to require that any wetland designated as a Ramsar site by a State is afforded a basic level of protection under that State's domestic law. This would ensure that the Convention is able to deliver actual, rather than merely symbolic, protection for both the plants and wider ecosystem found on all sites considered worthy of listing under Ramsar.

PART 3: LEGAL RESPONSES TO THE DRIVERS OF PLANT DIVERSITY LOSS

VI

PLANTS AND GLOBAL CLIMATE CHANGE POLICY

Plants and the Challenges of Climate Change:

Climate change has been recognised as one of the principal threats to biodiversity, and to plants. Based on current climate predictions, as much as a quarter of all species may be committed to extinction by 2050.¹ Climate change poses unique challenges for plant conservation due to the characteristics of plants that reduce their capacity for adaptation. An example is the capability of plants to relocate to new habitat when their previous range has become unsuitable because of the changing climate.² Relocation will take generations, and there are no guarantees that a plant's seeds will be transported to a new area away from its parent, or that any new area will be ecologically-suitable. Climate change will not only affect individual species, but also the composition and viability of all ecosystems and therefore human society as well.³ A dramatic drop in species diversity could fundamentally alter the natural world's resilience and render all current discussions of what constitutes 'sustainable development' irrelevant.⁴

The science of climate change is complex however, and in certain respects plants are responding positively to changes in global climatic patterns. A 2016 study revealed that CO₂ fertilisation, coupled with the longer growing periods made possible by warmer temperatures and increased rainfall, is resulting in a 'greening' of the Earth.⁵ There are regional variations, and it is noted that climate change is having a significant negative impact on plants in terms of satellite leaf area index in South America. 'This is particularly important owing to the role of the Amazon forests in the global carbon cycle'.⁶ Furthermore, the study does not assess the quality of this

¹ C. Thomas et al, 'Extinction risk from climate change' (2004) 427 *Nature* 145-148.

² J. Good and D. Millward, *Alpine Plants: Ecology for Gardeners* (Batsford, 2007), chapter 10.

³ M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law* (2nd edition, Cambridge University Press, 2010), p. 701-704.

⁴ R. Peters II, 'The Effect of Global Climatic Change on Natural Communities', in E.O. Wilson (ed), *Biodiversity* (National Academy Press, 1988). See also: O. Edenhofer et al (eds), *Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (IPCC, 2014).

⁵ Z. Zhu, S. Piao and R. Myneni et al, 'Greening of the Earth and its drivers' (2016) *Nature Climate Change*, published online 25 April 2016, DOI: 10.1038/NClimate3004, 3.

⁶ *ibid.*

greening in terms of biodiversity. It may be the case that only a few species are capitalising on these more favourable conditions, resulting in a net loss of biodiversity even though net plant biomass is increasing. It should also be noted that another study found that the impact of CO₂ fertilisation varies depending on the methodology used to measure it, and that other factors affected by climate change, such as nutrient and water availability, will also influence vegetation growth.⁷ What is clear is that the impacts of climate change on plants, whilst uncertain, cannot be ignored.

In this chapter I examine plants' place in climate change debates. First, the suggestion that there is a mismatch between biodiversity conservation and climate change mitigation in international environmental law is considered. It is argued that whilst some advances have been made, certain aspects of the law mean that a joined-up approach has yet to be achieved, frustrating its ability to protect plants.

Climate change poses a significant threat to the survival of many species, but particularly in polar and mountainous regions. The legal frameworks for conserving plants in the polar regions have already been discussed, so in this chapter attention will be on the conservation of mountain flora, a third key plant biome. Mountains are particularly challenging arenas for plant conservation. In addition to the problems of relocation noted above, the potential scope for relocations is restricted by the physical size of the mountain and whether the plants' pollinators can survive at increased altitudes, where water, oxygen and other food supplies may be reduced. What is evident from an examination of global mountain instruments is that too much emphasis has been placed on the gathering of data about these issues at the expense of actual conservation measures, and the usefulness of this data is debatable.

Examining how international law attempts to protect plants from the impacts of climate change is only one aspect of the relationship between plants and the climate however. An increasingly significant body of law has evolved in which plants are used to assist in the achievement of the global community's climate change reduction targets.⁸ Two such mechanisms have been developed under the remit of the UN Framework Convention on Climate Change:⁹ Reducing Emissions from Deforestation and Forest Degradation and the Clean Development Mechanism. Both seek to incentivise low and zero carbon projects and activities, but as will be seen, design

⁷ W. Kolby Smith, S. Reed and C. Cleveland et al, 'Large divergence of satellite and Earth system model estimates of global terrestrial CO₂ fertilization' (2016) 6 *Nature Climate Change* 306-310.

⁸ R. Amos, 'Reassessing the Role of Plants in Society' *International Journal of Law in Context* (forthcoming) DOI: <https://doi.org/10.1017/S1744552317000040>.

⁹ New York, 9 May 1992, in force 24 March 1994, 1771 UNTS 107.

flaws reduce their effectiveness and there are significant concerns relating to their broader environmental impacts.

Underpinning this chapter are questions over whether international environmental law is fit for purpose, both in terms of plant conservation and environmental protection generally.

Climate Change and the Conservation of Nature – A Mismatch?

The principal instrument governing international efforts for reducing climate change is the 1992 UN Framework Convention on Climate Change (UNFCCC). This has been supplemented by the 1997 Kyoto Protocol,¹⁰ which imposed mandatory climate change reduction targets on many of the world's developed States, and the 2015 Paris Agreement,¹¹ which broadens the scope of reduction efforts to developing States, albeit with significant caveats.¹² These instruments focus primarily on emission reductions,¹³ either through reduction targets or capacity building and financing of developing States, rather than specific measures intended to protect plants and the rest of the natural world from the impacts of climate change.¹⁴ This is significant as the challenges of biodiversity loss and climate change are considered to be interconnected, and there is an ongoing debate whether biodiversity and climate change policies are sufficiently integrated at the international level to allow for the effective fulfilment of both.¹⁵ Trouwborst argues that there is a 'mismatch' between the two issues, as 'climate change is now placing demands on international conservation law which are fundamentally different from, and more severe than, the demands for which most conservation treaties were originally intended'.¹⁶ This is a view shared by McNeely. In his assessment of a number of major multilateral environmental agreements, he notes that although steps have been taken under each to address the impacts of climate change in the context of their individual remits, a coherent cross-cutting strategy to

¹⁰ Kyoto, 11 December 1997, in force 16 February 2005, 37 ILM 22 (1998).

¹¹ FCCC/CP/2015/L.9/Rev.1, in force 4 November 2016.

¹² For example, Article 4(1) of the Paris Agreement notes that peaking of emission levels will take longer for developing States.

¹³ Although Article 7 of the Paris Agreement also recognised adaptation as a goal of the international climate change regime.

¹⁴ Although such measures could of course form part of the broader adaption strategies outlined in Article 7 of the Paris Agreement.

¹⁵ D.A. Farber, 'Separated at Birth? Addressing the Twin Crises of Biodiversity and Climate Change' (2015) 42 *Ecology Law Quarterly* 841-888.

¹⁶ A. Trouwborst, 'International Nature Conservation Law and the Adaptation of Biodiversity to Climate Change: a Mismatch?' (2009) 21 *Journal of Environmental Law* 419-442. See also D. Hodas, 'Biodiversity and Climate Change Laws: A Failure to Communicate?', in M. Jeffery, J. Firestone and K. Bubna-Litic (eds), *Biodiversity, Conservation, Law + Livelihoods: Bridging the North-South Divide* (IUCN Academy of Environmental Law / Cambridge University Press, 2008).

deal with the effects of climate change has yet to emerge. Instead we 'continue to stumble along with a patchwork of uncoordinated conventions, protocols, and agreements so weak that significant climate change will inevitably have major negative impacts on human well-being as well as terrestrial, aquatic, and avian life'.¹⁷

Trouwborst's reason for suggesting there is this mismatch is the inability of international conservation law to facilitate adaptation to climate change by the natural world, defined as 'both promoting resilience to change (in other words, reducing vulnerability to change) and accommodation of change'.¹⁸ The 1972 World Heritage Convention¹⁹ is an illustration of this. Despite climate change being recognised as a major threat to much of the world's heritage, the Convention is largely powerless to facilitate adaptation 'for the plain reason that the Convention is, more than anything, devoted to keeping things as they are'.²⁰ In terms of specific adaptation policy goals, Trouwborst believes that conservation law must instead '(i) promote the dispersal of species; (ii) increase available habitat; and (iii) reduce pressures not linked to climate change'.²¹ To achieve this, he advocates, for example, redesigning protected areas so that they facilitate climate-induced migrations by running along north-south axis, or from low to high elevations.²² Whilst sound in theory, however, in practice there are significant problems with this approach. Particularly relevant to the current discussion is that natural obstacles, such as oceans or the top of the mountain, will eventually halt any migration, regardless of whether this migration is aided by protected areas.

The Convention on Biological Diversity²³ is another example of a conservation instrument that is not equipped to deal with climate change issues. Although, as I discuss below, there have been several COP Decisions that have addressed various aspects of the climate change challenge, these fail to compensate for the 'general and heavily qualified' obligations in the operational part of the treaty.²⁴ The weakness of the Biodiversity Convention in this regard is further compounded by the lack of direct reference to the need to ensure and enhance the adaptability of nature to climate change.²⁵

¹⁷ J. McNeely, 'Applying the Diversity of International Conventions to Address the Challenges of Climate Change' (2008) 17 *Michigan State Journal of International Law* 123-137, 137.

¹⁸ Trouwborst, (n 16) 427.

¹⁹ Convention for the Protection of the World Cultural and Natural Heritage, Paris, 16 November 1972, in force 17 December 1975, 27 UST 37, 11 ILM 1358 (1972).

²⁰ Trouwborst, (n 16) 433.

²¹ *ibid*, 428.

²² *ibid*, 428-429.

²³ Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992).

²⁴ Trouwborst, (n 16) 437.

²⁵ *ibid*.

Morgera takes the opposite view to Trouwborst and McNeely, arguing that ‘It has become increasingly inaccurate to refer to a “mismatch” between biodiversity law and climate change law’ due to the outcomes of the Biodiversity Convention COP-10 in 2010.²⁶ First, Morgera points to the COP’s Decision on Biodiversity and Climate Change,²⁷ which ‘aims to inject a more environmentally holistic and people-centred approach into state practice in tackling climate change’.²⁸ Importantly, and in contrast to climate change instruments, there is an explicit recognition in the Decision that loss of and damage to biodiversity is a consequence of climate change.²⁹ Included in the Decision is a moratorium on geoengineering, i.e. any process that seeks to artificially alter climatic conditions, due to the uncertainty surrounding the potential impacts of such activities on biodiversity.³⁰ In other words, a precautionary approach is being adopted in climate change mitigation for purposes of biodiversity protection. At the same time, climate change mitigation efforts are not being totally restricted, as the moratorium includes exceptions for both carbon capture and storage³¹ and research conducted in accordance with Article 3 of the Convention.

A further argument put forward by Morgera is the mainstreaming of climate change issues into the Biodiversity Convention’s Work Programmes following COP-10. For example, Decision X/30 recognises the range of impacts climate change will have on mountain biodiversity, and goes some way to addressing the weaknesses of international law’s approach to protecting mountain flora discussed below. Not only does it encourage greater consideration of climate change impacts in mountain conservation planning, but also recognises that climate change reduction actions, such as the deployment of renewable energy infrastructure, can also impact on mountain biodiversity.

It is true that COP-10 represents progress towards the effective integration of international climate change and biodiversity policies. However, there are a number of flaws in Morgera’s arguments that lead to the conclusion that a mismatch between the two areas still exists. For example, although there is an exception for carbon capture and storage to the moratorium on geoengineering, this exception is expressly limited to carbon capture from fossil fuels. It may therefore be inferred that bioenergy carbon capture and storage is not permitted under the

²⁶ E. Morgera, ‘Far away, so close: A Legal analysis of the increasing interactions between the Convention on Biological Diversity and climate change law’ (2011) 2 *Climate Law* 85-115, 85.

²⁷ Decision X/33. ‘Biodiversity and climate change’, UNEP/CBD/COP/DEC/X/33, 29 October 2010.

²⁸ Morgera, (n 26), 95.

²⁹ Decision X/33, (n 27) para. 2.

³⁰ *ibid*, para. 8(w).

³¹ A footnote to para. 8(w) explicitly excludes carbon capture and storage from fossil fuels from the moratorium.

Decision on Biodiversity and Climate Change. This is problematic because carbon capture from biofuels has been recognised as essential if the international community is to meet its 2°C climate change target.³² Proponents of this technology could rely on Article 22(1) of the Biodiversity Convention, which states that the Convention will not affect the rights and obligations of States arising from other international agreements. However, despite its importance, neither the UNFCCC nor the 2015 Paris Agreement explicitly mention bioenergy carbon capture and storage, and so it is difficult to say that these instruments contain an obligation to employ this technology. Furthermore, Article 22(1) goes on to say that the Biodiversity Convention takes priority ‘where the exercise of those rights and obligations would cause a serious damage or threat to biological diversity’. That the moratorium has been imposed suggests that such a threat is considered to exist. Regardless, there is clearly a mismatch between biodiversity policy on geoengineering, specifically carbon capture from biofuels, and climate change mitigation methods. This could simply be a consequence of poor drafting and a future COP of either regime will clarify the position on this potentially crucial technology. In the meantime, however, the Biodiversity Convention does not endorse an important component of climate change mitigation strategies and so a mismatch exists.³³

Additionally, Morgera herself has acknowledged that there are limits on how far cooperation between the biodiversity and climate change regimes can go due to a reluctance on the part of some States to conflate the two issues. Consequently, the Decision on Biodiversity and Climate Change only called for the development of joint activities between the two regimes,³⁴ rather than the more ambitious joint programme of work that had initially been proposed.³⁵

Finally, the lack of progress towards achieving the majority of the Aichi Biodiversity Targets show that whatever the potential may have been for COP-10 to overcome some of the inconsistencies between biodiversity and climate change policies, since that meeting integration between the two remains poor. Of particular relevance is Target 15. According to the Fourth Global Biodiversity Outlook, no progress has been made towards enhancing ecosystem resilience, and although some progress has been made in restoring degraded ecosystems, the 15% target is unlikely to be met by 2020.³⁶

³² Edenhofer et al (eds), (n 4) 10.

³³ On the current approach to the international regulation of geoengineering, and potential ways forward, see C. Redgwell, ‘Geoengineering the Climate: Technological Solutions to Mitigation – Failure or Continuing Carbon Addiction?’ (2011) 2 *Carbon & Climate Law Review* 178-189.

³⁴ Decision X/33, (n 27) para. 13.

³⁵ Morgera, (n 26).

³⁶ Secretariat to the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montreal, 2014), p. 100-103.

The Conservation of Mountain Flora:

The conservation of mountain flora raises several unique practical and legal challenges. It has been on the agenda in international environmental fora for several decades, with scientific communities recognising the importance of mountain ecosystems long before the 1992 Rio Conference.³⁷ International cooperation is a common feature of mountain-related instruments, often as a substitute for more specific obligations on States.

The impacts of climate change on mountains have gradually been recognised in international documents. For example, the World Summit on Sustainable Development's Plan of Implementation notes that '[Mountain ecosystems] are particularly fragile and vulnerable to the adverse effects of climate change and need specific protection'.³⁸ As Sands points out, however, 'The WSSD Plan of Implementation is long on general commitments and aspiration, but short on specific actions to be taken',³⁹ and this is equally true of the section on mountain biodiversity. Six areas for action are identified but these are expressed in very general terms and, like the Summit as a whole, focus on the social equity element of sustainable development.⁴⁰

A more detailed framework for action was provided ten years earlier in Agenda 21, Chapter 13 of which concerns the sustainable development of mountains. This contains two Programme Areas, the most important for the current discussion being Programme Area A: Generating and strengthening knowledge about the ecology and sustainable development of mountain ecosystems.⁴¹ As the title suggests, the focus of this Programme Area is on collecting scientific information. The objectives of the Programme Area consequently include the conducting of surveys on the constituent elements of mountain ecosystems, the generation of databases to aid in the assessment of environmental impacts of activities on mountain ecosystems, to improve ecological awareness of agricultural and conservation practices and to improve regional coordination efforts in mountain conservation.⁴² The data that is made available in pursuit of these objectives will undoubtedly have its uses, and some of the activities encouraged by the Programme Area, such as facilitating the sharing of best environmental practices between local

³⁷ B. Messerli, 'Global Change and the World's Mountains: Where Are We Coming From, and Where Are We Going To?' (2012) 32 *Mountain Research and Development* s55-s63.

³⁸ A/CONF.199/20, 4 September 2002, para. 42.

³⁹ P. Sands and J. Peel, *Principles of International Environmental Law* (3rd edition, Cambridge University Press, 2012), p. 48.

⁴⁰ *ibid.*

⁴¹ Programme Area B is dedicated to promoting integrated watershed development and alternative livelihood opportunities.

⁴² Para. 13.5.

communities,⁴³ have the potential to address some of the more direct threats to plants, such as overgrazing. However, given the immediacy of the threats facing mountain ecosystems, the added value of yet more scientific data at the expense of positive conservation actions is debatable. Although Chapter 13 recognises that ‘Mountains are the areas most sensitive to all climatic changes in the atmosphere’,⁴⁴ nothing in the Chapter directly addresses the impacts climate change is having on mountain ecosystems, or even about gathering data about those impacts. Further, the amount of data now being produced from multiple sources ‘has increased to a level that is no longer manageable’.⁴⁵

Despite the attention that mountain biodiversity had received, the Biodiversity Convention did not develop a Programme of Work on Mountain Biodiversity until 2004.⁴⁶ Whilst the collection of scientific data has its place in the Programme, it also sets out a number of other direct actions for conservation,⁴⁷ including:

Monitor and exchange information on the impacts of global climate change on mountain biological diversity, and identify and implement ways and means to reduce the negative impacts.⁴⁸

Other actions called for in the Programme of Work, although not explicitly linked to the issue, will nevertheless require some consideration of how certain activities will contribute to climate change. For example, paragraph 1.1.1. encourages States to ‘Reduce the impacts of adverse land-use practices and changes in urban, forest, inland waters and agricultural areas in mountain ecosystems’, and 1.1.3. calls on States to ‘Prevent or mitigate the negative impacts of economic development, infrastructure projects and other human-induced disturbances on mountain biological diversity’. Importantly, and in contrast to other instruments examined in this work, the fundamental role of plants in supporting mountain ecosystems is also recognised:

Soil retention and stability are closely connected with the extent of above-ground and below-ground vegetation, both essential to ecosystem resilience after disturbance. The high plant functional diversity of mountain ecosystems may also add to their resiliency and, should extreme disturbances occur, often provides effective barriers to high-energy events such as rock falls and avalanches. It may also reduce extensive damage levels at lower elevations.⁴⁹

⁴³ Para. 13.6(b).

⁴⁴ Para. 13.4.

⁴⁵ Messerli, (n 38), s61.

⁴⁶ Decision VII/27, ‘Mountain biological diversity’, UNEP/CBD/COP/DEC/VII/27, 13 April 2004, Annex.

⁴⁷ Programme Element 1.

⁴⁸ Goal 1.1.5.

⁴⁹ Annex, para. 3.

This is reflected in a further direct conservation action, which encourages States to ‘maintain and/or enhance soil stability and ecosystem integrity by way of a diverse and natural vegetation cover that will also promote soil biodiversity function’.⁵⁰ The Programme of Work on Mountain Biodiversity therefore represents a step forward in international efforts to protect mountain flora from a range of pressures, including climate change. It moves beyond simply collecting data and attempts to deal with, in a more explicit manner than the actual Convention, some of the drivers of mountain biodiversity loss. The overall objective of the Work Programme was a significant reduction in the loss of mountain biodiversity by 2010. However, despite the status of mountain biodiversity not being specifically addressed, the Third Global Biodiversity Outlook, published in 2010, makes it clear that this target was not met. In the summary of the (lack of) progress towards the 2010 subsidiary biodiversity targets⁵¹ it was noted that for Goal 7.1⁵² ‘limited action’ had been taken to enhance the resilience of biodiversity,⁵³ which no doubt contributed to the failure of Goal 5.1,⁵⁴ as a number of more fragile ecosystems were found to have declined.⁵⁵

The response of the Parties to the Biodiversity Convention to this failure was Decision X/30 on Mountain Biological Diversity.⁵⁶ In comparison to earlier instruments, Decision X/30 repeatedly emphasises the need to protect mountain biodiversity from the effects of climate change.⁵⁷ A further important development was the recognition that mountains have a role to play in climate change mitigation. Paragraph 4 invites States to ‘safeguard and restore mountain biological diversity and related ecosystem services, given their potential to contribute to climate change mitigation and adaptation’, and paragraph 5(b) calls on States to ‘enhance the role of mountains in providing important ecosystem services such as natural carbon and water regulation’. This more rounded approach supports Morgera’s proposition that climate change and biodiversity policies are being increasingly integrated, although these broad (non-binding) statements fall short of a coherent and detailed policy.

With regards to the means of implementation, the focus of Decision X/30, as with the Programme of Work on Mountain Biodiversity, is on national action and regional cooperation.

⁵⁰ *ibid*, Goal 1.1.2.

⁵¹ Decision VI/26, ‘Strategic Plan for the Convention on Biological Diversity’, UNEP/CBD/COP/6/20, 2002, p. 317.

⁵² Maintain and enhance resilience of the components of biodiversity to adapt to climate change.

⁵³ Secretariat to the Convention on Biological Diversity, *Global Biodiversity Outlook 3* (Montreal, 2010), p. 19.

⁵⁴ Rate of loss and degradation of natural habitats decreased.

⁵⁵ Secretariat to the Convention, (n 54) p. 18.

⁵⁶ Decision X/30, ‘Mountain Biological Diversity’, UNEP/CBD/COP/DEC/X/30, 29 October 2010.

⁵⁷ See para. 2(c), 5, 5(a), and 5(c).

This is further evidence of the dominant sovereign interests of States that underpin international discussions on mountain conservation, although unlike the Decision containing the Programme of Work,⁵⁸ Decision X/30 is free from an explicit recognition of State sovereignty. This emphasis on national action has achieved similar results as other activities under the Biodiversity Convention, namely few positive conservation outcomes. In the summary of Aichi Target 10, the Fourth Global Biodiversity Outlook notes that ‘insufficient information was available’ to be able to assess whether anthropogenic pressures on mountain ecosystems, including climate change, had been reduced. Other Aichi Targets, however, suggest that they have not. One element of Target 5 is for the degradation and fragmentation of habitats to be significantly reduced by 2020, but the Fourth Global Biodiversity Outlook indicates that habitats are becoming increasingly fragmented and degraded.⁵⁹

The specific conclusion that there is insufficient information on mountain ecosystems is more concerning than this general trend in two respects. First, it means that the principal global conservation regime does not know the status of one of the most vulnerable ecosystems. How can more specific conservation actions be developed without this basic knowledge? More worryingly, it was noted above that much of the focus of international mountain conservation efforts has, in fact, been on gathering data. That there was insufficient information for a proper assessment of the state of mountain ecosystems suggests that either this data has been mishandled in attempting to conduct that assessment, or, worse, that it is of limited practical use. With mountain ecosystems continuing to decline as pressures from climate change increase, we cannot afford to spend another three decades collecting data.

To summarise, the regimes in place to conserve mountain flora contain major weaknesses that undermine the law’s ability to protect plants. Despite decades of data-gathering, there appears to be no clear picture on the state of the world’s mountain biodiversity. What is needed, therefore, is a single authority responsible for collating and disseminating this information in a clear and concise way so as to better inform any conservation strategies, a proposal that is also advanced by Messerli.⁶⁰ Additionally, a fundamental rethink of traditional conservation methods, particularly protected areas, is needed. Like conservation law, be this national, regional or international conservation law, protected areas remain linked to a historic preoccupation with ‘preservation’, and are simply not designed to facilitate the adaptation and migration of the natural world. However, as noted above, merely redesigning protected areas

⁵⁸ Decision VII/27, (n 47) para. 2.

⁵⁹ Secretariat to the Convention, (n 37) p. 50.

⁶⁰ Messerli, (n 38).

so that they facilitate climate-induced migrations will not address the deeper systemic challenges of climate change.

The UNFCCC's REDD Programme:

The preceding discussion has looked at how international environmental law attempts to reduce the impacts of climate change on plants. This, however, is only one aspect of the relationship between plants and international climate change law. Plants are also central to policies and mechanisms designed to mitigate climate change as part of climate change solutions.⁶¹

One such mechanism is Reducing Emissions from Deforestation and Degradation (REDD), which was initially proposed by Papua New Guinea and Costa Rica at the UNFCCC COP-11 in 2005.⁶² In subsequent COPs the scope of REDD was expanded, and in 2009 Reducing Emissions from Deforestation and Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks, or REDD+,⁶³ was given official recognition.⁶⁴

The rationale behind REDD is relatively straightforward. It is intended to make forests more valuable to the States in which they are located if they are left intact rather than felled for timber and other land-uses. REDD is therefore based on an instrumental understanding of the value of forests, both in terms of their utility as carbon sinks but also a commodity value as the focal point for investment. Whilst sound in theory, however, this added instrumental value creates pressure for the conversion of forests specifically for carbon storage, which is not necessarily beneficial for biodiversity. A number of issues must therefore be addressed if REDD is to be able to both play a significant role in combatting climate change and provide adequate protection of forests and their constituent species.

First are issues of practical implementation, which fall into three categories: establishing baselines, monitoring and forest management.⁶⁵ With regards to the necessary scientific basis of REDD, it has proven challenging to establish baselines for deforestation. Efforts to identify

⁶¹ For example, through bioenergy carbon capture and storage. See R. Amos, 'Bioenergy Carbon Capture and Storage in Global Climate Policy: Examining the Issues' (2016) 10 *Carbon & Climate Law Review* 187-193.

⁶² FCCC/CP/2005/Misc.1. Originally the mechanism was RED – degradation was added in 2007, Decision 2/CP.13, FCCC/CP/2007/6/Add.1.

⁶³ For ease of reading, I have used the acronym REDD in the remainder of this chapter to refer to both REDD and REDD+.

⁶⁴ A. Wiersama, 'Climate Change, Forests, and International Law: REDD's Descent into Irrelevance' (2014) 47 *Vanderbilt Journal of Transnational Law* 1-66.

⁶⁵ L. Godden et al, 'Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD): Implementation Issues' (2010) 36 *Monash University Law Review* 139-172.

pre-industrial human forest levels have been frustrated by a lack of data and that human relationships with forests are complex. In many areas it has been a case of modification rather than wholesale deforestation, and other areas have undergone reforestation with varying degrees of success.⁶⁶

Related to the difficulties of establishing baselines are the challenges to monitoring carbon stocks:

From a technical perspective there are two broad challenges. The first is measuring the change in forest carbon stocks associated with the conversion of forest to other land uses... afforestation or natural forest regeneration... The second challenge lies in assessing changes in forest carbon stocks in areas of forest that remain forested but are potentially subject to degradation.⁶⁷

The only way to accurately monitor this is with on-the-ground surveys of the quality of forests and the diversity of species. These require considerable technical and financial resources, although are becoming increasingly viable.⁶⁸

Forest management is a particularly contentious issue, as it involves questions of property rights over both the forests themselves and the carbon stored in them, as well as the impacts a REDD project will have on any community that relies on the forest for its livelihood.⁶⁹ A key point is that in many States exactly who 'owns' a forest will be difficult to establish. It may be the case that a forest belongs to the State, but an indigenous community has the right to reside in it and holds the rights over the resources in that forest. Alternatively, forests might be privately owned but the State could hold the rights to the carbon stocks. If REDD is to be successfully implemented, establishing exactly who has what rights is critical, as it is this that will determine who should be credited for any emission reductions – the State or the project developer – and who should receive payment for those reductions.

There is also a need to ensure that REDD supports biodiversity conservation. The reason for this is twofold. First, in the absence of a robust forest conservation regime 'the potential for REDD to secure biodiversity conservation represents a critical opportunity to make progress where

⁶⁶ *ibid.*

⁶⁷ Godden et al, (n 66) 153.

⁶⁸ S. Goetz et al, 'Measurement and monitoring needs, capabilities and potential for addressing reduced emissions from deforestation and forest degradation under REDD+' (2015) 10 *Environmental Research Letters* 123001.

⁶⁹ W. Nartey, 'A REDD Solution to a Green Problem: Using REDD Plus to Address Deforestation in Ghana through Benefit Sharing and Community Self-Empowerment' (2014) 22 *African Journal of International and Comparative Law* 80-102.

prior instruments have floundered'.⁷⁰ Second, maximising the potential of forests to act as carbon sinks does not necessarily mean that biodiversity will also be protected. Different species store different level of carbon,⁷¹ and REDD could incentivise the mass planting of a single species that absorbs the most carbon. Further, as Hinsley et al point out, not all threats to forest biodiversity will be detected through REDD's current principal indicators of tree cover and carbon storage.⁷²

The Contracting Parties to the UNFCCC have demonstrated an awareness of the risks REDD potentially poses to forest biodiversity. At the 2010 COP-16 in Cancun they adopted safeguards to be incorporated into any REDD project. These include:

That actions are consistent with the conservation of natural forests and biological diversity, ensuring that the actions [taken in pursuit of REDD] are not used for the conversion of forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits.⁷³

Whilst an important recognition of the potential risks posed by REDD to forest biodiversity, the practical value of this safeguard has been challenged. Saveresi, for example, questions whether it will be adequate to ensure biodiversity concerns are properly taken into account without an overarching supranational body – be this a single COP or a more formal joint body between the UNFCCC and Biodiversity Convention – to facilitate greater levels of cooperation between the different international entities responsible for different aspects of forest conservation.⁷⁴ Long believes something much more radical than a mere safeguard is required to ensure that REDD is, at the very least, ecologically benign. He proposes a system in which REDD projects that meet certain criteria, such as the use of a diverse range of species in reforestation programmes, are classified as 'biodiversity-enhancing projects' and become eligible for additional financial support.⁷⁵

⁷⁰ A. Long, 'Taking Adaptation Value Seriously: Designing REDD to Protect Biodiversity' (2009) 3 *Carbon and Climate Law Review* 314-323, 319.

⁷¹ A. Hinsley, A. Entwistle and D. Pio, 'Does the long-term success of REDD+ also depend on biodiversity?' (2015) 49 *Oryx* 216-221.

⁷² *ibid*, 218.

⁷³ Decision 1/CP.16, FCCC/CP/2010/7/Add.1, Appendix I, para. 2(e). Other safeguards relate to the protection of indigenous peoples and ensuring public participation in REDD activities. Further guidance on the implementation of the Cancun safeguards has been provided in Decision 12/CP.17, FCCC/CP/2011/9/Add.2; 12/CP.19, FCCC/CP/2013/10/Add.1; and 17/CP.21, FCCC/CP/2015/10/Add.3.

⁷⁴ A. Saveresi, 'The Human Rights Dimension of REDD' (2012) 12 *Review of European Community and International Environmental Law* 102-113.

⁷⁵ Long, (n 71) 322.

In addition to extra finance, Long proposes that these biodiversity-enhancing projects should be awarded additional credits under a market-based REDD scheme, which rewards project hosts for biodiversity-beneficial activities and also incentivises investment in biodiversity-enhancing activities. He argues that ‘the income generated through [biodiversity-enhancing] REDD credits would directly support adaptation and, accordingly, may decrease the need for voluntary or [Official Development Assistance] adaptation funding. Without the incentives envisaged in this proposal, REDD is unlikely to realize these benefits’.⁷⁶

Long’s proposals address the concern that REDD could lead to a further decline in forest biodiversity due to carbon storage being prioritised over conservation, and they also create new funding opportunities for conservation projects. However, they also share some of the implementation concerns noted above. Baselines would have to be established so that any improvements in a forest’s biodiversity could be accurately measured, and there would need to be ongoing monitoring to ensure that steps taken to secure additional funding were not abandoned once payment had been received. Long also envisages significant administrative infrastructure to support his proposals, with an expert panel being responsible for determining whether a project qualifies as ‘biodiversity enhancing’ and an Executive Board to provide oversight.⁷⁷ This adds a further layer to an already complex international climate change bureaucracy, and would require significant levels of additional funding.

The broader remit of REDD enables it to (potentially) address some of the other drivers of forest biodiversity loss, including hunting,⁷⁸ forest fires⁷⁹ and poverty.⁸⁰ Further, it represents an opportunity to integrate the twin goals of climate change policy: adaptation and mitigation. However, this has made it increasingly difficult to implement. A report on the REDD programme was published in 2014⁸¹ and its key findings with regards to the programme’s effectiveness were mixed. Notable progress was observed in relation to the programme’s outputs, for example on forest monitoring, reporting and verification and stakeholder involvement. The programme was also linked with increased awareness of forest conservation, and with the facilitation of forest-dependent communities in having greater access to decision-making processes. However, the

⁷⁶ *ibid*, 323.

⁷⁷ *Ibid*.

⁷⁸ Hinsley, Entwistle and Pio, (n 72).

⁷⁹ A. Hoover, ‘Using REDD to Promote Biodiversity-Sensitive Forest Fire Management Schemes’ (2009-2010) 10 *Sustainable Development Law and Policy* 34-53.

⁸⁰ C. Hett et al, Carbon Pools and Poverty Peaks in Lao PDR’ (2012) 32 *Mountain Research and Development* 390-399.

⁸¹ UN-REDD Programme, ‘External Evaluation of the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (the UN-REDD Programme)’ (July, 2014).

level of resources needed to make developing States 'REDD+ ready' had been seriously underestimated, and no State reviewed by the report had made satisfactory progress in all areas of the REDD programme. Financial incentives had clearly not had the desired impact in terms of changing national behaviour,⁸² a point that is reinforced by the Fourth Global Biodiversity Outlook's conclusions on deforestation.⁸³

The Kyoto Protocol's Clean Development Mechanism:

A second mechanism through which plants can play a role in combatting climate change is the Clean Development Mechanism (CDM), a market-based mechanism designed to assist developed States in achieving their emission reduction obligations under the Kyoto Protocol by financing carbon reduction projects in developing States.⁸⁴ Where emission reductions that are in addition to what would have been achieved anyway are attributed to a project, the investors in that project are awarded Certified Emission Reduction credits (CERs), each equivalent to one tonne of carbon dioxide. These may be bought and sold as necessary by States when meeting their Kyoto Protocol obligations.⁸⁵ As such, it is perhaps more accurately described as an emissions offsetting system, rather than an emissions reduction system, as it allows developed States to continue emitting greenhouse gases through the financing of carbon-reduction technologies in developing States.⁸⁶ It also facilitates technology transfer, with investments in developing States being targeted towards new, high-tech low-carbon technologies.⁸⁷

There are a number of aspects to the operation of the CDM that are relevant to plants. The first relates to whether or not deforestation, reforestation and afforestation, i.e. the activities covered by REDD, should be considered eligible projects under the CDM.⁸⁸ Resistance to including such activities within the CDM is primarily founded on the difficulty in determining whether any emissions reductions would be additional to a 'business as usual' policy.⁸⁹ Further

⁸² *ibid*, p. iv

⁸³ Secretariat to the Convention, (n 37) p. 51.

⁸⁴ Article 12 of the Kyoto Protocol.

⁸⁵ For the rules and regulations of the CDM see Decision 3/CMP.1, FCCC/KP/CMP/2005/8/Add.1.

⁸⁶ C. Voigt, 'Responsibility for the Environmental Integrity of the CDM: Judicial Review of Executive Board Decisions', in D. Freestone and C. Streck (eds), *Legal Aspects of Carbon Trading: Kyoto, Copenhagen and beyond* (Oxford University Press, 2009), p. 273-264.

⁸⁷ G. Cox, 'The Clean Development Mechanism as a Vehicle for Technology Transfer and Sustainable Development – Myth or Reality' (2010) 6 *Law, Environment and Development Journal* 179-199.

⁸⁸ R. Sampaio, 'Seeing the Forest for the Treaties: The Evolving Debates on Forest and Forestry Activities under the Clean Development Mechanism Ten Years After the Kyoto Protocol' (2007-2008) 31 *Fordham International Law Journal* 634-683.

⁸⁹ D. Hirsch, 'Trading in Ecosystem Services: Carbon Sinks and the Clean Development Mechanism' (2007) 22 *Journal of Land Use* 623-639.

grounds for opposing the inclusion of forestry and other carbon sink activities are that there are no guarantees that the emission reductions would be permanent.⁹⁰ Future changes in national policy could see previously protected forests being felled and the stored carbon emitted. A compromise has been reached in the CDM, with reforestation and afforestation being accepted, but not deforestation. This is a practical solution to the problem, as it is easier to determine whether positive action, i.e. the planting and restoration of forests, was only possible with CDM financing than it is passive action, i.e. simply not cutting down trees, although the problem of potential re-emission remains.

Forests are just one way in which plants can form part of a CDM project and other project-types, for example relating to biofuels, are common.⁹¹ Biofuels are not unproblematic however, particularly in the broader context of global climate ambitions, as I have explored elsewhere.⁹²

The question of whether any emissions reductions are additional⁹³ to what would otherwise have been achieved in the absence of the CDM is at the heart of the environmental integrity of the Mechanism. Difficulties arise because it is based on hypothetical scenarios; project developers must predict what the emission reductions would be if the project did not go ahead, which inevitably involves a degree of (educated) guesswork. In addition to these practical difficulties, this approach also carries the risk of project developers exaggerating what the level of emissions would be to maximise the CERs from the project.⁹⁴ Evidence shows that this overestimation, whether the result of intentional inflation or inaccurate modelling, is common,⁹⁵ suggesting that there are flaws in the design of the CDM that prevent it from operating efficiently. The way the CDM operates also creates a perverse incentive for governments to avoid regulating greenhouse gas emitters. Leaving it to the CDM to provide the funds for operators to move towards low-carbon technologies frees governments from imposing costly and burdensome command and control regulations on industries and creates new tax revenues from taxes on CERs.⁹⁶ Similarly, operators have found it more cost-effective to continue emitting harmful gases than unilaterally moving to greener methods.⁹⁷ Furthermore, the project-specific

⁹⁰ *ibid.*

⁹¹ For a complete list of CDM projects see: <http://cdm.unfccc.int/Projects/projsearch.html>.

⁹² Amos, (n 62).

⁹³ A. Michaelowa, 'Interpreting the Additionality of CDM Projects: Changes in Additionality Definitions and Regulatory Practices over Time', in Freestone and Streck (eds), (n 87).

⁹⁴ C. Voigt, 'Is the Clean Development Mechanism Sustainable? Some Critical Aspects' (2007-2008) 8 *Sustainable Development Law and Policy* 15-21.

⁹⁵ Voigt, (n 87) p. 278

⁹⁶ M. Brown, 'Limiting Corrupt Incentives in a Global REDD Regime' (2010) 37 *Ecology Law Quarterly* 237-268.

⁹⁷ *ibid.*

nature of the CDM makes it harder to take into account the effects of national policies when judging the additionality of any emission reductions. Brown refers to the example of Chinese renewable energy operators. Individually, each project had a legitimate claim to being unable to compete with the fossil fuel industry and was therefore eligible for CDM support. However, China had taken steps, including significant national funding, that meant the national renewables industry was more competitive. The additionality of any emission reductions from the individual projects is therefore debatable.⁹⁸

Defining the CDM's environmental integrity based on additionality alone ignores the wider environmental impacts a project is likely to have, especially on biodiversity. 'In particular, these concerns exist where CO₂ sequestration projects... result in large-scale plantations of mono-cultural and/or non-indigenous tree species that could pose a threat to, or destroy local ecological systems'.⁹⁹ Like REDD, there is nothing in the relevant international instruments that prohibits absolutely the mass planting of single species to maximise carbon absorption capacity at the expense of, inter alia, biodiversity and ecosystem functionality. The UNFCCC COP, acting as the Kyoto Protocol MOP, has highlighted the importance of ensuring CDM projects do not entail negative environmental impacts,¹⁰⁰ but this a poor substitute for a legal prohibition on projects that would result in significant environmental harms.

Conclusions:

There are no easy answers to climate change, but this chapter has shown that the answers the international community have so far produced are flawed, insufficient and in some cases self-defeating.

In terms of broader biodiversity conservation, the inability of international environmental law to mitigate the impacts of climate change is as much a consequence of its historical development as it is a failure of more modern(ish) agreements. The early conservation treaties, which are predominately issue- or region-specific, are simply not designed to deal with an issue as pervasive as climate change. Whilst a lack of foresight on the part of negotiators in the 1970s can be forgiven, the failure of the Biodiversity Convention and UNFCCC regimes to produce a coherent and integrated response to global climate change cannot. Morgera is correct to point

⁹⁸ *ibid.*

⁹⁹ Voigt, (n 95) 16.

¹⁰⁰ For example, see Decision 2/CMP.1 (Montreal, 28 November – 10 December 2005), FCCC/KP/CMP/2005/8/Add.1

out that efforts have been made to incorporate climate change into the work programmes of the Biodiversity Convention but, as the case study of mountain flora illustrates, these fall short of a comprehensive response that both mitigates the impacts of climate change on nature and facilitates its adaptation to those impacts. This issue is compounded by the similarly flawed mechanisms of listing endangered species and creating protected areas. These cannot respond adequately to climate change if they remain anchored to a political preoccupation with preservation. A protected area can enjoy the most formidable system of monitoring and enforcement, but this will be of no help to the biodiversity it hosts if its water supply evaporates because of the changing climate. Equally, however, mere reforms to protected areas will fall short of the more holistic response needed to climate change.

Templates for this response can be found in REDD and the CDM, although these are not without their own issues. There are still, in my view, inadequate safeguards to ensure that carbon storage capacity is not maximised at the expense of biodiversity. For REDD, efforts should therefore be made to facilitate the sharing of best practice and the development of international guidelines to aid developing States in designing ecologically-benign and ecologically-beneficial REDD policies. With regard to the CDM, the concept of environmental integrity needs to be expanded to include ecological criteria. This would go some way to addressing concerns raised about the ecological credentials of the Mechanism.

VII

REGULATING THE IMPACTS OF INTERNATIONAL TRADE ON PLANTS

Plants and International Trade:

Trade is one of the principal manifestations of the anthropocentric values of plants, both instrumental and inherent. Thousands of species are utilised as building materials, pharmaceutical components and in a host of other everyday uses. Other species, notably orchids,¹ are highly valued by collectors, and consequently take on a commercial value separate from any practical use. This trade has consequences for wild plant populations, particularly on species found in only a few locations or that are subject to excessive levels of collection and harvesting.² For other species, trade in commercially cultivated plants has reduced demand for specimens collected from the wild, but this in turn has reduced the economic incentives for preserving those species' natural sites.³

This chapter explores the way in which international law approaches the interrelationships between international trade rules and the conservation of plants. Trade liberalisation has been a long-term objective of the international community and a complex regime, brought together under the umbrella of the World Trade Organisation (WTO), has evolved to facilitate this. This regime however sits in tension with otherwise legitimate exercises of State sovereignty that are contrary to WTO rules. At the same time, the international community has recognised, particularly through the 1973 Convention on International Trade in Endangered Species⁴ (CITES), that trade in certain species can be a contributory factor to their decline.

Whilst the WTO and CITES are the two main international trading regimes, and therefore the focus of this chapter, they are not the only trade instruments relevant to plant conservation.⁵

¹ For a remarkable account of how orchids can become an all-consuming passion see E. Hansen, *Orchid Fever: A Horticultural Tale of Love, Lust and Lunacy* (Methuen, 2001).

² For example, see: H. de Boer and B. Gravendeel, 'Harvesting of salep orchids in north-western Greece continue to threaten natural populations' (2016) 50 *Oryx* 393-396.

³ M. Bishop, A. Davis and J. Grimshaw, *Snowdrops: A Monograph of Cultivated Galanthus* (Griffin Press, 2006), p. 342-343.

⁴ Convention on International Trade in Endangered Species of Fauna and Flora, Washington, 3 March 1973, in force 1 July 1975, 993 UNTS 243.

⁵ As this work is principally concerned with public international law I do not examine the relationship between the environment and trade in the context of the European Union. For a discussion of how issues similar to those covered in this chapter are addressed by the European Union see N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 2014).

Another is the 2006 International Tropical Timber Agreement.⁶ This is, however, much more limited in scope, and although it places greater emphasis on sustainable development than earlier agreements, it remains 'little more than a commodity market adjustment among consumer and producer states'.⁷ It should also be noted that other conservation agreements contain trade provisions, notably the regional conservation agreements examined in chapter three,⁸ but these lack the same level of detail as CITES and the WTO regime and so are not examined here.

This chapter begins with an appraisal of the jurisprudence of the WTO Dispute Panel and Appellate Body to see how the environmental exceptions in Article XX of the 1994 General Agreement on Tariffs and Trade⁹ (GATT) might apply in the event of a State restricting trade for purposes of protecting and conserving a plant species. Attention then turns to CITES, where I highlight some of the key features of that Convention, emphasising how these relate to the challenges particular to the conservation of plants. The analysis of these two regimes suggests that a broad framework exists through which the effective conservation of plants can be achieved at the same time as guaranteeing the integrity of the international trade system, but reforms are needed to address specific difficulties.

As with all of the other regimes examined in this work, the influence of State sovereignty cannot be ignored. It is here where the tension between trade and non-trade priorities is most apparent.¹⁰ However, whereas in other areas of the law State sovereignty is invoked to prevent environmental obligations from limiting States' right to exploit the natural world, in the context of trade States assert their sovereignty as a means of protecting and furthering their domestic environmental agenda. On one level, it is self-evident that included within the peremptory norm of sovereignty is the right of States to set and pursue an environmental policy in accordance

⁶ 1 February 2006, in force 7 December 2011, TD/TIMBER,3.12, OJ L262, 9 October 2007, 8.

⁷ M. Bowman, P. Davies and C. Redgwell, *Lyster's International Wildlife Law* (2nd edition, Cambridge University Press, 2010), p. 636.

⁸ For example, Article XI of the 2003 African Convention on the Conservation of Nature and Natural Resources, not in force. Text available at: <http://www.au.int/en/treaties/african-convention-conservation-nature-and-natural-resources-revised-version>.

⁹ Note that the original 1947 agreement (Geneva, 30 October 1947, 55 UNTS 194, in force provisionally since 1 January 1948 under the 1947 Protocol of Application, 55 UNTS 308) has been incorporated into the 1994 General Agreement on Tariffs and Trade, which is itself a component of the 1994 Agreement Establishing the World Trade Organization (in force 1 January 1995, 33 ILM 1125 (1994); 1867 UNTS 3). For ease of reading, in this chapter I simply refer to this instrument as the 'GATT'.

¹⁰ S. Zin and A. Kazi, 'An Analysis of Customary International Law and the Importance of Dispute Settlement: A Study of Environmental Law Exceptions Under Article XX' (2011) 7 *Macquarie Journal of International and Comparative Environmental Law* 39-80.

with their own environmental values.¹¹ The measures designed to give effect to these policies, however, can impact on the sovereignty of other States, either by requiring those States to adopt certain policies if they wish to access the markets of the regulating State, or by otherwise undermining the rights all States enjoy in the international trading regime. Similarly, the rights and obligations States have under the WTO regime may conflict with the rights and obligations contained in multilateral environmental agreements.¹² In trade disputes, these tensions with environmental rights and obligations manifest in diverse ways, including the imposition of trade restrictions:

- To protect the domestic environment of the importing State.¹³
- To achieve a particular environmental objective.¹⁴
- As a sanction for failing to comply with an environmental obligation.¹⁵
- As a way of forcing a State either to adopt stricter environmental standards or cease an environmentally harmful activity.¹⁶

The environmental disputes discussed below all result from an exercise by one State of its sovereign right to determine its own environmental policy that conflicts with the obligations it has undertaken when it ratified the GATT, itself an exercise of sovereignty, and as such the rights of other States to set their own trade and environmental policies. These disputes, therefore, have not only required the WTO Dispute Panel and Appellate Body to reconcile the equally legitimate, but not necessarily compatible, goals of environmental protection and trade

¹¹ For example, Principle 2 of the 1992 Rio Declaration on Environment and Development (31 ILM 874 (1992)) says: 'States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources *pursuant to their own environmental and development policies...*' (emphasis added).

¹² A. Lindroos and M. Mehling, 'From Autonomy to Integration? International Law, Free Trade and the Environment?' (2008) 77 *Nordic Journal of International Law* 253-273.

¹³ For example, both the Cartagena Protocol on Biosafety (in force 11 September 2003, 39 ILM 1027 (2000)) and the 1989 Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal (in force 1992, 28 ILM 657 (1989)) condition the exportation of potentially environmentally harmful material on certain conditions, including notification and risk assessment. See further, C. Bail, R. Falkner and H. Marquard (eds), *The Cartagena Protocol on Biosafety: Reconciling Trade in Biotechnology with Environment & Development?* (The Royal Institute of International Affairs / Earthscan, 2002).

¹⁴ The objective behind listing a species under CITES is to prevent its extinction due to the impacts of international trade, see Article II of the Convention.

¹⁵ Under para. 30 of Conf. Resolution 14.3 (CITES Compliance Procedures) the CITES Standing Committee may, in the event of unresolved or persistent non-compliance, recommend that all trade in one or more species be suspended for the State Party in question.

¹⁶ In the United States, the Pelly Amendment to the Fisherman's Protective Act 1967 (22 USC §1978) and Packwood-Magnuson Amendment to the Fishery Conservation and Management Act 1976 (16 USC §1821(e)(2)) set out the trade sanctions that the United States will impose on any State that engages in unsustainable fishing practices or practices that undermine the effectiveness of the 1946 International Convention on the Regulation of Whaling (161 UNTS 72, as amended 19 November 1956, 338 UNTS 336).

liberalisation, but also the reciprocal rights and obligations that are constituent elements of State sovereignty.

Protecting Plants through the Environmental Exceptions in the GATT:

Despite the environment being a relatively low priority for the post-war international community in the late 1940s,¹⁷ it was nevertheless envisaged that a State could raise legitimate environmental concerns that would justify it imposing unilateral restrictions on free trade. Article XX of the GATT contains a list of exceptions that a WTO Member may invoke to justify measures that would otherwise be unlawful. Two of these relate to the environment:

Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:

- ...
- (b) necessary to protect human, animal or plant life or health;
- ...
- (g) relating to the conservation of exhaustible natural resources if such measures are made in effective conjunction with restrictions on domestic production or consumption;

Through a series of disputes, the two dispute settlement organs of the WTO, the Dispute Panel and Appellate Body, have established a regime that affords appropriate and balanced respect to a State's sovereign right to determine its domestic environmental policies, the complexity of both environmental challenges and the regulatory responses to those challenges and the international trading order. At the same time, however, the approach in resolving these carries implications that could frustrate a State's efforts to protect plants through the imposition of measures that restrict trade.

Article XX(g) – The Conservation of Exhaustible Natural Resources:

To understand the relationship between the WTO trading regime and the protection of plants it is necessary to examine some of the key decisions within the WTO's environmental jurisprudence. The first is *United States – Tuna I*,¹⁸ in which Mexico challenged the United States

¹⁷ Bowman, Davies and Redgwell, (n 7) p. 8.

¹⁸ *United States – Restrictions on Imports of Tuna (United States – Tuna I)*, DS21/R – 39S/155, 3 September 1991.

ban on imported and domestic tuna caught using methods that resulted in excessive incidental dolphins deaths.¹⁹ In theory, because it applied equally to tuna caught by United States fishermen the measure could have been considered as an internal law, regulation or requirement that complied with the equal national treatment rule in Article III(4) of the GATT. However, controversially the Dispute Panel upheld Mexico's challenge, finding that Article III only applied to measures that regulated a product per se, and not the production process of that product.²⁰ The Panel in *US – Tuna I* was concerned that through the disputed measure the United States sought to impose its own environmental agenda on other States, and the Panel did not believe such an exercise of extraterritoriality could be lawful under the GATT.²¹

United States – Tuna I was criticised on environmental grounds. Not only did it represent 'a worst-case scenario' because a progressive environmental law had been declared unlawful because of a conflict with a trade rule, but it also threatened the operation of several other key environmental measures.²² Consequently, the ruling has never been officially adopted by the States party to the GATT, and subsequently a very different approach has been taken. In a number of disputes, most notably *United States – Reformulated Gasoline*,²³ the Appellate Body developed a two-stage approach to analysing whether a measure was justifiable under Article XX. First, the *design* of the measure is assessed against the criteria set out in the individual exceptions in paragraphs (a) – (j). Second, the *application* of the measure is examined against the conditions in the chapeau of Article XX, i.e. that it is not applied in such a way as to be arbitrary or unjustifiable discrimination or a disguised restriction on trade.

The importance of this two-tier approach was emphasised in the seminal *United States – Shrimp*.²⁴ This concerned a challenge by several Asian WTO Members against United States laws that prohibited the importation of shrimp caught using methods lethal to sea turtles.²⁵ If a harvester used a method that was dangerous to sea turtles, their access to the United States shrimp market was conditioned on the harvester's State of origin having in place a regulatory

¹⁹ A similar case was brought by the European Community a year later: *United States – Restrictions on Imports of Tuna (United States – Tuna II)*, DS29/R, 16 June 1994.

²⁰ *United States – Tuna I*, (n 18) para. 5.15.

²¹ *ibid*, para. 5.32.

²² T. Goplerud, 'The Struggle to "Green" GATT: Free Trade and Environmental Responsibility in the Wake of the United States-Mexico Tuna-Dolphin Dispute' (1993) 17 *William and Mary Journal of Environmental Law*, 215-236, 222-223.

²³ *United States – Standards for Reformulated and Conventional Gasoline (United States – Reformulated Gasoline)*, WT/DS2/AB/R, 29 April 1996 (Appellate Body); WT/DS2/R, 29 January 1996 (Panel).

²⁴ *United States – Import Prohibition of Certain Shrimp and Shrimp Products (United States – Shrimp)*, WT/DS58/AB/R, adopted on 6 November 1998 (Appellate Body); WT/DS58/R (Panel).

²⁵ Specifically, section 609 of Public Law 101-62, adopted pursuant to the Endangered Species Act 1973 (16 USC §1537 (2000)).

regime to control incidental sea turtle deaths, or a finding that that State's environment was not an important site for sea turtles.

In the first instance, the Dispute Panel delivered what was another highly-criticised ruling. In particular, the Panel departed from the approach set out by the Appellate Body in *United States – Reformulated Gasoline* by not only applying the conditions in the chapeau before considering whether one of the Article XX exceptions applied, but also by reading into the chapeau a much broader test founded on the object and purpose of the entire WTO trading system (the protection of free trade) rather than the object and purpose of the chapeau of Article XX (the prevention of abuse through the Article XX exceptions).²⁶ Again, had this decision stood it would have made it all but impossible for a State to adopt measures that restricted trade with the aim of achieving an environmental objective, or indeed any objective related to the policies referred to in the Article XX exceptions. Following an appeal by the United States, however, the Appellate Body overruled the Dispute Panel and set out in the clearest possible terms a more balanced interpretation of Article XX.

One criticism the Appellate Body had of the Panel was that it had shown a complete lack of understanding of the purpose of Article XX and how it should operate. The Appellate Body made it clear that the way in which it had set out the two-stage assessment process in *United States – Reformulated Gasoline*, i.e. consideration of the specific exception and then a broader review of the measure against the chapeau, reflected 'not inadvertence or random choice, but rather the fundamental structure and logic of Article XX'.²⁷ By reversing the process, the Panel had made it difficult, if not impossible, to accurately determine whether United States law constituted discrimination or a disguised restriction.²⁸

The Appellate Body also criticised the Panel for giving an inappropriate and unnecessarily broad interpretation to the types of measures that could not be justified under Article XX, to the extent that any measure that conditioned market access on the adoption of the policy of the regulating State would be held as an unjustifiable breach of the WTO regime.²⁹ As the Appellate Body observes:

Paragraphs (a) to (j) [of Article XX] comprise measures that are recognized as *exceptions to substantive obligations* established [in the WTO regime], because the domestic policies embodied in such measures have been recognized as important and legitimate in character. It is not necessary to assume that requiring from exporting countries

²⁶ *United States – Shrimp* (Panel), (n 24) para. 7.44.

²⁷ *ibid*, (Appellate Body), para. 119.

²⁸ *ibid*, para. 120.

²⁹ *ibid*, para. 121.

compliance with, or adoption of, certain policies (although covered in principle by one or another of the exceptions) prescribed by the importing country, renders a measure *a priori* incapable of justification under Article XX. Such an interpretation renders most, if not all, of the specific exceptions of Article XX inutile, a result abhorrent to the principles of interpretation we are bound to apply.³⁰

Having addressed the fallacies of the Panel decision, the Appellate Body proceeded to apply Article XX correctly to the dispute.³¹ The first issue that was addressed was whether the sea turtles qualified as 'exhaustible natural resources'. Drawing on the reference to sustainable development in the preamble to the 1994 WTO Agreement and other developments in international environmental law,³² the Appellate Body held that Article XX(g) could be read as including living resources.³³ Regarding whether the turtles were an exhaustible natural resource, the Appellate Body noted that this would be difficult to dispute, as all seven species of sea turtles were listed in Appendix I of CITES, and so were believed to be at risk of extinction.³⁴

The second issue was whether the measures adopted by the United States were 'related to' the conservation of the sea turtles. Here, the Appellate Body focussed on the design of the measure and found that conditioning access to the United States shrimp market on, *inter alia*, the use of turtle exclusion devices was inherently linked to the conservation objective being pursued.³⁵

Third, were the measures made 'in conjunction with restrictions on domestic production or consumption'? The measures in question only related to imported shrimp. However, separate regulations had been passed by the United States at an earlier date that required all United States fishermen to use turtle exclusion devices or take other preventative steps. This was deemed sufficient for the purposes of Article XX(g).³⁶

Finally, the Appellate Body assessed the measures against the chapeau of Article XX. Here it was not concerned with the design of the measures, but rather their application. The nature of this assessment was seen as reflecting that a balance had to be struck between a State's right to

³⁰ *ibid.*

³¹ In theory, the Appellate Body's jurisdiction is limited to interpreting the WTO instruments (see Article 17 of Annex 2 of the 1994 WTO Agreement, 'The Understanding on rules and procedures governing the settlement of disputes' (the DSU)). However, because the Appellate Body lacks the power to refer a case back to the Dispute Panel once it has correctly interpreted the law it often applies its interpretation to the facts. It does so because the stated aim of the DSU is 'to secure a positive solution to the dispute' (Article 3.7). See further, *ibid.*, paras. 123-124.

³² *United States – Shrimp*, (n 24) paras. 129-131.

³³ *ibid.*, para. 128.

³⁴ *ibid.*, para. 132.

³⁵ *ibid.*, para. 141.

³⁶ *ibid.*, paras. 143-145. Had the measures on domestic fishermen only been contained in draft legislation this would have arguably not been enough to satisfy the Appellate Body. The legislation would be susceptible to amendment or withdrawal, leaving domestic production free from restriction.

invoke an exception under Article XX and that State's duty to respect the rights that other States enjoyed within the WTO regime.³⁷

The Appellate Body found several instances where the United States had failed in its duty to respect the trade rights of the Asian States party to the dispute. The Appellate Body, again drawing on international environmental law, recognised that 'the protection and conservation of highly migratory sea turtles, that is, the very policy objective of the measure, demands concerted and cooperative efforts on the part of the many countries whose waters are traversed in the course of recurrent sea turtle migrations'.³⁸ Further, that the United States had already been involved in the negotiation of a regional turtle conservation agreement³⁹ illustrated its acceptance 'that consensual and multilateral procedures are available and feasible for the establishment of programs for the conservation of sea turtles'.⁴⁰

Consequently, the measures adopted by the United States were applied in a manner that constituted arbitrary and unjustifiable discrimination. Therefore, and notwithstanding that it was considered to serve a legitimate environmental policy objective, the Appellate Body found that the US regulation did not comply with the Article XX chapeau and thus was not justified under Article XX.⁴¹ More important than what was decided in this ruling, however, is what was not:

In reaching these conclusions, we wish to underscore what we have *not* decided in this appeal. We have *not* decided that the protection and preservation of the environment is of no significance to the Members of the WTO. Clearly, it is. We have not decided that the sovereign nations that are Members of the WTO cannot adopt effective measures to protect endangered species, such as sea turtles. Clearly, they can and should. And we have not decided that sovereign states should not act together bilaterally, plurilaterally or multilaterally, either within the WTO or in other international fora, to protect endangered species or to otherwise protect the environment. Clearly, they should and do.⁴²

This ruling effectively ended the debate over whether States could pursue environmental policies that conflicted with their obligations in the WTO regime. However, as I discuss below, the way in which the Appellate Body applied the chapeau in *United States – Shrimp* is problematic in the context of plant conservation.

³⁷ *ibid*, para. 156.

³⁸ *ibid*, para. 168.

³⁹ The 1996 Inter-American Convention for the Protection and Conservation of Sea Turtles, in force 2001, text available at: <http://www.iacseaturtle.org/texto-eng.htm>.

⁴⁰ *United States – Shrimp*, (n 24) para. 170.

⁴¹ *ibid*, para. 186.

⁴² *ibid*, para. 185.

Article XX(b) – The Protection of Human, Animal and Plant Life and Health:

Although principally concerned with Article XX(g) of the GATT, the Appellate Body's ruling in *United States – Shrimp* applies equally to the application of Article XX(b).⁴³ The analytical process follows the same pattern. First, the stated objective of the measures is assessed against the criteria in paragraph (b), namely that the measures are 'necessary' to protect human, animal or plant life or health. Second, the application of the measure is tested against the criteria of the chapeau.

Guidance on the 'necessity' test was provided by the Appellate Body in *Korea – Beef*.⁴⁴ Again, we see the Appellate Body stressing the importance of using the ordinary meaning of words when interpreting treaty provisions. That 'necessary' means 'indispensable' was considered self-evident, but the Appellate Body also noted that there are 'a range of degrees of necessity', from indispensable to 'making a contribution to'. For the purposes of Article XX, a 'necessary' measure would fall closer to the 'indispensable' end of the scale, but the application of the provision was not limited to this. Instead, there must 'in every case [be] a process of weighing and balancing a series of factors' including the contribution made by the measure to the stated objective,⁴⁵ 'the importance of the common interests or values protected' by the law or regulation in which the disputed measure is found, and the impact on international trade.⁴⁶ This has been seen as introducing a proportionality element to those exceptions in Article XX that use the word 'necessary', but only where the measure in question falls short of the 'indispensable' threshold.⁴⁷ If the measure is indispensable to the stated objective, then it does not have to be assessed against these proportionality criteria. This is 'regardless of it being vastly more trade restrictive than the next less-trade restrictive alternative, and regardless of whether the next

⁴³ Also relevant here is the 1994 WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) (in force 1 January 1995, 1867 UNTS 493). This elaborates on the principles of Article XX(b) in the specific context toxins and other contaminants contained in food, drink and feed.

⁴⁴ *Korea – Measures Affecting the Imports of Fresh, Chilled and Frozen Beef*, WT/DS161/AB/R; WT/DS169/AB/R (11 December 2000). This was not an environmental case but rather concerned the exception in Article XX(d), which covers measures 'necessary to secure compliance with the provisions of [the GATT], including those relating to customs enforcement, the enforcement of monopolies operated under paragraph 4 of Article II and Article XVII, the protection of patents, trade marks and copyrights, and the prevention of deceptive practices'.

⁴⁵ In *Korea – Beef* this was of the compliance measure to the enforcement of the law at issue, but under Article XX(b) would be the contribution of the measure towards the protection of human, animal or plant life or health.

⁴⁶ *Korea Beef*, (n 44) para. 164.

⁴⁷ M. Trebilcock, R. Howse and A. Eliason, *The Regulation of International Trade* (4th edition, Routledge, 2013), p. 682.

less-trade restrictive alternative comes very close to achieving the Member's chosen level of protection'.⁴⁸

The Appellate Body elaborated on this proportionality element of 'necessity' in *Brazil – Retreaded Tyres*.⁴⁹ Brazil sought to justify its ban on imported retreaded tyres by arguing it was necessary to protect human, animal and plant health from the environmental risk associated with waste tyres. The importation ban was not directly related to the tyres per se, however, but rather that the presence of imported tyres in Brazil resulted in fewer domestic tyres being retread and were therefore being disposed of sooner. The Appellate Body upheld the Dispute Panel's ruling and found in favour of Brazil, stating that although an import ban is one of the most trade-restrictive measures that a State can adopt, it may nevertheless be found to be 'necessary' under Article XX(b). This was a significant ruling. 'Without the ability to ban products produced by environmentally unsustainable practices, countries [would] be lacking an essential measure for achieving environmentally sustainable development, since the measure is precisely tailored to deterring the unwanted practice'.⁵⁰

Once it has been established that the import ban contributes to the goal of protecting human, animal or plant life or health,⁵¹ there must be a comparison of possible alternatives to establish whether the same level of protection could be achieved through a less trade restrictive measure. This process 'is a holistic operation that involves putting all the variables of the equation together and evaluating them in relation to each other after having examined them individually, in order to reach an overall judgement'.⁵² In *Brazil – Retreaded Tyres* the Appellate Body examined the different alternatives proposed by the complainants, including landfill, stockpiling, incineration and recycling, and found that none of them would have achieved the same level of environmental protection as the import ban. Brazil's import ban was consequently found to fall within the scope of Article XX(b).

This reinforcement of a State's right to set and pursue its own policy objectives, regardless of what impacts the measures needed to achieve these policies may have on international trade,⁵³

⁴⁸ *ibid.*

⁴⁹ *Brazil – Measures Affecting Imports of Retreaded Tyres*, WT/DS332/AB/R, 3 December 2007.

⁵⁰ E. Brown Weiss, 'Environment and Trade as Partners in Sustainable Development: A Commentary' (1992) 86 *American Journal of International Law* 728-735, 730.

⁵¹ This does not have to be demonstrated through a quantitative risk analysis. The Appellate Body stated that because the Dispute Panel is in a better position to determine the availability and nature of evidence supporting States' contentions they should be afforded a certain amount of discretion when selecting the methodology by which this evidence will be tested, *Brazil – Retreaded Tyres*, (n 49) paras. 145-147.

⁵² *Brazil – Retreaded Tyres*, (n 49) para. 182.

⁵³ *ibid.*, para. 156, drawing on *United States – Measures Affecting the Cross-Border Supply of Gambling and Betting Services*, WT/DS285/AB/R, 7 April 2005.

is significant. It means that the WTO regime will not prevent a State from adopting a policy of absolute protection of plants. Obviously, it is unlikely that a State would ever seek to protect absolutely all plants, but it is possible that a State would seek to give such protection to a particular species, for example if it held significant inherent value as a national symbol. The issue however, as was seen in relation to Article XX(g), will be demonstrating that any measures satisfy the conditions of the chapeau.

Applying the WTO Jurisprudence to the Conservation of Plants:

In his analysis of *United States – Shrimp* di Pepe, whilst recognising the major contribution the decision has made to strengthening the environmental credentials of the WTO system, believes it is also problematic.⁵⁴ On the one hand, the decision protected a State's sovereign right to dictate its own environmental policy, recognised that States pursue priorities other than free trade through public international law and legitimised the use of relevant multilateral environmental agreements in the interpretation of WTO obligations, regardless of whether all Members of the WTO are party to them.⁵⁵ On the other hand, 'one should not underestimate the fact that, in the end, the decision was against the United States and that the chapeau of Article XX could turn out to be a formidable barrier to the full implementation of paragraph[s] (b) and (g)'.⁵⁶ Nevertheless, the WTO Appellate Body has proven itself more willing to accommodate environmental concerns than was initially feared in the early 1990s.⁵⁷ It is for the State wishing to restrict trade for environmental purposes to establish that the measure in question is both sufficiently related to the stated objective and satisfies the test of the chapeau, but this is to be expected for a provision that is an exception in a trade instrument and as *United States – Shrimp* illustrates, this is not an insurmountable challenge. This suggests that the WTO regime would not be hostile to measures that restrict trade for the purpose of protecting plants. However, the approach of the Appellate Body in *United States – Shrimp* raises several obstacles that could frustrate such unilateral attempts.

As the Appellate Body emphasised in *United States – Shrimp*, whether a measure can be justified under Article XX can only be decided on a case-by-case basis. It is therefore useful to consider

⁵⁴ L.S. di Pepe, 'The World Trade Organization and the Protection of the Natural Environment: Recent Trends in the Interpretation of G.A.T.T. Article XX(b) and (g)' (2000) 10 *Transnational Law and Contemporary Problems* 271-302.

⁵⁵ *ibid*, 294-296. This reversed the Panel's position in *United States – Tuna II* (n 19).

⁵⁶ Di Pepe, 'The World Trade Organization and the Protection of the Natural Environment', (n 54) 302.

⁵⁷ K. von Moltke, 'The Last Round: The General Agreement on Tariffs and Trade in Light of the Earth Summit' (1993) 23 *Environmental Law* 519-531.

three scenarios that may arise should a State wish to use Article XX(g)⁵⁸ to justify a restriction of trade to protect plants:

Scenario 1: State X conditions the sale of biofuels in its territory on the State of origin of the biofuels having in place sustainability criteria equivalent to those that have been imposed on State X's domestic producers. The objective of this measure is to combat climate change by ensuring that the production of biofuels does not result in the clearing of primary forest.

Scenario 2: State X prohibits the importation of timber from a non-native species listed as critically endangered by the IUCN, unless the State of origin has been certified as having in place a regulatory regime to ensure that the timber is harvested sustainably.

Scenario 3: State X prohibits the importation of timber of a native species unless the State of origin has been certified as having in place a regulatory regime to ensure that the timber is harvested sustainably. Although the species is critically endangered in State X, its global population means that it is not at risk of extinction.

Scenario 1 is similar to that posited by Rancourt,⁵⁹ who believes that such a measure could be justified as relating to the legitimate goal of combatting climate change under Article XX(g).⁶⁰ The difficulty would be justifying such a unilateral move under the chapeau. Its legality would depend on the State being able to demonstrate that it had engaged in bilateral and multilateral talks with other States in an effort to agree a consensual approach to regulating the sustainability of biofuels before adopting its own standards.⁶¹ Further, just as the United States' involvement in multilateral discussions in other fora had shown that they consider the issue of turtle conservation to be one that is better addressed at a multilateral level, so too could any involvement by State X in the negotiations of the global climate change instruments⁶²

⁵⁸ Article XX(g) is the focus of these scenarios for two reasons. First, it is arguably more likely that a State will seek restrict trade to protect plants as an exhaustible natural resource, rather than the health or life of the plants per se. Second, the application of paragraph (b) is relatively straightforward compared to that of paragraph (g). Provided that the State seeking to restrict trade can demonstrate that the proposed measure is 'necessary', as defined in *Korea – Beef* and *Brazil – Retreaded Tyres*, to achieve the desired level of environmental protection, and that there is not a less-trade-restrictive alternative that would achieve the same level of protection, then the conditions of paragraph (b) will be met. Note that the legality of the measure would still depend on its compatibility with the conditions of Article XX's chapeau.

⁵⁹ M. Rancourt, 'Promoting Sustainable Biofuels Under the WTO Legal Regime' (2009) 5 *McGill International Journal on Sustainable Development Law and Policy* 73-144.

⁶⁰ See further R. Amos, 'Bioenergy Carbon Capture and Storage in Global Climate Policy: Examining the Issues' (2016) 10 *Carbon & Climate Law Review* 187-193, 189-191.

⁶¹ Rancourt, (n 59) 104-105.

⁶² This is not an unfair assumption, as there are currently 196 States party to the 1992 UN Framework Convention on Climate Change (New York, 9 May 1992, in force 24 March 1994, 1771 UNTS 107):

demonstrate their recognition of the need for coordinated global action to address climate change.

The issue of international standards is particularly pertinent to scenario 1. The WTO encourages its Members to adopt international environmental standards, where they exist, stating that when they do so ‘they are unlikely to be challenged legally in a WTO dispute’.⁶³ It follows, therefore, that the Dispute Panel is more likely to uphold a plant conservation measure if it is justified under international environmental law, for example by the inclusion of the target species in CITES. The difficulty, as was highlighted in the discussion of listing as a conservation mechanism in chapter three, is that lists of endangered species found in international environmental instruments are a poor evidentiary tool because they lack representativeness. Additionally, as I discuss below, politics is becoming an increasingly determinative factor in the listing decisions of the CITES COP.

Potentially a more valuable resource for States wishing to justify domestic conservation policies is the IUCN Red List. It is not clear whether this would be a legitimate international standard for the purposes of justifying a measure under Article XX, as the Appellate Body in *United States – Shrimp* merely stated that the inclusion of the turtle species in Appendix I was sufficient for determining whether they qualified as an exhaustible natural resource.⁶⁴ Arguably it would. One of the stated aims of the Red List is to ‘Provide a global context for the establishment of conservation priorities at the local level’, and the Red List is increasingly used in conservation legislation and planning at the national level.⁶⁵ Further, the Red List is one of the indicators that has been developed by the Biodiversity Convention’s Ad Hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020 to assess the international community’s progress towards the Aichi Biodiversity Targets.⁶⁶ Finally, whilst encouraging States to adopt international standards, the WTO permits a State to adopt stricter measures ‘if there is scientific justification’.⁶⁷ The Red List, as an objective international standard, should constitute a sufficient ‘scientific justification’ if a State wishes to move beyond the international consensus on the appropriate level of protection for a species.

http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php.

⁶³ https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm4_e.htm.

⁶⁴ *United States – Shrimp*, (n 24) para. 132.

⁶⁵ G.M. Mace et al, ‘Quantification of Extinction Risk: IUCN’s System for Classifying Threatened Species’ (2008) 22 *Conservation Biology* 1424-1442, 1438.

⁶⁶ Available at: <https://www.cbd.int/sp/indicators/>.

⁶⁷ https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm4_e.htm.

In scenario 2 problems arise in the first stage of the Article XX process, establishing that the measure is related to the goal of paragraph (g). As noted above, there are two parts to this provision. First, the resource in question must be related to the conservation of an exhaustible natural resource. Here analogies may be drawn with the disputed measures in *United States – Shrimp* and so would likely be found to be acceptable. Second, they must be made in conjunction with restrictions on domestic production or consumption. That the species in question is not native to State X suggests that this part of Article XX(g) will not be satisfied. How can restrictions be imposed on domestic production if the species in question is not being harvested in State X?⁶⁸ For these reasons, the measures in scenario 2 would therefore probably not be covered by the exception.

This raises the question of whether Article XX may be used in such a way as to amount to an exercise of extraterritoriality by one State over another. The evidence indicates that this would not be permitted under WTO law. In *United States – Shrimp* the Appellate Body did not rule on whether there needed to be a jurisdictional link between the regulating State and the natural resource in question, but that it found there to be ‘sufficient nexus’ between the United States and the turtles suggests that there is some kind of jurisdictional element to Article XX.⁶⁹ This can be contrasted with the earlier *United States – Tuna II* decision, where the Panel stated that ‘it could see no valid reason supporting the conclusion that the provisions of Article XX(g) apply only to policies related to the conservation of exhaustible natural resources within the territory of the contracting party’.⁷⁰ The focus of *US – Tuna II*, however, was on migratory fish populations that spent a significant amount of time in the high seas, beyond State jurisdiction. This would obviously not be the case for plants, and given the Panel’s rejection of an ‘extrajurisdictional application’ of Article XX in their, albeit flawed, decision in *United States – Tuna I*,⁷¹ it is unlikely that WTO law would permit a State to regulate a resource that is located exclusively within the jurisdiction of another State.

For scenario 3 one challenge would be in proving that the measures related to the conservation of an exhaustible natural resource. As noted above, little guidance was given by the Appellate Body on what might amount to ‘exhaustible’. If the Appellate Body only considered the status

⁶⁸ It could of course be harvested from commercially cultivated sources. In such circumstances, however, they would be no need to impose any restrictions as no pressure would be being put on wild populations of the species in question.

⁶⁹ *United States – Shrimp*, (n 24) para. 133. In this case it was sufficient that every species could be found in waters under the United States’ jurisdiction at some point during their migration. It was not necessary that every population of the species spent some time in United States waters.

⁷⁰ *United States – Tuna II*, (n 19) para. 5.20.

⁷¹ *United States – Tuna I*, (n 18) para. 5.32.

of the species in State X then it is likely that the first part of the paragraph (g) analysis would be satisfied. On the other hand, if the Appellate Body looked at the global status of the species, then Article XX(g) would probably not apply.⁷² If the Appellate Body accepted the conservation of an endangered local population of an otherwise common species as a legitimate goal, the second part of the Article XX(g) analysis should not be an issue. It would be reasonable to assume that some restrictions would have been placed on the domestic harvesting or management of the species as it is threatened with extinction in State X. However, it is debatable whether the test in the chapeau would be met. In *United States – Shrimp* the Appellate Body stated:

[I]t is not acceptable, in international trade relations, for one WTO Member to use an economic embargo to *require* other Members to adopt essentially the same comprehensive regulatory program, to achieve a certain policy goal, as that in force within that Member's territory, *without* taking into consideration different conditions which may occur in the territories of those other Members.⁷³

That the species State X is seeking to protect is not at risk in other States suggests that its measures would be considered 'unjustifiable discrimination' under the chapeau, and therefore outside the scope of the GATT exceptions. Further, the same issue as that in scenario 1 would be encountered, namely the existence of multilateral environmental agreements that are more appropriate fora in which action to protect an endangered species should be taken. In particular, Appendix III of CITES⁷⁴ provides a mechanism through which restrictions on international trade can be imposed on specimens of an endangered species originating from a particular State.⁷⁵

The analysis of Article XX and its potential application to plant conservation measures supports di Pepe's suggestion that the chapeau may undermine the effective operation of the environmental exceptions.⁷⁶ This situation could be addressed if the Dispute Panel engaged in a more thorough assessment of any relevant multilateral environmental agreement. It would be neither appropriate nor necessary for the Dispute Panel to pass judgement on the quality of an environmental treaty, i.e. whether it can achieve its stated objectives. However, in general terms, the Dispute Panel could assess the design and application of a treaty to determine whether it operates principally at the supranational or national level, and whether it applied generally or specifically. For example, although CITES potentially applies to all species, its

⁷² There several such species to which this scenario would apply. For example, the Eurasian Red Squirrel (*Sciurus vulgaris*) has all but disappeared from the United Kingdom, but is listed by the IUCN as 'Least Concern' because of its global population.

⁷³ *United States – Shrimp*, (n 24) para. 164.

⁷⁴ Again, it would be fair to assume that State X is party to CITES as there are currently 182 parties to the Convention: <https://cites.org/eng/disc/parties/index.php>.

⁷⁵ Article II(3) of CITES.

⁷⁶ Di Pepe, (n 54).

application is limited to those species that have been listed in the appendices, and the process through which a species may be listed is governed by the CITES institutions. Further, CITES contains mechanisms through which a State may unilaterally impose tighter restrictions on certain species than those resulting from inclusion in the appendices,⁷⁷ again subject to the requirements established by the CITES COP. The Biodiversity Convention, in comparison, imposes very generic obligations and States are free to determine what habitats and species warrant protection and the exact form this protection should take.⁷⁸

If a State imposes non-trade conservation measures for a species that nevertheless have an impact on international trade, these should be viewed by the Dispute Panel as a legitimate exercise of the authority granted to the State to adopt such measures by the Biodiversity Convention, provided that the measures are otherwise lawful. Rather than respecting international environmental law, precluding the application of Article XX to such measures merely because a State has engaged in the Biodiversity Convention would in fact frustrate its proper operation because the treaty depends on nationally-determined measures for its implementation. The integrity of the international trade regime would be maintained through the other safeguards developed by the Appellate Body, including the relevant tests of paragraphs (b) and (g) and the requirement under the chapeau to engage in meaningful consultation with States likely to be affected. In other cases, such as where CITES is the relevant treaty because the measure in question is an export ban on a particular species, it would be legitimate to require the States to follow the procedures of this more specific environmental agreement, otherwise Article XX would allow a State to circumvent that treaty. Here the result would be the same as under the current application of the law, i.e. Article XX would not apply because a State has indicated its acceptance of the need to adopt a multilateral approach to certain environmental problems. However, the basis of the decision would be the nature of the relevant environmental treaty rather than its mere existence.

The potential limiting effect of the chapeau would not be as significant an issue if there existed effective multilateral conservation regimes through which genuine protection of plants could be achieved. I argue elsewhere in this work that many of the global and regional conservation agreements are incapable of delivering this. CITES, in comparison, has several features that enable it to respond to the challenges of conserving plants, at least to the extent that their existence is threatened by international trade.

⁷⁷ See the discussions on Appendix III and Article XIV of CITES on p. 151 et seq.

⁷⁸ For example, see Article 8.

The 1973 Convention on International Trade in Endangered Species:

CITES and the Threats to Biodiversity:

CITES is viewed as one of the most successful international conservation agreements.⁷⁹ However, whilst it has many of the attributes considered to be essential in environmental instruments, including institutional oversight and effective non-compliance procedures,⁸⁰ there is a limit to the impact CITES will have on the conservation status of a species.

Firstly, whilst opinions vary on the extent to which trade affects a species' conservation status, the consensus appears to be that it is not a direct cause of extinction.⁸¹ The reason for this is one of economics. As a species nears extinction, locating and collecting it will become so expensive as to be no longer commercially viable.⁸² In certain cases, where the species is valued as part of a collection, rarity may increase its commercial value. Nevertheless, 'very few species have been entirely exterminated as a result of international trade'.⁸³ CITES can thus be characterised more as a response to a perceived problem,⁸⁴ rather than to an actual issue that is supported by empirical data. The difficulty, when following the principle of environmental law that prevention is preferable to remediation, is in both predicting what species are likely to be subject to significant levels of international trade, and whether that species' value will rise or fall as it becomes harder to find. The latter is possibly more easily determined than the former. Demand in plants that are traded because they are integral to a production process is likely to fall when they become too costly to locate, whilst the value of those plants that are sought after by collectors of rare species will increase exponentially as they near extinction. These are only generalisations however. If, for example, nothing can replace what a plant contributes to a production process, and demand for the resulting product is such that people will pay any price for it, then the plant would remain commercially valuable regardless of the costs in locating it. CITES response to this challenge can be found in the listing criteria for Appendix II, which allows for the listing of a species 'which although not necessarily now threatened with extinction may become so unless trade in such specimens is subject to strict regulation in order to avoid utilization incompatible with their survival'.⁸⁵ This does not, however, set out indicators to assist

⁷⁹ Bowman, Davies and Redgwell, (n 7) p. 484.

⁸⁰ See chapter 3.

⁸¹ M.A. du Plessis, 'CITES and the Causes of Extinction', in J. Hutton and B. Dickson (eds), *Endangered Species Threatened Convention: The Past, Present and Future of CITES* (Earthscan, 2000).

⁸² C. Huxley, 'CITES: The Vision', in Hutton and Dickson (eds), *ibid*, p. 4.

⁸³ *ibid*, p. 5.

⁸⁴ *ibid*, p. 4-5.

⁸⁵ Article II(2)(a).

in this determination, and neither does the additional guidance for the listing of a species in Appendix II that has been developed by the COP.⁸⁶

Secondly, CITES is only concerned with international trade. Trade that remains within the borders of a State, regardless of how unsustainable that trade may be or the conservation status of the species involved, does not fall within the Convention's remit, although it may still be the subject of other international or national regulations.

Thirdly, as with all conservation agreements, CITES is dependent upon effective implementation at the national level.⁸⁷ Particularly important are the reporting requirements, which form the basis for listing proposals and other trade review mechanisms operating under CITES.⁸⁸ Whether this is achieved will depend on the capacity and internal structures of States to both monitor trade and compile the data necessary for the CITES reports.⁸⁹

Finally, prohibiting trade in a species, rather than implementing controls that reduce trade, may simply create a black market in illegal wildlife. Illegal wildlife trade is estimated to be worth billions of dollars,⁹⁰ and in the same financial league as narcotics, arms and people trafficking.⁹¹ Illegal wildlife trade can provide local people with a lifestyle that would be otherwise unobtainable,⁹² and often there will be extensive organised crime networks involved. This has necessitated a close working relationship between CITES and Interpol.⁹³

Nevertheless, CITES remains an important conservation agreement, as addressing international trade in wildlife is an essential component of any holistic conservation strategy. Furthermore, many of the features of the Convention enable it to effectively provide for the protection of plants from the impacts of unsustainable international trade. This is despite the inclusion of

⁸⁶ See Annex 2a of Resolution Conf. 9.24 (Criteria for amendment of Appendices I and II).

⁸⁷ For example, inaccurate and incomplete national reporting is one reason why early efforts to control commercial trade in whale products failed, see J.E. Scarff, 'The International Management of Whales, Dolphins, and Porpoises: An Interdisciplinary Assessment' (1977) 6 *Ecology Law Quarterly* 323-427, 365.

⁸⁸ Bowman, Davies and Redgwell, (n 7) p. 520-522.

⁸⁹ R.B. Martin, 'When CITES Works and When It Does Not', in Hutton and Dickson (eds), (n 81).

⁹⁰ <https://cites.org/eng/disc/what.php> (last accessed 01/04/2017).

⁹¹ O. Holmes and N. Davies, 'Revealed: the criminals making millions from illegal wildlife trafficking' (The Guardian, 26 September 2016), available at: <https://www.theguardian.com/environment/2016/sep/26/revealed-the-criminals-making-millions-from-illegal-wildlife-trafficking>.

⁹² Bowman, Davies and Redgwell, (n 7) p. 483.

⁹³ F. Comte, 'Environmental Crime and the Police in Europe: A Panorama of Possible Paths for Future Action' (2006) 15 *European Environmental Law Review* 190-232.

plants in the remit of CITES almost being an afterthought when the treaty was being negotiated.⁹⁴

CITES and the Challenges of Plant Conservation:

CITES benefits from a comprehensive administrative infrastructure. The Conference of the Parties enjoys the support of both a Secretariat⁹⁵ and a Standing Committee,⁹⁶ the latter constituting an ‘inner cabinet’ with a key role in monitoring the implementation and enforcement of the Convention.⁹⁷ Scientific advice is provided by the Animals and Plants Committees, which also have a role in ensuring the effective implementation of CITES.⁹⁸ The existence of a formal treaty body dedicated to providing scientific advice on all matters pertaining to the international trade in plants makes CITES unique among multilateral environmental agreements⁹⁹ and ensures that flora are afforded the same attention as fauna, at least in matters included in the Plants Committee’s remit. Additionally, Article IX requires each Contracting Party to establish both a Management and Scientific Authority. These constitute ‘a global network of institutions which co-operate directly with their counterparts in other states, unfettered by the constraints of formal diplomatic channels’.¹⁰⁰ Again, this marks CITES out from other conservation instruments, as it requires that some positive action is taken at the national level to implement the treaty.¹⁰¹

Under CITES, restrictions on trade vary according to the Appendix in which a species is listed. The principal listing criteria is contained in Article II of the Convention. However, almost immediately after coming into force, the Contracting Parties recognised the need for more detailed guidelines for the listing of species.¹⁰² At the first COP the Bern criteria were adopted¹⁰³

⁹⁴ Wijnstekers notes that the original impetus behind CITES was a desire to see international trade in animals regulated. In 1960, for example, the Seventh IUCN General Assembly called on governments to restrict the importation of animals, and in 1963 it called for a convention regulating trade in ‘rare or threatened wildlife species or their skins and trophies’ – W. Wijnstekers, *The Evolution of CITES* (9th edition, International Council for Game and Wildlife Conservation, 2011), p. 31.

⁹⁵ Article XII.

⁹⁶ The current Roles of Procedure of the Standing Committee are available at: <https://cites.org/sites/default/files/eng/com/sc/E-SC65-Rules.pdf> (last accessed 01/04/2017).

⁹⁷ Bowman, Davies and Redgwell, (n 7) p. 489.

⁹⁸ Resolution Conf. 11.1 (Establishment of Committees).

⁹⁹ The Biodiversity Convention’s Updated Global Strategy for Plant Conservation (UNEP/CBD/COP/DEC/X/17), in comparison, is not part of that treaty’s formal institutional architecture, but rather a non-binding programme of work.

¹⁰⁰ Bowman, Davies and Redgwell, (n 7) p. 489.

¹⁰¹ *ibid*, p. 490.

¹⁰² *ibid*, p. 493.

¹⁰³ Resolution Conf. 1.1, now repealed.

but these were criticised, particularly by range States and proponents of sustainable utilisation, for their 'rigidity', which made it difficult to downgrade a species from Appendix I to Appendix II, or remove a species completely from CITES.¹⁰⁴ In 1992 the Bern criteria were replaced by the Fort Lauderdale criteria.¹⁰⁵ These set out in a comprehensive manner biological criteria to aid States in determining whether a species was 'threatened with extinction' for the purposes of Appendix I,¹⁰⁶ as well as guidance for the two categories of species that may be listed in Appendix II.¹⁰⁷ The Fort Lauderdale Criteria also re-emphasised the importance of consulting range States¹⁰⁸ before submitting a proposal to list or upgrade a species in the CITES Appendices.¹⁰⁹

A review of the biological criteria for Appendix I set out in Annex 1 of the Fort Lauderdale criteria shows these to be highly relevant to plants:

A species is considered to be threatened with extinction if it meets, or is likely to meet, at least one of the following criteria:

- a) The wild population is small, and is characterized by at least one of the following:
 - i. an observed, inferred or projected decline in the number of individuals or the area and quality of habitat;
 - ii. each subpopulation being very small;
 - iii. a majority of individuals being concentrated geographically during one or more life-history phases;
 - iv. large short-term fluctuations in population size; or
 - v. a high vulnerability to either intrinsic or extrinsic factors.
- b) The wild population has a restricted area of distribution and is characterized by at least one of the following:
 - i. fragmentation or occurrence at very few locations;
 - ii. large fluctuations in the area of distribution or the number of subpopulations;
 - iii. a high vulnerability to either intrinsic or extrinsic factors; or
 - iv. an observed, inferred or projected decrease in any one of the following:
 - the area of distribution;
 - the area of habitat;
 - the number of subpopulations;
 - the number of individuals;
 - the quality of habitat; or
 - the recruitment.
- c) A marked decline in the population size in the wild, which has been either:

¹⁰⁴ P.H. Sand, 'Whither CITES? The Evolution of a Treaty Regime in the Borderland of Trade and Environment' (1997) 1 *European Journal of International Law* 29-58, 45.

¹⁰⁵ Resolution Conf. 9.24 (Criteria for amendment of Appendices I and II).

¹⁰⁶ *ibid*, Annex 1.

¹⁰⁷ *ibid*, Annexes 2a and 2b.

¹⁰⁸ See also Resolution Conf. 8.21 (Consultation with range States on proposals to amend Appendices I and II).

¹⁰⁹ Bowman, Davies and Redgwell, (n 7) p. 493.

- i. observed as ongoing or as having occurred in the past (but with a potential to resume); or
- ii. inferred or projected on the basis of any one of the following:
 - a decrease in area of habitat;
 - a decrease in quality of habitat;
 - levels or patterns of exploitation;
 - a high vulnerability to either intrinsic or extrinsic factors; or
 - a decreasing recruitment.

Many species of plants have small populations that are geographically concentrated,¹¹⁰ or are vulnerable to extrinsic factors such as climate change.¹¹¹ It is therefore concerning that only around three hundred species of plants are listed in Appendix I,¹¹² less than half the number of animals, and only a fraction of the number of species a recent study estimated were at risk of extinction.¹¹³ Even if it is accepted that international trade is not a major driver of biodiversity loss, it is still difficult to reconcile these statistics, particularly as trade is considered by some to be a greater threat to plants than it is to animals.¹¹⁴ In comparison, nearly 30,000 species of plants are listed in Appendix II, around six times the number of animals.¹¹⁵

One of the principal reasons why CITES may be considered one of the more successful multilateral conservation agreements is that it has developed intelligent responses to difficult issues. This is demonstrated by the inclusion in Appendix II of so-called 'look alike' species,¹¹⁶ i.e. species that are at minimal risk from international trade but are nevertheless regulated because they are sufficiently similar in appearance to an at-risk species that traders may seek to deceive customs officials into thinking an endangered species is a more common one. One of the main challenges in the implementation of CITES, particularly in developing States, is the lack of training given to customs officials to identify species.¹¹⁷ The listing of 'look alike' species goes some way in addressing this concern. It would, for example, be impossible for a customs official, and indeed many experts, to distinguish the form of one species of *Cyclamen* from another

¹¹⁰ For example, see A. Mendoza-Fernández et al, 'Threatened plants of arid ecosystems in the Mediterranean Basin: a case study of the south-eastern Iberian Peninsula' (2014) 48 *Oryx* 548-545.

¹¹¹ J.E. Good and D. Millward, *Alpine Plants: Ecology for Gardeners* (Alpine Garden Society / Batsford, 2007), p. 155-162.

¹¹² <https://cites.org/eng/disc/species.php> (last accessed 01/04/2017).

¹¹³ RBG Kew, 'The State of the World's Plants Report – 2016' (Royal Botanic Gardens, Kew, 2016).

¹¹⁴ W.C. Burns, 'CITES and the Regulation of International Trade in Endangered Species of Flora: A Critical Appraisal' (1990) 8 *Dickson Journal of International Law* 203-223, 204.

¹¹⁵ (n 112).

¹¹⁶ The treaty text on refers to the listing of species that look like a species listed on Appendix II; it is silent on the issue of species that are similar to an Appendix I species. Annex 2a of Resolution Conf. 9.24 however makes it clear that species that look like Appendix I species should also be included in Appendix II.

¹¹⁷ Bowman, Davies and Redgwell, (n 7) p. 525.

without the assistance of a laboratory. Identifying a particular specimen just as a *Cyclamen* corm, however, is relatively straightforward and can be done on the basis of appearance alone.¹¹⁸

A further example is the split-listing of species, i.e. separating a certain population of a species into a different Appendix because it is either well-managed, and can therefore support a certain level of trade, or is at greater risk from the impacts of international trade and therefore warrants protection under Appendix I.¹¹⁹ This counters the charge that CITES is an overly restrictive mechanism,¹²⁰ although the Parties have noted that the split-listing of a species can lead to enforcement difficulties.¹²¹

A second positive feature of CITES is the emphasis it places on precaution, which is evident in the rules governing the listing of species in the Appendices. Dickson identifies two versions of the precautionary principle in the CITES framework. The first is an 'action guiding' interpretation that is evident in the requirement of Article II(2)(a) that a species be listed because it *might* become at risk of extinction unless subject to regulation by CITES. The second is the strict criteria that must be met before a species can be downgraded from Appendix I to Appendix II, or removed from CITES completely.¹²² Paragraph A(2) of Annex 4 to Resolution Conf. 9.24, for example, states:

2. Species included in Appendix I should only be transferred to Appendix II:
 - a) If they do not satisfy the [biological criteria for Appendix I species] and when of one of the following precautionary safeguards is met:
 - i. the species is not in demand for international trade, nor is its transfer to Appendix II likely to stimulate trade in, or cause enforcement problems for, any other species included in Appendix I; or
 - ii. the species is likely to be in demand for trade, but its management is such that the Conference of the Parties is satisfied with:
 - A. implementation by the range States of the requirements of the Convention, in particular Article IV; and
 - B. appropriate enforcement controls and compliance with the requirements of the Convention; or
 - iii. an integral part of the amendment proposal is an export quota or other special measure approved by the Conference of the Parties, based on management measures described in the supporting statement of the

¹¹⁸ All *Cyclamen* are listed in Appendix II of CITES, see C. Grey-Wilson, *Cyclamen: A Guide for Gardeners, Horticulturalists and Botanists* (revised edition, B.T. Batsford, 2002), chapter 12.

¹¹⁹ Bowman, Davies and Redgwell, (n 7) p. 492.

¹²⁰ M. Bowman, 'A Tale of Two CITES: Divergent Perspectives upon the Effectiveness of the Wildlife Trade Convention' (2013) 22 *Review of European Community and International Environmental Law* 228-238, 236.

¹²¹ Resolution Conf. 9.24, Annex 3.

¹²² B. Dickson, 'Precaution at the Heart of CITES?', in Hutton and Dickson (eds), (n 81) p. 43-44. Dickson's characterisations of the precautionary principle are similar to the 'strong' (action guiding) and 'weak' (deliberation) interpretations more commonly seen in the literature, for example see C.R. Sunstein, 'Beyond the Precautionary Principle' (2003) 151 *University of Pennsylvania Law Review* 1003-1058.

amendment proposal, provided that effective enforcement controls are in place...¹²³

These impose an extremely high threshold on any State wishing to downgrade or delist a species.¹²⁴ The difficulty in downgrading a population or species remains one of the main criticisms of CITES, especially from range States and those who believe sustainable utilisation is a more effective conservation strategy than absolute prohibitions on international trade. Furthermore, despite the Contracting Parties being obliged to list a species once it has met the criteria for either Appendix I or II, the listing process is becoming increasingly politicised,¹²⁵ particularly if the species concerned is economically valuable.¹²⁶ Nevertheless, given the controversy over including the precautionary principle, however it may be interpreted, in other multilateral environmental agreements,¹²⁷ that CITES has explicitly endorsed the role of precaution in addressing the impacts of international trade on wildlife, if not the principle per se, is a positive achievement.

Species that have been listed in CITES are subject to a permitting system, which is set out in Articles III and IV for Appendix I and II species respectively. Both Appendix I and Appendix II species must be accompanied by an export permit, the requirements of which are:

- (a) a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species;
- (b) a Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora; and
- (c) a Management Authority of the State of export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment.¹²⁸

Appendix I species must also be accompanied by an import permit, and it is the strict conditions for these that limit trade in those species.¹²⁹ An import permit will only be granted where:

¹²³ The procedural requirements for amending Appendices I and II are contained in Article XV.

¹²⁴ R.W.G. Jenkins, 'The Significant Trade Process: Making Appendix II Work', in Hutton and Dickson (eds), (n 81), p. 49.

¹²⁵ A. Wiersama, 'Adversaries or Partners? Science and the Precautionary Principle in International Wildlife Treaty Regimes' (2008) 11 *Journal of International Wildlife Law and Policy* 211-239, 222-228.

¹²⁶ M. Blue Sky, 'Getting on the List: Politics and Procedural Manoeuvring in CITES Appendix I and II Decisions for Commercially Exploited Marine and Timber Species' (2010) 10 *Sustainable Development Law and Policy* 35-40.

¹²⁷ J. B. Wiener, 'Precaution', in D. Bodansky, J. Brunnée and E. Hey (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2007).

¹²⁸ Article III(2) contains a further condition of permits for the export of an Appendix I species; 'a Management Authority of the State of export is satisfied that an import permit has been granted for the specimen'.

¹²⁹ Bowman, Davies and Redgwell, (n 7) p. 500.

- (a) a Scientific Authority of the State of import has advised that the import will be for purposes which are not detrimental to the survival of the species;
- (b) a Scientific Authority of the State of import is satisfied that the proposed recipient of a living specimen is suitably equipped to house and care for it; and
- (c) a Management Authority of the State of import is satisfied that the specimen *is not to be used for primarily commercial purposes*.¹³⁰ (emphasis added)

That Article IV does not require a determination that the import of an Appendix II species is not for primarily commercial purposes means that a significant amount of trade in those species can legally take place. There is nevertheless a risk that trade in a certain species reaches unsustainable levels. Theoretically, Article IV(3) safeguards against this by requiring the relevant Scientific Authority to monitor the export of Appendix II species and, where it believes that the export of a species ‘should be limited in order to maintain the species throughout its range at a level consistent with its role in the ecosystem’, to advise the Management Authority of suitable measures to limit the number of export permits for that species. This introduces an ecosystem approach into CITES, as the relevant threshold is the level at which a species can sustain its role in its ecosystem rather than the level at which it can sustain trade. However, there have been concerns about the efficacy of this mechanism in controlling the levels of trade in Appendix II species. In particular, it relies on the exporting State having the administrative and technical capacities to operate it, and the differing capacities of exporting States have resulted in the national implementation of Article IV varying considerably.¹³¹

Consequently, the Conference of the Parties has developed the ‘significant trade procedure’.¹³² This creates a role for the CITES institutions in monitoring Appendix II species that are subject to particularly high levels of trade. Following a review of all available data and consultations with the range States, the Animals or Plants Committee will recommend that certain measures are taken to temporarily restrict trade in an affected species.¹³³ The significant trade procedure thus goes some way in overcoming the problems of relying solely on exporting States to monitor and control trade in Appendix II species. There has, however, also been problems in the implementation of this procedure, with some initial confusion over what exactly its purpose was.

¹³⁰ Article III(3). See also Resolution Conf. 5.10 (Definition of ‘primarily commercial purposes’).

¹³¹ Jenkins, (n 124) p. 48.

¹³² The rules governing this procedure are currently contained in Resolution Conf. 12.8 (Review of significant trade in Appendix-II species).

¹³³ Bowman, Davies and Redgwell, (n 7) p. 523-524. See H.N. McGough et al, ‘Addressing non-detrimental trade for CITES Appendix II-listed plant species: the status of wild and cultivated *Galanthus woronowii* in Georgia’ (2014) 48 *Oryx* 345-353 for an example of how the review of significant trade procedure operates in practice.

In many cases the Animals Committee had failed to make clear exactly what measures it was recommending.¹³⁴

Article VII of CITES contains several exceptions, which if applicable either amend or negate the permit conditions. The most relevant of these to plants is that where a specimen of a listed species has been artificially propagated, a certificate to that effect from the Management Authority of the State of export may be presented in lieu of the CITES permits.¹³⁵ Reflecting the advances in plant cultivation techniques, Resolution Conf. 11.11 (Regulation of trade in plants) defines ‘artificially propagated’ as:

- a) grown under controlled conditions; and
- b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

Excluding artificially propagated species from the CITES permits requirements is a sensible measure, and the smaller administrative burden could incentivise the greater use of cultivated specimens to meet commercial demand rather than collections from the wild. At the eleventh Conference of the Parties in 2000, for example, *Lewisia cotyledon* was removed from Appendix II because virtually all commercial trade in that species now comes from cultivated, rather than collected, specimens.¹³⁶ On the other hand, this reduces the economic value of the wild habitat of the species in question.¹³⁷ In relation to *Galanthus* it has been observed that wild collection makes their habitat commercially-valuable. Without it, there would be pressure to convert the site to another land-use and the *Galanthus* would be lost.¹³⁸

Operating alongside Appendices I and II is Appendix III, which includes ‘all species which any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation, and as needing the co-operation of other Parties in the control of trade’.¹³⁹ Appendix III is thus a recognition of the globalised nature of wildlife trade and that this issue is best addressed through international cooperation. As with Appendix I and II species, specimens of Appendix III species from the regulating State must be accompanied by an export permit, which will be granted when the exporting Management Authority has determined that

¹³⁴ Eleventh Meeting of the Conference of the Parties, ‘Implementation of Resolution Conf. 8.9’ (Doc. 11.41.1, 2000).

¹³⁵ Article VII(5).

¹³⁶ Prop. 11.1. See also: https://www.cites.org/sites/default/files/eng/cop/11/other/E-Amendments_App.pdf (last accessed 01/04/2017).

¹³⁷ Bowman, Davies and Redgwell, (n 7) p. 233.

¹³⁸ Bishop, Davis and Grimshaw, (n 3) p. 342-343. See also McGough et al, (n 132).

¹³⁹ Article II(3).

the specimen was collected in a manner that did not violate the State's protection laws and, if it is a live specimen, that any risk to it during transport is minimised.¹⁴⁰ Additionally, all imports of Appendix III species must be accompanied with a certificate of origin and, where the specimen is from a State that has listed the species in Appendix III, an export permit. This provides a useful tool with which a State can regulate trade in a species that it considers to be particularly valuable, either as an important economic resource or because of its inherent value. However, doubts have been raised over the efficacy of Appendix III, with many species eventually needing to be regulated under Appendix I or II. At the sixteenth Conference of the Parties in 2013, for example, Malagasy ebony (*Diospyros* spp.) and Malagasy rosewood (*Dalbergia* spp.) were included in Appendix II because regulation under Appendix III had been insufficient.¹⁴¹

Like Appendix III, Article XIV of CITES enables a State to pursue its domestic conservation agenda through an international forum. However, whereas the scope of Appendix III is limited to species within the regulating State's jurisdiction, Article XIV permits a State to adopt stricter regulations for any species listed in the Appendices, regardless of whether it is native to that State. It may therefore be characterised as an exercise of the same kind of extraterritoriality that gave rise to the *United States – Tuna* and *United States – Shrimp* WTO disputes. Article XIV has proven just as controversial, particularly when used by economically powerful consumer States to advance their own conservation agenda that is contrary to the consensual position represented by the CITES appendices,¹⁴² but in this case such action is given explicit legitimacy by the treaty text.

Hutton makes the point that Article XIV shifts the determination on the sustainability of the level of trade in a species from the range States, which is required to make this decision by Article IV, to the importing State. This is also contrary to the emphasis in CITES that is placed on the role of range States in making sustainability determinations.¹⁴³ However, given the problems in implementing Article IV it might be better for the State of import, which is often a developed State, to make this judgement as it is likely to have greater capacity to do so. Further measures suggested by Hutton to improve the legitimacy of actions taken under Article XIV are similar to the criteria of chapeau to Article XX of the GATT:

Those taking stricter domestic measures should be expected not only to demonstrate that the CITES listing is inappropriate, and that legal commercial trade continues to have

¹⁴⁰ Article V(2).

¹⁴¹ *Earth Negotiations Bulletin* (18 March 2013, published by the International Institute for Sustainable Development), p.25. See also Decision 16.152 and Annex 3 to the COP-16 Decision, available at: <https://www.cites.org/eng/dec/index.php> (last accessed 01/04/2017).

¹⁴² J. M. Hutton, 'Who Knows Best? Controversy over Unilateral Stricter Domestic Measures', in Hutton and Dickson (eds), (n 81) p. 58.

¹⁴³ Resolution Conf. 8.21 (Consultation with range States on proposals to amend Appendices I and II).

a negative effect on the species despite the CITES listing and the operation of the significant trade process. They should also be expected to show that the measure they are taking has been discussed with the range state concerned and can reasonably be expected to have a positive conservation effect.¹⁴⁴

As previously noted, the Contracting Parties have already stressed the importance of consulting with range States. Regarding Hutton's other proposals, whilst sound in theory they present significant practical difficulties. In particular, they would by necessity lead to a conflict of scientific evidence, as the State wishing to impose unilateral trade restrictions would have to demonstrate that the scientific basis for CITES' treatment of a species was flawed. Of the current CITES institutions, the obvious choice to assess the validity of conflicting scientific evidence would be the Animals or Plants Committee, but these bodies would have already been involved in recommending that the species in question be listed in either Appendix I or II and has a role in submitting a species to the significant trade procedure. As such, it is difficult to envisage a situation in which one of these Committees found that both the CITES listing was inappropriate and the significant trade procedure was incapable of restricting unsustainable international trade. The purpose of the recommendations resulting from this process is to address concerns that regulation under Appendix II for a certain species is failing, and a failure to implement these constitutes a non-compliance issue.¹⁴⁵ Alternatively, recourse could be made to the dispute settlement mechanism in Article XVIII of CITES, which allows the Parties involved to submit the dispute for arbitration if they fail to reach a negotiated settlement. The issue would be the same however, namely choosing between conflicting but potentially equally legitimate scientific evidence.¹⁴⁶

Furthermore, the sovereignty implications of one State attempting to compel another to adopt certain environmental standards through unilateral restrictions on trade that were central to the WTO disputes discussed above are not as relevant in this context. The provisions of Article XX of the GATT are exceptions that may be invoked when a State wishes to derogate from its WTO obligations, and the Appellate Body has appropriately characterised the Article XX analysis as a balancing of a State's rights to pursue its own environmental policies against its GATT obligations and the corresponding rights of other States under that regime. Article XIV, in comparison, is not an exceptions clause but rather an explicit right afforded to States to adopt

¹⁴⁴ Hutton, (n 142) p. 66.

¹⁴⁵ Resolution Conf. 12.8 (Review of Significant Trade in specimens of Appendix-II species), para. (S).

¹⁴⁶ On the issue of conflicting scientific evidence in international disputes see P. Sands, 'Water and international law: science and evidence in international litigation' (2010) 22 *Environmental Law and Management* 151-161.

stricter measures regardless of the common position agreed by the CITES Parties and set out in the Appendices. Thus, as Bowman correctly points out:

Provided they are exercised in good faith and in furtherance of the Convention's objectives, and consistently with other treaty obligations, no formal infringement of sovereign rights can possibly arise, since all parties have consented to this option in advance.¹⁴⁷

Neither is this a particularly unusual feature in environmental law. Article 193 of the Treaty on the Functioning of the European Union¹⁴⁸ affords EU Member States the right to adopt stricter environmental standards than the common EU position, subject to them being compatible with EU law.

The final feature of CITES that warrants discussion is the system in place to ensure compliance with its obligations. In lieu of any explicit non-compliance provision in the treaty text, a system has been developed through Resolutions and Decisions of the Conference of the Parties,¹⁴⁹ with the Standing Committee playing a key role.¹⁵⁰ Consequently, the CITES non-compliance procedures are technically not legally binding, but they are nevertheless taken seriously by the Contracting Parties.¹⁵¹ In brief, the Secretariat, using a range of sources such as States' reports and the significant trade procedure, monitors compliance with the Convention's obligations. Where it finds a State to be in violation of the treaty it informs that State and requests all relevant information and, if necessary, a remediation plan.¹⁵² If a compliance issue remains unresolved it is notified to the Standing Committee, which will conduct its own investigation.¹⁵³ Should a State fail to remedy the violation, the Standing Committee may take a number of steps to bring it back into compliance, ranging from the provision of advice on capacity-building, to issuing a formal non-compliance warning and requiring a compliance action plan to be submitted by the State in question.¹⁵⁴ In the event of 'unresolved and persistent' non-compliance and if the State shows no intention to address the problem, the Standing Committee

¹⁴⁷ Bowman, (n 120) 237.

¹⁴⁸ [2008] O.J. C 115/47.

¹⁴⁹ See Bowman, Davies and Redgwell, (n 7) p. 518, and Resolution Conf. 14.3 (CITES compliance procedures).

¹⁵⁰ R. Reeve, *Policing International Trade in Endangered Species: The CITES Treaty and Compliance* (Royal Institute of International Affairs / Earthscan, 2002), chapter 3.

¹⁵¹ R. Reeve, 'The CITES treaty and compliance: progress or jeopardy?' (Chatham House Sustainable Development Programme, September 2004, BP 04/01).

¹⁵² Resolution Conf. 14.3 (CITES compliance procedures), paras. 15-20.

¹⁵³ *ibid*, paras. 21-28.

¹⁵⁴ *ibid*, para. 29.

can recommend either a partial or total suspension in CITES trading rights for that State.¹⁵⁵

When deciding what measures to take it will take into account:

- a) the capacity of the Party concerned, especially developing countries, and in particular the least developed and small island developing States and Parties with economies in transition;
- b) such factors as the cause, type, degree and frequency of the compliance matters;
- c) the appropriateness of the measures so that they are commensurate with the gravity of the compliance matter; and
- d) the possible impact on conservation and sustainable use with a view to avoiding negative results.

These criteria demonstrate an awareness of the significant challenges many developing States face in meeting their international environmental obligations.¹⁵⁶ At the same time, they allow for meaningful sanctions to be imposed on any State that fails to implement CITES. Importantly, the Conference of the Parties has decided that a failure to submit annual and biennial reports¹⁵⁷ constitutes ‘a major problem with the implementation of the Convention’ and must be reported by the Secretariat to the Standing Committee. Many of the trade suspensions currently in place relate to a failure to submit annual reports,¹⁵⁸ highlighting the importance of national reporting to the operation of CITES.¹⁵⁹

One criticism of the CITES regime is that it is too limited in scope to make any real difference to the conservation of endangered species. It has therefore been suggested that there should be stronger ties between CITES and the Biodiversity Convention, even to the point of recasting CITES as a protocol to the Biodiversity Convention.¹⁶⁰ This reflects broader concerns about the impact that the fragmentation of international environmental law has on efforts to develop a holistic response to current ecological crises.¹⁶¹ I am unconvinced that a radical reformation of CITES is the appropriate response. Regardless of the lack of demonstrable impact CITES is having on the conservation status of the world’s most endangered species,¹⁶² on paper at least it has all the hallmarks of a sound environmental instrument, including institutional oversight and robust non-compliance procedures. It therefore has the potential to deliver effective protection for plants. In comparison, the Convention on Biodiversity is by design a deeply flawed

¹⁵⁵ *ibid*, para. 30.

¹⁵⁶ E.M. McOmber, ‘Problems in Enforcement of the Convention on International Trade in Endangered Species’ (2002) 27 *Brooklyn Journal of International Law* 673-701, 696-697.

¹⁵⁷ Article VIII(7).

¹⁵⁸ <https://cites.org/eng/resources/ref/suspend.php> (last accessed 01/04/2017).

¹⁵⁹ Reeve, (n 150) p. 62-68.

¹⁶⁰ Martin, (n 89) p. 36.

¹⁶¹ W. Bradnee Chambers, *Interlinkages and the Effectiveness of Multilateral Environmental Agreements* (United Nations University Press, 2008), p. 140-143.

¹⁶² Martin, (n 89) p. 30.

instrument, and one that is largely failing to protect both plants¹⁶³ and the natural world as a whole.¹⁶⁴ Rather than the diminishing of CITES, the natural world would be better served by CITES becoming the template for reforms to both the Biodiversity Convention and other multilateral conservation agreements.

Conclusions:

The relationship between the environment and international trade is complex, involving trade-offs between competing but equally valid national and international priorities, and between the constituent elements of State sovereignty. In the WTO, the jurisprudence of the dispute settlement bodies has evolved from ‘the worst-case scenario’¹⁶⁵ for environmentalists to a well-reasoned position in which the right of States to pursue their own environmental policies is balanced against their obligations under the WTO regime, and the corresponding rights of other States to enjoy the freest possible trade relations.

Following *United States – Shrimp*, a State may impose the strictest of trade restrictions to protect plants, provided the measure is either necessary for the protection of the plants’ life or health (Article XX(b)) or relates to the conservation of the plants as an exhaustible natural resource and made in conjunction with domestic restrictions (Article XX(g)). The difficulty is in the second stage of the Article XX process, i.e. satisfying the criteria of the chapeau and demonstrating that the application of the measure is not arbitrary or unjustifiable discrimination, or a disguised restriction on international trade. A key component of this is that the State must show that, prior to adopting the unilateral trade restriction, it engaged in negotiations with other States.

Whilst a sound interpretation of an exceptions provision to a regime intended to liberalise international trade, for advocates of conservation it is problematic. The existence of multilateral conservation regimes that enjoy near-universal participation by States could frustrate a State’s attempts to justify the imposition of unilateral trade restrictions for the purposes of protecting plants. The State’s likely membership of conservation regimes would indicate their acknowledgment that such issues can only be effectively addressed with international cooperation, and its acceptance of the approach taken by those regimes. As in the case of the endangered turtles, therefore, the criteria of the chapeau will probably preclude the justification of unilateral conservation measures under Article XX of the GATT. This situation could be

¹⁶³ RBG Kew, (n 113).

¹⁶⁴ Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montreal, 2014).

¹⁶⁵ Goplerud, (n 22).

remedied if the WTO Dispute Panel undertook a more thorough assessment of the nature of the environmental agreement relevant to the subject matter of the national measures. If, as in the case of the Biodiversity Convention, the treaty only establishes a very broad framework within which States enjoy considerable discretion to determine the form and design of conservation measures, then a State's engagement with that instrument should not preclude the application of Article XX to domestic conservation measures.

The limitations of the current position adopted by the WTO Appellate Body would not be as problematic for the conservation of plants if there existed effective conservation treaties. As has been observed elsewhere in this thesis, however, many global and regional conservation instruments are incapable of delivering meaningful protection to nature. The possible exception is CITES, which, in contrast to many other conservation instruments, benefits from technical and robust institutional oversight and an effective non-compliance procedure. CITES has developed intelligent responses to certain practical difficulties associated with managing trade in wildlife, and the Contracting Parties have explicitly endorsed the importance of adopting a precautionary approach when considering a species for listing.

Further, CITES, arguably more than any other instrument, can respond to the specific challenges encountered in the conservation of plants. The emphasis on small, localised and vulnerable populations in the Fort Lauderdale listing criteria, for example, means many of the world's rarest plants are eligible for listing in Appendix I. That so few plants are listed here is a cause of concern, which may be attributable both to the increasingly politicised nature of CITES listing decisions and the economic value of many plant species. Nevertheless, rather than needing substantial reform or subordination into a regime with a more comprehensive conservation remit, CITES is instead a template of a regime that provides a more sophisticated legal standard for the protection of plants.

Doubts have been cast over the links between international trade and extinction, but trade is often a factor in a species decline, even if it is not the main driver. Further, trade is one issue that is relatively easy to address through regulation. Other drivers of biodiversity loss, notably climate change, require fundamental changes to society if they are to be mitigated, whereas the introduction of controls can immediately affect the impacts of international trade on a species, provided that such controls can be enforced. This chapter has shown that both the WTO and CITES have the potential to deliver these controls at the same time as respecting international trade rules and the sovereignty of States, and are therefore highly relevant instruments for the conservation of plants.

VIII

ALIEN/INVASIVE SPECIES AND DISEASE

The Threat of Alien/Invasive Species and Disease:

Alien/invasive species¹ are one of the principal drivers of biodiversity loss.² Once established, an alien/invasive species competes with native species that occupy a similar ecological niche. They may also introduce new diseases to which native species have not been previously exposed and therefore have no defence against. Similarly, if, for example, it is a new type of predator to which there is no equivalent in the ecosystem, the alien/invasive species could wipe out prey species that have not evolved defensive behaviours. As well as direct impacts on certain species, a biological invasion can have a wider detrimental effect on ecosystems, including plant life. Studies show that plant diversity and abundance are reduced in areas in which an alien/invasive species has become established.³ If initially left unchecked, an alien/invasive species can be extremely difficult and costly to eradicate. In Florida alone, over \$500 million is spent every year to remove alien/invasive species of fauna and flora.⁴ Globally, the costs of invasive species have been estimated at approximately 5% of the world's economy.⁵

Globalisation has opened a range of pathways through which alien/invasive species may be introduced, including tourism, the pet trade, international shipping, agriculture, aquaculture, horticulture and construction. Furthermore, other drivers of biodiversity loss, particularly climate change, are facilitating the spread of alien/invasive species by opening up previously inhospitable habitats to colonisation.⁶ In mountainous regions, for example, as warmer

¹ In this chapter I use the term 'alien/invasive species' as a generic term to indicate any species that may have a negative ecological impact. However, it is important to note that not all alien species are invasive, and not all invasive species are alien. Where an ecosystem has been disturbed, such as where the numbers of a particular predator are dramatically reduced, the population of that predator's prey species may increase to the point that it becomes invasive. Equally, if the circumstances are such that an alien species is unable to reproduce in sufficient numbers, for example if there is a shortage of females in the alien population, it is unlikely to become invasive.

² Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montreal, 2014), p. 70-74.

³ RBG Kew, 'The State of the World's Plants Report' (2016), p. 48.

⁴ National Park Service and Florida Fish and Wildlife Conservation Commission, 'Florida Invaders' (2013), available at: <https://www.nps.gov/ever/learn/nature/floridainvaders.htm> (last accessed 01/04/2017).

⁵ RBG Kew, (n 3) p. 48.

⁶ D. A. Striffling 'An Ecosystem-Based Approach to Slowing the Synergistic Effects of Invasive Species and Climate Change' (2011) 22 *Duke Environmental Law and Policy Forum* 145-193 and E.V. Hull, 'Climate Change and Aquatic Invasive Species: Building Coastal Resilience Through Integrated Ecosystem Management' (2012) 25 *Georgetown International Environmental Law Review* 51-93.

temperatures reach higher altitudes so too do lowland plant species. These tend to be more robust and so can outcompete the more specialist high alpine species, increasing the pressures on these already vulnerable plants. In the same way, the changing climate and the mass movement of materials from one part of the world to another is facilitating the spread of infectious diseases. Although disease it not currently considered to be as big a threat to biodiversity as alien/invasive species, it is of increasing concern to conservationists.

International concern over alien/invasive species is reflected in a number of instruments.⁷ In relation to plants, measures are contained in, inter alia, the 1951 International Convention for the Establishment of the European and Mediterranean Plant Protection Organisation,⁸ the 1954 Phyto-Sanitary Convention for South Africa South of the Sahara,⁹ the 1956 Plant Protection Agreement for the Asia and Pacific Region¹⁰ and the 1959 Agreement Concerning Co-operation in the Quarantine of Plants and Their Protection Against Pests and Diseases.¹¹ The primary focus of these instruments, and of the regimes discussed in this chapter, is the prevention of the spread of plant pests and diseases by improving cooperation between States in minimising the risk of introduction.¹² Many international organisations have been established to consolidate and provide scientific expertise on alien/invasive species, including the Global Invasive Species Programme¹³ and the IUCN Invasive Species Specialist Group.¹⁴ Finance is an ongoing concern for such initiatives. The Global Invasive Species Programme was closed in 2011 due to a lack of funds.¹⁵

Controlling alien/invasive species also forms part of the 1992 Biodiversity Convention's¹⁶ Strategic Plan:

⁷ A.M. Perrault and W.C. Muffett, 'Turning off the Tap: A Strategy to Address International Aspects of Invasive Alien Species' (2002) 11 *Review of European Community and International Environmental Law* 211-224.

⁸ Rome, 18 April 1951, in force 1 November 1953, UKTS 44 (1956).

⁹ London, 29 July 1954, in force 15 June 1956, 1 SMTE 115.

¹⁰ Rome, 27 February 1956, in force 2 July 1956, 247 UNTS 400.

¹¹ In force 19 October 1960, 1 SMTE 153.

¹² P. Sands and J. Peel, *Principles of International Environmental Law* (3rd edition, Cambridge University Press, 2012), p. 507.

¹³ <http://www.diversitas-international.org/activities/past-projects/global-invasive-species-programme-gisp> (last accessed 01/04/2017).

¹⁴ <http://www.issg.org/> (last accessed 01/04/2017).

¹⁵ http://www.bgci.org/news-and-events/news/0794/?sec=resources&option=com_news&id=0794 (last accessed 01/04/2017).

¹⁶ Convention on Biological Diversity, Rio de Janeiro, 5 June 1992, in force 29 December 1993, 3 ILM 822 (1992).

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.¹⁷

Despite decades of cooperation under a range of instruments, however, little progress is being made towards achieving this target.¹⁸ This chapter explores why this might be the case.

I begin by evaluating two different bodies that have the control of alien/invasive species as part of their remit: the Biodiversity Convention and the UN Food and Agriculture Organisation. The lack of a single, coherent strategy to deal with all stages of a biological invasion is suggested as the principal reason why action against alien/invasive species has largely been ineffective. In the case of infectious disease, the issue is not the multiplicity of international regulation, but rather the comparative lack of detailed provisions. This is contrasted with the advances being made in conservation science, which show a growing appreciation of the threat disease poses to plants.

International Regulation of Alien/Invasive Species:

The 1992 Convention on Biological Diversity:

The threat of alien/invasive species to biodiversity has been a priority for the parties to the Biodiversity Convention¹⁹ since the fourth Conference of the Parties, where it was adopted as an official cross-cutting issue.²⁰ Article 8(h) of the Convention requires States, ‘as far as possible and as appropriate’, to:

Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.

Like many of the provisions in the Biodiversity Convention, Article 8(h) is lacking in detail. It has, however, been elaborated by the Convention’s Subsidiary Body on Scientific, Technical and Technological Advice through the Guiding Principles for the Prevention, Introduction and

¹⁷ Decision X/2, ‘The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets’, UNEP/CBD/COP/DEC/X/2, 29 October 2010, Annex, Target 9.

¹⁸ There are four elements to this Target, none of which are on course to be met, see: Secretariat to the Convention, (n 2) p. 70.

¹⁹ The Biodiversity Convention defines ‘invasive alien species’ as ‘species whose introduction and/or spread outside of their natural past or present distribution threatens biological diversity’ (<https://www.cbd.int/invasive/WhatareIAS.shtml> - last accessed 01/04/2017).

²⁰ Decision IV/1, ‘Report and recommendations of the third meeting of the Subsidiary Body on Scientific, Technical and Technological Advice and Instructions by the Conservation of the Party to the Subsidiary Body on Scientific, Technical and Technological Advice’ (UNEP/CBD/COP/DEC/IV/1), 1998.

Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species.²¹

Combined, these Principles constitute a comprehensive response to a biological invasion:

A. General:	
Principle 1	Precautionary approach
Principle 2	Three-stage hierarchical approach
Principle 3	Ecosystem approach
Principle 4	The role of States
Principle 5	Research and monitoring
Principle 6	Education and public awareness
B. Prevention:	
Principle 7	Border control and quarantine measures
Principle 8	Exchange of information
Principle 9	Cooperation, including capacity-building
C. Introduction of species:	
Principle 10	Intentional introduction
Principle 11	Unintentional introductions
D. Mitigation of impacts:	
Principle 12	Mitigation of impacts
Principle 13	Eradication
Principle 14	Containment
Principle 15	Control

The Principles under heading A reflect several general principles and concepts of international environmental law. Underpinning all action concerning alien/invasive species is precaution.²² The Guiding Principles import the same terminology²³ of ‘approach’ seen in both the preamble of the Biodiversity Convention and Principle 15 of the 1992 Rio Declaration.²⁴ It is also evident that the Guiding Principles incorporate a weak interpretation²⁵ of the precautionary principle:

²¹ Decision VI/23, ‘Alien species that threaten ecosystems, habitats or species’ (UNEP/CBD/COP/DEC/VI/23), 2002, Annex.

²² Precaution is also central to many domestic mechanisms designed to prevent the introduction and spread of alien/invasive species. See, for example, T. Low, ‘Preventing Alien Invasions: The Precautionary Principle in Practice in Weed Risk Assessment in Australia’, in R. Cooney and B. Dickson (eds), *Biodiversity & The Precautionary Principle: Risk and Uncertainty in Conservation and Sustainable Use* (Earthscan, 2005).

²³ The use of the term ‘precautionary principle’ in this chapter should be read as including both the ‘precautionary principle’ as it is referred to in environmental literature and also the ‘precautionary approach’ that is expressed in certain environmental instruments.

²⁴ ‘In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation’, 1992 Rio Declaration on Environment and Development 31 ILM 874 (1992).

²⁵ C.R. Sunstein, ‘Beyond the Precautionary Principle’ (2003) 151 *University of Pennsylvania Law Review* 1003-1058.

Lack of scientific certainty about the various implications of an invasion should not be used as a reason for postponing or failing to take appropriate eradication, containment and control measures.²⁶

A second key concept in the Guiding Principles is the ecosystem approach, which, in the context of the Biodiversity Convention, is defined as ‘a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way’.²⁷ A further twelve principles have been developed to aid States in implementing the ecosystem approach, one of the most important of which is Principle 5:

Ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species.²⁸

Evidence suggests that one reason why a species may become invasive is a failure to adopt an ecosystem approach in conservation and sustainable use practices. This is particularly true where the instrumental value of a particular species is prioritised over its ecological value. For example, an area off the coast of South Africa, between Dyer Island and Geyser Rock, is known as ‘shark alley’ because it is commonly used by great white sharks (*Carcharodon carcharias*) to hunt Cape fur seals (*Arctocephalus pusillus*). Shark alley is being overtaken by kelp, which blocks the sharks access to the area and has transformed it from a hunting ground for the sharks to a refuge for the seals. The kelp is not an alien species, but has become invasive because the shellfish species that feed on it have been overharvested to meet demand in Asian markets.²⁹ By not respecting the ‘dynamic relationship’ between the species that inhabit shark alley, humans have enabled one species to dominate and fundamentally alter the ecology of the area. This is contrary to both the ecosystem approach seen in the Biodiversity Convention regime and the ecosystem approach that may be read into Part XII of the 1982 Law of the Sea Convention.³⁰ Similarly, other studies show that more diverse ecosystems are not only less susceptible to biological invasion, but can also play a role in slowing the spread of an alien/invasive species.

²⁶ Guiding Principle 1.

²⁷ Decision V/6, ‘Ecosystem Approach’ (UNEP/CBD/COP/DEC/V/6), 2000.

²⁸ *ibid.*

²⁹ BBC Natural World, *Great White Shark – A Living Legend*, first broadcast on BBC2 on 2 January 2009, from 31:55.

³⁰ United Nations Convention on the Law of Sea (Montego Bay), 10 December 1982, in force 16 November 1994, 21 ILM 1261 (1982). D. Freestone, ‘The Conservation of Marine Ecosystems under International Law’, in M. Bowman and C. Redgwell (eds), *International Law and the Conservation of Biological Diversity* (Kluwer Law International, 1996), p. 103.

Alien species face greater levels of competition from established native species in such ecosystems, reducing their ability to survive and thrive.³¹

The three-stage hierarchical approach in Principle 2 mirrors the construction of Article 8(h) of the Convention, with the priority being the prevention of the spread or introduction of an alien/invasive species.³² If an alien/invasive species becomes established the first response should be eradication, but where this is not feasible, steps should be taken to contain and control its spread and negative impacts. With regard to prevention, Guiding Principle 7 states:

1. States should implement border controls and quarantine measures for alien species that are or could become invasive to ensure that:
 - a. Intentional introductions of alien species are subject to appropriate authorization (principle 10);
 - b. Unintentional or unauthorized introductions of alien species are minimized.
2. States should consider putting in place appropriate measures to control introductions of invasive alien species within the State according to national legislation and policies where they exist.
3. These measures should be based on a risk analysis of the threats posed by alien species and their potential pathways of entry. Existing appropriate governmental agencies or authorities should be strengthened and broadened as necessary, and staff should be properly trained to implement these measures. Early detection systems and regional and international coordination are essential to prevention.

The construction of Guiding Principle 7 highlights the weakness that has already been observed in the Biodiversity Convention regime. Guiding Principle 7 does not impose any obligations on States; it merely suggests possible actions within pre-existing national administrative and legislative structures. The consequences of this less-than-assertive approach are evident in the Fourth Global Biodiversity Outlook's assessment of progress towards Aichi Target 9.³³ In some cases, a failure to adopt appropriate risk assessment and border control measures may be due to a State's lack of capacity. Guiding Principles 8 and 9 respond to this concern by calling on States to cooperate in the collecting and sharing of data and develop capacity-building programmes. 'Such capacity-building may involve technology transfer and the development of training programmes'.³⁴

As invasive/alien species are one of the principal drivers of biodiversity loss, that Guiding Principle 10 allows for the intentional release of a potentially invasive species is concerning. Under the Principle this should be subject to the prior authorisation of the State in which the

³¹ J.D. Ackerman et al, 'Biotic resistance in the tropics: patterns of seed plant invasions within an island' (2016) *Biological Invasions* DOI: 10.1007/s10530-016-1281-4.

³² This reflects the prevention principle in environmental law, i.e. that it is better to prevent an environmental harm rather than remediate it.

³³ See (n 17) above.

³⁴ Guiding Principle 9.

species is being introduced and an analysis of the risks associated with the release. Similarities can therefore be drawn with the system governing the transboundary movement of living modified organisms seen in the Biodiversity Convention's Biosafety Protocol,³⁵ although the measures contained in the Protocol benefit from being in a binding instrument, and, as a rule, the provisions of that Protocol are also phrased in stronger language than either the parent Convention or the Guiding Principles on alien/invasive species.³⁶

The intentional introduction of alien species is an ideal candidate for a new protocol to the Biodiversity Convention.³⁷ First, the subject matter is analogous to that of the Biosafety Protocol, i.e. the release of a foreign entity that could potentially have a significant adverse impact on ecological systems. Second, the provisions on prior authorisation, risk analysis, international cooperation and data gathering seen in the Guiding Principles are similar to those that govern the transboundary movement of living modified organisms in the Biosafety Convention.³⁸ Third, alien/invasive species are arguably a bigger threat to biodiversity than living modified organisms, or at least the threat of alien/invasive species to biodiversity is currently better understood and the subject of more scientific studies than that of living modified organisms. Consequently, a protocol on alien/invasive species is more likely to have a positive impact on the state of the world's biodiversity, and could prove more valuable in the Contracting Parties' efforts to meet the Aichi Biodiversity Targets. If nothing else, the adoption of a binding protocol on one aspect of a key driver of biodiversity loss would counter the argument that the Biodiversity Convention is, at best, a missed opportunity,³⁹ or at worst, a hollow instrument that has done more harm than good for the conservation cause.⁴⁰

For unintentional introductions, in Guiding Principle 11 we see a similar emphasis on preventative action, based on risk and impact assessments of 'common pathways' through which an alien/invasive species may be introduced. These include 'fisheries, agriculture,

³⁵ Cartagena Protocol on Biosafety to the Convention on Biological Diversity (Montreal), 29 January 2000, in force 11 September 2003, 39 ILM 1027.

³⁶ Article 8(1) of the Biosafety Protocol, for example, states: 'The Party of export shall notify, or require the exporter to ensure notification to, in writing, the competent national authority of the Party of import prior to the intentional transboundary movement of a living modified organism that falls within the scope of Article 7, paragraph 1. The notification shall contain, at a minimum, the information specified in Annex I'.

³⁷ This suggestion finds support in L. Glowka and C. de Klemm, 'International Instruments and Processes and Non-Indigenous Species: Is a Protocol Necessary?' (1996) 26 *Environmental Policy and Law* 247-267.

³⁸ For example, see Articles 7 (application of the advance informed agreement procedure), 15 (risk assessment) and 20 (information sharing and the biosafety clearing-house) of the Biosafety Protocol.

³⁹ C. Wold, 'The Futility, Utility, and Future of the Biodiversity Convention' (1998) 9 *Colorado Journal of International Environmental Law and Policy* 1-42.

⁴⁰ R. Adam, 'Missing the 2010 Biodiversity Target: A Wake-up Call for the Convention on Biodiversity?' (2010) 21 *Colorado Journal of International Environmental Law and Policy* 123-166.

forestry, horticulture, shipping (including the discharge of ballast waters), ground and air transportation, construction projects, landscaping, aquaculture including ornamental aquaculture, tourism, the pet industry and game farming'. The range of activities highlights the need to integrate policies designed to prevent the establishment and spread of alien/invasive species with other environmental and non-environmental policies.⁴¹

The final group of Guiding Principles address the responses to a biological invasion. Guiding Principle 12 focusses on the mitigation of the impacts of an alien/invasive species. Mitigation measures fall into three categories: eradication, containment and control. That mitigation is explicitly addressed is a positive feature of the Biodiversity Convention's approach to alien/invasive species, and one that is not shared in other areas of concern of the Convention, or in other regimes that address alien/invasive species. The Biosafety Protocol, for example, is only concerned with ensuring the transboundary movement of living modified organisms is subject to prior authorisation and risk assessment, and mitigation and remediation is also missing from the 1997 International Plant Protection Convention.⁴²

Methods to eradicate, contain or control an alien/invasive species should be safe to both humans and the environment, including agricultural systems. The methods employed should also be 'ethically acceptable to stakeholders in the areas affected'.⁴³ This is reflective of the tension in conservation law and policy between conservationists and those that are principally concerned with protecting an animal's welfare. For the former, the killing of individual animals may be a legitimate response to the threat an alien/invasive species poses to the ecological stability of a region. For welfarists, in comparison, that the animals are free from suffering is the principal concern.⁴⁴ However, 'Culling, even when expertly carried out, is likely to cause some suffering. Wild animals cannot be simply pre-stunned and then cleanly and quickly killed like domestic animals in a slaughterhouse. Indeed, from the welfare perspective the destruction of alien species, as a component of conservation strategy, has been described as analogous to ethnic cleansing'.⁴⁵ In terms of plant protection the welfarist position is particularly problematic. Allowing an alien/invasive species to remain unchecked could result in significant damage to the plants native to the ecosystem in question.

⁴¹ See also para. 12(d) of Decision VI/23, (n 21).

⁴² See below.

⁴³ Guiding Principle 12.

⁴⁴ S.R Harrop, 'Trade-offs between Animal Welfare and Conservation in Law and Policy', in N. Leader-Williams, W.M. Adams and R.J. Smith (eds), *Trade-offs in Conservation: Deciding What to Save* (Zoological Society of London / Wiley-Blackwell, 2010), p. 119-123.

⁴⁵ *ibid*, p. 128-129, drawing on T.C. Smout, 'The alien species in 20th century Britain: constructing a new vermin' (2003) 28 *Landscape Research* 11-20.

Harrop proposes a number of ways the conflicting priorities of conservationists and welfarists may be reconciled in international law. These include the regulation of hunting and killing methods⁴⁶ and the adoption of international standards, either under the auspices of a parent convention or an international organisation such as the International Organisation for Standardisation.⁴⁷ In the present context, the most practicable of Harrop's suggestions is to include welfare concerns as one consideration in a wide-ranging impact assessment,⁴⁸ as States are already encouraged to conduct risk and impact assessments on the likelihood of establishment and potential impacts of an alien/invasive species by the Guiding Principles.⁴⁹ It may be that the ecological evidence suggests that the alien/invasive species may only have a limited impact, or can easily be controlled through non-lethal means. In these circumstances, subject to the requirements of the precautionary approach, eradication could be precluded on the grounds of welfare concerns.

Guiding Principle 13 recognises that, 'Where it is feasible, eradication is often the best course of action to deal with the introduction and establishment of invasive alien species'. Once again, the importance of identifying and monitoring likely pathways through which an alien/invasive species may enter a State is emphasised, as eradication is more likely to be feasible at the early stages of an invasion when the populations of the species will probably be highly localised. Guiding Principle 13 contains features that are considered to be important if an eradication strategy is to be successful, including post-eradication monitoring and engagement with local communities. Post-eradication monitoring purposes are similar to those of post-project monitoring in environmental assessment.⁵⁰ First, it can indicate whether the target species has actually been eradicated, and second, the data produced can be used in the formulation of future response measures. Under Guiding Principle 13, the secondary effects of eradication on biological diversity should be taken into account when deciding whether to attempt eradication, and post-eradication monitoring from previous biological invasions could provide an important source of data on what these secondary effects might be. The consideration of the wider effects eradication may have on biodiversity is also an additional way in which the Guiding Principles seek to enact an ecosystem approach.

⁴⁶ Such as those contained in Article 8 and Appendix IV of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats (Berne, 19 September 1979, in force 1 June 1982, UKTS 56 (1982)).

⁴⁷ Harrop, (n 44) p. 131-132.

⁴⁸ *ibid*, p. 132.

⁴⁹ See, for example, Guiding Principles 7 and 11.

⁵⁰ N. Craik, *The International Law of Environmental Impact Assessment* (Cambridge University Press, 2008), p. 196.

With regards to containment, Guiding Principle 14 notes that this is ‘often an appropriate strategy in cases where the range of the organisms or of a population is small enough to make such efforts feasible’. The importance of monitoring the species is stressed, as this will indicate the success of any containment measures and enable a quick response to any new outbreaks.

Should eradication and containment be either unfeasible or ineffective, States should seek to control the alien/invasive species in accordance with Guiding Principle 15:

Control measures should focus on reducing the damage caused as well as reducing the number of invasive alien species. Effective control will often rely on a range of integrated management techniques, including mechanical control, chemical control, biological control and habitat management, implemented according to existing national regulations and international codes.

Doubts have been raised over whether such integrated management techniques exist. A 2013 review of the availability of decision tools to enable the efficient management of a biological invasion found there to be a severe lack of multi-criteria frameworks that take account of the ecological, social and economic impacts of an invasion and also assess the likely impacts of any response measures.⁵¹ In other words, the holistic approach to analysing the risks of and responding to the establishment of an alien/invasive species advocated in the Guiding Principles has yet to be developed. The consequences of this include the poor targeting of management actions, the inefficient use of public resources and, as a corollary to these, lower success rates.⁵²

The findings of the 2013 review suggest not only that many alien/invasive species are not being effectively controlled, but also that States’ capacity-building efforts and information exchange mechanisms are inadequate. Similar concerns were raised by the Conference of the Parties in their review of the ongoing work on alien/invasive species.⁵³ In particular, the Conference of the Parties calls for greater coordination⁵⁴ with other international organisations and treaty bodies such as the 1997 International Plant Protection Convention, the World Organisation for Animal Health, the World Trade Organisation, CITES and the International Maritime Organisation, ‘with a view to filling gaps and promoting coherence in the regulatory framework, reducing

⁵¹ E.D. Dana, J.M. Jeschke and J. García-de-Lomas, ‘Decision tools for managing biological invasions: existing biases and future needs’ (2013) 48 *Oryx* 56-63.

⁵² *ibid*, 60-61.

⁵³ Decision IX/4, ‘In-depth review of ongoing work on alien species that threaten ecosystems, habitats or species’, UNEP/CBD/COP/DEC/IX/4, 9 October 2008.

⁵⁴ Lack of coordination in responses to alien/invasive species is also a problem in the domestic law of some States: Y. Zhao, ‘Prevention and Control of Alien Invasive Species – China’s Implementation of the CBD’, in M.I. Jeffery, J. Firestone and K. Bubna-Litic (eds), *Biodiversity Convention, Law + Livelihoods: Bridging the North-South Divide* (IUCN Academy of Environmental Law Research Studies / Cambridge University Press, 2008).

duplication, promoting other actions to address invasive alien species at the national level and facilitating support to Parties including through capacity-building'.⁵⁵ The Conference of the Parties has also elaborated on some of the Guiding Principles. For example, regarding the collection and sharing of data Contracting Parties are encouraged to submit case studies on the successful use of, *inter alia*, risk assessment procedures, monitoring techniques and remediation measures.⁵⁶ Whilst further guidance is welcome, this is still a poor substitute for a comprehensive and legally binding protocol on alien/invasive species.

A template for this new protocol can be found in the EU's Regulation on alien/invasive species.⁵⁷ As with all the other regimes discussed in this chapter, the provisions of the Regulation are underpinned by risk assessment, both of alien/invasive species⁵⁸ and likely pathways of introduction.⁵⁹ The Regulation adopts a similar hierarchy to that seen in the Guiding Principles. First, Member States are required to take action to prevent the intentional and unintentional introduction of alien/invasive species by prohibiting their importation, use and cultivation in the territory of the Union.⁶⁰ In comparison to the Guiding Principles, the intentional introduction of a species is limited to purposes for the conservation of the species in question, or where products derived from an alien/invasive species are essential for medicinal research and use.⁶¹ In these circumstances, a permit must be obtained from the relevant competent national authority, the conditions of which include having appropriate storage and transport facilities and there being measures in place to prevent and contain any escape.⁶²

In the event of an invasion, the primary response under the Regulation is eradication. When implementing eradication measures Member States must take into account the likely impact on 'human health and the environment, especially non-targeted species and their habitats, and ensuring that animals are spared any avoidable pain, distress or suffering'.⁶³ In recognition of the difficulties in eradicating certain species, Article 18 permits a State to not pursue eradication

⁵⁵ Decision IX/4, (n 53) Part A, para. 11.

⁵⁶ *ibid*, Part B, para. 15. See: <https://www.cbd.int/invasive/assessments.shtml> (last accessed 01/04/2017).

⁵⁷ Regulation No. 1143/2014 on the prevention and management of the introduction and spread of invasive alien species [2014] OJ L317/35. The Regulation uses a similar definition of 'invasive alien species' as the Biodiversity Convention and includes any species 'whose introduction or spread has been found to threaten or adversely impact upon biodiversity and related ecosystem services' (Article 3(2)). Importantly, natural migrants, i.e. species whose natural range has been altered by, for example, climate change, are not covered by the Regulation (Article 2(2)(a)).

⁵⁸ Article 5.

⁵⁹ Article 13.

⁶⁰ Article 7.

⁶¹ Article 8(1).

⁶² Article 8(2).

⁶³ Article 17(2).

where, for example, a cost-benefit analysis indicates that the long-term costs of eradication will be ‘exceptionally high and disproportionate to the benefits of eradication’.⁶⁴ This would cover a situation similar to that in New Zealand, where efforts to eradicate wasps have proven futile because cleared areas are soon recolonised.⁶⁵ The importance of surveillance in detecting an invasion as early as possible is emphasised in Article 14, which requires Member States to establish a system to collect data on the occurrence of alien/invasive species in the environment including, where possible, in a transboundary context.⁶⁶

Where eradication is not viable Member States must put in place management measures so that the species’ ecological, environmental and socioeconomic impacts are minimised. These may include lethal and non-lethal, biological and chemical actions aimed at eradication, containment and control.⁶⁷ They can also include measures designed to enhance the resilience of ecosystems to enhance their capacity to respond to current and future invasions.⁶⁸ This is an additional preventative step that is not seen in the Biodiversity Convention’s Guiding Principles.

Another positive feature of the Regulation, and again one that is not shared by the Guiding Principles, is that it requires the restoration of ecosystems that have been degraded, damaged or destroyed by an alien/invasive species.⁶⁹ Restoration may be considered the missing step in the Guiding Principles,⁷⁰ but whilst this has noted advantages, particularly if it includes the restoration of ecosystem services, the potential costs in undoing systemic and potentially irreversible damage to an ecosystem must be taken into account. This is recognised in the Regulation, as restoration does not have to be undertaken where the costs would be disproportionate to any likely benefits.⁷¹

To summarise, the Biodiversity Convention’s Guiding Principles offer a framework for action to address a biological invasion, which gives appropriate emphasis on the need for risk assessments, monitoring and cooperation. The response hierarchy reflects the environmental mantra that prevention is better than remediation and at the same time recognises that different invasions will require different responses based on eradication, containment and control. However, that alien/invasive species continue to spread suggests that the current

⁶⁴ Article 18(1)(b).

⁶⁵ J.R. Beggs et al, ‘The difficulty of reducing introduced wasps (*Vespula vulgaris*) populations for conservation gains’ (1998) 22 *New Zealand Journal of Ecology* 55-63.

⁶⁶ Article 14.

⁶⁷ Article 19(1).

⁶⁸ Article 19(2).

⁶⁹ Article 20.

⁷⁰ After prevention, eradication, containment and control.

⁷¹ Article 20(1).

approach is not working. A new protocol, drawing on a range of sources including the Guiding Principles, the EU's Regulation on alien/invasive species and other areas of international environmental law, could go a long way in enhancing the law's ability to address one of the key drivers of biodiversity loss and to protect plants.

The UN Food and Agriculture Organisation:

Alien/invasive species is a core area of concern for the UN Food and Agriculture Organisation. It has, for example, produced guidance on addressing the threat of alien/invasive species to the forestry sector, which follows the same hierarchy of prevention, eradication, containment and control as the Biodiversity Convention.⁷² More significant is the 1997 International Plant Protection Convention (IPPC);⁷³ a treaty that has the objective of 'securing common and effective action to prevent the spread and introduction of pests of plants and plant products, and to promote appropriate measures for their control'.⁷⁴ For the purposes of the Convention both 'plants' and 'plant products' are given broad definitions, with the latter meaning: 'unmanufactured material of plant origin (including grain) and those manufactured products that, by their nature or that of their processing, may create a risk for the introduction and spread of pests'.⁷⁵ In contrast, as I discuss further below, the narrow definition applied to 'pest' undermines the IPPC's utility as a conservation instrument.

Article IV requires each Contracting Party to establish a national plant protection organisation. These have a broad range of responsibilities, covering both administrative matters and direct action, including certification of imported products and the inspection of regulated articles in international traffic. The IPPC thus adopts a similar model to CITES by requiring States to designate a national authority to facilitate the implementation of the Convention at the national level. There are significant differences however. First, the national plant protection organisation may be seen as a hybrid between the CITES scientific and management authorities. Combining these roles may be a positive development, as it has been necessary for the CITES Conference of the Parties to clarify the roles of the two different authorities.⁷⁶ Second, each Contracting

⁷² <http://www.fao.org/forestry/aliens/en/> (last accessed 01/04/2017).

⁷³ In force 2 October 2005, amending the 1951 Convention (Rome, 6 December 1951, in force 3 April 1952, 150 UNTS 67, as revised by the FAO Conference in 1979). Text available at: <https://www.ippc.int/en/core-activities/governance/convention-text/>. There are currently 166 Parties to the Convention: <https://www.ippc.int/en/publications/269/> (last accessed 01/04/2017).

⁷⁴ Article I(1).

⁷⁵ Article II.

⁷⁶ CITES Resolution Conf. 10.3 (Designation and role of the Scientific Authorities).

Party only needs to provide for the national plant protection organisations ‘to the best of its ability’.⁷⁷ The same qualification applies to the obligations in Article IV(3), which relate to, inter alia, the internal transmission within a State of information about plant pests and research into plant protection. In the case of Article IV(3) the inclusion of the phrase ‘to the best of its ability’ may be defended as both a recognition that the capacity of States to undertake such activities varies according to domestic circumstances and as deference to a State’s right to determine its own priorities for scientific research. The same cannot be said of the establishment of national plant protection organisations, and arguably the effectiveness of the IPPC regime, as with CITES, depends on these organisations being able to properly carry out their functions. Whilst the imposition of sanctions against States that fail to establish a national authority that meets that standard may be counter-productive,⁷⁸ other steps can be taken, such as directing capacity-building support to those States.⁷⁹

In contrast to Article IV, the other substantive provisions of the IPPC do not refer to individual State capacities. The central control mechanism of the IPPC is phytosanitary certification, which is set out in Article V. Any export of ‘plants, plant products and other regulated articles or consignments thereof’ must be accompanied with a phytosanitary certificate.⁸⁰ These certificates must comply with the conditions in Article V(2), which include:

- a) Inspection and other related activities leading to issuance of phytosanitary certificates shall be carried out only by or under the authority of the official national plant protection Organisation. The issuance of phytosanitary certificates shall be carried out by public officers who are technically qualified and duly authorized by the official national plant protection Organisation to act on its behalf and under its control with such knowledge and information available to those officers that the authorities of importing contracting parties may accept the phytosanitary certificates with confidence as dependable documents.
- b) Phytosanitary certificates, or their electronic equivalent where accepted by the importing contracting party concerned, shall be as worded in the models set out in the Annex to this Convention. These certificates should be completed and issued taking into account relevant international standards.

⁷⁷ Article IV(1).

⁷⁸ A. Chayes and A.H. Chayes, *The New Sovereignty: Compliance with International Regulatory Agreements* (Harvard University Press, 1998). Yang, in contrast, believes that despite the difficulties associated with them, formal treaty sanctions still have an important role to play in the enforcement of multilateral environmental agreements, T. Yang, ‘International Treaty Enforcement as a Public Good: Institutional Deterrent Sanctions in International Environmental Agreements’ (2006) 27 *Michigan Journal of International Law* 1131-1184.

⁷⁹ CITES Decision 16.29 (capacity building), for example, directs the Secretariat to ‘provide targeted capacity-building support to CITES Management and Scientific Authorities, Customs and law enforcement entities, the judiciary, legislators and other stakeholders, particularly in new Parties and Small Island Developing States’.

⁸⁰ Article V(1).

Again, a comparison can be made with CITES, as we see a similar emphasis on consistency between States in the format and content of phytosanitary certificates. The IPPC goes one step further than CITES, however, and rather than merely encourage States to adopt a certain format,⁸¹ has made this a formal legal standard. This may address some of the concerns regarding inconsistent national implementation resulting from the qualified obligation in Article IV(1), although there is still a risk that some national plant protection organisations will simply lack the technical and financial resources to effectively carry out their duties.

Throughout the IPPC reference is made to the need to comply with international trade rules. The preamble, for example, states:

[P]hytosanitary measures should be technically justified, transparent and should not be applied in such a way as to constitute either a means of arbitrary or unjustified discrimination or a disguised restriction, particularly on international trade.

Standards of international trade law have also been incorporated into the operational part of the IPPC through Article VI:

1. Contracting parties may require phytosanitary measures for quarantine pests and regulated non-quarantine pests, provided that such measures are:
 - (a) no more stringent than measures applied to the same pests, if present within the territory of the importing contracting party; and
 - (b) limited to what is necessary to protect plant health and/or safeguard the intended use and can be technically justified by the contracting party concerned.
2. Contracting parties shall not require phytosanitary measures for non-regulated pests.

Prohibiting the Contracting Parties from imposing phytosanitary measures for non-regulated pests is problematic. Unlike the definitions seen in the Biodiversity Convention and EU Regulation, the definitions of 'quarantine pest' and 'regulated non-quarantine pest' focus exclusively on the potential economic impacts of a plant pest. It prevents a State from imposing measures on a plant pest that targets a non-economically important species of plant, but one that may nevertheless warrant protection, for example because it is a national symbol or because it is a key component in a rare habitat. This unnecessarily restrictive approach can be contrasted with that taken to the environmental exceptions in Article XX of the 1947 General Agreement on Tariffs and Trade.⁸² As was discussed in the previous chapter, under Article XX, a State is free to determine its own environmental policies, regardless of any economic

⁸¹ See CITES Resolution Conf. 12.3 (Permits and Certificates).

⁸² Geneva, 30 October 1947, 55 UNTS 194, in force provisionally since 1 January 1948 under the 1947 Protocol of Application, 55 UNTS 308.

implications, and only has to show that any trade restrictive measures are suitably linked to the stated objective and have not been applied in an arbitrary or unjustifiable manner.⁸³ Article VI(2) of the IPPC appears to reflect the approach that the GATT Dispute Panel was condemned for taking by the Appellate Body in *United States – Shrimp*, which could have automatically precluded entire classes of trade restriction measures from the scope of Article XX of the GATT.⁸⁴

The IPPC does not impose any conditions on the import of plants or plant products, but Article VII recognises that States have the ‘sovereign authority’ to take certain measures. However, ‘in order to minimize interference with international trade’, any restrictions on the importation of plants and plant products must comply with the conditions of Article VII(2). We see here a similar trade-off between free trade and State sovereignty that has been observed in the wider environment/trade debates.⁸⁵ However, whereas under the GATT State sovereignty has, to a certain extent, re-exerted itself over international trade rules, here strict conditions still severely limit a State’s freedom to act according to its own environmental priorities. Again, it is possible to question the desirability of this; the IPPC is not a trade instrument, but a treaty intended to control the spread of plant pests.

Finally, the importance of international cooperation in addressing the threat of plant pests is emphasised by the IPPC. The Contracting Parties must ‘cooperate with one another to the fullest practicable extent in achieving the aims of [the] Convention’, particularly in information exchange, combatting pests that threaten crop production and pest risk analysis.⁸⁶ At the regional level, Article IX calls on States to establish regional plant protection organisations, which ‘shall participate in various activities to achieve the objectives of this Convention, and where appropriate, shall gather and disseminate information’.

Having identified some of the key features of the IPPC, it is possible to assess its value as both a response to the challenge of alien/invasive species and a plant conservation instrument. On the positive side, the expansive definition given to ‘pest’ means potentially any ‘species, strain or biotype of plant, animal or pathogenic agent injurious to plants’ may be subject to regulation under the Convention. The actual scope of the IPPC is, however, restricted to economic impacts

⁸³ *United States – Import Prohibition of Certain Shrimp and Shrimp Products (United States – Shrimp)*, WT/DS58/AB/R, adopted on 6 November 1998 (Appellate Body); WT/DS58R (Panel).

⁸⁴ *ibid.*

⁸⁵ See E. Barrett Lydgate, ‘Sustainable Development in the WTO: from mutual supportiveness to balancing’ (2012) 11 *World Trade Review* 621-639; K.J. Hunt, ‘International Environmental Agreements in Conflict with GATT – Greening GATT after the Uruguay Round Agreement’ (1996) 30 *International Lawyer* 163-191; and E. Brown Weiss, ‘Environment and Trade as Partners in Sustainable Development: A Commentary’ (1992) 86 *American Journal of International Law* 728-735.

⁸⁶ Article VIII.

by the reference in the definitions of ‘quarantine pests and ‘regulated non-quarantine pests’, i.e. the categories of pest that may be subject to phytosanitary measures. As noted above, pests that do not have an economic impact are not only not included in these definitions, but the Contracting Parties are explicitly forbidden to adopt phytosanitary measures to control them. This is one of several instances where the IPPC prioritises free trade over environmental concerns, and whilst trade liberalisation is a legitimate consideration, it is possible to question the apparently overwhelming emphasis on trade rules in a non-trade instrument. That the revised version of the IPPC was adopted by the FAO Conference prior to the WTO Appellate Body’s landmark ruling in *United States – Shrimp* might be one explanation for this.

Another unusual, and from an environmental perspective, negative, feature of the IPPC is that it does not mention the importance of precaution. Instead there is only a vague preambular reference to ‘approved principles governing the protection of plant, human and animal health, and the environment’. Again this is surprising, as not only is precaution a hallmark of earlier environmental agreements,⁸⁷ but measures designed to prevent the introduction and spread of alien/invasive species (or plant pests) are inherently precautionary in nature. This may be a further reflection of international trade law, in which the precautionary principle has received a lukewarm welcome.⁸⁸

Notwithstanding these issues, and the qualified nature of Article IV, that the IPPC is a binding legal agreement means it is a significantly stronger regime than the Biodiversity Convention’s Guiding Principles. It is ironic, then, that in this instance the existence of a legally binding treaty for plants may be frustrating efforts to establish a more coherent international response to alien/invasive species. The existence of the IPPC may be one reason why a protocol on alien/invasive species has not materialised under the Biodiversity Convention, as States may be unwilling to duplicate its provisions.⁸⁹ It has also resulted in major gaps in international law. In its 2008 review of the work being undertaken to address the issue of alien/invasive species, the Conference of the Parties to the Biodiversity Convention highlighted ‘the lack of international standards covering invasive alien species, in particular animals, that are not pests of plants under the [IPPC]’.⁹⁰ Taking these issues into account, it could be argued that the IPPC should be repealed and replaced with a new legally binding instrument, preferably a protocol to the

⁸⁷ For example, see Principle 15 of the Rio Declaration, (n 24).

⁸⁸ *European Communities – Measures Affecting the Approval and Marketing of Biotech Products*, WT/DS291/R, 29 September 2006.

⁸⁹ Duplication was identified as an issue by the Biodiversity Convention’s Conference of the Parties in their assessment of the global regulatory framework for alien/invasive species, see (n 53) above.

⁹⁰ Decision IX/4, (n 53) paras. 4 and 5.

Biodiversity Convention. This would allow for a more comprehensive approach to be taken to alien/invasive species, and reflect the jurisprudence of the World Trade Organisation Appellate Body on the legitimacy of trade restrictive measures taken for environmental (and other non-economic) reasons. Finally, a new instrument, particularly one modelled on the Biodiversity Convention's Guiding Principles, would provide an opportunity to redress another weakness of the IPPC: the absence of any detailed mitigation measures following the establishment of a plant pest. The only provision of the IPPC that relates to post-invasion response is Article VII(6), which permits, rather than requires, States to take 'appropriate emergency action on the detection of a pest posing a potential threat to its territories or the report of such a detection'. If a State decides to act, any measures imposed must be communicated to the Secretary of the Commission on Phytosanitary Measures and affected Contracting Parties, and 'shall be evaluated as soon as possible to ensure that [their] continuance is justified'. This suggests a lack of appreciation of how difficult it can be to eradicate a species once it has become established.

Controlling the Spread of Disease:

The threat that infectious diseases pose to biodiversity was initially neglected in conservation science due to the misguided belief that parasites evolve so as not to harm their hosts.⁹¹ Ecology has now advanced and research is being undertaken to both better understand how diseases spread within and between species and how different diseases can best be treated.

The evidence on the impact infectious disease has on biodiversity is mixed. It is difficult to attribute historical extinctions to disease, as sample material that is suitable for testing is rarely available.⁹² In terms of recent extinctions, disease is not considered to be a common cause. In 2004 an analysis of the extinctions listed on the IUCN Red List found that only thirty-one out of 833 were partly attributable to disease.⁹³ Disease can therefore be compared with international trade; it is known to be a contributory factor to a species decline and eventual extinction, but is rarely the primary factor and, so far at least, has not been the sole cause of extinction.⁹⁴ It is also possible, however, that disease is being underestimated as a cause of extinction. Whilst scientific

⁹¹ H. McCallum, 'Diseases and the dynamics of extinction' (2012) 367 *Philosophical Transactions of the Royal Society B* 2828-2839, 2828.

⁹² *ibid*, 2829.

⁹³ K.E. Smith, D.F. Sax and K.D. Lafferty, 'Evidence for the Role of Infectious Disease in Species Extinction and Endangerment' (2006) 20 *Conservation Biology* 1349-1357.

⁹⁴ *ibid*.

evidence is lacking, there is anecdotal evidence indicating widespread disease immediately prior to a species' extinction.⁹⁵

Notwithstanding the comparative lack of scientific evidence, clearly disease represents a threat to biodiversity. An outbreak of a disease can have a devastating effect on infected species, and although disease has yet to lead to global extinction, it has been responsible for the localised extinction of a species.⁹⁶ Ash dieback, for example, is leading to largescale mortality events in woodlands across Europe, putting at risk not only the European ash (*Fraxinus excelsior*) but also the ecosystems of which they are an integral part.⁹⁷ Replicating the ecosystem functions of such species is inherently difficult, and often require trade-offs to be made between different ecological priorities. In the case of the European ash, alternative species that have a similar role in their ecosystem support a very different group of species to the European ash, and those tree species that support the same species of flora and fauna as the ash do not perform a similar function in the ecosystem.⁹⁸ Furthermore, as with many other drivers of biodiversity loss, anthropogenic changes including habitat loss and climate change increase the threat diseases pose to biodiversity by facilitating the spread of a disease to previously uninfected areas. International trade, for example, is believed to be behind the spread of the ash dieback and sudden oak death diseases.⁹⁹

As with alien/invasive species, prevention is the best defence against disease. Again, adherence to the precautionary principle is crucial. 'If action to manage disease is delayed until unequivocal evidence of the threat is obtained, it is likely to be too late'.¹⁰⁰ Preventative action based on the precautionary principle requires that species or populations susceptible to disease be identified, and also that those diseases more likely to become infectious are identified.¹⁰¹ It is not the case that every population of a species will be vulnerable, for example a population may have evolved a natural defence to a disease due to historic exposure. Neither is it inevitable that every disease will have a demonstrably negative impact on a species' status.¹⁰²

⁹⁵ McCallum, (n 91) 2829-2830.

⁹⁶ Smith, Sax and Lafferty, (n 93) 1350.

⁹⁷ J. Needham et al, 'Forest community response to invasive pathogens: the case of ash dieback in a British woodland' (2016) 104 *Journal of Ecology* 315-330.

⁹⁸ R. Mitchell et al, 'How to Replicate the Functions and Biodiversity of a Threatened Tree Species? The Case of *Fraxinus excelsior* in Britain' (2016) 18 *Ecosystems* 573-586.

⁹⁹ V.A. Chavez, S. Parnell and F. van der Bosch, 'Monitoring invasive pathogens in plant nurseries for early-detection and to minimise the probability of escape' (2016) 407 *Journal of Theoretical Biology* 290-302.

¹⁰⁰ McCallum, (n 91) 2832.

¹⁰¹ *ibid.*

¹⁰² *ibid.*

Once established, the options available for managing a disease are limited. McCallum identifies five possibilities, not all of which are viable for plants. First, uninfected populations can be isolated, with the aim of preventing the spread of the disease. As McCallum observes, 'In almost all cases, an extinction-threatening disease will be a relatively recent introduction into the population under threat: otherwise, that population would no longer exist'.¹⁰³ Therefore isolating healthy populations can ensure the species survives even if infected populations are wiped out. Where there are multiple populations of a plant species this may be an effective way to manage a disease. Uninfected populations could be effectively quarantined by restricting access and other safeguards that limit the chances of transmission. It could, however, be difficult to maintain the quarantine, particularly in more remote areas where preventing people from inadvertently contaminating the site would require either constant monitoring or the erection of physical barriers. In comparison, if there is only a single population of the plant species isolating healthy individuals may be difficult. It would require relocating them with all the associated risks that entails, including the possibility that the plant would die because it is unable to establish itself in its new environment.

Instead, infected individuals could be removed. Culling is a widespread practice for controlling diseases in livestock, but is more problematic in the wild. There are two types of culling, neither of which are suitable for plants. First there is so-called 'stamping-out' culling, i.e. the non-selective killing of potential hosts of the disease.¹⁰⁴ This would remove the risk of transmission, but could itself result in the local or even global extinction of a plant species if there were only a few small populations of it. Equally, where the species is common and fundamental to the integrity of an ecosystem, its complete removal could lead to greater ecological damage than the disease alone would cause. Alternatively, the 'test and cull' approach may be used, with each individual tested and those found to be carrying the disease removed. Again, this is problematic when the species in question is a plant. In many cases, a plant will only exhibit the signs of a disease during certain stages of its annual lifecycle, for example in disfigured or discoloured flowers. Waiting for such signs to become apparent means leaving healthy individuals exposed to infected plants for a prolonged period. The alternative would be to take genetic material of each individual for testing, but this would be an expensive and timely process, and there is also the possibility that initially healthy individual plants would contract the disease between the samples being taken and the infected plants being removed.

¹⁰³ *ibid*, 2834.

¹⁰⁴ *ibid*.

The third disease management tool is habitat modification. In some cases, this can be very effective. McCallum refers to the example of draining swamps to reduce the transmission of malaria.¹⁰⁵ As many plants are specifically adapted to survive in certain habitats, however, this is obviously not a feasible option for tackling plant diseases.

Another possibility is vaccination.¹⁰⁶ Although typically seen as a way of preventing disease in animals, work is being done to produce vaccines for plants. The basic method is the same; a plant is treated with an inducing agent that stimulates defence responses, ultimately resulting in an ingrained resistance to a disease.¹⁰⁷ However the viability of mass-producing plant vaccinations is debatable, not only due to the costs associated with producing vaccines,¹⁰⁸ but also the practical difficulties in locating and treating individual plants in at-risk populations.

Finally, genetic-management options are available. It is always possible that a species will evolve a natural resistance to a disease. A recent study on Tasmanian devils (*Sarcophilus harrisii*) suggests that the species is developing a natural defence against the so-called devil facial tumour disease, a transmissible type of cancer that has caused the Tasmanian devil's population to collapse by around 80% over the last twenty years.¹⁰⁹ This should not be relied on as a primary response to a particular disease, however. It is contingent on enough infected members of the species being able to reproduce so that they can pass on the genetic information needed for future generations to begin to develop resistance. There is also a risk that exposing uninfected members of a species to diseased individuals would simply increase the spread of disease. Furthermore, in the case of the Tasmanian devils it is unlikely that the species would have survived long enough for this natural resistance to evolve without the direct intervention of humans. This intervention, initially involving the isolation of uninfected populations and now focussed on the rehabilitation of wild individuals that were taken into captivity for treatment,¹¹⁰ has been very expensive. For other species, particularly if they do not enjoy the flagship status of the Tasmanian devils, this may simply not be economically or scientifically feasible.¹¹¹ Nevertheless, developing natural resistance through genetic evolution remains perhaps the best defence to infectious diseases. 'If this process of evolution of resistance or tolerance in the host

¹⁰⁵ *ibid*, 2835.

¹⁰⁶ *ibid*.

¹⁰⁷ I.L. Kothari and M. Patel, 'Plant immunization' (2004) 42 *Indian Journal of Experimental Biology* 244-252.

¹⁰⁸ McCallum, (n 91) 2835.

¹⁰⁹ B. Epstein et al, 'Rapid evolutionary response to a transmissible cancer in Tasmanian devils' (2016) 7 *Nature Communications*, doi: 10.1038/ncomms12684.

¹¹⁰ <http://www.tassiedevil.com.au/tasdevil.nsf/> (last accessed 01/04/2017).

¹¹¹ L. Douglas and G. Winkel, 'The flipside of the flagship' (2014) 23 *Biodiversity and Conservation* 979-997.

could be accelerated or facilitated, it would represent a powerful means to control emerging disease threats'.¹¹² The practical obstacles to this must be considered however. Not only in terms of the financial costs, but also the scientific expertise needed to both develop genetically-resistant individuals and understand the disease that is being targeted. There is, as well, the need to consider the risks in releasing what would be genetically-modified organisms into the natural environment. A gene that is intended to provide protection against a particular disease could result in that species becoming resistant to other natural and chemical controls, allowing it to become an invasive species and a threat to biodiversity.

In contrast to the advances being made in conservation science to respond to the threat that disease poses to biodiversity, relatively little action is being taken in international environmental law and policy. Disease is not, for example, addressed in a comprehensive manner by the Biodiversity Convention. Indeed, preventing the spread of and finding cures to disease are not even listed in the general in situ and ex situ conservation measures in Articles 8 and 9 of the Convention. Neither is disease mentioned in the Updated Global Strategy for Plant Conservation¹¹³ or the broader strategic plan for biodiversity.¹¹⁴ As with alien/invasive species, to find binding legal provisions on the prevention of disease it is necessary to turn to international organisations for which the conservation of biodiversity is a secondary concern. Article 6 of the World Trade Organisation's Sanitary and Phytosanitary Agreement, for example, calls for pest/disease free and low prevalence areas, based on factors including geography, ecosystems, epidemiological surveillance and the effectiveness of control measures imposed.¹¹⁵ The most comprehensive regime that seeks to protect plants from disease is the IPPC. That pathogenic agents are included within the meaning of 'pest' means that the IPPC applies equally to diseases as it does to alien/invasive species. However, its scope is again limited to diseases that will have an economic impact.

For international law to be able to respond to the increasing threat of infectious disease to biodiversity a more holistic approach is needed. A positive first step would be to designate disease as an official thematic programme of the Biodiversity Convention, with a programme of work being developed that focusses on four core areas. Species and areas most at risk of disease need to be identified and monitored so that any outbreaks are discovered as early as possible. The same must be done for pathways for disease and other factors that facilitate the spread of

¹¹² McCallum, (n 91) 2835.

¹¹³ Decision X/17, 'Consolidated update of the Global Strategy for Plant Conservation 2011-2020, UNEP/CBD/COP/DEC/X/17, 29 October 2010.

¹¹⁴ See (n 17) above.

¹¹⁵ Article 6(2).

disease. Preventative actions, such as the risk assessment and prior authorisation mechanisms employed by the IPPC and Biosafety Protocol, should be established. Finally, response measures, such as those examined by McCallum, should be prioritised for research, and technical and other capacity-building support should be given to States to assist them in developing these. Once established, this programme of work should begin to provide some insight into the extent of the threat infectious disease poses to biodiversity, the efficacy of pre-existing preventative and response mechanisms and the actions that are most likely to be successful in the future. It may become apparent that, as with alien/invasive species, a binding protocol to the Biodiversity Convention is needed to provide a more robust framework. Alternatively, a targeted programme of work may be sufficient to mitigate the effects of disease on biodiversity, and instead of a disease protocol additional efforts to address other causes of biodiversity loss, such as habitat loss and climate change, which are themselves drivers of disease, would be of greater conservation value.

Conclusions:

Alien/invasive species are a persistent and growing threat to biodiversity. Arguably, this is because there is no single, binding instrument setting out a comprehensive strategy for the prevention of and response to their establishment. The most comprehensive regime is that contained in the Biodiversity Convention's Guiding Principles, but this is of limited legal effect. In contrast, those frameworks that enjoy the legally binding status of a convention are too narrow in their scope and suffer from being constituted in a system for which the conservation of biodiversity is a secondary concern. What is needed is a new protocol under the Biodiversity Convention that prioritises the ecological impacts of alien/invasive species, whilst at the same time recognises their broader socioeconomic impacts as well.

With regard to disease, much more work needs to be done to understand the extent of the risk it poses to plants, the ways in which diseases spread and the most effective means of combatting a disease once it is established. A new programme of work under the auspices of the Biodiversity Convention would be an important first step, and would indicate whether international law needed to deal with disease as a specific driver of biodiversity loss in its own right, or could adequately address it as part of the law's response to other biodiversity issues.

PART 4: RESPONDING TO THE WEAKNESSES OF INTERNATIONAL ENVIRONMENTAL LAW

IX

CONSERVATION PRACTICE AND INTERNATIONAL LAW

Actors and Factors in the Conservation of Plants:

As this thesis is concerned with international law, its focus has been on what States are obligated and encouraged to do to protect plants. In practice, however, States' role in delivering conservation activities is comparatively minimal. Other non-State actors are on the frontline of conservation, but although they are not the principal subjects of international law,¹ international law nevertheless has an impact on their work. It is therefore important to consider the extent to which international law facilitates and hinders the ability of conservation practitioners to protect plants. In doing so, I highlight particular areas in which modest reforms could be introduced to address some of the more immediate issues in plant conservation law. These reforms alone would not achieve a reversal in the decline of plant diversity. Nevertheless, they may be seen as feeding into a broader framework of governance that would remedy some of the deeper structural flaws that have been identified in the body of international environmental law relevant to plants. Because of its focus on the complexity of networks, in this case between States, practitioners, communities and nature, resilience-thinking is particularly relevant in this context.² This is a more accurate reflection of the realities of plant conservation practice than the more typical top-down and prescriptive framework dominated by States seen international environmental law. What the proposals set out in this chapter begin to do is demonstrate how this more responsive framework could develop from pre-existing laws and mechanisms.

This chapter begins by examining how a number of non-States actors – NGOs, botanical institutions, local communities and individuals – can contribute towards the conservation of plants. Attention then turns to what may be considered as some of the essential components of successful plant conservation strategies, including scientific and technological factors, funding

¹ J. Crawford, *Brownlie's Principles of Public International Law* (8th edition, Oxford University Press, 2012), chapter 4.

² D. Chandler, *Resilience: The Governance of Complexity* (Routledge, 2014), p. 38.

and community/public engagement. Overall, whilst it cannot be said that international law is failing to deliver what is needed in terms of support for conservation practitioners, changes could be made so that additional and better-targeted support is given.

Finally, I consider what impact the Biodiversity Convention's Protocol on Access and Benefit-sharing may have on the conservation of plants. It is argued that although the Protocol addresses an important aspect of biodiversity conservation, its failure to distinguish between different users of genetic resources has resulted in it becoming potentially a very problematic instrument for plant conservationists. Suggestions on how the Protocol could be reformed into a more flexible instrument are given.

Plant Conservation and Civil Society:

The international community's recognition of the limited direct role international law has in conservation is evident in the frequent reference to national implementation seen in many multilateral environmental agreements.³ International law does, could and should make important contributions, both through the setting of broad frameworks within which more detailed strategies can be devised and in tackling certain issues, such as international trade, that cannot be addressed effectively by States acting alone. However, non-State actors, including NGOs, botanical institutions, local communities and individuals, have equally important, if not more important, roles in plant conservation. Each interacts with plants in different ways, resulting in a range of motivations and approaches towards the conservation of plants.

Conservation NGOs and Botanical Institutions:

At the forefront of many plant conservation projects and initiatives are conservation NGOs⁴ and botanical institutions. Plant conservation NGOs take many forms, with different remits,

³ For example see Article 6 of the Convention on Biological Diversity (Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992)), Article 4 of the UN Framework Convention on Climate Change (New York, 9 May 1992, in force 24 March 1994, 1771 UNTS 107) and Article VIII of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) (Washington, 3 March 1973, in force 1 July 1975, 993 UNTS 243).

⁴ For the purposes of this discussion it is not necessary to explore in-depth what an NGO actually *is*. However, there is a growing body of literature examining how NGOs participate in international fora and relate to other international actors. This is particularly pertinent to the field of international environmental law, which tends to be more open to direct involvement by NGOs in negotiations and other international meetings than, for example, international trade law. See further: P.J. Spiro, 'Non-Governmental Organizations and Civil Society', in D. Bodansky, J. Brunnée and E. Hey (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2007).

expertise and fields of operation. Some NGOs focus on specific types of plants,⁵ others on plants that grow in specific habitats⁶ or a specific genus.⁷ Others are not directly concerned with conservation per se but instead foster links between conservation practitioners. Botanic Gardens Conservation International, for example, seeks to facilitate collaboration and the sharing of best practice between botanical institutions and other conservation organisations.⁸ Similar variety can be seen in botanical institutions, with some whose collections represent purely native or local flora, others, such as arboreta, that only grow certain types of plants and others that specialise in rare or endangered flora. Often the decision about what plants to grow is influenced by non-conservation factors. 'Every botanical garden has limited resources – space, money, manpower, and climate – and must decide how best to use those resources'.⁹ Such considerations will also influence what conservation methods are employed. Growing actual specimens requires considerably more space and resources and has higher maintenance costs than seedbanks, but seedbanks, as will be discussed, are not without risks, and are not as appealing attractions for the public.¹⁰

Looking first at NGOs, it is clear that they contribute to the conservation of plants in a number of ways. Educating the public is at the heart of many conservation NGOs' agenda, and various methods are adopted to reach different audiences. The constitution of the Alpine Garden Society (AGS), for example, states:

3.1 The Objects of the Society shall be to educate the public and its members about the cultivation and conservation of alpine plants. This will include:

3.1.1 To gather and disseminate details of their cultivation and conditions under which they grow in nature by means of a Bulletin... and by other special publications

3.1.2 To hold shows of alpine plants

...

3.1.6 To arrange tours and visits

3.1.7 To organise meetings and Conferences

⁵ For example, the Global Trees Campaign, which is a joint initiative between Fauna & Flora International and Botanic Gardens Conservation Initiative, focusses on endangered tree species – <http://www.fauna-flora.org/initiatives/global-trees-campaign/> (last accessed 01/04/2017).

⁶ For example, the Alpine Garden Society is dedicated to the conservation of montane flora – <http://www.alpinegardensociety.net/>.

⁷ For example, the Cyclamen Society – <http://www.cyclamen.org/>.

⁸ <https://www.bghi.org/>.

⁹ A. Hackney Blackwell, 'Botanical Gardens: Driving Plant Conservation Law' (2012-2013) 5 *Kentucky Journal of Equine, Agriculture and Natural Resources Law* 1-32, 5.

¹⁰ P.S. Ashton, 'Conservation of Biological Diversity in Botanical Gardens', in E.O. Wilson (ed), *Biodiversity* (National Academy Press, 1988), p. 271-272.

3.1.8 To promote the formation of Local and Special Interest Groups of the Society...¹¹

Each of these appeals to a different section of the broad base that supports the AGS' activities, and is reflective of the range of values that plants are perceived to have by AGS members.¹²

Another important way NGOs contribute to the conservation of plants is by leading or sponsoring field studies. Some organisations have dedicated research committees to help formulate and guide projects. One NGO that is particularly active in this regard is the Cyclamen Society. This Society currently has an ongoing taxonomic study of the *Cyclamen coum* group to determine whether there is a single species of *C. coum* that simply has significant variation, or whether it is necessary to formally split the species. The project comprises field observations and DNA analysis of collected samples.¹³

As well as studying certain species, NGOs can undertake more ambitious conservation projects, either individually or in collaboration with other partners to pool expertise and resources. One such project that has been recently launched is between the AGS and Royal Society for the Protection of Birds (RSPB) to conserve and rejuvenate two areas of montane flora in the RSPB's Haweswater reserve.¹⁴ The upland flora of the reserve has deteriorated due primarily to overgrazing, but the reserve still hosts important populations of some of Britain's rare and endangered flora. The project will see the creation of enclosures at the two sites to protect them from further grazing. Seed has been collected from certain species, which will be propagated by both the RSPB, through the establishment of a nursery at Haweswater, and the AGS membership, with the aim of repopulating the sites with native plants. Information about the project will be provided at the site for educational purposes.¹⁵

Turning to botanical gardens, we see a similarly broad range of activities. Opening their gardens and collections to the public performs an educational function, as well provides a useful source of funding. Some gardens make a deliberate effort to educate the public about the value of plants and their conservation work. The 'chemicals from plants' trail in the Cambridge Botanic

¹¹ <http://www.alpinegardensociety.net/information/constitution/>.

¹² R. Amos, 'Just how do we assess the true value of alpinists?' (2016) 84 *The Alpine Gardener* 112-118.

¹³ M. Denney and R. Bailey, 'Georgia field study February 2015 – *C. coum*' (2016) 40 *Cyclamen: The Journal of the Cyclamen Society* 24-33.

¹⁴ <https://www.rspb.org.uk/reserves-and-events/find-a-reserve/reserves-a-z/reserves-by-name/h/haweswater/index.aspx> (last accessed 01/04/2017).

¹⁵ For further information about the project see the report in (2016) 84 *The Alpine Gardener* 359-363.

Garden, for example, is intended to showcase the plants in their collection that have particular utilitarian value.¹⁶

Botanical gardens are also well-placed to undertake scientific research into plants and plant conservation. In the first place, their collections are useful sources of material for study. Additionally, botanical gardens provide expertise and other assistance to in and ex situ conservation projects, some of which are not only concerned with conservation per se but also the wider contribution plants can make to sustainability and sustainable development agenda. Cambridge Botanic Garden is currently growing a range of bamboo species to assist the Structural Bamboo research project being run by, inter alia, the University of Cambridge and the Massachusetts Institute of Technology.¹⁷ This project is exploring the potential of bamboo as a low-carbon alternative in the construction sector, which accounts for approximately 40% of global carbon emissions.¹⁸

Cambridge Botanic Garden is particularly well-placed to engage in this kind of work due to its association with Cambridge University, but other gardens are still able to undertake important scientific work. Kew's Science Strategy currently consists of three strategic priorities, which are reflective of certain elements the Biodiversity Convention's Global Strategy for Plant Conservation (GSPC).¹⁹

Local Communities:

The role of local communities in conservation has been extensively examined elsewhere,²⁰ and so the discussion here is limited to two key observations.

First, the importance of understanding the relationships between communities and their local plants is being increasingly recognised by conservationists. The discipline of ethnobotany is

¹⁶ <http://www.botanic.cam.ac.uk/Botanic/Trail.aspx?p=27&ix=11&pid=2704&prcid=4&ppid=2704> (last accessed 01/04/2017).

¹⁷ <https://structuralbamboo.wordpress.com/> (last accessed 01/04/2017).

¹⁸ <http://www.botanic.cam.ac.uk/Botanic/Page.aspx?p=27&ix=2971&pid=2949&prcid=4&ppid=2949> (last accessed 01/04/2017).

¹⁹ Decision X/17, 'Consolidated update of the Global Strategy for Plant Conservation 2011-2020', UNEP/CBD/COP/DEC/X/17, 29 October 2010.

²⁰ For example, see J. Tuxill and G.P. Nabhan, *People, Plants and Protected Areas: A Guide to In Situ Management* (People and Plants Conservation Manual, Earthscan, 2001), chapter 3 and G.F. Maggio, 'Recognizing the Vital Role of Local Communities in International Legal Instruments for Conserving Biodiversity' (1997-1998) 16 *UCLA Journal of Environmental Law and Policy* 179-226. The importance of local community involvement in conservation projects is examined below.

devoted to studying the ways in which communities perceive, interact with and utilise plants.²¹ Furthermore, there has been a paradigm shift in conservation, similar to that traced by Mace in ecology,²² which has seen 'fortress' conservation thinking give way to community-conservation.²³ Tuxill and Nabhan, for example, observe that in situ plant conservation will be most effective where it recognises and accommodates traditional uses, rather than prohibits them absolutely.²⁴

Second, local communities can assist in the achievement of international and national conservation goals. They can do this indirectly, such as by reporting poaching, although, as I discuss below, this is conditioned on local communities being engaged by practitioners so that they see the benefits of supporting the conservation project. Local communities can also directly assist in conservation through their own activities. On the island of São Tomé work is being done to encourage local communities to hunt introduced mammals, rather than native (and in many cases endangered) birds. Recommendations to encourage the hunting of alien species include raising awareness in local communities about the impacts these species are having on native biodiversity to incentivise hunters to target them, and enforcing legislation to remove the economic drivers behind the hunting of native birds. If successful, these efforts will not only reduce pressure on the native bird species, but the removal of the alien mammals will bring wider ecological benefits, including allowing native vegetation to recover.²⁵

Individual Action:

It is not only those who utilise plants on a daily basis to meet their essential needs that can engage in conservation action. Individuals in developed countries may take more proactive steps than merely donating to a particular cause to support conservation. Very simple measures, such as only purchasing plants from reputable sources that are able to provide the correct paperwork, means that they do not support any unsustainable (or at least illegal) harvesting activities. Many conservation organisations that have the (commercial) exchange of plant materials as one of their activities take steps to ensure that they are compliant with all legal requirements and

²¹ G.J. Martin, *Ethnobotany: A Methods Manual* (People and Plants Conservation Series, Earthscan, 2004).

²² G. Mace, 'Whose conservation?' (2014) 345 *Science* 1558-1560.

²³ W.M. Adams, *Against Extinction: The Story of Conservation* (Earthscan, 2004), p. 111-124.

²⁴ Tuxill and Nabhan, (n 20) p. 21.

²⁵ M. Carvalho et al, 'What motivates hunters to target exotic or endemic species on the island of São Tomé, Gulf of Guinea?' (2015) 49 *Oryx* 278-286. See also R. Kannan et al, 'Can local use assist in controlling invasive alien species in tropical forests? The case of *Lantana camara* in southern India' (2016) 376 *Forest Ecology and Management* 166-173.

require those supplying the material to also confirm that it has been collected lawfully.²⁶ Few conservation instruments require the imposition of sanctions for buying illegally-sourced plants, although some require States to make trading in illegally-collected plants illegal.²⁷

Conservation-minded individuals may also engage in direct conservation action and offer projects something more than mere technical or financial expertise, as the following account of Fred and Janet Pointons' experiences in South Africa demonstrates.

The Pointons first visited the Cape Floristic Region of South Africa in 2001 as tourists interested in exploring the plants of the region. They discovered a small area of renosterveld habitat,²⁸ containing a variety of rare plants, on the farm in which they were staying. Their conversations with the farm-owner revealed that she had no idea about the significance of what was growing on her land.

Subsequent investigations back in the United Kingdom led the Pointons to the Tulbagh Renosterveld Project, a plan to identify, connect and protect areas of renosterveld being implemented by the South African National Biodiversity Institute²⁹ and CapeNature.³⁰ The project involved mapping the remaining renosterveld in the Tulbagh Valley, with the resulting data being used to identify priority areas for conservation.

The Pointons were given the opportunity to join members of the project in meeting local landowners. One individual they met was reluctant to engage in any project being sponsored by the State, in part a consequence of the previous unhappy relationship many landowners had with conservation, and was, like the farm-owner they met on their first visit, unaware of the global importance of the wild plants that were growing on his land. After returning to the United Kingdom they wrote to the landowner encouraging him to sign a long-term conservation agreement, which he did so in 2008, thereby protecting a key area of renosterveld.³¹

It was not the Pointons' actions alone that led to the protection of renosterveld habitat in the Tulbagh Valley. The conservation project was being planned prior to their first visit in 2001 and would have proceeded without their involvement. They nevertheless made an important and in

²⁶ For example, see:

<http://www.alpinegardensociety.net/plants/conservation/Wild+Collected+seed+in+the+AGS+seed+exchange/72/> (last accessed 01/04/2017).

²⁷ For example, see Article VIII(1) of CITES.

²⁸ Renosterveld is a habitat-type found in the Cape Floral Region of South Africa. It is characterised by rich soils that support a diverse range of flora and fauna. The richness of this soil also makes it valuable agricultural land, and much of it has been converted into crops, orchards and vineyards.

²⁹ <http://www.sanbi.org/> (last accessed 01/04/2017).

³⁰ <http://www.capenature.co.za/> (last accessed 01/04/2017).

³¹ F. Pointon, 'Grootvlei: the battle to preserve a botanical jewel' (2016) 84 *The Alpine Gardener* 342-347.

some ways separate contribution to the conservation of renosterveld flora. Crucially, their actions shared many of the traits that are identified below as being essential if conservation action is to be successful. They engaged in some preliminary research, which although initially reliant on secondary data and perhaps lacking full scientific rigour, was subsequently supplemented by materials made available to them by the South African National Biodiversity Institute. They also delivered community engagement and buy-in, not only by meeting with the landowner but by persuading him to sign the conservation agreement. As they were not agents of the State, they may have offered more in this regard than representatives of the Tulbagh Renosterveld Project. Finally, the Pointons provided funds that might not otherwise have been available. They paid for local labourers to clear the site of invasive species, providing the labourers with work at a time of year when other employment was scarce. They have also provided the landowner with a digital camera so that he can record seasonal changes in the renosterveld habitat. These actions have furthered the community's engagement and buy-in with the conservation project, enhancing its long-term prospects of success.

Key Components of Successful Conservation:

From the conservation literature, it is possible to draw out a number of key elements of conservation projects that are considered to be preconditions of success. These include:

- Well-conceived, clear and quantifiable goals
- Sound understanding of the habitat and ecology of the target species
- Confidence in scientific practices and techniques
- Long-term funding
- Community/public engagement and partnerships
- Buy-in by communities, practitioners and other stakeholders

Each of these will be discussed in turn. A deliberate choice has been made to treat in and ex situ conservation simultaneously. This is for two reasons. First, many of the traits listed above are relevant to both, even if they differ in their specific application. Second, global conservation policy has, to date, arguably treated in and ex situ as distinct. The Biodiversity Convention, for example, views ex situ measures as 'predominantly for the purpose of complementing in-situ measures',³² although it has been suggested that this is more a consequence of economics than

³² Article 9.

scientific reasoning.³³ In the more recent International Treaty on Plant Genetic Resources³⁴ this terminology is not repeated, but in and ex situ are still considered to be distinct methodologies for conservation.³⁵ However, it is becoming increasingly clear, particularly in the conservation of plants, that to be effective a conservation programme requires both in and ex situ components.³⁶ This allows for synergies between particular methods to be developed, for example the propagation of stock with genuine wild provenance (ex situ) that is subsequently used in reintroduction programmes (in situ), as well as facilitates the integration of the technical, well-financed and scientific (western) expertise of ex situ managers with the more locally-based experiential expertise of in situ managers. As observed above in relation to the joint conservation project between the AGS and RSPB, it also allows for the pooling of expertise and resources between different conservation actors.

Both this thesis and numerous reports on the current status of global biodiversity³⁷ illustrate the limits of international law's ability to achieve meaningful conservation success. So far, my focus has been on the design flaws of individual regimes that deal with conservation in a holistic manner, such as the Biodiversity Convention, and specific conservation issues, namely climate change, trade and alien/invasive species. However, this failure can also be attributed broader flaws in the architecture of international environmental governance. Most international environmental instruments can be characterised as being top-down, prescriptive instruments,³⁸ yet such an approach now seems counter-intuitive. Advances in ecology increasingly show how interconnected the natural world is, and yet, notwithstanding the gradual development of ecosystem approaches,³⁹ the law remains very reactionary and narrow, focussing more on

³³ L.M. Warren, 'The Role of *Ex Situ* Measures in the Conservation of Biodiversity', in M. Bowman and C. Redgwell (eds), *International Law and the Conservation of Biological Diversity* (International Environmental Law & Policy Series / Kluwer Law International, 1996), p. 142-143.

³⁴ 2001 International Treaty on Plant Genetic Resources for Food and Agriculture, Rome, 3 November 2001, in force 29 June 2004, text available at: www.planttreaty.org/index_en.htm.

³⁵ See Articles 5 and 15.

³⁶ D.J. Pritchard et al, 'Bring the captive closer to the wild: redefining the role of ex situ conservation' (2011) 46 *Oryx* 18-23.

³⁷ RBG Kew, 'The State of the World's Plants Report' (2016); WWF/ZSL, 'Living Planet Report 2016: Risk and resilience in a new era' (WWF International, 2016); and Secretariat to the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montreal, 2014).

³⁸ The main exception to this being the Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, Paris, 17 June 1994, in force 26 December 1996, 33 ILM 1328. Recently, however, the efficacy of a bottom-up approach to tackling desertification has been questioned. See A. Tal and J.A. Cohen, 'Bringing "Top-Down" to "Bottom-Up": A New Role for Environmental Legislation in Combating Desertification' (2007) 31 *Harvard Environmental Law Review* 163-217.

³⁹ V. de Lucia, 'Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law' (2015) 27 *Journal of Environmental Law* 91-117.

species that are endangered and sites that are threatened rather than cohesive ecological wholes.

Incorporating resilience-thinking into the law would be one response to these advances. Reforming the law so that it reflects this model for governance would arguably deliver a system that would provide better, more responsive, protection for plants. This is because, as Chandler observes, resilience-thinking adopts a bottom-up approach through which it is real-world conditions that guide management approaches, rather than the imposition of pre-conditioned and artificial policy objectives.⁴⁰ The success of this approach would, however, be conditioned on a more systematic recognition in international law of the role non-State actors play in the conservation of plants. Furthermore, concerns have been raised over the ability of bottom-up approaches to instigate the level of action needed to achieve conservation goals. Tal and Cohen, for example, argue that ‘Human history clearly teaches that the tragedy of the commons will often not be solved by consultation or by galvanizing the collective wisdom and goodwill of affected communities. If sustainable practices are not imposed or strongly encouraged [by a centralised authority], ecological collapse is often inevitable’.⁴¹ What this suggests is that a combination of traditional regulatory and community-based approaches is needed in conservation, and the following sections outline how a better balance between these may be achieved in international environmental law.

It should also be noted that increasing emphasis is being placed on adaptive management techniques in conservation, i.e. not only learning from past projects to inform the design of new programmes, but using current experiences to help develop the ongoing evolution of a project.⁴² Rather than being particularly new or novel, adaptive management may be regarded as a way of bringing together in a more holistic manner pre-existing norms and practices that are commonly referred to in legal and conservation literature. For example, in its operational guidance for the application of the ecosystem approach, the Biodiversity Convention encourages the use of adaptive management practices.⁴³ Calls have also been made for adaptive management techniques to be incorporated into more specific measures, such as any risk assessment conducted in relation to the intentional introduction of a new species. In this context, adaptive management would take the form of periodic monitoring of both the species

⁴⁰ Chandler, (n 2) p. 38.

⁴¹ Tal and Cohen, (n 38).

⁴² M.P. Wells and T.O. McShane, ‘Integrating Protected Area Management with Local Needs and Aspirations’ (2004) 33 *Ambio* 513-519, 516.

⁴³ <https://www.cbd.int/ecosystem/operational.shtml> (last accessed 01/04/2017).

being introduced and the wider ecosystem so that any changes in conditions can be addressed at an early stage.⁴⁴

Well-Conceived, Clear and Quantifiable Goals:

As with any endeavour, conservation projects must have well-conceived, clear and quantifiable goals. Note that this is not the same as the imposition of vague goals, such as the Aichi targets, by supranational bodies that take little account of varying local conditions and are contrary to resilience-thinking and adaptive management approaches to conservation. Rather, conservation projects require clear goals to both inform the design and implementation of the project's activities as well as allow for progress to be tracked.

An important prerequisite to the setting of appropriate goals is taxonomic accuracy. Conservationists need to be confident that they are conserving the species they intend to conserve. Access to reliable taxonomic data is arguably more important for the conservation of plants than it is for animals. For animals, it is usually possible to distinguish between different species and subspecies by sight alone. An elephant looks very different to a tiger, and an African elephant looks very different to an Indian elephant. Many subspecies of plants, however, are distinguishable only by very small characteristics, such as colouration of the flowers, size of the plant or particular genes. Others are separated by their geographic location alone, and so accurate data about where the plant grows in the wild is essential if it is to be correctly identified. Accurate identification is made more challenging by the constant reclassification of plants, again something which is not observed, at least not to the same extent, in animals.⁴⁵ What is a subspecies today may be a species tomorrow, and what was a *Leucojum* yesterday is an *Acis* today.⁴⁶

Unfortunately, the science of taxonomy has historically not received the same attention or respect as other sciences relevant to conservation. 'Taxonomists have been considered at best

⁴⁴ A.E. Camacho, 'Going the Way of the Dodo: De-Extinction, Dualisms, and Reframing Conservation' (2015) 92 *Washington University Law Review* 849-906, 898-902.

⁴⁵ No genus illustrates this better than *Crocus*. In what was the most comprehensive guide on *Crocus* to-date, Jānis Rukšāns, the world authority on the genus, described around 200 species (J. Rukšāns, *Crocuses: A Complete Guide to the Genus* (Timber Press, 2010). In his new monograph, (J. Rukšāns, *The World of Crocus* (2017)), Rukšāns describes over 230. The increase is largely due to new research that has led Rukšāns to conclude that many subspecies of *Crocus* are more appropriately classified as species in their own right.

⁴⁶ A. Davis et al, 'Phylogenetic analysis of *Leucojum* and *Galanthus* (Amaryllidaceae) based on plastid *matK* and nuclear ribosomal spacer (ITS) DNA sequences and morphology' (2004) 246 *Plant Systemics and Evolution* 223-243.

as useful consultants for life scientists in that they name and classify species, at worst as mere collectors of things'.⁴⁷ This has been attributed to the different perspective taxonomy has of nature compared with, for example, ecologists. Whilst ecologists view nature as an interconnected web of complex relationships, taxonomists tend to view nature as a collection of individual species that must be categorised.⁴⁸ Consequently, conservation practitioners have often been left disappointed when working with taxonomists, as the taxonomists appeared to be pursuing their own research agenda with goals and methodologies that were not compatible with the broader conservation programme.⁴⁹

The onus of addressing this issue is on both non-taxonomists and taxonomists. Non-taxonomists must recognise the validity and utility in taxonomy as a discipline, as it provides the basic data needed to underpin any conservation strategy. For their part, taxonomists must make the data they collect relevant and useful to other conservationists.⁵⁰ Where this is achieved, studies show that the resulting data can allow for more comprehensive national biodiversity reports to be compiled and empower local communities engaged in biodiversity monitoring.⁵¹

This is one area in which international law is more advanced than conservation science. Taxonomy is central to Targets 1 and 2 of the GSPC:

1. An online flora of all known plants.
2. An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action.

Assessing the conservation status of all known plant species will be impossible without reliable taxonomic information, and an online flora will be meaningless if it contains outdated or inaccurate data.

Once accurate taxonomic information is acquired it is possible to begin to prioritise species for protection. The central mechanism for assessing the conservation status of a species (Target 2 of the GSPC) remains the IUCN Red List. As noted previously, however, the representativeness of the Red List, particularly in relation to plants, is questionable.⁵² Compiling a flora of the world's

⁴⁷ C. Granjou et al, 'Making taxonomy environmentally relevant. Insights from an All Taxa Biodiversity Inventory' (2014) 38 *Environmental Science & Policy* 254-262, 254.

⁴⁸ *ibid*, 255.

⁴⁹ *ibid*, 258-259.

⁵⁰ *ibid*, 259-260.

⁵¹ A. Monro and D.T. Jones, 'Conservation of biological diversity in El Salvador shade coffee: the importance of taxonomic capacity for participatory assessments', in A. Lawrence (ed), *Taking Stock of Nature: Participatory Biodiversity Assessment for Policy, Planning and Practice* (Cambridge University Press, 2010).

⁵² See chapter 3.

plants would go some way in remediating this problem, although the Red List would still lack the resources needed to keep updating the species that have been inscribed.⁵³

Prioritisation is also necessary when using protected areas as a method of in situ conservation of species and habitats. As noted previously, the areas that will be identified as most in need of protection will vary according to the methodology used.⁵⁴ Having a set of clearly defined objectives will enable conservation practitioners to determine which methodology is most appropriate for their project. There are also other non-scientific considerations. Much of the world's landmass is privately-owned, and so whether conservationists can operate on a particular site will depend upon the goodwill and circumstances of the landowner.⁵⁵ To counter this, Knight and Cowling believe that conservationists should map opportunity as well as conservation priority. This would allow for more efficient use of conservation resources, as conservationists would not have to repeat prioritisation exercises in the event that the initial sites are unavailable.⁵⁶ On the other hand, mapping social attitudes towards conservation, physical accessibility of sites and the availability of the necessary skilled and unskilled labour requires an entirely different skill-set from mapping areas of conservation priority. These skills, or the resources to acquire or employ people with them, may be beyond many conservation projects.

The identification of clear goals is just as important in ex situ conservation as it is for in situ conservation. Ex situ practitioners must know what it is they wish to conserve – whole specimens, plants with particular characteristics, specific gene sequences etc. – and for what purpose. This will then inform the decision of what type of ex situ conservation should be pursued.⁵⁷ If the objective is to conserve plants to serve as an educational visitors' attraction, then the appropriate ex situ institution would be a botanical garden. If, on the other hand, the purpose is to store genetic codes for research and as an insurance policy in the event of a species disappearing from the wild, then a seed bank would suffice.

Sound Understanding of the Habitat and Ecology of the Target Species:

⁵³ C. Rondinini et al, 'Update or Outdate: Long-Term Viability of the IUCN Red List' (2014) 7 *Conservation Letters* 126-130.

⁵⁴ See chapter 2.

⁵⁵ A.T. Knight and R.M. Cowling, 'Trading-off "Knowing" versus "Doing" for Effective Conservation Planning', in N. Leader-Williams, W.M. Adams and R.J. Smith (eds), *Trade-offs in Conservation: Deciding What to Save* (Zoological Society of London / Wiley-Blackwell, 2010), p. 282.

⁵⁶ *ibid*, p. 287.

⁵⁷ Ashton, (n 10) p. 274-275.

It is self-evident that conservation will only be successful if practitioners understand the habitat and ecology of the species being conserved. As the deliberate introduction of an alien species illustrates, a failure to appreciate how a species interacts with its ecosystem can result in more harm than good.⁵⁸ Further, it is important to understand the causes of a species' decline before attempting any conservation action. If, for example, a contributory factor is disease, then care will have to be taken to ensure that both in and ex situ populations are not exposed to contamination. Equally, if the cause of decline is that climate change has rendered its wild habitat unsuitable, then either conservation may have to be limited to ex situ activities or new habitat would have to be located. If the latter course of action is chosen, then, as was discussed in the previous chapter, appropriate risk assessments and monitoring would have to be undertaken before releasing the species, particularly if the site in question does not already host the species. Equally, there would be little point in attempting to rear a plant in conditions that were ecologically unsuitable in an ex situ setting.

International environmental law's role in this context is twofold. First, it can promote the research required to give practitioners a sound understanding of the ecology of a species. The importance of this, as well of continuously building on our understanding of the relationships between species and habitats, is implicitly recognised in several provisions common in international conservation agreements. The operational guidance to aid in the implementation of the Biodiversity Convention's ecosystem approach states:

The many components of biodiversity control the stores and flows of energy, water and nutrients within ecosystems, and provide resistance to major perturbations. A much better knowledge of ecosystem functions and structure, and the roles of the components of biological diversity in ecosystems, is required...⁵⁹

In terms of actual treaty provisions, Article 12(b) of the Biodiversity Convention calls on the Contracting Parties to 'Promote and encourage research which contributes to the conservation and sustainable use of biological diversity'. More progressive articles concerning research can be found at the regional level. Article 15 of the ASEAN Agreement on the Conservation of Nature and Natural Resources,⁶⁰ for example, states:

The Contracting Parties shall individually or in co-operation with other Contracting Parties or appropriate international organizations, promote and, whenever possible, support scientific and technical programmes of relevance to the conservation and

⁵⁸ S. Riley, 'Heads I Win, Tails You Lose: Uncertainty and the Protection of Biodiversity from Invasive Alien Species' (2012) 14 *Asia Pacific Journal of Environmental Law* 139-168.

⁵⁹ <https://www.cbd.int/ecosystem/operational.shtml> (last accessed 01/04/2017).

⁶⁰ Kuala Lumpur, 9 July 1985, 15 EPL 64 (1985) (not in force).

management of natural resources, including monitoring, research, the exchange of technical information and the evaluation of results.

A similar measure may be found in Article VII of the Convention on the Conservation of Nature in the South Pacific.⁶¹ In the case of Africa,⁶² although the 1968 Convention on the African Conservation of Nature and Natural Resources⁶³ is silent on research, the revised 2003 Convention⁶⁴ not only calls on States to promote and cooperate in scientific research, but requires them to 'strengthen their capabilities to carry out scientific and technological research in conservation, sustainable utilization and management of natural resources paying particular attention to ecological and socio-economic factors as well as their integration'.⁶⁵

Stronger provisions mandating that conservation-related research is undertaken, or that stipulate what form this research should take, are non-existent, but this is perhaps one area in which international law's role is necessarily limited. Taken too far, a legal measure demanding specific research activity could be seen as unduly interfering with State sovereignty and could restrict conservationist's ability to determine their own research agenda. Furthermore, most conservation practitioners would not seek to conserve a species without first gaining basic knowledge about its habitat and ecology. Indeed, the conservation activities per se will contribute to this knowledge, ideally as part of an adaptive management approach.

Second, the law, for example through judicial decisions, can encourage States to promote ecosystem-level assessments of certain activities, as the Court of Arbitration did in the *Kishenganga Arbitration*, rather than ones based on narrow criteria.⁶⁶ This would provide context-specific data that may be used to protect a species from an identified threat. Such mechanisms can already be seen in procedural environmental instruments. Article 3 of the EU's EIA Directive, for example, requires environmental impact assessments to take into account 'the interactions' between a range of factors, including biodiversity, environmental media and the

⁶¹ Apia, 12 June 1976, in force 28 June 1990, IELMT 976:45. Note the application of this treaty was suspended in 2006.

⁶² Article 11(1)(b) of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 19 September 1979, in force 1 June 1982, UKTS 56 (1982)) merely calls on States to 'encourage and co-ordinate' research relevant to the Convention. The 1940 Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (Washington, 12 October 1940, in force 1 May 1942, 161 UNTS 193) does not encourage States to conduct research, but does recognise that the protection provided to protected areas and species can be derogated from for scientific purposes. For example, see Articles I(3) and VIII.

⁶³ Algiers, 15 September 1968, in force 9 October 1969, 1001 UNTS 3.

⁶⁴ Not in force. Text available at: <http://www.au.int/en/treaties/african-convention-conservation-nature-and-natural-resources-revised-version>.

⁶⁵ Article XVIII.

⁶⁶ *Indus Waters Kishenganga Arbitration (Pakistan v India)*, Final Award of the Court of Arbitration, 20th December 2013, para. 99.

climate.⁶⁷ Similar obligations could be read into other instruments through a progressive interpretation based on developments in environmental law that reflect contemporary understandings of ecology. One possible candidate is the 1991 Convention on Environmental Impact Assessment in a Transboundary Context.⁶⁸ Appendix III of the Convention lists effects ‘causing additional loading which cannot be sustained by the carrying capacity of the environment’ as one of the thresholds that may indicate that the proposed activity will have significant environmental impacts.⁶⁹ Arguably, whether this criterion is fulfilled can only be determined following a more holistic assessment of the likely impacts.

Going further, the EU Habitats Directive,⁷⁰ and the way in which it has been interpreted by both the European and national courts, provides an example of how environmental assessment obligations can be strengthened. In *Waddenzee*, for example, not only was a broad definition given to the type of plan or project that will fall under the Directive,⁷¹ but the nature of the assessment obligation in Article 6 was linked to both the conservation objectives of the instrument and the precautionary principle:

Therefore, the triggering of the environmental protection mechanism [in Article 6] does not presume... that the plan or project considered definitely has significant effects on the site concerned but follows *from the mere probability* that such an effect attaches to that plan or project.⁷² (emphasis added)

In the light, in particular, of the precautionary principle... such a risk exists if it cannot be excluded on the basis of objective information that the plan or project will have significant effects on the site concerned...⁷³

Arguably, this is a much stricter interpretation of the precautionary principle typically seen in international environmental law. If this approach was adopted more broadly, it could go some way in balancing economic development imperatives and the need to avoid and mitigate certain types of environmental harm.

⁶⁷ Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment OJ L 26, 28.1.2012, 1-21, as amended by Directive 2014/52/EU, OJ L 124, 25.4.2014, 1-18.

⁶⁸ Espoo, 25 February 1991, in force 10 September 1997, 30 ILM 802 (1991).

⁶⁹ The use of carrying capacity, or ‘critical loads’ as a legal standard is already common in pollution law. See, for example, C. Hilson, *Regulating Pollution: A UK and EC Perspective* (Bloomsbury Publishing, 2000), p. 69-71 and 85-88.

⁷⁰ Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, OJ L 206/7, 22.7.92.

⁷¹ Case C-127/02 *Waddenzee* [2005] 2 CMLR 31, at 26-28.

⁷² *ibid*, at 41.

⁷³ *ibid*, at 44.

More recently, in *Wealden District Council*, the UK Court of Appeal, dismissing an appeal against an earlier ruling to quash a planning inspectorate's approval of a housing development, held that any proposed mitigation measures must be clearly defined and linked to the anticipated negative impact. In this case, broad financial undertakings linked to the general development scheme were insufficient, as they were not directly linked to the likely impact of nitrogen-loading in a protected heathland.⁷⁴ The Habitats Directive therefore provides an example of how an obligation to undertake specific mitigation action can be linked to a strict precautionary-based environmental assessment.

Note that there are limitations to environmental assessment, even in the more substantive form seen in the Habitats Directive. Holder, for example, highlights how environmental assessments, even those that address cumulative and system-wide impacts, are artificially restrained by other factors, such as property law, which may limit the geographic scope of the assessment, and the need to balance assessment requirements with the rights of developers not to suffer undue delay before being permitted to undertake the proposed activity or project.⁷⁵ Nevertheless, there is still space within international environmental law for greater account to be taken of ecosystemic impacts in environmental assessments.

Confidence in Scientific Practices and Techniques:

As well as understanding the ecology of target species, it is also important for conservation practitioners to be confident in their scientific methodologies. However, doubts have been raised over the efficacy of measures often adopted to conserve plants in both in and ex situ situations. Many areas important for plant diversity are not protected⁷⁶ and lists of protected and endangered plants in multilateral conservation instruments do not reflect the IUCN Red List.⁷⁷ Similarly, many of the plants in ex situ collections represent the particular interests of the institution's scientists, local flora or simply what was easily acquired.⁷⁸ Whilst all of these are legitimate rationales for ex situ collections, the contributions such collections make to the conservation of endangered flora is debatable. Additionally, all of the ex situ material of a

⁷⁴ *Wealden District Council v The Secretary of State for Communities and Local Government and Another* [2017] EWCA Civ 39, 25-34.

⁷⁵ J. Holder, 'The prospects for ecological impact assessment', in J. Holder and D. McGillivray (eds), *Taking Stock of Environmental Assessment: Law, Policy and Practice* (Routledge-Cavendish, 2007).

⁷⁶ F. Larsen, W. Turner and R. Mittermeier, 'Will protection of 17% of land by 2020 be enough to safeguard biodiversity and critical ecosystem services?' (2015) 49 *Oryx* 74-79.

⁷⁷ See chapter 3.

⁷⁸ Hackney Blackwell, (n 9) 7-9.

species may be kept in the same location, leaving it vulnerable should something go wrong at that institution.⁷⁹ More concerning, material stored in seedbanks, one of the principal purposes of which is to ensure that a species can be reintroduced into the wild, may not be viable.⁸⁰ These problems are compounded by the need to constantly refresh *ex situ* material, partly to maintain the genetic diversity of *ex situ* stock but also to ensure it can be used in a reintroduction programme.⁸¹ This could be problematic if there are only a few specimens left in the wild, as not only could the species be difficult to locate but it would also limit, at least temporarily, the species' capacity to multiply in the wild.

A range of measures can be adopted that could partially address these issues. In the case of *in situ* conservation, appropriate mapping of the best areas for conservation, taking into account the points raised above about prioritisation criteria and opportunity, can ensure that protection is given to areas hosting the greatest numbers of the target species. More complex are measures to engage local communities, discussed below, particularly those that frequently utilise species or related ecological components so that unsustainable uses can be addressed.

In relation to *ex situ* conservation, Krigas advocates the storing of species (in whatever form) in multiple institutions, so that if one source of material is lost the plant is still represented in *ex situ* collections.⁸² Regarding the need to constantly replace material to ensure that there is an available source should a species' reintroduction become necessary, one option would be to collect seed from plants in *ex situ* collections. This would reduce pressure on a potentially very limited wild population, although repeatedly using *ex situ* stock for this purpose means that eventually a seedbank would become a library of propagated, rather than wild, plants.

Again, I doubt whether it is appropriate for international law to prescribe steps that should be taken to minimise the risk of practitioners adopting less-than-optimum approaches to conservation. States must be free to determine what resources, including land, are made available for conservation and practitioners must be allowed to determine their own conservation agenda and methodologies. Furthermore, given the difficulties in amending treaty instruments, even those that are subject to lower thresholds such as schedules or annexes, there is a danger that what is provided for in a legal instrument will quickly become obsolete as conservation science advances. What international law can do, however, is promote, encourage

⁷⁹ N. Krigas, V. Menteli and D. Vokou, 'Analysis of the *ex situ* conservation of the Greek endemic flora at national, European and global scales and of its effectiveness in meeting GSPC Target 8' (2014) 148 *Plant Biosystems* DOI: 10.1080/11263504.2014.988194.

⁸⁰ *ibid.*

⁸¹ Hackney Blackwell, 'Botanical Gardens', (n 9) 7.

⁸² Krigas et al, (n 79) 8.

and support the sharing of best practice between States and practitioners. Article 15 of the ASEAN Agreement, referred to above, is one example of how this might be achieved, as is the work being completed on protected areas under the aegis of the Biodiversity Convention's protected areas cross-cutting issue.⁸³ There is also a role for conservation NGOs to play in this regard, such as Botanic Gardens Conservation International, which facilitates the exchange of information between botanical gardens on conservation practices.

A second area in which international law could contribute is in providing for the ongoing monitoring and assessment of conservation activities. Both the target species and conservation methodologies must be continuously assessed, preferably in accordance with adaptive management principles, if a conservation activity is to be successful.

Long-Term Funding:

Conservation is not cheap, particularly if there are perpetual costs that must be met, for example in relation to the administration and policing of a protected area or the operation of a seed bank. Long-term funding is therefore essential if a conservation project is to be successful. However, such funding is rarely forthcoming and globally there is a serious shortfall in the money available for conservation. This problem is compounded by the uneven distribution of plant diversity between rich and poor States, with the majority of species being found in States that are less able to fund conservation.

Conservation funding comes from a number of sources. Individuals contribute significant sums of money each year in the form of membership subscriptions for conservation organisations, entrance fees to zoos, botanical gardens and other institutions and donations for specific causes or projects. At the international level, the Global Environmental Facility (GEF) has provided billions of dollars since its establishment in 1991 and is now the principal instrument for conservation funding in developing States.⁸⁴ Studies have shown how the GEF has contributed to progress on a range of environmental issues in developing States, including in slowing the loss of biodiversity.⁸⁵ However, the considerable funds raised and otherwise sourced by the GEF are still insufficient to meet the needs of global conservation efforts. Furthermore, even though the

⁸³ <https://www.cbd.int/protected/> (last accessed 01/04/2017).

⁸⁴ P. Birnie, A Boyle and C. Redgwell, *International Law & the Environment* (3rd edition, Oxford University Press, 2009), p. 83.

⁸⁵ D. Freestone, 'The World Bank and sustainable development', in M. Fitzmaurice, D.M. Ong and P. Merkouris (eds), *Research Handbook on International Environmental Law* (Edward Elgar Publishing, 2010), p. 147.

GEF is now the financial mechanism for five conventions,⁸⁶ the funding it receives remains at a similar level to when it supported only two treaty regimes.⁸⁷ In other words, additional, equally legitimate, demands are being placed on the already limited money available for biodiversity conservation.

Arguably, few reforms are needed in terms of funding arrangements in international law. It is simply the case that more funds need to be made available, either via the GEF or other sources.

Community and Public Engagement:

It is often stated that in situ conservation, and indeed any environmental endeavour, will not be successful unless practitioners can engage with the local community. Brockington refers to this as the principle of local support, and bases it on the premise that a community that does not support a protected area, for example, will protest against it, not cooperate with park managers and other authorities and may seek to actively undermine the area's conservation objectives.⁸⁸

However, questions have been raised over the extent to which the success of a protected area or other in situ conservation project is conditioned on engaging local communities:

The local communities who oppose the existence and policies of their neighbouring protected areas tend to be politically weak rural groups. They can be opposed to powerful alliances of central and local governments, the police, park guards and paramilitary units, and national and international NGOs raising money and awareness for the cause of protected areas. These are contests that the rural groups may be ill-equipped to win. Asserting the necessity of their cooperation ignores the realities of power. Some local groups can be ignored.⁸⁹

Holmes identifies a range of circumstances in which a local community's opposition will be irrelevant to the operation of a protected area. First, in certain States local residents may fear the legalised use of violence by park guards or other authorities if they attempt to resist.⁹⁰ Second, measures that purport to involve local communities in decision-making processes may

⁸⁶ Convention on Mercury (Minamata, 10 October 2013, not in force, text available at: <http://www.mercuryconvention.org/Convention/tabid/3426/Default.aspx>); Convention on Persistent Organic Pollutants (Stockholm, 22 May 2001, in force 17 May 2004, 40 ILM 532 (2001)); the UN Convention to Combat Desertification; the Biodiversity Convention; and the UN Framework Convention on Climate Change.

⁸⁷ Freestone, (n 85) p. 147.

⁸⁸ D. Brockington, 'Community Conservation, Inequality and Injustice: Myths of Power in Protected Area Management' (2004) 2 *Conservation and Society* 411-432.

⁸⁹ *ibid*, 413.

⁹⁰ G. Holmes, 'Exploring the Relationship Between Local Support and the Success of Protected Areas' (2013) 11 *Conservation and Society* 72-82, 74.

be carefully choreographed, for example by selecting those who can attend, so that the process results in 'correct' results for the authorities.⁹¹ Third, where a State or other authority can create a false narrative, such as that the area being designated has always been empty of human habitation, it can be very difficult for a local community to challenge that narrative.⁹² Where these circumstances exist, conservation activities can still proceed because local opposition cannot be translated into an effective challenge to those activities. One solution could be to reform relevant administrative institutions so that local communities are not effectively excluded from decisions about their local environment.⁹³ In certain States there may be broader political obstacles to such reforms, however, independent of any flaws in the design or implementation of a specific conservation strategy.

Notwithstanding the validity of the points raised by Brockington and Holmes, engaging local communities must still be considered an important component of a successful conservation strategy or project. In the first instance, even if they lack the means to change the location or policies of a protected area, a hostile local community can still take some steps that undermines the park's operation. They may, for example, not report poachers to the authorities. More importantly, engaging local communities is about more than the success of a conservation project. Engaging with local communities so that they are aware of what is happening in their environment, and providing meaningful opportunities for them to participate in those decisions, has been linked to the delivery of environmental justice for these communities.⁹⁴

It is the development and recognition of these relationships within and between different social groups and plants that form the basis of a resilience-approach to conservation. 'From the perspective of resilience-thinking, the governance of complexity therefore – of necessity – needs to reject the artifice of imposing goals and direction on the world and instead seeks to find its goals in the processes, practices and communicative interactions of the world itself'.⁹⁵ International law could play an important role in this regard, as well as in enhancing the likelihood that a conservation project will receive public support. A number of instruments call on States to provide for meaningful public participation in environmental decision-making. An

⁹¹ *ibid*, 75.

⁹² *ibid*, 75.

⁹³ S.T. McAllister, 'Community-Based Conservation: Restructuring Institutions to Involve Local Communities in a Meaningful Way' (1999) 10 *Colorado Journal of International Environmental Law and Policy* 195-225.

⁹⁴ J. Razzaque, 'Participatory rights in natural resource management: the role of communities in South Asia', in J. Ebbesson and P. Okowa (eds), *Environmental Law and Justice in Context* (Cambridge University Press, 2009).

⁹⁵ Chandler, (n 2) p. 37.

obvious example is the Aarhus Convention,⁹⁶ which although primarily a treaty operating in Europe has nevertheless had a broader impact on global procedural environmental rights.⁹⁷ Although arguably one of the most comprehensive procedural regimes in international environmental law, there is still scope for Aarhus to be reformed so as to better support the more network-based, bottom-up approach advocated by proponents of resilience-thinking models of governance. For example, measures for indigenous peoples, similar to those applied by the World Bank,⁹⁸ could create specific protections and opportunities for communities that are both potentially more vulnerable than other groups in society, and that may also be best placed to offer practical insights into the conservation status and methodologies of particular species.

In contrast to Aarhus, the Biodiversity Convention has relatively poor public participation provisions. Article 14 merely calls on States, ‘where appropriate’, to provide for public participation in environmental impact assessments. This may be another consequence of the framework nature of the Biodiversity Convention, and more detailed provisions have been provided in its protocols. Article 23 of the Biosafety Protocol⁹⁹ requires States to ‘consult the public in the decision-making process regarding living modified organisms and [to] make the results of such decisions available to the public’.¹⁰⁰ More should be done, however, so that it is the results of these processes that direct conservation action. As I discuss further in the next section, providing for the effective participation of local communities in decision-making procedures can enhance the evidence-base for decisions, and deliver environmental justice for those communities.

For conservation organisations, it is not only important to engage with communities living adjacent to their conservation activities, but the wider public as well. As noted above, the public is an important source of funding for both in and ex situ conservation. Furthermore, if government-funding of conservation is to be maintained and, hopefully, increased, it must be seen by the public as a legitimate use of those funds. There are a variety of tools conservationists can use to engage the public. Marketing campaigns can be an effective way to reach a large

⁹⁶ Convention on Access to Information, Public Participation and Decision-Making and Access to Justice in Environmental Matters (Aarhus) 25 June 1998, in force 30 October 2001, 38 ILM 517 (1999).

⁹⁷ J. Razzaque, ‘Human rights to a clean environment: procedural rights’, in Fitzmaurice, Ong and Merkouris (eds), (n 85).

⁹⁸ OP 4.10 – Indigenous Peoples, July 2005.

⁹⁹ Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal, 29 January 2000, in force 11 September 2003, 39 ILM 1027.

¹⁰⁰ Note that this provision is qualified by a reference to national law.

audience and raise funds,¹⁰¹ although if poorly targeted there is a risk that these campaigns can be an inefficient use of limited resources. Another tool, which may form part of a marketing campaign, is the creation of a conservation narrative, such as the need to raise funds to create and maintain the last remaining habitat of a particular species. Efforts must be made to ensure such narratives are accurate however. This will avoid the risk of local communities being disenfranchised by a false narrative, identified by Holmes.¹⁰² Furthermore, a false narrative, however effective in the short-term, may do long-term damage to environmental causes. Early apocalyptic predictions on climate change has arguably led to a fatigue in the public about climate change discourse,¹⁰³ and desensitised them to more immediate environmental crises.¹⁰⁴

Not all conservation treaties contain obligations relating to public education, and those that do vary in quality. Article 13 of the Biodiversity Convention requires States to 'Promote and encourage understanding of the importance of, and the measures required for, the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in educational programmes'.¹⁰⁵ Article 13 has been elaborated in a number of Decisions by the Conference of the Parties, and in 2006 a number of priority activities were identified to enhance the implementation of the educational agenda.¹⁰⁶ In particular, the Convention's Executive Secretary was tasked with developing key messages for the Parties to communicate to domestic audiences, including the importance of biodiversity and the work of the Biodiversity Convention.¹⁰⁷ At the regional level, Article 16 of the ASEAN Agreement is interesting as it requires information about how conservation measures relate to sustainable development objectives to be circulated. This could go some way in building local support for conservation activities as it could demonstrate how conservation can bring long-term socioeconomic benefits to a community.

¹⁰¹ R.J. Smith, D. Veríssimo and D.C. MacMillan, 'Marketing and Conservation: How to Lose Friends and Influence People', in Leader-Williams, Adams and Smith (eds), (n 55).

¹⁰² Holmes, (n 90) 75.

¹⁰³ T. Nordhaus and M. Shellenberger, 'Apocalypse Fatigue: Losing the Public on Climate Change' (2009) *Yale Environment* 360 <
http://e360.yale.edu/feature/apocalypse_fatigue_losing_the_public_on_climate_change/2210/> last accessed 01/04/2017.

¹⁰⁴ E. Crist, 'Beyond the Climate Crisis: A Critique of Climate Change Discourse' (2007) 141 *Telos* 29-55, 48.

¹⁰⁵ See also, inter alia, Decision X/18, 'Communication, education and public awareness and the International Year of Biodiversity', UNEP/CBD/COP/DEC/X/18, 29 October 2010 and Decision VIII/6, 'Global Initiative on Communication, Education and Public Awareness: overview of implementation of the programme of work and options to advance future work', UNEP/CBD/DEC/VIII/6. 15 June 2006.

¹⁰⁶ Decision VIII/6, *ibid.* See also Decision VI/19, 'Communication, education and public awareness', UNEP/CBD/COP/DEC/VI/19, 2002.

¹⁰⁷ Priority Activity 3.

A simple reform that could potentially deliver major benefits for conservation would be to include an obligation to educate and otherwise raise public awareness of conservation issues in all environmental instruments. These could be tailored to reflect the remits of individual treaties, so, for example, States party to CITES could be required to raise awareness about the impacts of international trade on wildlife and what steps individuals can take to ensure that they are purchasing from legitimate suppliers. The role of the Biodiversity Convention and other generic conservation agreements would then to be highlight the connections between different environmental challenges and how action to tackle one issue impacts (both positively and negatively) on another.

Buy-In by Communities, Practitioners and Other Stakeholders:

Engaging local communities and the wider public should be considered a minimum threshold for conservation projects. Passive support or acquiescence to an in situ conservation project by the local community will not sustain it when external resources, be these from the State or other entity, are reduced or withdrawn. Its long-term success depends on going beyond this and ensuring that local communities, practitioners and other key stakeholders ‘buy-in’ to, i.e. have a stake in or otherwise feel part of, the project. Community buy-in can also deliver short-term economic benefits for the communities themselves. In the Chatham Islands of New Zealand, for example, buying into efforts to reinvigorate the local economy by developing a tourism industry allowed locals to influence the decisions being made by policymakers and operators to best reflect local needs and priorities.¹⁰⁸

One way communities can buy-in to a project is through participatory monitoring mechanisms. In short, local communities are trained in skills and techniques that enable them to monitor their local wildlife and contribute directly to conservation work, thereby allowing them to ‘own’ part of the process.¹⁰⁹ Again it is possible to see links with environmental justice literature. In Canada, training indigenous communities to be able to test for and monitor levels of pollutants in their environment has provided them the means to gather the scientific data that is essential to

¹⁰⁸ A. Cardow and P. Wiltshier, ‘Indigenous tourism operators: The vanguard of economic recovery in the Chatham Islands’ (2010) 10 *International Journal of Entrepreneurship and Small Business* 484-498.

¹⁰⁹ A. Lawrence, ‘Introduction: learning from experience of participatory biodiversity assessment’, in Lawrence (ed), (n 51).

establishing legitimate environmental claims in mainstream administrative and judicial processes.¹¹⁰

It is the incorporation of knowledge of this kind that would form the basis of both resilience- and adaptive management approaches to conservation. It would reveal actual realities that would in turn feed into the setting of conservation goals and the monitoring of progress towards their goals. It is here, however, that a possible conflict between resilience-thinking and what would be the most efficient way to utilise this knowledge in international law arises. Under a resilience-thinking model, 'There is no directing centre or controller, no agent who possesses superior knowledge or information'.¹¹¹ However, many supranational conservation regimes, including the Biodiversity Convention and CITES, have established bodies that collect, collate and disseminate information about best practice that may be considered to be 'superior' to the knowledge possessed by any single actor. However, it should be considered superior because it represents a sum of experience that may confirm or refute the utility of a particular approach to conservation, rather than because the institution sharing that knowledge among other actors inhabits a particular position in an artificial hierarchy of actors.

Participatory monitoring has also been identified as potentially a useful tool in the national implementation of the Biodiversity Convention. 'Participatory approaches to biodiversity assessment and monitoring could provide, and in numerous countries are providing, important inputs to national identification and monitoring efforts, and to evaluation of the effectiveness of measures taken, by contributing detailed knowledge of specific species, habitats or ecosystems and monitoring changes over time'.¹¹² Recommendations¹¹³ have been made to increase and improve the support given to developing States when collating and implementing National Biodiversity Strategies and Action Plans,¹¹⁴ although challenges remain, with lack of human and financial resources often cited as the reason for delay or failure to submit reports.¹¹⁵

For ex situ conservation, there is no need to ensure that local communities buy-in to a conservation programme, beyond what was noted in relation to public engagement above.

¹¹⁰ S. Sabzwari and D.N. Scott, 'The quest for environmental justice on a Canadian aboriginal reserve', in Y. Le Bouthillier et al (eds), *Poverty Alleviation and Environmental Law* (IUCN Academy of Environmental Law Series, Edward Elgar, 2012).

¹¹¹ Chandler, (n 2) p. 39.

¹¹² R. MacKenzie, 'Monitoring and assessment of biodiversity under the Convention on Biological Diversity', in Lawrence (ed), (n 51) p. 46.

¹¹³ For example, see Recommendation 2/1, Report of the Ad Hoc Working Group on Review of Implementation of the Convention on the Work of its Second Meeting, UNEP/CBD/COP/9/4, 26 July 2007.

¹¹⁴ See Article 6 of the Convention.

¹¹⁵ MacKenzie, (n 112) p. 41.

There is, however, a need to ensure that practitioners buy-in to a project so that its long-term operation can be guaranteed. Collections of certain plants that have national or international significance may, once the original (presumably enthusiastic) experts who championed the collection have moved on, be left to deteriorate or simply dismantled if they come to be viewed as a drain on the host institution's limited resources.¹¹⁶ This issue can be difficult to address. Whilst the provision of funds and training can be encouraged and facilitated by legal mechanisms so that there are experts capable of working on a conservation project, there is little law- and policymakers can do if these experts are simply not interested in working on a project about a given species. Education may go some way in inspiring this enthusiasm, but is still dependent on the individual having some latent interest.

Beyond the promotion of education, the principal role international law can play in terms of buy-in is through capacity-building. This needs to be at both the State level, so that developing States can train experts in the identification and conservation of native flora, and at the local level so that communities can engage in schemes such as participatory monitoring.

Making International Law Work for Conservation – The Nagoya Protocol on Access and Benefit-Sharing:

The Nagoya Protocol addresses a legitimate and important issue relevant to the conservation of biodiversity.¹¹⁷ In certain respects it may be considered as an agreement primarily about plants, as it is plants that constitute the richest source of genetic material. The Protocol seeks to ensure the fair and equitable sharing of benefits resulting from the utilisation of natural resources with the State of origin and any local or indigenous community to which the resources belonged.¹¹⁸ Like almost all of the instruments discussed in this work, the Protocol shows a particular sensitivity to State sovereignty, both in the conditioning of access to a State's genetic resources on its prior informed consent and in the references to national law when addressing the rights of local and indigenous communities.¹¹⁹

¹¹⁶ P.H. Raven, 'Research in botanical gardens' (1981) 102 *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 52-72, 56.

¹¹⁷ Although as noted in chapter 2, access and benefit-sharing is not *the* most pressing issue the Biodiversity Convention could have addressed, and protocols addressing other concerns, such as alien/invasive species would have more noticeable positive impact on the status of global biodiversity.

¹¹⁸ Articles 1 and 5.

¹¹⁹ Articles 6(1), 6(2) and 7.

A number of provisions in the Protocol may be read as encouraging States to harmonise domestic procedures and requirements for accessing natural resources, thereby reducing the administrative burden on those wishing to access resources in multiple jurisdictions. Article 6(3)(g) provides examples of what should be included in the ‘mutually agreed’ terms of access and Article 17(3), which addresses the monitoring of the utilisation of genetic resources, refers to an ‘internationally recognised certificate of compliance’ that would serve as evidence that resources have been accessed lawfully.

In certain regards, the Protocol is a positive instrument in the sense that it incorporates mechanisms common in international environmental law, such as prior informed consent, and, subject to national law, seeks to protect the interests of local and indigenous communities in their natural resources. However, no instrument illustrates as clearly the discrepancies between the legal and political perception of an issue and the real world, day-to-day operations of conservation practitioners. The critical flaw in the Nagoya Protocol is that it fails to distinguish between the parties intending to access genetic resources. A multinational pharmaceutical company whose sole intention is to exploit a particular species of plant for commercial gain is treated exactly the same as a small botanic garden that wishes to collect samples to assist in the conservation of a species. Work is being done to assist entities such as botanic gardens in complying with national laws that implement the Nagoya Protocol. The Royal Horticultural Society has established a Working Group on the Nagoya Protocol including representatives from, inter alia, plant NGOs, collection-holders and nurseries,¹²⁰ and Botanic Gardens Conservation International is compiling information to assist botanic gardens with the implementation of the Protocol’s requirements.¹²¹ However, lack of both resources and legal expertise will be a significant hurdle for many conservation practitioners.

The Nagoya Protocol should therefore be reformed to make it a more flexible instrument. Rather than requiring botanic gardens and other conservationists to reach formal agreements based on the mutually agreed terms set out in Article 6, the Nagoya Protocol could instead only require that they gain the simple consent of the relevant national authority. This would be a much lower burden and more reflective of the non-commercial nature of these bodies’ utilisation of the resource. Consideration should also be given to the nature of the benefits that different entities should be expected to provide to the State and community of origin. The Protocol’s Annex contains a non-exhaustive list of the type of benefits that could be given in return for access to

¹²⁰ <https://www.rhs.org.uk/science/articles/nagoya-protocol-update-september-2015> (last accessed 01/04/2017).

¹²¹ https://www.bgci.org/policy/abs_links (last accessed 01/04/2017).

a genetic resource, but gives no guidance on the circumstances in which each would be suitable. Many botanical gardens and other research institutes will lack the funds to be able to make direct monetary payments in return for access. They could, however, offer to collaborate with researchers in the State of origin and undertake to train local people so that they can assist with future work.

Reforms such as this would greatly reduce the burden Nagoya imposes on conservation bodies but still retain the legitimate safeguards Nagoya seeks to place on the utilisation of natural resources by external parties. First, the consent element remains, and would be conditioned on the access being for purely non-commercial purposes and an undertaking to provide appropriate benefits to the State of origin and any local or indigenous community. Second, the application of this lower threshold or exception could be limited to botanic gardens, research institutes and other conservation organisations, i.e. non-commercial bodies. This would ensure that a pharmaceutical company that is engaged in preliminary research, with no short-term intention to commercially exploit a species' genetic resources, is still subject to the full requirements of the Nagoya Protocol.

The Nagoya Protocol does not by any means render plant conservation by external actors impossible. It is nevertheless a highly problematic instrument. The danger is that, in the absence of any other legally binding global plant conservation agreement of general application,¹²² it will evolve to become the principal plant agreement but do so in such a way that is hostile to the very institutions that have the means and motivation to ensure the survival of the world's endangered plants.

Conclusions:

International law performs a number of functions relating to conservation practice, including providing funds, facilitating the sharing of best practice and capacity-building activities relating to public education and States' ability to implement conservation measures at the national level. Reforms can be made to international law so that it is better able to fulfil these roles. In many cases these are not so fundamentally necessary that plant conservation will not be able to function properly if they are not enacted. However, they would facilitate the more efficient use

¹²² General in the sense that it potentially applies to all species of plants (see Article 3 of the Nagoya Protocol and Article 15 of the Biodiversity Convention). In comparison, the International Treaty on Plant Genetic Resources only applies to 'plant genetic resources for food and agriculture' (Article 3).

of limited resources and could improve the likelihood of the international community meeting their global plant biodiversity targets.

A much more important area for reform is the Nagoya Protocol on Access and Benefit-sharing. As it is currently conceived, the Protocol cannot distinguish between different users of genetic material, even though the intentions and resources of botanical gardens and others conservation bodies differ considerably from commercial entities. A more flexible approach is required so that the Protocol does not frustrate the ability of conservationists to research and protect endangered flora, and so that the benefits that they are rightly required to deliver to the State and community of origin are a better reflection of what conservationists have to offer.

All these reforms, however, whilst important, are arguably insufficient to engineer a reverse in the continuing decline of biodiversity. For this to be achieved, we need a new approach to international environmental governance, which draws on real-world experiences of those involved in the conservation of plants, including those that must utilise them to meet their subsistence needs, and to guide conservation activities. Resilience-thinking is such an approach, and one that may be of significant benefit to plants if it was incorporated into the Biodiversity Convention.

Ironically, it is the weaknesses for which the Biodiversity Convention has been condemned both here and elsewhere that make it suitable for a resilience-thinking approach. Because it contains only vague obligations, with States being given significant discretion about how to fulfil these, it is closer to a multi-level governance structure than other agreements. Some reform would still be necessary. Stronger provisions would need to be introduced so that the processes through which the experiential knowledge of practitioners and other actors could be delivered up to a supranational body and then back down to other stakeholders. These provisions would include those highlighted above as central to resilience-thinking and adaptive management, including risk assessments, post-activity monitoring, participatory biodiversity assessment and participation in environmental decision-making. Achieving a suitably robust regime would be challenging. As already noted, implementation faces practical and political difficulties, and the reforms I am advocating here would go much further than any pre-existing procedural environmental agreement. That they could be introduced through a new protocol to the Biodiversity Convention, and would therefore avoid the reopening of negotiations over the treaty itself, would address some of these concerns, but not all of them.

CONCLUSION: HUMANITY'S FAILURE TO PROTECT PLANTS

Plants are the cornerstone of all life on Earth, both terrestrial and marine. They provide the air we breathe and food we eat, are essential components of modern medicine, provide shelter and fuel for people around the world and regulate the planet's life-support systems. And yet the impacts of human activities on plants, and how we seek to mitigate these, is often neglected in legal literature. In this thesis, I have sought to redress this bias against plants by offering a contemporary and comprehensive analysis of how plants are protected in international environmental law. In doing so, I have offered new insights into the relationships between conservation law and conservation practice, and suggested reforms to address some of the more immediate issues. I have also used the challenges peculiar to the conservation of plants to provide different perspectives on long-standing debates in international environmental law, including the tensions between anthropocentric and ecological valuations of nature and how these manifest in the law, how States' sovereign rights to exploit natural resources are being reinterpreted in light of their evolving environmental obligations and the design and operation of international legal instruments.

At its heart, this thesis has been about whether international law offers effective protection to plants. The simple answer to that question is: no. Why this is the case relates to the three key themes set out in the introduction: the anthropocentric values of nature are prioritised over its ecological values, States' zealous protection of the principle of permanent sovereignty over natural resources and the inability of the law to keep pace with conservation science and ecology. These have left international environmental law incapable of responding to the challenges of plant conservation.

The extent to which anthropocentrism dominates the law became clear in chapter one. Five interpretations of value were identified, but the overwhelming focus in international conservation law and policy is the instrumental values of nature. A body of law that is more ecologically-grounded is never going to be achieved whilst perpetuating this exploitation remains the primary rationale for conservation law.

A case in point was provided in chapter two, where the principal global conservation instrument, the Biodiversity Convention,¹ was found to be woefully inadequate. The treaty itself perpetuates unsustainable practices by subordinating conservation agenda to the narrow self-interests of

¹ Rio de Janeiro, 5 June 1992, in force 29 December 1993, 31 ILM 822 (1992).

States. Furthermore, whilst the non-binding programmes, particularly the Updated Global Strategy for Plant Conservation,² set out useful guidance for States in terms of the actions necessary to protect plants, their impact on the conservation status of plants has been negligible. A dogmatic reliance on global targets in the Biodiversity Convention regime means that there is too much focus on the processes of conservation rather than its outcomes. The same criticisms can be levied against the forest instruments discussed in that chapter. They are non-binding and prioritise States' sovereign rights to exploit forests' instrumental values over the protection of forests' ecological functions.

The weaknesses of the global conservation instruments would arguably not be as big an issue if there existed an effective system of regional conservation agreements. There does not. On three measures of effectiveness – geographic scope, treaty construction and the design of conservation mechanisms – regional conservation treaties fall short. Important areas of plant diversity are not covered by a regional conservation instrument, with reasons for this including geopolitical instability and lack of political will. As with the Biodiversity Convention, many of the obligations in these instruments are phrased in soft or discretionary language, and there are few provisions on non-compliance and enforcement. The forms of protected areas set out in the instruments are generally outdated and incapable of responding to contemporary conservation challenges. They often fail to explicitly differentiate between the needs of plants and the needs of animals, creating a false sense that 'one size fits all' when it comes to conservation policy. More concerning is their complete lack of ecological representativeness, evident in the comparisons between the lists of protected and endangered species in the instruments and the IUCN's Red List. The consequences of these issues became clear in the study of the list of protected plant species in Appendix II of the Convention on the Conservation of European Wildlife and Natural Habitats,³ which concluded that any improvements in the conservation status of listed species were despite, not because of, the Convention. This suggests that international conservation law, at least that which operates at a regional level, is of limited value when it comes to delivering actual conservation success.

In contrast, there have been positive developments in the polar regions. Through the Environment Protocol⁴ the Antarctic Treaty System, which had in practice initially excluded plants from its remit, has evolved to become a more ecologically-aware regime that is of equal

² Decision X/17, 'Consolidated update of the Global Strategy for Plant Conservation 2011-2020', UNEP/CBD/COP/DEC/X/17, 29 October 2010.

³ Bern, 19 September 1979, in force 1 June 1982, UKTS 56 (1982).

⁴ Protocol on Environmental Protection to the Antarctic Treaty, Madrid, 4 October 1991, in force 14 January 1998, 30 ILM 1461 (1991).

and specific benefit to plants. In the Arctic, no treaty exists and arguably no treaty should exist. Instead, cooperation, largely driven by scientists, has seen the protection of Arctic flora become an important subject under the Arctic Environmental Protection Strategy.⁵

The issue of sovereignty is particularly pertinent to marine plants. Not only do States have a sovereign interest in protecting their rights to exploit marine natural resources, but also in ensuring that environmental protection does not undermine the freedom of the high seas. This is apparent in the UN Convention on the Law of the Seas.⁶ Arguably a better model of protection can be found in the Protocol on Specially Protected Areas and Biological Diversity.⁷ This offers robust protection to marine flora both in relation to specific species but also the wider marine ecosystem.

Finally, the Convention on Wetlands of International Importance⁸ is an example of the more responsive instrument that I believe is necessary to address the discrepancies between conservation science and conservation law. The explicit reference in this regime to the IUCN Red List means that it is not reliant on the constant amending of treaties and their subsidiary instruments to remain current. Where this Convention falls down is in the lack of a robust system to address non-compliance.

Turning to some of the key drivers of plant diversity loss, the picture is mixed. Climate change remains the biggest challenge in plant conservation, and this is unlikely to change whilst there continues to be a mismatch between global conservation and climate change policies. A more flexible system of law that focusses on adaptation in nature rather than preservation of nature is needed. In relation to mountains, one of the most vulnerable plant biomes, a major concern is the apparent lack of useful data. This is despite the gathering of data being the focus of mountain conservation efforts over the past few decades.

The relationship between plants and climate change is more complex than just the threat aspect. Because of their unique position in ecological cycles, plants play an important role in tackling climate change, and the REDD and Clean Development Mechanisms established under the UN

⁵ Arctic Environmental Protection Strategy, Declaration on the Protection of the Arctic Environment (Rovaniemi, June 1991).

⁶ Montego Bay, 10 December 1982, in force 16 November 1994, 21 ILM 1261 (1982).

⁷ Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 10 June 1995, in force 12 December 1999) to the Convention for the Protection of the Marine Environment and Coastal Region of the Mediterranean (Barcelona, 16 February 1976, in force 12 February 1978, 15 ILM 290 (1976)).

⁸ Ramsar Convention on Wetlands of International Importance Especially as Waterfowl habitat, Ramsar, 2 February 1971, in force 21 December 1975, 996 UNTS 245.

Framework Convention on Climate Change⁹ seek to facilitate this. These instruments are not perfect, and more needs to be done to ensure that they protect plant diversity rather than encourage the mass planting of those species that absorb the most carbon dioxide. However, they offer important incentives for the protection of plants, and do so in a manner that recognises both the instrumental and ecological values of plants.

Perhaps surprisingly, it is in the international trade regimes that more suitable legal protection for plants is found. Following the World Trade Organisation (WTO) Appellate Body's decision in *United States – Shrimp*,¹⁰ States can lawfully restrict trade for the purpose of protecting plants. The situation is not ideal, however. As the scenarios set out in chapter seven show, the chapeau of Article XX of the General Agreement on Tariffs and Trade¹¹ could be a significant obstacle to any State wishing to go beyond an international consensus that is expressed through a conservation treaty. A more thorough analysis of the nature of any relevant conservation instrument, specifically whether it contains supranational procedures or leaves national implementation to the discretion of States, could address this problem.

In comparison to the other conservation instruments that I have examined, the Convention on International Trade in Endangered Species of Fauna and Flora¹² (CITES) benefits from robust provisions on national implementation and enforcement. CITES has also developed intelligent responses to specific challenges relating to its remit, with the listing of like-species under Appendix II being particularly important for plants. As noted in chapter seven, CITES should be a model to guide the future development of other conservation regimes.

Regarding the international response to alien/invasive species, there are again positive and negative aspects. The Biodiversity Convention's Guiding Principles¹³ are a comprehensive system through which a biological invasion can be prevented or mitigated. Strengthening these by recasting them as a new protocol to the Convention could go a long way to both assisting the international community with its conservation goals and challenging perceptions that the Biodiversity Convention is a hollow instrument. The 1997 International Plant Protection

⁹ New York, 9 May 1992, in force 24 March 1994, 1771 UNTS 107.

¹⁰ *United States – Import Prohibition of Certain Shrimp and Shrimp Products (United States – Shrimp)*, WT/DS58/AB/R, adopted on 6 November 1998 (Appellate Body); WT/DS58R (Panel).

¹¹ Geneva, 30 October 1947, 55 UNTS 194, in force provisionally since 1 January 1948 under the 1947 Protocol of Application, 55 UNTS 308.

¹² Washington, 3 March 1973, in force 1 July 1975, 993 UNTS 243.

¹³ Decision VI/23, 'Alien species that threaten ecosystems, habitats or species' (UNEP/CBD/COP/DEC/VI/23), 2002, Annex.

Convention,¹⁴ in comparison, is highly problematic. Under this treaty, action, both preventative and mitigatory, can only be taken against a plant pest or disease if it has, or will have, an economic impact. This severely limits the scope of the Convention and is contrary to the approach taken by the WTO Appellate Body in relation to the restriction of trade for environmental purposes.

The issue of disease highlights the disconnect between international conservation law and conservation science. Increasing work is being done by conservationists and scientists about the threat disease poses to plants, and how best to mitigate this. Yet neither the Biodiversity Convention nor its non-binding programmes even mention disease as a cause of plant diversity loss. Given that the warming climate is a driver of disease, and that the international community's efforts to prevent climate change are less than sufficient, this is a potentially dangerous oversight.

All of this raises the question of what needs to change? In chapter nine, I set out a range of potential reforms that would make international law a better tool for conservation practitioners. Even if all these were achieved however, they would arguably be insufficient to remedy the deeper, structural flaws in international law, resulting from the domination of anthropocentrism and sovereignty, that has left it incapable of preventing the continual loss of plant diversity. Arguably, much more extensive reform is needed, not just to the law but the political and societal infrastructure that underpins it. It has not been possible to explore ecocentric alternatives to current forms of legal protection for plants in this work. However, one proposal warrants discussion here, that of Stone's global commons guardian.

In 1972, Stone famously asked 'should trees have standing?', and proposed a model through which natural entities could be given legal rights.¹⁵ At the core of his hypothesis is the guardian concept, i.e. a legal person that would act on behalf of a natural entity in matters affecting it. In the most recent iteration of his work, Stone discusses the potential for a global commons guardian to represent and enforce the rights of the natural world in international negotiations and before international courts and tribunals.¹⁶

¹⁴ In force 2 October 2005, amending the 1951 Convention (Rome, 6 December 1951, in force 3 April 1952, 150 UNTS 67, as revised by the FAO Conference in 1979).

¹⁵ C. Stone, 'Should Trees Have Standing? Toward Legal Rights for Natural Objects' (1972) 45 *Southern California Law Review* 450-501.

¹⁶ C. Stone, *Should Trees Have Standing? Law, Morality and the Environment* (3rd edition, Oxford University Press, 2010), p. 130-132. To an extent, international organisations, notably UNEP, and international NGOs already perform such functions. One of the key differences in Stone's proposals is that the role of these actors in representing the environment, and the necessary powers for them to be able to do so, would be formally recognised in international instruments.

Stone sees a global commons guardian as representing those elements of nature that are found outside the jurisdiction of States. As such, it is effectively a guardian for the high seas, and to a certain extent the atmosphere, and therefore of limited practical value for plants.¹⁷ However, notwithstanding the near-insurmountable obstacle of the principle of permanent sovereignty over natural resources, there arguably exists in international law space in which resources found within State boundaries may be subject to a form of commons guardianship.

First, the preamble to the Biodiversity Convention states that the conservation of biodiversity 'is a common concern of humankind'. It is important to note that the phrase 'common concern' was used due to the political opposition to using 'common heritage of mankind', which has a much greater legal significance,¹⁸ and there is little evidence to suggest that this position has changed. However, 'common concern' has been interpreted as recognising that all States have an interest in the conservation of biodiversity, and that their sovereignty over natural resources must be exercised in a manner that is compatible with their international environmental obligations.¹⁹ I would go further than this and say that because the Biodiversity Convention's preamble recognises that biodiversity conservation is a common concern of *humankind*, not just the international community (i.e. States), it demonstrates States' acceptance that in addition to their formal legal rights over their natural resources, there is a broader global community which feels a sense of metaphysical interest in the wonders of the natural world. It is this that would justify the designation of biodiversity as a global commons, the protection of which should be vested in a global commons guardian.

Secondly, in certain very narrow circumstances States have already suspended the rights afforded to them over biodiversity by permanent sovereignty.²⁰ The listing of a species in the CITES appendices imposes certain obligations on States and limits their rights to engage in the international trade of those species.²¹ A much broader application of this basic approach, for example imposing obligations regarding species listed as endangered by the IUCN Red List, could

¹⁷ *ibid*, p. 135-137.

¹⁸ P. Birnie, A. Boyle and C. Redgwell, *International Law & the Environment*, (3rd edition, Oxford University Press, 2009), p. 129.

¹⁹ *ibid*, p. 130.

²⁰ Suspended in the sense that States have the right to withdraw from the international conventions which impact on their sovereignty.

²¹ See Articles III, IV and V.

be one way to implement a guardianship model for plants and other natural entities typically found within the jurisdiction of States.²²

Such ideas are controversial and run contrary to the currently accepted understandings of permanent sovereignty, even those that recognise an element of sustainable use within that norm.²³ Others, notably advocates of wild law,²⁴ go much further than simply granting legal rights to natural entities and argue for the complete ecologising of social and political structures.²⁵ The extent to which such ideas are practicable is debatable but, as I have argued elsewhere, the increasingly parlous state of nature, and that plants may be seen as actively participating in human society, demand that such radical proposals are given serious consideration.²⁶

The Fourth Biodiversity Outlook²⁷ is presented as a mid-term assessment of the Biodiversity Convention Contracting Parties' progress towards the 2020 Aichi Biodiversity targets.²⁸ I would argue, however, that it should have been seen as a recognition of failure. Of the fifty-six sub-targets, insufficient progress had been made in relation to thirty-three of them if they were to be achieved by 2020, little or no progress had been made on ten, including keeping exploitation of the natural world to within safe ecological limits,²⁹ and States had moved further away from achieving five sub-targets, including those relating to habitat degradation³⁰ and enhancing the conservation status of threatened species.³¹ Without renewed efforts to dramatically alter our relationship with the natural world, it was clear that the 2020 Targets were not going to be achieved. A new approach, based on strict and legally enforceable conservation obligations, should have been adopted.

More recent reports provide further evidence that we have already failed to meet the Aichi Targets. Kew's State of the World's Plants Report reveals that over a fifth of all known plant

²² This would, however, be contingent on the reforms to the Red List already proposed in chapter 3. In particular, greater technical and financial support would have to be given to ensure the Red List was as representative and accurate as possible.

²³ N. Schrijver, *Sovereignty Over Natural Resources: Balancing Rights and Duties* (Cambridge University Press, 1997), p. 168.

²⁴ C. Cullinan, *Wild Law: A Manifesto for Earth Justice* (2nd edition, Green Books, 2011).

²⁵ L. Westra, 'Governance for Integrity? A Distant but Necessary Goal', in P. Burdon (ed), *Exploring Wild Law: The Philosophy of Earth Jurisprudence* (Wakefield Press, 2011).

²⁶ R. Amos, 'Reassessing the Role of Plants in Society' (2017) *International Journal of Law in Context* DOI: <https://doi.org/10.1017/S1744552317000040>.

²⁷ Secretariat to the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montreal, 2014).

²⁸ Decision X/2, 'The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets', UNEP/CBD/COP/DEC/X/2, 29 October 2010, Annex.

²⁹ A component of target 4.

³⁰ A component of target 5.

³¹ A component of target 12.

species are at risk of extinction,³² with key areas of plant diversity disappearing.³³ The latest Living Planet Index states that ‘In a business-as-usual scenario, [the] downward trend in species populations continues into the future’.³⁴ Although this report is currently limited to vertebrate species, its implications for the wider natural world are clear.

The consequences of this catalogue of failure remain largely unknown but are potentially catastrophic. For those who wish to protect the wonders of the natural world so that future generations may enjoy the pleasure of sharing the planet with them, every extinction must be considered too high a price to pay for humanity’s increasingly and unnecessarily hedonistic lifestyle. And for those that see plants as merely ‘things’ to be utilised for the benefit of humans, at some point the ecological costs of our unsustainable and unprecedented exploitation will outweigh any short-term advantages. The reports listed above are not just highlighting the international community’s failure to meet arbitrary and political conservation targets. They are tracking our systematic undermining of the Earth’s ecological integrity. At some point, our planet’s life-support systems will collapse.

To return to the first question posed in this work. Why a thesis about plants? Because plants matter. And we are failing them.

³² RBG Kew, ‘The State of the World’s Plants Report – 2016’ (Royal Botanic Gardens, Kew, 2016), p. 59.

³³ *ibid*, p. 26.

³⁴ WWF/ZSL, *Living Planet Report 2016: Risk and resilience in a new era* (WWF International, 2016), p. 12.

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APPENDIX 1

RATIFICATION STATUS OF THE REGIONAL CONSERVATION INSTRUMENTS

1940 Western Hemisphere Convention (19/35 ratifications) International Organisation: The Organization of American States	
STATE	RATIFIED
Antigua and Barbuda	
Argentina	Y
Barbados	
Belize	
Bolivia	
Brazil	Y
Canada	
Chile	Y
Columbia	
Costa Rica	Y
Cuba	
Dominica	
Dominican Republic	Y
Ecuador	Y
El Salvador	Y
Grenada	
Guatemala	Y
Guyana	
Haiti	Y
Honduras	
Jamaica	
Mexico	Y
Nicaragua	Y
Panama	Y
Paraguay	Y
Peru	Y
Saint Kitts and Nevis	
Saint Lucia	
Saint Vincent and the Grenadines	
Suriname	Y
The Bahamas	
Trinidad and Tobago	Y
United States	Y
Uruguay	Y
Venezuela	Y

States too small to appear on the maps: Barbados, Dominica, Grenada, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines and, The Bahamas Trinidad and Tobago

1968 African Convention on the Conservation of Nature and Natural Resources (31/54 ratifications)	
International Organisation: The African Union	
STATE	RATIFIED
Algeria	Y
Angola	
Benin	
Botswana	
Burkina Faso	Y
Burundi	
Cabo Verde	
Cameroon	Y
Central African Republic	Y
Chad	
Comoros	Y
Congo	Y
Cote d'Ivoire	Y
Democratic Republic of the Congo	Y
Djibouti	Y
Egypt	Y
Equatorial Guinea	
Eritrea	
Ethiopia	
Gabon	Y
Gambia	
Ghana	Y
Guinea	Y
Guinea-Bissau	
Kenya	Y
Lesotho	
Liberia	Y
Libya	
Madagascar	Y
Malawi	Y
Mali	Y
Mauritania	
Mauritius	
Mozambique	Y
Namibia	
Niger	Y
Nigeria	Y
Rwanda	Y
Saharawi	
Sao Tome and Principe	
Senegal	Y
Seychelles	Y
Sierra Leone	

Somali	
South Africa	
South Sudan	
Sudan	Y
Swaziland	Y
Tanzania	Y
Togo	Y
Tunisia	Y
Uganda	Y
Zambia	Y
Zimbabwe	

States too small to appear on the maps: Cape Verde, Comoros, Mauritius, Sao Tome and Principe and Seychelles

1976 Convention on Conservation of Nature in the South Pacific (5/26 ratifications) International Organisation: The Pacific Regional Environment Programme	
STATE	RATIFIED
American Samoa	
Australia	Y
Cook Islands	Y
Federated States of Micronesia	
Fiji	Y
France	Y
French Polynesia	
Guam	
Kiribati	
Marshall Islands	
Nauru	
New Caledonia	
New Zealand	
Niue	
Northern Mariana Islands	
Palau	
Papua New Guinea	
Samoa	Y
Solomon Islands	
Tokelau	
Tonga	
Tuvalu	
United Kingdom	
United States	
Vanuatu	
Wallis and Futuna	

States too small to appear on the maps: American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Wallis and Futuna.

1979 Convention on the Conservation of European Wildlife and Natural Habitats (45/47 ratifications)	
International Organisation: The Council of Europe	
STATE	RATIFIED
Albania	Y
Andorra	Y
Armenia	Y
Austria	Y
Azerbaijan	Y
Belgium	Y
Bosnia and Herzegovina	Y
Bulgaria	Y
Croatia	Y
Cyprus	Y
Czech Republic	Y
Denmark	Y
Estonia	Y
Finland	Y
France	Y
Georgia	Y
Germany	Y
Greece	Y
Hungary	Y
Iceland	Y
Ireland	Y
Italy	Y
Latvia	Y
Lichtenstein	Y
Lithuania	Y
Luxembourg	Y
Macedonia	Y
Malta	Y
Moldova	Y
Monaco	Y
Montenegro	Y
Netherlands	Y
Norway	Y
Poland	Y
Portugal	Y
Romania	Y
Russia	

San Marino	
Serbia	Y
Slovakia	Y
Slovenia	Y
Spain	Y
Sweden	Y
Switzerland	Y
Turkey	Y
Ukraine	Y
United Kingdom	Y

States too small to appear on the maps: Andorra, Liechtenstein, Luxembourg, Malta, Monaco and San Marino.

The lighter blue indicates ratifications from non-Council of Europe States: Belarus, Burkina Faso, Morocco, Senegal and Tunisia. When these and the European Union are included the total number of ratifications is fifty-one.

The five observer States have been excluded. These are: Canada, Holy See, Israel, Japan, Mexico and the United States.

The 1985 ASEAN Agreement on the Conservation of Nature and Natural Resources (3/10 ratifications)	
International Organisation: The Association of South East Asian Nations	
STATE	RATIFIED
Brunei	
Cambodia	
Indonesia	Y
Lao	
Malaysia	
Myanmar	
Philippines	Y
Singapore	
Thailand	Y
Vietnam	

All States are visible on the maps.

APPENDIX 2

1979 BERN CONVENTION / IUCN RED LIST DATA TABLES

Methodological Notes:

The search function on the IUCN Red List website¹ was used to search for each species listed in Appendix I of the Bern Convention. Individual species were searched to ensure that they were all identified as in some cases a species' genus, for example species listed as *Liliaceae* by the Appendix, has been reclassified. The conservation status and population trend of species, as defined by the IUCN, were recorded and three sets of data collected:

1. The total number of species classified in each IUCN conservation status category
2. The total number of species with increasing, stable, decreasing, unknown and outdated population trends
3. The population trends of all species classified in each IUCN conservation status

Plants listed in Appendix I were then removed from a search for all European flora on the Red List, and the same three sets of data were collected. All data were correct as of November 2016.

The percentage calculations were as follows:

Chart 1	100(X/1046)
Chart 2	100(X/423)
Chart 3	100 (X/419)
Chart 4	100(X/1042)
Chart 5a	100(X/17)
Chart 5b	100(X/100)
Chart 5c	100(X/167)
Chart 5d	100(X/128)
Chart 5e	100(X/4)
Chart 6a	100(X/28)
Chart 6b	100(X/426)
Chart 6c	100(X/197)
Chart 6d	100(X/339)
Chart 6e	100(X/52)

Percentages were rounded to two decimal places.

Data Tables:

Chart 1: IUCN classification of species not included in the Bern Convention

¹ www.iucnredlist.org/ (last accessed 01/04/2017).

Extinct (EX)	3	0.29%
Extinct in Wild (EW)	1	0.1%
Regionally Extinct (RE)	0	0
Critically Endangered (CR)	62	5.93%
Endangered (EN)	64	6.12%
Vulnerable (VU)	68	6.5%
Lower Risk – conservation dependent (LR/cd)	6	0.57%
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	70 (64+6)	6.69%
Data Deficient (DD)	117	11.19%
Least Concern (LC) or Lower Risk – least concern	655 (643+12)	62.8%
	Total = 1046	

Chart 2: IUCN classification of all species listed in Appendix I of Bern			
			Incl. NE
Extinct (EX)	1	0.24%	0.14%
Extinct in Wild (EW)	3	0.71%	0.43%
Regionally Extinct (RE)	0	0	0
Critically Endangered (CR)	92	21.75%	13.12%
Endangered (EN)	96	22.7%	13.69%
Vulnerable (VU)	86	20.33%	12.27%
Lower Risk – conservation dependent (LR/cd)	0	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	39 (36+3)	9.22%	5.56%
Date Deficient (DD)	54	12.77%	7.7%
Least Concern (LC) or Lower Risk – least concern	52 (51+1)	12.29%	7.42%
	Total = 423		
Not Evaluated (NE)	278*		39.66%
	Total = 701		

* To aid with comparisons NE is not included in the chart. The percentages of each conservation status when NE is included is provided here for information.

Chart 3: Population trends of species included in Appendix I of the Bern Convention and IUCN Red List		
Increasing	20	4.77%
Stable	100	23.87%
Decreasing	167	39.86%
Unknown	128	30.55%
Needs Updating	4	0.95%
	Total = 419*	

* Excludes the one species listed as EX and three listed as EW

Chart 4: Population trends of species not included in Appendix I of the Bern Convention		
Increasing	28	2.69%
Stable	426	40.88%
Decreasing	197	18.91%
Unknown	335	32.15%
Needs Updating	56	5.37%

	Total = 1042*	
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* Excludes the three species listed as EX and one as EW

Chart 5a: Conservation status of species with an increasing population included in Appendix I		
Critically Endangered (CR)	3	17.65%
Endangered (EN)	1	5.88%
Vulnerable (VU)	8	47.06%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	4	23.53%
Data Deficient (DD)	1	5.88%
Least Concern (LC) or Lower Risk – least concern	3	17.65%
	Total = 17	

Chart 5b: Conservation status of species with a stable population included in Appendix I		
Critically Endangered (CR)	18	18%
Endangered (EN)	14	14%
Vulnerable (VU)	23	23%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	11	11%
Data Deficient (DD)	9	9%
Least Concern (LC) or Lower Risk – least concern	25	25%
	Total = 100	

Chart 5c: Conservation status of species with a decreasing population included in Appendix I		
Critically Endangered (CR)	52	31.14%
Endangered (EN)	58	34.73%
Vulnerable (VU)	24	14.37%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	8	4.79%
Data Deficient (DD)	12	7.19%
Least Concern (LC) or Lower Risk – least concern	13	7.78%
	Total = 167	

Chart 5d: Conservation status of species with an unknown population included in Appendix I		
Critically Endangered (CR)	19	14.84%
Endangered (EN)	23	17.97%
Vulnerable (VU)	30	23.44%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	13	10.16%
Data Deficient (DD)	32	25%
Least Concern (LC) or Lower Risk – least concern	11	8.59%
	Total = 128	

Chart 5e: Conservation status of species with a population trend that needs updating included in Appendix I

Critically Endangered (CR)	0	0
Endangered (EN)	0	0
Vulnerable (VU)	1	25%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	3	75%
Data Deficient (DD)	0	0
Least Concern (LC) or Lower Risk – least concern	0	0
	Total = 4	

Chart 6a: Conservation status of species with an increasing population not included in Appendix I

Critically Endangered (CR)	0	0
Endangered (EN)	0	0
Vulnerable (VU)	0	0
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	1	3.57%
Data Deficient (DD)	0	0
Least Concern (LC) or Lower Risk – least concern	27	96.43%
	Total = 28	

Chart 6b: Conservation status of species with a stable population not included in Appendix I

Critically Endangered (CR)	7	1.64%
Endangered (EN)	7	1.64%
Vulnerable (VU)	12	2.82%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	14	3.29%
Data Deficient (DD)	8	1.88%
Least Concern (LC) or Lower Risk – least concern	378	88.73%
	Total = 426	

Chart 6c: Conservation status of species with a decreasing population not included in Appendix I

Critically Endangered (CR)	33	16.75%
Endangered (EN)	43	21.83%
Vulnerable (VU)	27	13.71%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	26	13.2%
Data Deficient (DD)	14	7.11%
Least Concern (LC) or Lower Risk – least concern	54	27.41%
	Total = 197	

Chart 6d: Conservation status of species with an unknown population not included in Appendix I

Critically Endangered (CR)	16	4.72%
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Endangered (EN)	12	3.54%
Vulnerable (VU)	13	3.83%
Lower Risk – conservation dependent (LR/cd)	0	0
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	23	6.78%
Data Deficient (DD)	93	27.43%
Least Concern (LC) or Lower Risk – least concern	182	53.69%
	Total = 339	

Chart 6e: Conservation status of species with a population status that needs updating not included in Appendix I

Critically Endangered (CR)	6	11.54%
Endangered (EN)	2	3.85%
Vulnerable (VU)	16	30.77%
Lower Risk – conservation dependent (LR/cd)	6	11.54%
Near Threatened (NT) or Lower Risk – near threatened (LR/nt)	6	11.54%
Data Deficient (DD)	2	3.85%
Least Concern (LC) or Lower Risk – least concern	14	26.92%
	Total = 52	