

# From the Galapagos to Tongariro: recognizing and saving the most important places in the world

---

*Professor Alexander Gillespie*  
*School of Law, University of Waikato*

## INTRODUCTION

Protected areas are one of the less glamorous areas of international environmental law. They are commonly overshadowed by what are perceived as much more dramatic topics, which capture the public attention to a much greater degree.<sup>1</sup> This is a highly ironic situation for three reasons. First, because protected areas are the foremost methods by which species and ecosystems are effectively preserved. Second, because protected areas are tangible, and are not merely theoretical constructs. Third, the obligation to create protected areas is one of the most long-standing goals in numerous environmental treaties. For a long time this goal was not tied to any specific outcomes, and the numbers of protected areas grew slowly. However, in the new century, due to an increased recognition of the above considerations, the international community has not only reiterated the goal to create more protected areas, they also set targets of what they want to achieve. The international interest in this area can be seen with a number of examples, such as marine protected areas and transboundary protected areas. Collectively, such support has led to the creation, in total, of over 102,000 protected areas spread over the Earth.

However, despite the laudable intentions of this goal, and the success to date, fundamental gaps exist in the over-riding thinking of how new goals to further increase the numbers and types of protected areas, are to be achieved. These gaps are primarily due to a number of thematic gaps in the international architecture, designed to protect the Earth's ecology. That is, certain key ecological areas, although noted in passing in a number of existing protected areas treaties are not necessarily central concerns. Moreover, in the specific agreements which have the knowledge and capacity to specifically cover such topics as forests, coral reefs, mountains or deserts, the machinery to create and enhance protected areas is missing.

Given that the problems of the gaps in the architecture will (if ever) take years to solve, a number of international organizations have begun to prioritise what areas they should be seeking to protect via working out where the current gaps are, by using, inter alia, inventories, comparative and thematic analysis. Despite the utilization of tentative lists and comparative and thematic analysis, it is not always clear what the primary conservation objectives should be, as there are a number of different approaches to consider and exactly what and where the priority areas are is a matter of debate between four different (but often overlapping) schemas. These schemas are the Udvardy system, the Global 200, Species Focused Approaches, and Hotspots. Although these schemas are all commendable, it is necessary to note that they are not all seeking to conserve the same areas. Nevertheless, given that the differences between are philosophical in their priority setting, it is not necessary to try to select which one is best. Rather, until the thematic gaps in the international legal architecture are filled by meaningful instruments which can directly list protected areas by specific type, the schemas should be fully utilised by the existing protected areas regimes, as the best way to prioritise what needs areas need to be saved, and thereby meet the goals that the international community has set itself.

Part II of this article discusses the historical progression of the obligation

to create protected areas, with a focus on marine protected areas and transboundary protected areas. Part III explores the thematic gaps in the current international system for protected areas in the context of marine, forest, dryland, and mountainous areas. Finally, Part IV examines the four different schemas and how each can be utilized to identify priority areas and meet international goals in spite of the current deficiencies in the system.

### **THE OBLIGATION TO CREATE PROTECTED AREAS**

The current international initiatives to increase the numbers and types of protected areas, and enhance their status and management domestically, regionally and internationally are not new. This obligation is both long standing in both general and specific contexts. For example, the 1933 *African Convention*, (and its 1968<sup>2</sup> and 2003 successors)<sup>3</sup> obliged its Parties to, "explore forthwith the possibility of establishing in their territories national parks and strict natural reserves"<sup>5</sup> in Africa. This was especially so for the benefit of endangered species.<sup>o</sup> The 1940 *Western Hemisphere Convention* had a very similar obligation.<sup>l</sup> This obligation is both long standing in both general and specific contexts.

Variations on this obligation (as opposed to the option) existed with the early treaties which were species specific. The first notable occurrence where habitat was protected, so as to protect the targeted species, was the 1911 *Convention Between the United States, Great Britain, Russia and Japan for the Preservation and Protection of Fur Seals.*<sup>l</sup> This approach was adopted with a number of other early species specific agreements, such as those related to the protection of certain birds and their associated habitats:<sup>4</sup> as well as a later collection of species specific agreements ranging from Vicuna<sup>10</sup> to sea turtles<sup>11</sup> and whales.<sup>12</sup>

Despite this relatively early success of international law in furthering the creation of protected areas, from an early point, momentum was building for the creation of more protected areas. For example, the second recommendation from the First World Congress on Protected Areas in 1962 called for the creation of:

A series of natural reserves providing permanent examples of the many diverse types of habitats, both natural and semi-natural, so as to preserve them permanently for world science.<sup>13</sup>

The Conference went on to argue for the creation of an official world list for each, "bio-climatic region ... of the most representative habitats" so that such habitats may be, "selected and legally established at an early date".<sup>14</sup> The first truly international response to these calls was the 1968 UNESCO Conference on the Use and Conservation of the Biosphere. From this conference, the MAB program originated as a response to the recommendation that, inter alia, Member states accelerate the establishment and development of national parks and wildlife sanctuaries.<sup>15</sup>

Three years later in 1971, the *Ramsar Convention* was concluded, so as to prevent the "irreparable loss" of wetlands<sup>16</sup> "by combining far-sighted national policies with co-ordinated international action"<sup>17</sup> through which the Parties agreed to, "promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands".<sup>18</sup> In furtherance of this objective, aside the obligation upon all Parties to designate at least one wetland when acceding to the Convention,<sup>19</sup> and broad invitations to all Parties to increase the designation of their wetlands to the List of Wetlands of International Importance,<sup>20</sup> the Parties have set themselves the goal of possessing 2,500 sites encompassing 250 million hectares by 2010 (they had 1,555 in 2005).<sup>21,22</sup> The Ramsar Parties have also directed resolutions to specific Parties, encouraging them to recognise wetlands of international importance within their borders, and the need to specifically conserve them.<sup>23</sup>

The MAB and the *Ramsar* did not sate the international appetite for more protected areas, and the 1972 *United Nations Conference on the Human Environment*, in calling for all natural resources to be safeguarded,<sup>24</sup> specifically added in Recommendation 38 that, "Governments take steps to set aside areas representing ecosystems of international significance for protection under international agreement". This point from Stockholm was picked up by the 1972 Second World Congress on Protected Areas which called:

It is upon all governments to widen the coverage of their protected areas so as to ensure that adequate and representative samples of natural biomes and ecosystems throughout the world are conserved in a coordinated system of national parks and related protected areas.<sup>25</sup>

The response of the international community to these recommendations was the creation of the *World Heritage Convention* in 1972, and two habitat related conventions in 1979. The international community's desire to create more protected areas appeared to be in full swing.

The *World Heritage Convention* ("*WHC*") is just that — a convention designed to protect the World's outstanding Heritage. The World's Heritage is that related to humanities, "creative [cultural] genius and of the rich resources of nature".<sup>26</sup> Together, these categories encompass many non--tangible universal values<sup>27</sup> that belong to all peoples. The emphasis is upon the *world's* heritage. That is, the Convention works on the principle that, "each and every country has a contribution to make" and collectively, all the heritage of all nations, "together forms the patrimony of mankind".<sup>28</sup> Such heritage of, "outstanding interest" needs, "to be preserved as part of the world heritage of mankind as a whole".<sup>29</sup> Despite clearly being sovereign property, some view this patrimony as a type of, "global commons".<sup>30</sup> As part of the patrimony of humankind or global commons of value to all humanity, the heritage must be safeguarded for future generations.<sup>31</sup> To allow otherwise, whereby the heritage is destroyed, is deemed, "a harmful impoverishment of the heritage

of all the nations of the world".<sup>32</sup> As such, all Parties shall seek to, "safeguard this unique and irreplaceable property, to whatever people it may belong".<sup>33</sup> Accordingly, the WHC exists in a continual momentum for the discovery and listing of sites of outstanding universal value.

The 1979 *Convention on Migratory Species* obliged all of its Parties to, "endeavour to conserve, and where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction".<sup>34</sup> This obligation has also been transferred to all of the subsidiary CMS Agreements.<sup>35</sup> Accordingly, obligations to create protected areas with regard to specific Agreements on particular migratory species can be found for Albatross and Petrels;<sup>36</sup> Wadden Sea Seals;<sup>37</sup> African-Eurasian Migratory Birds;<sup>38</sup> Small Cetaceans of the Baltic and the North Seas; <sup>39</sup> Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area;<sup>40</sup> and European Bats.<sup>41</sup> Similar obligations exist within the CMS Memorandum of Understandings for the Great Bustard,<sup>42</sup> the Slender billed Curlew,<sup>43</sup> the Siberian Crane<sup>44</sup> and the Aquatic Warbler.<sup>45</sup>

The CMS, like the WHC, acted as a strong response to the action taken at the Second World Congress on Protected Areas. In a similar vein, *Convention on the Conservation of European Wildlife and Natural Habitats* (the Bern Convention) was built on the recognition that the conservation of natural habitats is a vital component of the protection and conservation of wild flora and fauna.<sup>46</sup> Each Contracting Party agreed under the Bern Convention, (and the related European Diploma,<sup>47</sup> and Emerald Network)<sup>48</sup> to take appropriate national policies, including necessary legislative and administrative measures to ensure the conservation of the habitats<sup>49</sup> of the wild flora and fauna species, and especially that which was endangered, vulnerable and/or migratory.<sup>50</sup> In furtherance of this goal, the Parties have identified, both critical habitat types and the habitats of key species in need of protection.<sup>51</sup>

Despite the fact that clear progress in the facilitation of the creation of

protected areas was taking place throughout the 1970s, the third World Congress on Protected Areas nevertheless, called upon governments to:

Give high priority to the fulfillment of the ecological representiveness of their terrestrial protected areas systems by establishing new ones areas or enlarging existing ones.<sup>52</sup>

Five years later, the *World Commission on Environment and Development* ("WCED"), introduced a novel idea. This idea was that of a target of how much protected areas should be sought. Specifically, although the WCED noted that the number of protected areas was growing, nevertheless:

A consensus of professional opinion suggests that the total expanse of protected areas needs to be at least tripled if it is to constitute a representative example of the Earth's ecosystems. There is still time to save species and their ecosystems. It is an indispensable prerequisite for sustainable development,<sup>53</sup>

The next major response of the international community to these types of recommendation came at the 1992 *Earth Summit*. However, one year before then, the 1991 *Madrid Protocol*, building on a long established practice for the South Pole,<sup>54</sup> came to oblige its signatories to protect Antarctica as, "a natural reserve, devoted to peace and science" and effectively turned the location into one giant protected area. Building on from such momentum, the importance of protected areas was entrenched at the 1992 *Earth Summit*, in both *Agenda 21* and the *Convention on Biological Diversity*. In the first instance, *Agenda 21* iterated the importance of protected areas with regards to the conservation of forests,<sup>56</sup> mountains,<sup>57</sup> and biodiversity.<sup>58</sup> In the second instance, the most important document to evolve from the 1992 *Earth Summit* to deal with protected areas was the *Convention on Biological Diversity* ("CBD"). Article 8 of the CBD obliged each Contracting Party, "as far as possible and as appropriate" to:

- (a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
- (b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity.

The ultimate aim of the CBD is, "the establishment and maintenance of an effectively managed, ecologically representative global system of protected area networks where human activities are managed to maintain the structure and functioning of the full range of ecosystems, in order to provide benefits to both present and future generations and to achieve a significant reduction in the rate of biological diversity loss".<sup>59</sup> In large part, this CBD objective is due to their conclusion that the creation and maintenance of protected areas are "essential" in meeting all of the broad objectives of the CBD, the 2010 target (to significantly reduce the rate of biodiversity loss) from the *World Summit on Sustainable Development* and the attainment of the *Millennium Development Goals*.<sup>60</sup> To achieve these goals, protected areas became incorporated within many of the thematic areas of the Convention, as well as becoming a central stand alone item on the CBD agenda, which is supplemented by active working groups.<sup>61</sup>

Following the paths set by the WCED and the 1992 *Earth Summit*, the fifth World Congress on protected areas in 2004 broke the pattern of earlier Congresses in that it was laden with targets. The idea of targets for development in general, and sustainable development in particular, although clearly part of the international architecture dating back to the WCED, received a huge boost with the United Nation's *Millennium Development Goals*, and goal seven in particular of seeking to achieve environmental sustainability by, inter alia, integrating the principles of sustainable development into country policies and programmes, whilst also seeking to reverse the loss of environmental resources. Soon after, the idea of targets began to filter in a number of Multilateral Environmental Agreements, With

specific regard to protected areas, a number of established conventions began to adopt soft targets.<sup>62</sup> This theme of targets for protected areas was strongly replicated with the Fifth World Parks Congress. This Congress called for governments and appropriate international organizations to:

Maximize representation and persistence of biodiversity in comprehensive protected area networks in all ecoregions by 2012, focusing especially on threatened and under-exploited ecosystems and those species that qualify as globally threatened with extinction.<sup>63</sup>

As a series of subsidiary targets, the Congress called for all globally threatened species to be effectively conserved in-situ with the following immediate targets:

- A. All Critically Endangered and Endangered Species globally confined to single sites are effectively conserved in situ by 2006.
- B. All other globally Critically Endangered and Endangered Species are effectively conserved in situ by 2008.
- C. All other globally threatened species are effectively conserved in situ by 2010.
- D. Sites that support internationally important populations of restricted range species are adequately conserved by 2010.

They also called for "viable representations of every terrestrial, freshwater and marine ecosystems" within protected areas with the following immediate targets:

- A. A common global framework for classifying and assessing the status of ecosystems established by 2006.
- B. Quantitative targets for each ecosystem type identified by 2008.
- C. Viable representation of every threatened or under protected ecosystem conserved by 2010.<sup>64</sup>

Finally, the Congress called for, "a representative network of marine protected

areas by 2012, as stated in the WSSD plan of implementation".<sup>65</sup> By the time of the 7<sup>th</sup> COP of the CBD in 2004, the above targets of the Fifth World Parks Congress, were being supplemented by the proposals of the working group on protected areas. The most controversial of these proposals, relating to the imposition of clear targets and timetables for the creation of more protected areas had been thoroughly square bracketed.<sup>66</sup> Nevertheless, after some lengthy negotiations, broad targets (subject to national priorities) were agreed.<sup>67</sup> These were:

The establishment and maintenance by 2010 for terrestrial and by 2012 for marine areas of comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas that collectively, inter alia through a global network/ contribute to achieving the three objectives of the Convention and the 2010 target to significantly reduce the current rate of biodiversity loss.<sup>68</sup>

Within this broad target, a series of subsidiary targets were agreed. These include, "as a matter of urgency" by 2006 "take action to establish or expand protected areas in any large, intact or relatively un-fragmented or highly irreplaceable natural areas, or areas under high threat, as well as areas securing the most threatened species in the context of national priorities, and taking into consideration the conservation needs of migratory species". The 2010 target was also supplemented with gap analysis for representative systems by 2006, integration of these into broad sustainable development strategies by 2008, and designation of protected areas by 2009.<sup>69</sup>

### **Two examples of the facilitation of growth areas: marine protected areas and trans-boundary protected areas**

A good example of the growing obligation to create protected area is with Marine Protected Areas ("MPAs"). The international recognition of this

obligation can be traced to the First World Conference on National Parks in 1962, which invited all governments with marine frontiers:

To examine as a matter of urgency the possibility of creating marine parks or reserves to defend underwater areas of special significance from all forms of human interference,<sup>70</sup>

The necessity for direct action in this area was reiterated at the World Congress on protected areas in 1972,<sup>71</sup> 1982,<sup>72</sup> and 1994. These calls were supplemented by similar recommendations from notable and powerful national and international commissions,<sup>73</sup> soft international law,<sup>74</sup> and a large number of regional seas agreements covering, inter alia, the Mediterranean, the Caribbean, East Africa, the South East Pacific, and the North Atlantic.<sup>75</sup> Against this background, the Fifth World Parks Congress in 2002 suggested, targets for this area,<sup>76</sup> and the CBD, after long recognising the value of MPAs,<sup>77</sup> called for:

The establishment and maintenance ... by 2012 for marine areas of comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas that collectively, inter alia through a global network/ contribute to achieving the three objectives of the Convention and the 2010 target to significantly reduce the current rate of biodiversity loss.<sup>78</sup>

This goal was supplemented with the suggestion, that such coverage should include marine ecosystems beyond areas of national jurisdiction in accordance with applicable international law.<sup>79</sup> This decision from the CBD was consistent with the WSSD goals in this area.<sup>80</sup> However, exactly how the high seas MPAS ("HSMPAs") are to be achieved, despite clear advocacy for them," and tacit support for them within the CBD," is less than clear.<sup>83</sup>

A second example of the success of the growth of protected areas is with Transboundary Protected Areas ("TBPAs"). By 2003, there were 169 TBPAs,

involving 666 individual protected areas in 113 countries. Together, these sites represent at least 10% of all the world's protected areas.<sup>84</sup> These numbers did not develop quickly. Rather, they represent the culmination of over seventy years international co-operation, that began in 1932.<sup>85</sup> Since that point, the utility of TBPA's has been consistently advocated in the World Parks Congresses,<sup>86,87</sup> and a number of soft law documents of international environmental law.<sup>88</sup> It has also been strongly mooted by the CBD,<sup>89</sup> as well as by a number of international regimes. Most notably, the MAB,<sup>90</sup> the WHC<sup>91</sup> (which actively encourages TBPA's)<sup>92</sup> and Ramsar<sup>93</sup> (which also directs Parties to cooperate in this matter).<sup>94</sup> Even the Global Environment Facility<sup>95</sup> (with 29 TBPA's under its auspice),<sup>96</sup> and the International Timber Trade Organisation ("ITTO") is also notable in this context, despite having no explicit mandate to further protected areas. Nevertheless, it has become actively involved of the support of a number of TBPA forest sites.<sup>97</sup> TBPA's, thus, have grown as a result of persistent efforts, over time, by a number of international regimes for protected areas.

#### The number of protected areas

In 1958, the International Union for the Conservation of Nature ("IUCN") proposed that an international list be established which contained all of the world's protected areas. Soon after, the Economic and Social Council of the United Nations, requested the Secretary General to establish, "a list of national parks and equivalent reserves, with a brief description of each".<sup>98</sup> Since this point, an international inventory has been produced every ten years, showing exactly how many protected areas are in existence. The overall number has grown from just over 1,000 in 1962,<sup>99</sup> to 1,204 in 1971,<sup>100</sup> 2,671 in 1982,<sup>101</sup> to 12,754 in 1997. By 2003, the numbers had increased to a remarkable 102,102 protected areas.<sup>102</sup> The 2003 figure is the equivalent to 12.65 of the Earth's land surface. If marine protected areas were included in the calculation, 18.8 million kilometres of the Earth fall within protected areas. If marine protected areas are excluded from these calculations, the terrestrial extent of protected

areas is some 17.1 million kilometres (11.5% of the land surface). This is almost the same as the entire continent of South America.<sup>103</sup>

Aside the generic figures included in the United Nations list of protected areas, it is also possible to note that a number of these are internationally recognised sites. The 2003 list included 4,633 internationally designated sites. Within these low thousands, a number of sites are particularly notable. The first set of noticeable sites comes from the WHC. This Convention has seen its numbers (of natural and cultural sites) go from 12 in 1978, to 754 listed sites in 125 State parties in 2005. Of these, 582 were inscribed as cultural properties, 149 as natural sites and 23 as mixed properties.<sup>104</sup> MAB sites have increased from 56 in 1976 to to 459 sites in 97 countries in 2005.<sup>105</sup> As of 2005, there were 1525 wetland sites, totalling 129.5 million hectares. In the Antarctic, there are 2741 square kilometres, of protected areas.<sup>106</sup> By 2005, there were 64 areas in receipt of the European Diploma.<sup>107</sup> The International Maritime Organisation also has a collection of notable areas under international protection.<sup>108</sup>

### **The sheer number of internationally recognized sites illustrates gaps in the progress of the obligation to create a protected areas system**

In order to understand how the system of treaties came into being, it is important to examine the historical progression of the obligation to create protected areas. But, to understand how the system for protected areas exists in its present state and identify gaps in the current system, one must engage in a comprehensive thematic analysis.

Although the sheer numbers of protected areas is, without doubt, impressive, the numbers are deceptive, for as the CBD noted, "existing systems of protected areas are neither representative of the world's ecosystems, nor do they adequately address conservation of critical habitat types, biomes and

threatened species".<sup>109</sup> With regard to species threatened with extinction, more than 1,300 species of mammals, amphibians and threatened birds not represented in any protected areas.<sup>110</sup> Similar problems exist with threatened or endangered plant species. For example, in Eastern Europe of the 796 important areas identified as containing threatened or endangered plant life, 170 had no legal protection.<sup>111</sup> Likewise, with regard to ecosystems by type, although some ecosystems are well represented in protected area figures, such as with tropical humid forests (with a total of 23% coverage) subtropical forests (16.9% coverage) and mixed island ecosystems, (29.7% coverage), other ecosystems, such as temperate grasslands (with only 4.59% protected area coverage of the total known area) or lake systems (at only 1.54% coverage) are vastly underrepresented. Even within areas that appear well represented, the figures may be deceptive. For example, with over 17% of the Arctic landmass under formal protection, it may seem that the level of the protection of the Arctic is adequate. However, this statistic is problematic, as it disguises the very low protection afforded to the marine environment. It also discounts the fact that if the nearly one million kilometre Greenland national park is removed, the percentage drops by half.<sup>112</sup> Or, if looking at the figures for protected areas in the Antarctic (a tiny 0.008% of the total land area) of the sites which are protected, these are located in two clusters, on the fringes of the Antarctic, with no sites a significant distance inland. Likewise, there is a complete absence of protected areas within Marie Byrd Land in western Antarctica.<sup>113</sup> Even within relatively successful regimes such as Ramsar, sites tend to be concentrated in certain regions, and of certain wetland types, much to detriment of other possible areas.<sup>114</sup> For example, out of 1180 Ramsar sites listed at the end of 2002, only 70 were temporary pools.<sup>115</sup> One of the best ways of looking at the problem of under, and over-representation of types of protected areas, is by looking at them thematically, in terms of ecosystem type. In this regard, marine, forest, drylands and mountainous areas are divisible categories.

## THEMATIC GAPS

### Marine

The problem of vast areas without adequate representative coverage, is particularly obvious with MPAs, in that about only one fifth of all marine biogeographic types identified are encompassed within MPAs.<sup>116</sup> This is not surprising in that although the international protected areas network now covers about 11 per cent of Earth's land surface, less than 1 per cent of the Earth's marine area is covered. As such, marine and coastal ecosystems are severely under-represented as protected areas, and the existing MPAs only protect a very small proportion of marine and coastal environments globally. Consequently, the existing MPAs make a relatively small contribution to the overall sustainable management of marine and coastal biodiversity.<sup>117</sup> Moreover, the MPAs that do exist provide a very slanted picture. This is because of the 1.6 million kilometres attributed to MPAs, a few overtly large MPAs make up the lion's share of this figure (with the difference between the mean size of an MPAs being 100,000 hectares, whilst the median size is 1,584 hectares.<sup>118</sup> The other caveat in the MPA discussion, is that MPAs tend to be disproportionately represented in only certain parts of the world. For example, as of 2004, of the 20 WHC sites with a marine component, 11 of them were in Oceania/Australasia. Even within a number of relatively progressive international regimes which deal with such questions, such as with the Antarctic regime, the creation of MPAs has proven fraught with difficulty caused by concerns of sovereignty and overlapping international organisations, taking over twenty years to achieve the pitifully small total of only 3 MPAs.<sup>119</sup>

This problem is particularly obvious with certain, key oceanic ecosystems, such as coral reefs.<sup>120</sup> These ecosystems are important because, inter alia, globally, nearly two thirds of all fish harvest ultimately depend on the health of them.<sup>121</sup> Coral reefs, (including both cold and warm water corals), in particular, are

the forests of the ocean. They have vast economic, cultural and ecological importance. On the last factor alone, although coral reefs occupy less than one quarter of 1% of the marine environment, coral reefs are home to more than a quarter of all known marine fish species and cumulatively they may hold close to 1 million species (although only 93,000 are known).<sup>122</sup>

Despite coral reefs being the hotspots of marine biodiversity, only slightly more than 400 MPAs contain them. Moreover, despite being identifiable within the listings of the WHC, MAB, *Ramsar* and the IMO,<sup>123</sup> this critical subset of marine biodiversity is largely invisible as a particular theme for protected areas. Indeed, at the turn of the century, at least 40 countries lacked any marine protected areas for conserving their coral reef ecosystems.<sup>124</sup> Although the MAB, the WHC, and most notably *Ramsar* have recognised the category, as a subset within other areas of their overall work,<sup>125</sup> the only international body which explicitly deals with coral reefs, the International Coral Reef Initiative ("ICRI"),<sup>126</sup> despite voicing the importance of MPAs encompassing coral reefs, has no power to designate such areas.<sup>127</sup>

## **Forests**

Forests are an obvious choice as protected areas as natural forests are typically, strong repositories for biodiversity, with great cultural, economic and ecological importance. This common-sense realization is part of the reason why forests are, on the whole, relatively well protected. Indeed, the Global Forest Resource Assessment by the Food and Agricultural Organisation in the year 2000 estimated that around 12% of the world's forests are included in IUCN protected areas categories.<sup>128</sup> This is not surprising as of the year 2000, 22 countries had already pledged to protect a minimum of 10% of their forests.<sup>129</sup> Central America, South America, Eastern and Southern Africa, Australia and New Zealand have 25% or more of their forests within some kind of protected area. However, not all categories of forest have the

same level of protection, and their situation is hidden beneath the generic figure.<sup>130</sup> For example, forests in North Africa and the Middle East and in the Pacific are particularly poorly protected with less than 5% of their area within protected areas. Freshwater swamp forests in both tropical and temperate regions, mixed needle-leaved and broad-leaved forests in tropical regions and sub-tropical thorn and sclerophyllous dry forests are also, in general, poorly protected.<sup>131</sup>

The recognition that forests should be prime candidates to be made into protected areas dates back to Second World Conference on National Parks in 1972.<sup>132</sup> This goal was reiterated in 1982,<sup>133</sup> and the considerably watered down<sup>134</sup> 1992 *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests*:<sup>135</sup> Agenda 21 has emphasised the importance of enhanced protected forest areas,<sup>136</sup> as has the CBD,<sup>137</sup> and the GEE The GEF being particularly notable due to its economic support for a number of notable forest protected areas, such as the Amazon Region Protected Areas programme which aims to incorporate and additional 25 million hectares to reach the goal of 37 million hectares under protection. This would triple the existing extent of Brazil's protected areas by 2012, to an area the size of Spain.<sup>138</sup>

Despite the utility of the above processes, the only driving processes in the international community, aside some thematic studies in the WHC,<sup>139</sup> which could effectively facilitate the establishment, expansion and management of forest protected areas, by virtue of the fact that they are forests, is either the Montreal Process, or the ITTO. Of these two, only the latter, is a formal international organization, with real possibilities in this area. The former, being largely driven by the development of sustainability indicators, of which protected areas are but one factor.<sup>140</sup> Although the 1110, also utilizes indicators, with an overlap into protected areas,<sup>141</sup> the ITTO has actually gone a little further in the promotion of protected areas. This is despite the fact that although the primary instrument in this area, the *International Tropical Timber Agreement*,<sup>142</sup> places a strong emphasis

upon "sustainability", no mention of protected areas is present in the document. The only mention of protected areas, in the high level documents, appears in the 2002 to 2006 ITTO *Action Plan*, under which the Parties pledged themselves to maintain the integrity of the resource base, including protected area networks.<sup>143</sup> Since this point, the ITTO has assisted its member countries in setting aside and managing totally protected areas. Despite this support, the critical point to note is that the ITTO does not nominate, evaluate or list these protected areas and their individual worth for its own purposes. Rather, it only supports its members' decisions in this area.

In many ways, the failure of the international community to develop a specific mechanism that could encompass forest protected areas, is a reflection of their larger failure to develop an effective and overall international forestry convention. Accordingly, despite a near universal recognition that forests make wonderful candidates as protected areas, as it stands, forest protected areas remain tangential to the Montreal Process, only within a discussion forum of the CBD, and only in the margins of the ITTO. The problem in this instance can be best demonstrated by the collapse of the United Nations Forest Forum in 2005. One of the few things that all of the participants could agree, was calling upon all countries to significantly increase the area of protected forests and sustainably managed forests.<sup>144</sup> However, as the UNFF collapsed, the only mechanisms left to achieve this goal were the Montreal Process, the CBD and the ITTO. Without an international forestry convention or a similar mechanism, therefore, gaps in forest protection will continue to plague the international system of protected areas.

### **Mountains**

Mountain environments cover 27% of the world's land surface, and host about 12% of the Earth's human populations. Lowland people also depend on mountain environments for a wide range of goods and services, including

water, food, timber and biodiversity. Mountains are also increasingly fragile, due to being under multiple anthropogenic threats.<sup>145</sup> Accordingly, the conservation of mountain biodiversity and its linkage with protected areas was iterated at the WSSD,<sup>146</sup> the CBD,<sup>147</sup> Agenda 21,<sup>148</sup> and the World Parks Congress.<sup>149</sup> However, aside some GEF support for this area, (one third of GEF sponsored protected area assistance goes to mountain areas, encompassing 107 projects in 64 countries),<sup>150</sup> and some tangential focusing on mountains within the MAB,<sup>151</sup> WHC,<sup>152</sup> and *Ramsar*<sup>153</sup> there is no specific, over-riding body directing work in this area. This is all the more disappointing given that there are a number of regional instruments which are specifically focused on the conservation of certain mountain ecosystems, such as such as the *Alpine Convention*<sup>154</sup> and the *Carpathian Convention*.<sup>155</sup> However, once more, protected areas are but a small subset within a much larger sustainable management agenda, and there is no direct regional or international guidance or law by which protected areas in mountainous regions can be facilitated.

### **Drylands, Arid, Semi-arid, Grassland and Savannah Ecosystems**

Natural grasslands and savannahs host very distinctive plant and animal communities where diversity tends to increase towards the tropics. All these systems hold an array of native herbivores, and these, in turn, can support a high profile of mammals and avian predators. The savannah communities of East Africa, for example, are typified by large herds of ungulate herbivores including more than 70 species of antelope and other medium to large sized bovids. At very fine spatial scales, natural grasslands can be among the most species rich habitats on Earth. Up to 80 plant species have been identified in a square meter in the Central Asian Steppe, and 42 plant species in a quarter of a square meter in pine Savannah on the US Atlantic coastal plain. Even deserts, which are not normally associated with biodiversity, can have highly unique species within them. Collectively, summary analysis of global habitat distribution of globally threatened mammals and birds shows that drylands,

scrublands and grasslands make up the second most important group of threatened species of mammals, and a high proportion of continental species known to have become extinct since 1600, occurred in dry land ecosystems.<sup>156</sup>

Due to such considerations, the CBD in its discussions on these areas has recommended the importance of, inter alia, protected areas as part of the strategy to combat biodiversity loss." Despite such recommendations, the primary international instrument in this area the United Nations *Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa* ("CCD"), although developing a series of ways to combat desertification, and protect both human communities and non-human biodiversity," has been largely silent on the utilization or value of protected areas. The only other convention which has dealt with a small category of grasslands (those which are wet) in passing, has been *Ramsar*.<sup>159</sup>

### **Identifying priority areas to meet international goals**

Due to the multifaceted problems noted above, it has been suggested that, there is an urgent need to take action to improve the coverage and representativeness of protected areas nationally, regionally and globally.<sup>160</sup> However, recognition of this problem is easier to articulate, than developing an approach to solve it by which all countries, let alone those seeking to establish protected areas, can agree. Indeed, it *is* not always clear what the primary conservation objectives should be, as there are a number of different approaches to consider. Moreover, these different approaches often conflict. This particular problem is inflamed by the difficulties of limited resources and near unlimited demand. Accordingly, it has become increasingly necessary to seek prioritise what areas should be at the forefront of conservation efforts.<sup>161</sup> A number of conventions have already started this process, with the development of strategies and inventories, designed to help select key areas which they could come to protect. Although the process of comparative and thematic analysis (whereby

sites are put forward on tentative lists, and broadly compared) is made use, as a gap-analysis tool by, inter alia, the CBD,<sup>162</sup> the *Bern Convention*,<sup>163</sup> and Ramsar,<sup>164</sup> it is most notable with the WHC and with its extensive emphasis upon tentative lists, and comparative and thematic analysis.<sup>165</sup>

## SELECTING PRIORITIES

Despite the utilization of tentative lists and comparative and thematic analysis, it is not always clear what the primary conservation objectives should be, as there are a number of different approaches to consider and exactly what and where the priority areas are is a matter of debate between four different (but often overlapping) schemas. These schemas are the Udvardy system, the Global 200, Species Focused Approaches, and Hotspots. To one degree or another, most regimes interested in protected areas utilize one or more of these schemas. For example, the GEF focuses on globally significant and representative ecosystems, including protected areas within the Global 200 (140 GEF projects covering 761 protected areas) and Hotspots (112 projects covering 606 protected areas)<sup>166</sup> lists. The schemas, which will be addressed individually below, will enable the international community to meet goals for protected areas in spite of the current gaps in the system.

### The Udvardy System

In 1975, the Udvardy biogeographical system was unveiled. This was the first unified system that classified the natural ecosystems of the world in biogeographical realms, and the further divided them into biomes and showed their geographic distribution. At the top level, eight large Biogeographical Realms<sup>167</sup> which are continent or sub-continent sized areas with geography and fauna/flora/vegetation were recognised, These were subdivided into 14

biomes.<sup>168</sup> Biomes are groups of ecosystems that are related, and which show similarity in both appearance and internal structure, due to being influenced by the same climate, soil conditions and elevational conditions. Finally, they were divided into the last category of 193 (later reanalyzed as 227)<sup>169</sup> biogeographical provinces, which approximately correspond to floristic regions of botanists and the faunal provinces of zoologists. Although this classification has some obvious limitations, such as overall bluntness, its restriction to only terrestrial considerations<sup>170</sup> and focusing predominantly on vegetational components (with limited recognition of the species in them), it has the merit of being able to clearly identify the different biogeographical provinces of the Earth, and then accord them protection within appropriate protected area regimes. In this regard, the approach has clearly been successful. For example, all of Udvary's Biomes are contained within some WFIC Sites (with the most common being the 32 mountain systems, 26 tropical humid and 25 tropical dry forests) except with the biogeographical provinces recognised as cold winter deserts. Cold winter deserts, tundra and polar systems, and temperate grasslands (as of 2004 there are only four of each) are the least common biome classifications.<sup>171</sup>

### **The Global 200**

The "Global 200" is the mechanism of the World Wildlife Fund ("WWF"), and it has been actively touted at the WHC.<sup>172</sup> This mechanism seeks to answer many of the possible deficiencies of the Udvary system, as it covers marine areas, incorporates a much greater degree of weight towards biodiversity considerations within the biomes, and provides the clear objective of the protection of major habitat types ("eco-regions"), and not just individual species or hotspots of diversity.

The Global 200 mechanism is predicated upon an analysis of the eco-regions representing the Earth's 30 terrestrial, freshwater and marine major habitat types. An eco-region is defined as a relatively large unit of land or water

containing a characteristic set of natural communities that share a large majority of their species, dynamics and evolutionary conditions. This was further divided by Major Habitat Type ("MHT"). MHTs describe different areas of the world which share similar environmental conditions, habitat structure and patterns of biological complexity and that contain communities with similar guild structures and adaptations. MHT classifications are roughly equivalent to biomes. Each MHT was further subdivided by biogeographical realm (e.g. Nearctic, Indian Ocean) in order to represent the unique flora and fauna in each area. This resulted in a collection of 867 "ecoregions".

The ecoregions were then analysed in terms of their species richness, endemic nature, higher taxonomic uniqueness (unique genera, relict species etc), extra-ordinary ecological or evolutionary phenomena (e.g. adaptive radiations, intact large assemblages, presence of migrations of large vertebrates). Notably, the rich and endemic nature of species, is not the sole defining characteristics, as a number of "sparse" eco-regions (such as some boreal forests, tundra, and some ecoregions in very dry conditions) do not have high biodiversity counts in these regards. Accordingly, the enhanced emphasis was also given to "extra-ordinary ecological phenomena" (i.e. ecosystem rarity) and "unusual evolutionary phenomena" (such as uniquely adapted species to key environments). The most biologically outstanding of the 867 ecoregions – which were whittled down to 238 ecoregions – that deserve the most urgent conservation attention are referred to as the "Global 200". These 238 regions (the so called Global 200) are comprised of 142 terrestrial, 53 freshwater and 43 marine ecoregions.<sup>173</sup>

This clear list gives the benefit of being able to present a comprehensive strategy for conserving global biodiversity, that focuses not only on the obvious areas (such as tropical forests) but also the other distinctive ecosystems of the world (from tundra, grasslands, lakes, polar seas, mangroves etc) that hold the rest of the world's biodiversity. The Global 200 thesis is that all such ecosystems and habitat types need to be represented within meaningful conservation strategies.

This is especially so as some of these major habitat types (i.e. biomes) such as tropical dry forests and Mediterranean climate shrublands, are on average more threatened than are tropical moist forests and require immediate conservation action, as they are not within any protected area regime.<sup>174</sup> For example, fifty terrestrial Global 200 ecoregions are not in any WHC site, nor are 18 marine global 200 ecoregions.<sup>175</sup>

### **Species Focused Approaches**

An idea that falls between the need to protect habitats and key species, is that with regard to identifying key habitat which is necessary to protect, so as to conserve the biodiversity that rely upon that habitat. This focus may be upon individual species, biodiversity in general, or species threatened with extinction. The latter is a particularly common articulation of this approach given the clear links that can be made between species survival and habitat loss. Indeed in late 2005, an international team of scientists identified almost 600 sites around the world as "zones of imminent extinction". Each site contained at least one endangered species which lived no-where else. Of the 794 "trigger species" 408 are amphibians, 217 are birds and 131 are mammals.<sup>176</sup> Although these figures are new, the recognition of this approach is not, as this is one of the most well known and long-standing orientation strategies for protected areas,<sup>177</sup> and is well utilised within the CMS and *Bern* Conventions, and a secondary theme with regards to *Ramsar*.

A species focused approach is also partly replicated in the IUCN/Species Survival Global Habitat Classification. This system is derived from calculations involved in the protection of the necessary habitat for species which are endangered, and listed on the IUCN Red List. These divide into a three level hierarchical system. The first level consists of 15 broad habitat categories. Of these, 11 subdivide into 78 second level habitat types, which are further subdivided into 154 third level categories. Within these divisions,

it is possible to show that some first habitat sites are more protected in international protected area systems (such as forests in and wetlands). Conversely, the seven types of shrub-land are very poorly represented, as is over half (four out of seven) of all grassland types. Finally, marine and coastal habitats have a low occurrence in all continents/regions.

A variation on the above theme was offered by Birdlife International and their recognition of Endemic Bird Areas ("EBAs"). The variation is that one species is alone recognised as the key species linking to a habitat that should be the placed within a protected area. An endemic bird area is defined as:

An area which encompasses the overlapping breeding ranges of restricted range bird species, such that the complete ranges or two or more restricted range species are entirely included within the boundary of the EBA. This does not necessarily mean that the complete ranges of all of an EBAs restricted range species are entirely included within the boundary of a single EBA, as some species may be shared between EBAs.<sup>178</sup>

These are identified as areas that encompass the breeding ranges of two or more birds whose total breeding is restricted to 50,000 km or less. The biological importance of an EBA is measures by the number of restricted range species occurring in it, and whether they are shared with any other EBAs. Most EBAs support 2-10 restricted bird species. Globally, 218 EBAs have been identified. These 218 EBAs cover approximately 2% of the world's land surface.<sup>179</sup> Despite this relatively small area requiring protection, 144 EBAs are not within WI-1C sites.<sup>180</sup>

The final variant on focusing on key species as the basis for protected areas focuses upon centres of plant diversity ("CPD"). This IUCN/WWF initiative identified 250 priority sites for the global conservation of higher plants.<sup>81</sup> Plants were identified as key species because they are often highly threatened (the estimate is that as many as 60,000 species may become

extinct by 2050, or 1 in 4 plants). Accordingly, the IUCN/WWF initiative identified areas around the world which are of, "the greatest importance for plant conservation".<sup>1a2</sup> Sites were selected on the basis of their botanical richness, geographically defined areas with high species diversity and/or endemism (such as the Atlas mountains), and/or vegetation types which are exceptionally rich and/or endemic (such as the Amazon rain forests). Additional considerations involved how much the site was threatened, the diversity of the habitats within a site, the proportion of species adapted to special edaphic conditions (i.e. limestone) and the potential use of the plants contained.<sup>183</sup> Despite the utility of CPDs, only 20.2% of CPDs occur within WHC sites, while 79.8% do not.<sup>184</sup>

## Hotspots

As noted above, protecting habitats because they are linked to species is not a new idea. However, the divergence from focusing upon individual species, to numbers of species within an area (as a justification for creating protected areas), only fully appeared on the international arena in the early 1980s.<sup>185</sup> By the end of the 1980s, the idea of creating PAs to encompass areas of rich biodiversity (in terms of species numbers) has been considerably refined by Norman Myers<sup>186</sup> and the NGO Conservation International, with the concept of "hotspots". Originally, 25 hotspots were identified, but this number was later taken to 32.<sup>187</sup> This idea has become so influential, that the WSSD called upon all governments to, "effectively conserve and sustainably 'se biodiversity, promote and support initiatives for hot spot areas and other 'las essential for biodiversity".<sup>188</sup>

To make the hotspot list, areas must meet the criteria of endemism and threat. Although these criteria are not necessarily absolutely robust,<sup>189</sup> the yardstick is that with regard to "threat", the area should have 25% or less of its original primary natural vegetation cover remaining intact.<sup>190</sup> The endemism criterion

is that it has to have 0.5% of 300,000 species, or 1,500 endemic vascular plant species (roughly 0.5% of the world total) within its borders. As with the CPD approach, plants were chosen as the qualifiers as they are the basis for diversity for other taxonomic groups. Indeed, the hotspots have a high correlation with endangered species. For example, 57.5% of all mammal species listed as critically endangered or endangered are found within the 25 hotspots. 82.1% of all birds listed as critically endangered, and 81.3% of all birds listed as endangered are also within the 25 identified hotspot sites.<sup>191</sup>

From the analysis derived from the above two considerations, 25 hotspots (plus two mini hotspots — the Galapagos and the Juan Fernandez Islands) have been identified and ranked.<sup>192</sup> Of his 25 hotspots, 15 are tropic rainforests and nine are islands.<sup>193</sup> When the number of hotspots was expanded to 32, Japan, the Madrean pine oak forests of Mexico and the Southwest US, Eastern Melanesia were added. Cumulatively they represent only 2.1 million square kilometres (for the 25 hotspots) or 2.3 % (for the 32 hotspots). This is approximately 1.44% (for the 25) of the land surface of the planet. Together, these places contain 131,399 endemic vascular plants or 43.8% of all plants on Earth. The 32 hotspots include more than 50% of the vascular plants and 42% of all land vertebrates).<sup>194</sup> With the 25, then the non-endemic species are added, the total is closer to 70% of all the vascular plants on the planet in these spaces. They also contain 9,681 endemic (non-fish) species (35.5% of the global total). If the non-endemic are included, the total non-fish vertebrates on the planet is also closer to 70%.<sup>195</sup> A total of 56 WHC Sites are situated in 21 of the 25 selected priority hotspots. Because hotspots are generally very large (an average size of 663,000, in comparison to an average WHC site size of 9,960) some 29 WHC sites lie entirely within hotspots.<sup>196</sup>

## CONCLUSION

International and regional obligations to create protected areas can be traced to 1933. Nevertheless, a process began in 1962 which called for more protected areas to be created. The international community, over the following decades has responded with a variety of instruments, that facilitate the creation of protected areas in both generic and specific senses. However, it has been implicitly argued that these instruments have not gone as far as they could have, and greater progress, via the creation of more protected areas needs to be achieved. This criticism, was first linked into a numerical target of exactly how many protected areas should be created, in 1987. The numerical targets, have since been iterated by the World Parks Congresses, and adopted by the CBD. These targets are despite the fact that there has already been substantial success in the creation of protected areas. Indeed, by 2003, there were over 102,102 registered protected areas in 191 countries. The 2003 figure is equivalent to 12.65% of the Earth's land surface, or an area greater than the combined land area of China, South Asia and Southeast Asia. If marine protected areas (which along with TBPAs are good exemplars of the push for more protected areas) are included in the calculation, 18.8 million kilometres of the Earth fall within protected areas.

Despite the broad obligations to create more protected areas, and the strong international support for this goal, there are clear gaps in the international framework of protected areas. This is most notable, at the thematic level, with regard to marine, mountain, dryland (and types of) forest protected areas. In many ways, these gaps are because unlike with wetlands, there is no thematic international regime which has proved itself willing or able to pick up protected areas with their respective ecosystems. The answer to this problem which has evolved has been one of identifying priority areas. Some regimes have utilized a series of mechanisms, such as tentative lists, comparative and thematic analysis to help identify potential priority areas, and such analysis is often assisted by the schemas of the Udvardy system,

hotspots, the Global 200 or notable areas of endemic species. Although these schemas are all commendable, it is necessary to note that they are not all seeking to conserve the same areas. Nevertheless, given that the differences between are philosophical in their priority setting, it is not necessary to try to select which one is best, Rather, until the thematic gaps in the international legal architecture are filled by meaningful instruments which can directly list protected areas by specific type, the schemas should be fully utilised by the existing protected areas regimes, as the best way to prioritise what needs areas need to be saved, and thereby meet the goals that the international community has set itself.

## NOTES

---

1. Indeed, whilst Conventions such the United Nations Framework Convention on Climate Change attract close to three hundred Non-Governmental Organisations (NGOs) per conference of the Parties, or 400 NGOs for the Convention on Biological Diversity, see Report of the 9th COP. FCCC/CP/2003/ 6. March 30, 2004. 35-38, and Report of the 7th COP to the CBD. UNEP/CBD/COP/7/21. Apr 13. pp. 3-7; the premier instruments for protected areas, such as the World Heritage Convention, typically only receive less than a dozen environmentally inclined NGOs. In 2003, there in addition to the advisory bodies, there were 20 NGOs, of which 6 were environmentally inclined, UNESCO. (2003). 27th Session of the WHC. WHCO3/27.COW24. 2003. Paris, 10 December. 2.
2. African Convention (1968). Article X. (1) & X (2).
3. 2003 African Convention. Article XII (1). The 2003 African Convention obliges its Parties to, 'establish, maintain and extend, as appropriate, conservation areas'.
4. The 1933 Convention Relative to the Preservation of Fauna and Flora in their Natural State. Reprinted in the International Protection of the Environment. Volume IV: 1693. Article 3 (1). This was to be done within two years of entry into force of the Convention, or as soon as possible thereafter, Article 3 (2).
5. 1933 London Convention. Article 7 (2).
6. This approach was because the purpose of the 1933 London Convention was to stop the risk of: "extinction or permanent injury" to a number of species of fauna and flora of certain parts of the world, and in particular of Africa, that were, 'in danger'. 1933 London Convention. Preamble. Paragraph 1.
7. This Convention obliged its Contracting Governments to: "explore at once for "as soon as possible" or "circumstances will permit"] 1940 Western Hemisphere Convention. Preamble, Article H(I) and II (2).
8. The 1911 Convention Between The United States, Great Britain, Russia and Japan for the Preservation And Protection Of Fur Seals. Treaty Series, No. 564; 37 Statutes at Large, 1542. Article 1.

9. Austria/Hungary/Italy 1875 Declaration for the Protection of Birds Useful to Agriculture. IPE, *ibid.* IV 1561. The 1897, 1907, 1914 and 1927 Convention(s) Concerning Hunting (waterbirds) on Lake Constance and the Rhine Between Baden and Switzerland. In IPE, IV. 1599. 1916 Convention Between the United States and Great Britain for the Protection of Migratory Birds. IPE. IV, 1638. Article 2, 1936 Convention Between the United States and Mexico for the Protection of Migratory Birds. IPE. IV 1723.
10. Convention for the Conservation and Management of the Vicuna, 1979. Article 5.
11. See for example, the Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa. 39 ILM. 1 (2000). Paragraph 1, following preamble.
12. IWC. 30th Report. (1980) 27. IWC. 46th Report. (1996). 28.
13. See 'Closing Plenary Session.' In Adams, A. (ed). First World Conference on National Parks. (US Department of the Interior, Washington). 376. Recommendation No 2.
14. See 'Closing Plenary Session.' *Ibid.* 376-377. Recommendation No 3.
15. UNESCO. (1968). Use and Conservation of the Biosphere. (UNESCO, Paris). Recommendation 15. 228.
16. Ramsar. Preamble. Paragraphs 3 and 4.
17. Ramsar. Preamble. Paragraph 6,
  8. Ramsar. Article 4.1.
  9. Resolution 4.5. Accession Requirements. (1990, Montreux).
  10. "And they may incorporate 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, especially where these have importance as waterfowl habitat." Ramsar. Article 21 Recommendation 4.4. Establishment of Wetland Reserves. (1990, Montreux).
21. Resolution 9.15. The Status of Sites in the Ramsar List of Wetlands of International Importance. (2005, Kampala).
22. Resolution 9.1. Additional Scientific and Technical Guidance for Implementing the Ramsar Wise Use Concept. (2005, Kampala). Annex B. This goal first appeared in Resolution 8.26. The Implementation of the Strategic Plan 2003-2008. (2002, Valencia). Annex I. Global Implementation of the Targets for the Convention.
23. Final Act of the Ramsar Conference. Annex II. Recommendations adopted by the International Conference on the Conservation of Wetlands and Waterfowl at Ramsar, Iran, 3 February 1971. Recommendation 1. Conservation of the Wadden Sea, northwestern Europe. See also Recommendation 2.5. On the Wadden Sea. Recommendation 10. African Wetlands. Recommendation 4. Conservation of Lakes Ab-i-Istada and Dasht-e-Nawar, Afghanistan. Resolution 8.39. High Andean Wetlands as Strategic Ecosystems. (2002, Valencia). Recommendation 5.1. Ramsar Sites in Specific Contracting Parties. (1993, Kushiro), Recommendation 4.9. Sites in the Territories of Specific Contracting Parties. (1990, Montreux). Recommendation 2.9. Conservation of Unlisted Wetlands. (1984, Groningen).
4. 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 and management as appropriate. Principle 2 of the Stockholm Declaration.
25. Recommendation 1. Conservation of Representative Ecosystems.' In Elliot, H. (ed). Second World Conference on National Parks. (1972, IUCN, Lausanne). 377.
26. UNESCO. (1978). Second Session of the WHC. CC-78/CONE011/6. Nov 24, 1978. 2.
27. UNESCO. (1992). 16th Session of the WHC. WHC-92/CONE002/12. Dec 14, 1992. 4.
28. UNESCO. (1980). 3rd Session of the WHC. CC-80/CONE018/6. Oct 20, 1980. 4.

29. WH Convention. Preamble. Paragraph 7.
30. UNESCO. (1992). 16th Session of the WHC. WHC-92/CONE002/12. Dec 14, 1992. 2.
31. WI-IC Convention. Article 4. Each state has the obligation to achieve: "transmission to future generations of the cultural and natural heritage" that is identified of outstanding universal importance. Also, UNESCO. (1987). Sixth Session of the WI-IC. CC-87/CONE013/5. Oct 31, 1987. 2.
32. WHC Convention. Preamble. Paragraph 2.
33. WHC Convention. Preamble. Paragraph 5.
34. Article III. (4)(a). See also Article II (1).
35. CMS. Article V(5)(e)-(g).
36. ACAP. Article III.a. See also the ACAP Action Plan. 2.3, 2.3, 3.3 & 3.4. Resolution 1.4. International Implementation Priorities for 2000-2004. MOP 1 of the AEWA (South Africa, 1999). Available from the AEWA Secretariat, Resolution 2.4. International Implementation Priorities. MOP 2 of the AEWA (Bonn, 2002). Available from the AEWA Secretariat.
37. Wadden Sea Seals Agreement. Article VII.
38. AEWA. Preamble, and Article III.c,d & e.
39. ASCOBANS. Preamble, and Action Plan. Part I(c).
40. ACCOBAMS. Article II.3.c. Action Plan. Section I
41. Resolution 4.4. Bat Conservation and Sustainable Forest Management. Report of the Fourth Session of the MOP to EUROBATS, 2003. Available from the Secretariat, at <http://www.eurobats.org/>. pp. 39. Resolution 4. Transboundary Programme: Habitat Proposals. Report of the Session Session of the MOP to EUROBATS. Resolution 4.3. Guidelines for the Protection and Management of Important Underground Habitats for Bats. Report of the Fourth Session of the MOP to EUROBATS, 2003.
42. Great Bustard Memorandum of Understanding. Available from the CMS Secretariat. Point 6. Action Plan for the Middle European Population of the Great Bustard. Section 1. See also Sections 1.2.3 & 1.2.4.
43. Slender Billed Curlew MOU. Preamble. Section 1.
44. MOU, Siberian Crane. Preamble and Principle 1.
45. Memorandum of Understanding Concerning Conservation Measures for the Aquatic Warbler. Available from the CMS Secretariat. Preamble. See also Part I of the Action Plan Concerning Conservation Measures for the Aquatic Warbler.
46. Bern Convention. Preamble.
47. European Diploma. Annex I. Criteria. Section B (2), The applicant area must taken into account in regional planning in order to prevent projects which run counter to the objectives of the area from being approved.
48. Recommendation No. 114. (2004). On the Role of the Bern Convention in the Preservation of Biological Diversity.
49. Bern Convention. Articles 1, 3 (1), 4 (2).
50. Bern Convention. Article 4 (1) and (3).
51. Recommendation No. 30.(1991). The Conservation of Species in Appendix I of the Convention. Resolution No. 6. (1998). Listing the Species Requiring Specific Habitat Conservation Measures. Recommendation No. 6. (1986). The Protection of the Mediterranean Monk Seal. Recommendation No. 11. (1988) Protection of the Common Seal. Recommendation No. 94. (2002). Urgent Measures for the Conservation of the Iberian Lynx. Recommendation No. 19. (1991). The Pardel Lynx in the Iberian Peninsula. Recommendation No. 10. (1988). Protection of the Brown Bear. Recommendation No. 53 (1996) On the Conservation of the European otter (*Lutra lutra*). Recommendation No. 79 (1999). Protection of the Common

Hamster in Europe. Recommendation No. 60. (1997). The Implementation of the Action Plans for Globally Threatened Birds in Europe. Recommendation No. 70. On Protection of the Great Crested Newt in the United Kingdom. Recommendation No. 31. (1991). The Protection of the European Mink. Recommendation No 7. (1987). On the Protection of Marine Turtles and Their Habitat. Recommendation No 8. (1987). On the Protection of Marine Turtles in Dalyan and Other Important Areas in Turkey. Recommendation No. 12. (1988). Concerning the Protection of Important Turtle Nesting Sites in Turkey. Recommendation No. 24 (1991). The Protection of Some Beaches in Turkey of Particular Importance to Marine Turtles. Recommendation No. 54 (1996) on conservation of *Caretta caretta* at Patara (Turkey). Recommendation No. 66. The Conservation Status of Some Nesting Beaches for Marine Turtles in Turkey. Recommendation No. 95. (2002). The Conservation of Marine Turtles in Kazanlı Beach (Turkey). Recommendation No. 63. (1997). The Conservation of the Akamas Peninsula, Cyprus, Recommendation No. 64. (1997). The Conservation of the *Caretta caretta* in Kaminia, Greece, Recommendation No 9. (1987). On the Protection of *Caretta caretta* in Laganas Bay, Zakynthos (Greece). Declaration on Laganas Bay, Zakynthos, Greece (1992). Decision Concerning the Conservation of Laganas Bay, Zakynthos, Greece. Recommendation No. 23. (1991). On the Protection of the Habitat of *Vipera ursinii rakosiensis* in Hungary. Recommendation No. 84 (2000). The Conservation of Western Milos and in Particular the Milos Viper, *Macrovipera schweizeri*,. Recommendation No. 104 (2003). The Conservation of the Spur-thighed Tortoise in Spain. Recommendation No. 41. (1993). The Conservation of Freshwater Fish. Recommendation No. 12. (1988). Measures for the Protection of Critical Biotopes of Endangered Amphibians and Reptiles. Recommendation No 27 (1991). The Conservation of Some Threatened Amphibians in Europe. Guidelines Number 3. (1993). Recovery Plans for Species of Amphibians and Reptiles. Recommendation No. 29 (1991). The Conservation of Wetland Invertebrates, Recommendation No. 29 (1991). The Conservation of Wetland Invertebrates, Recommendation No. 12, (1988). Measures for the Protection of Critical Biotopes of Endangered Amphibians and Reptiles. Recommendation No 26 (1991). The Conservation of Some Threatened Reptiles in Europe. Guidelines Number 3. (1993). Recovery Plans for Species of Amphibians and Reptiles. Recommendation No. 42. The Conservation of Some Threatened Amphibians and Reptiles in the Areas of the Gulf of Orosei, Sardinia, Italy. Recommendation No. 52 (1996) on habitat conservation for invertebrate species. Recommendation No 47. Concerning the Conservation of European Semi-Aquatic Insectivora. Recommendation No. 22. (1991). The Conservation of the Pearl Mussel and Other Freshwater Mussels. Recommendation No. 50 (1996) on the Conservation of *Margaritifera auricularia*. Recommendation No. 34 (1992). The Conservation of the Flora of the Macaronesian Region. Recommendation No. 44. The Conservation of Some Threatened Plants in Central Europe. Recommendation No, 36. (1992). The Conservation of Underground Habitat. Recommendation No. 67. On the Conservation of Heathlands in Dorset, United Kingdom, Recommendation No. 83 (2000). The Conservation Status of Lake Vistonis and Lafka-Lafrouda Lagoon (Greece).

52. Recommendation 2. Global System of Representative Terrestrial Protected Areas. Recommendations of the World National Parks Congress. In McNeely, J. (ed). National Parks, Conservation and Development. (Smithsonian, Washington). 766.

53. World Commission on Environment and Development. (1987). Our Common Future. (OUP, Oxford). 165-166. The Third World Parks Congress in 1982, has earlier suggested, in passing, that a 10% target be established for the protection of different biomes.

54. See the 1964 Agreed Measures for the Conservation of Antarctic Fauna and Flora, from which all the Parties agreed to, 'exert appropriate efforts, consistent with the Charter of the United Nations, to the end that no one engages in any activity in the Treaty Area contrary to the principles or purposes of these Agreed Measures'. Moreover, each Party was obliged ("shall")

take appropriate action to carry out these Agreed Measures. Article III & X. Agreed Measures.

55. Madrid Protocol. Article 2.
56. Agenda 21. Chapter 11.14.(b).
57. Agenda 21. Chapter 13.7. (b).
58. Agenda 21.Chapter . 15.5. (g).
59. UNEP/WCWC. (2004). Protected Areas and Biodiversity. (UNEP: Biodiversity Series No 21). 11-12.
60. CUD. Decision VII/28. Protected Areas. Paragraph 1.
61. Decision VII/28. Protected Areas, Annex. Paragraphs 25, 26 & 28. Decision IV/16. Annex II. Decision VI/30. Preparations for the 7th COP
62. See Taylor, D. (2002). 'The Ramsar Convention on Wetlands'. 12 (3) Parks. 42. Simpson, K. (2002). 'The Natura 2000 Network'. 12 (3) Parks. 36, 37.
63. See Recommendation 5.04. Building a Comprehensive and Effective Protected Area System. (Vth IUCN World Parks Congress).
64. IUCN Vth World Parks Congress. The Durban Action Plan. pp. 9. Box 3.
65. See Recommendation 5.04. Building a Comprehensive and Effective Protected Area System. (Vth IUCN World Parks Congress).
66. Protected Areas. UNEP/CBD/COP/7/L32. Recommendation IX/4. Protected Areas. UNEP/CBD/COP/7/4.pp.5. SBSTTA. Report of the Ad Hoc Technical Expert Group on Protected Areas. UNEP/CBD/SBSTTA/9/INF/3. 22 Sep, 2003. Annex II. Pp.89.
67. Aglionby, J. (2004). '123 Nations Throw Lifeline to Species At Risk.' Guardian Weekly. Feb 26.
68. CBD. Decision VII/28. Protected Areas. Paragraph 18 & Goal 1.1.
69. CBD. Decision VII/28. Protected Areas. Annex. 1.1.2.
70. See 'Closing Plenary Session.' In Adams, A. (ed). First World Conference on National Parks. (US Department of the Interior, Washington). 382. Recommendation No 15.
71. "All governments concerned to set aside appropriate marine areas as national parks and reserves and to take action to extend the boundaries of existing terrestrial national parks and reserves to include representative marine ecosystems" Recommendation 4. Marine National Parks. In Elliot, H. (ed). Second World Conference on National Parks. (1972, IUCN, Lausanne). 443.
72. The Third Congress in 1982 called for: " as much as possible their territorial seas or other areas of jurisdiction" of marine and coastal protected areas, including on the high seas. The Third Congress in 1982 called for: " as much as possible their territorial seas or other areas of jurisdiction" of marine and coastal protected areas, including on the high seas. Recommendation 3. Marine and Coastal Protected Areas. Recommendations of the World National Parks Congress. In McNeely, J. (ed). National Parks, Conservation and Development. (Smithsonian, Washington). 765.
73. Independent World Commission on the Oceans. (1998). The Ocean Our Future. (Cambridge University Press, Cambridge). 79. Kelleher, G. (1995). A Global Representative System of Marine Protected Areas. (World Bank, Washington). Volume IV 5-6. National Research Council (2001). Marine Protected Areas. (National Academy Press, Washington).
74. Agenda 21. Chapter 17.7 and 17.85. Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities. Section 152 (d). UNEP(OCA)/LBA/IG.2/7. 5 Dec. 1995. Finally, see the FAO Code of Conduct for Responsible Fisheries. Section 6.8
75. See the Protocol Concerning Protected Areas of Wild Fauna and Flora in the Eastern African Region. Reprinted in Austen, A. (ed). Basic Legal Document on International Animal Welfare and Wildlife Conservation (Kluwer, London). Article 8. The 1989 Protocol for the Conservation and Management of Protected Marine and Coastal Areas of the South East Pacific.

Article 11. The Caribbean Protocol. Articles 3 and 4 of the Mediterranean Protocol,. Both of these are also in Austen, at 160, and 165. See also the OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas. Sections 2 and 3.

76. IUCN 5th World Parks Congress (2003, Durban). Recommendation 5.22: Building a Global System of Marine and Coastal Protected Area Networks.

77. CBD. Decision V11/5 Marine and Coastal Biological Diversity Section 20. CBD Decision II/10. Paragraph 11. Annex I to decision II/10. Section iv. See also CBD. Decision V11/28. Protected Areas. Paragraph 20.

78. CBD. Decision V11/28. Protected Areas. Paragraph 18 & Goal 1.1.

79. CBD. Decision VII/28. Protected Areas, Annex. 1.1.3

80. Report of the World Summit on Sustainable Development. A/CONF. 199/20. WSSD. Paragraph 32 (d).

81. IUCN, WCPA, WWC (2003). Towards a Strategy for High Seas Marine Protected Areas. (IUCN, Gland). 2. IUCN 5th World Parks Congress (2003, Durban), Recommendation 5.22: Protecting Marine Biodiversity and Ecosystem Processes Through Marine Protected Areas Beyond National Jurisdiction. Operative paragraph 2.

82. CBD. Decision V11/28. Protected Areas. Paragraph 29. Annex I. Para 3. Goal 1.3. Para.

1.3.2. CBD. Decision V11/5 Marine and Coastal Biological Diversity. Section 30,

83. Report of the UNICPOLOS At its Fourth Meeting. A/58/95. (2003, June 26). Paragraph 22.

84. Zbiez, D. (2000). Transfrontier Ecosystems and Internationally Adjoining Protected Areas.' Available from the World Conservation Monitoring Centre. IUCN. (2003). Transboundary Protected Areas for Peace and Cooperation. (IUCN, Geneva). VII. See Recommendation 5.11, A Global Network to Support the Development of Transboundary Conservation Initiatives. (Vth IUCN World Parks Congress).

85. The first recorded TBPA was created in 1932, when Poland and Czechoslovakia announced their intention to have shared nature reserve. In the same year, the Waterton-Glacier International Peace Park, connecting the mountainous regions of the shared boundaries between the United States and Canada came into force.

86. The 1972 Second World Congress on National Parks called upon governments to, 'collaborate closely in the planning and management of neighboring or contiguous national parks'. Recommendation 6. International Parks. In Elliot, H. (ed). Second World Conference on National Parks. (1972, IUCN, Lausanne). 444.

87. See Recommendation 5.11. A Global Network to Support the Development of Transboundary Conservation Initiatives. (Vth IUCN World Parks Congress).

88. Agenda 21. Chapter 15.7. Section (g)

89. CBD. Decision V11/28. Protected Areas. Annex 1. Para 3. Goal 1.3.

90. Seville Strategy. Objective 1.2 and IV.2. UNESCO. (2002). Biosphere Reserves: Special Places for People and Nature. (UNESCO, Paris), 136-140. For a full study of these five transboundary biosphere reserves, see MAB. (2003). Five Transboundary Biosphere Reserves in Europe. (UNESCO, Paris).

91. Operational Guidelines. 2002 Edn. Paragraphs 16 & 20.

92. Guinea, Liberia and the Ivory Coast with the Nimba Strict Nature Reserve. Fifth Session (1981) of the WHC. at 4. 26th Session (2002) of the WHC, at 19. Belarus and Poland, with the Belovezhskaya National park. 16th Session (1992) of the WHC, at 30. Columbia and Panama, with the Los Katios park. 18th Session (1995) of the WHC, at 40. The Talamanca Range Reserve in Costa Rica and Panama for the La Amistad.. 7th Session (1984) of the WHC, at 5. 14th Session (1990) of the WHC, at 5. India and Bhutan, with the Manas site. 25th Session (2001) of the WHC, at 40-41. 26th Session (2002) of the WHC, at 20. Zambia and Zimbabwe, with the

- Victoria falls. 13th Session (1989) of the WHC, at 12; and Bulgaria and its Srebarna site. 27th Session (2003) of the WHC, at 16.
93. Ramsar. Article 5. (1971). Resolution 4.4. Implementation of Article 5. (1990, Montreux). Resolution 7.19. International Cooperation. (1999, San Jose). Annex. The Guidelines for international cooperation under the Ramsar Convention. Resolution 8.25. The Ramsar Strategic Plan. (2002, Valencia). Annex. Operational Objective 12. Resolution 8.26. The Implementation of the Strategic Plan 2003-2008. (2002, Valencia). Annex 1. Global Implementation of the Targets for the Convention.
94. Resolution 9.8. Streamlining the Implementation of the Strategic Plan of the Convention 2003-2008 (2005, Kampala). Strategy 2.5. See Peru and Bolivia, with regard to Lake Titicaca. Recommendation 6.17. Ramsar Sites in Particular Countries. (1996, Brisbane); Austria, the Czech Republic and Slovakia, Recommendation 6.17. Ramsar Sites in Particular Countries. (1996, Brisbane); Countries sharing the High Andean ecosystems, Resolution 8.39. High Andean Wetlands as Strategic Ecosystems. (2002, Valencia); And Greece and Turkey with regard to the Evros/Merit Delta transfrontier wetland. Recommendation 5.1.1. Greek Ramsar Sites. (1993, Kushiro). Note, in the last instance, Turkey was decidedly lukewarm about this proposal, even insisting on a reservation to the Ramsar Guidelines for International Cooperation, which it explicitly refuses to recognise as a legally binding document. Resolution 7.19. International Cooperation. (1999, San Jose).
95. UNESCO. (2004). ICC of the MAB Programme. SC-04/CONE204/14. pp. 5.
96. GEE (2005). GEF In Action: Sustaining Wilderness Areas. (GEF, Washington). 2-3. GEE (2005). Making a Visible Difference in Our World. (GEF, Washington). 12.
97. The TBPA that the ITTO has supported include the Pulong Tau National Park in Malaysia, on the border region of Sabah and Sarawak, the Mengame-Minkebe Transboundary Gorilla Sanctuary on the Cameroon-Gabon border; the Betung-Kerihun National Park in Indonesia; the natural protected area system between Peru and Bolivia; the Condor Range between Ecuador and Peru; and the Phatam Protected Forest complex between Thailand, Cambodia and Laos. See ITTO. (2004). 'The Incredible Condor'. ITTO Tropical Forest Update. 14(4). 1-7.
98. ECOSOC Resolution 713 (XXVII), 1959.
99. See Monod, T. (1962). 'The United Nations List of National Parks and Equivalent Reserves.' In Adams, A. (ed). First World Conference on National Parks. (US Department of the Interior, Washington). 62-98.
100. United Nations List of National Parks and Equivalent Reserves. (1971, Hayez, Brussels). 7-10.
101. Miller, K. (1984). 'The Natural Protected Areas of the World.' In McNeely, J. (ed). National Parks, Conservation and Development. (Smithsonian, Washington). 20-23.
102. UN List. 2003. Ibid. 27.
103. UNEP. (2003). United Nations List of Protected Areas. (IUCN/Thanet, UK). 3. UNEP/WCWC. (2004). Protected Areas and Biodiversity. (UNEP: Biodiversity Series No 21). 7.
104. IUCN. (2004). Review of the World Heritage Network: Biogeography, Habitats and Biodiversity. (IUCN, Gland). 5. See UNESCO. (1978). 2nd Session of the WHC. CC-78/CONE010/10. Oct 9, 1978. pp.6.
105. UNESCO. (2004). 18th Session of the ICC Bureau Meeting. SC-04/CONE204/14. Jan 11. 19.
106. See New Zealand (2005). A Review of the Antarctic Protected Areas System. CEP Paper WP 11 (Stockholm, 2005). 1.
107. For a detailed list and examination of some of the earlier sites, see Bauer, E (2002), 'The European Diploma of Protected Areas'. 12 (3) Parks. 29, -33.
108. Note, inter alia, IMO Assembly Resolution A.284 (VIII). Routing Measures. IMO

Assembly Resolution. A.430 (X1). MO Assembly Resolution. A. 475 (XII). IMO Assembly Resolution A.527 (13). Routeing Measures. IMO Assembly Resolution A. 619 (15). Use of Pilotage Services in the Great Barrier Reef and Torres Strait Area. IMO Assembly Resolution. 669 (16). IMO Assembly Resolution. A. 711 (17). IMO Assembly Resolution A. 768 (18). The first two PSSAs recognised were the Great Barrier Reef MEPC 44(30). See Resolution MEPC. 97 (47). Identification of the Sea Area Around the Florida Keys as a PSSA. MEPC. (2002). Report of the MEPC on its 47th Session. MEPC 47/20. Annex 4. Resolution MEPC.101 (48). Identification of the Wadden Sea as a Particularly Sensitive Sea Area. MEPC. (2004). Report of the MEPC on its 51st Session. MEPC. 51/22. 38, 40-41. MEPC Resolution on the Designation of the Western European Waters as a Particularly Sensitive Area. MEPC. (2004). Report of the MEPC on its 52nd Session. MEPC. 52/WP.17. MEPC. (2004).

109. CBD. Decision VII/28. Protected Areas. Paragraph 16. See also Annex. I, Para 2.

110. Secretariat of the CBD. (2004). Biodiversity Issues for Consideration in the Planning, Establishment and Management of Protected Area Sites and Management. (CBD Technical Series No 15). 45-52,

111. Anon. (2005). 'Plants Hotspots in Protection Peril', New Scientist. June 4. 18.

112. Conservation of Arctic Flora and Fauna. (2002). Protected Areas of the Arctic: Conserving a Full Range of Values. (CAFF Secretariat, in Department of Foreign Affairs, Canada). Ii.

113. See New Zealand (2005). A Review of the Antarctic Protected Areas System. CEP Paper WP 11 (Stockholm, 2005). 2.

114. Recommendation 1.3. Designating More Sites for the Ramsar List. (1980, Cagliari).

115. Resolution 8.33. Guidance for Identifying, Sustainably Managing and Designating Temporary Pools as Wetlands of International Importance. (2002, Valencia). Annex. Paragraph 5.

116. Kelleher, G. (1995). A Global Representative System of Marine Protected Areas. (World Bank, Washington). Volume IV. 5-6. CBD. Decision VII/5 Marine and Coastal Biological Diversity. Section 13.

117. CBD, Decision VII/5 Marine and Coastal Biological Diversity. Section 14.

118. Conservation of Arctic Flora and Fauna. (2002). Protected Areas of the Arctic: Conserving a Full Range of Values. (CAFF Secretariat, in Department of Foreign Affairs, Canada). 15.

119. Kelleher, G. (1995). A Global Representative System of Marine Protected Areas. (World Bank, Washington). Volume IV. 5. IUCN. (2004). Speaking A Common Language: Management Categories for Protected Areas. (IUCN, Gland). 106.

119. Antarctic Treaty: Report of the Thirteenth Meeting. (Brussels, 1985). Paragraphs 65 and 66. Antarctic Treaty: Report of the Twelfth Meeting. (Canberra, 1983). Agenda Item 7. Recommendation XIV-6. Marine Sites of Special Scientific Interest. In Antarctic Treaty: Report of the Fourteenth Meeting (Rio de Janeiro, 1987). See Annex V, Article 6 (2) of the Madrid Protocol. Decision 4. (1998). Marine Protected Areas. In Antarctic Treaty: Report of the Twenty-Second Meeting. (Tromso, 1997). 70-71.119. Antarctic Treaty: Fourteenth Antarctic Treaty Consultative Meeting. (Rio de Janeiro, 1987). Para 88.

120. Olson, D. et al. (2000). The Global 200: A Representative Approach to Conserving the Earths Distinctive Ecoregions. (WWF, Washington). 20.

121. Resolution 8.11. Additional Guidance for Identifying and Designating Under Represented Wetland Types as Wetlands of International Importance. (2002, Valencia). Annex. Identification and Designation of Mangroves.

122. Commission on Sustainable Development. (2001), Global Status of Biodiversity. E/CN.17/2001/PC/18. March 14. 5. Pain, S. (1999). 'Treasures Lost in Reef Madness.' N. Sci. Feb 25. 14. Freiwald, A, Fosse, J. (2004). Cold Water Coral Reefs. (UNEP, WCMC, Cambridge). SBSTTA. Report of the Ad Hoc Technical Expert Group on Protected Areas. Brooks, T. (2002).

- 'Habitat Loss and Extinction in the Hotspots of Biodiversity.' *Conservation Biology*. 16(4): 909-923. UNEP/CBD/SBSTTA/9/INF/3. 22 Sep, 2003. pp.35.
123. UNEP (2004). *Conventions and Coral Reefs*. (UNEP, Nairobi). 5-15.
124. Commission on Sustainable Development. (2001). *Global Status of Biodiversity*. E/CN.17/2001/PC/18. March 14. 5.
125. See World Heritage Marine Programme. In Report of the World Heritage Centre in Implementing Strategic Objectives. WHC-05/29.001v1/5. IUCN. (1997). *A Global Overview of Wetland and Marine Protected Areas on the World Heritage List*. (IUCN, Gland). UNESCO. (2002). *Proceedings of the World Heritage Marine Biodiversity Workshop*. (World Heritage Papers No. 4, UNESCO, Paris). Resolution 8.11. *Additional Guidance for Identifying and Designating Under Represented Wetland Types as Wetlands of International Importance*. (2002, Valencia). Resolution 8.32. *Conservation, Integrated Management and Sustainable Use of Mangrove Ecosystems and Their Resources*, (2002, Valencia). Resolution 9.4. *The Ramsar Convention and the Conservation, Production and Sustainable Use of Fisheries Resources*. (Kampala, 2005). Paragraph 35.
126. ICRI Decision on Cold Water Coral Reefs. In ICRI (2004). *Report of the ICRI Meeting in Okinawa, Japan*. 3-4 July, 2004. For the support of ICRI, see paragraph 31 (e) of the WSSD Plan of Implementation, and Chapter 17 of Agenda 21.
127. *Decision on Marine Protected Areas*. In ICRI (2004). *Report of the ICRI Meeting in Okinawa, Japan*. 3-4 July, 2004.
128. FAO. (2000). *Global Forest Resources Assessment 2000*. (FAQ, Rome). xxv. Secretariat of the CBD. (2004). *Biodiversity Issues for Consideration in the Planning, Establishment and Management of Protected Area Sites and Management*. (COD Technical Series No 15). 63-70.
129. See World Commission on Forests and Sustainable Development. (2000). *Our Forests, Our Future*. (Cambridge University Press, Cambridge). 100.
130. The most protected forests are tropical moist forests and temperate needle-leaf forests, which have over 11% of their area included in protected areas. Tropical dry forests are the least protected with less than 9% of their area included in protected areas belonging to management categories I-VI. About 10% of the temperate broad-leaved forests are included under protected area of various IUCN categories.
131. Secretariat of the CBD. (2004). *Biodiversity Issues for Consideration in the Planning, Establishment and Management of Protected Area Sites and Management*. (CBD Technical Series No 15). 63-70.
132. This conference drew attention to the, 'paucity of protected areas in the tropical forest biomes' and called upon governments as a matter of urgency, 'to take effective steps to increase protected areas of virtually untouched natural forests of the humid tropics'. Recommendation 2. *Conservation of Tropical Rain Forest Ecosystems*. In Elliot, H. (ed). *Second World Conference on National Parks*. (1972, IUCN, Lausanne). 377, 378.
133. The third Congress noted the 'critical situation' with regard to the biomes of tropical forests (in given selected areas). Recommendation 2. *Global System of Representative Terrestrial Protected Areas*. Recommendations of the World National Parks Congress. In McNeely, J. (ed). *National Parks, Conservation and Development*. (Smithsonian, Washington). 766. See also Recommendation 18. *International Agreements and Protected Areas*. Recommendations of the World National Parks Congress. In McNeely, J. (ed). *National Parks, Conservation and Development*. (Smithsonian, Washington). 775.
134. See Humphreys, D. (1996). *Forest Politics: The Evolution of International Cooperation*. (Earthscan, London). Annex D. Draft Text for a Convention for the Conservation and Wise Use of Forests. Articles 8 and 9. See also, World Commission on Forests and Sustainable

- Development. (2000). *Our Forests, Our Future*, (Cambridge University Press, Cambridge). 00.
135. A/CONF.151/26 (Vol. III). Principle 7 (b).
136. Agenda 21. Chapter 11.14. b.
137. Recommendation V11/6. Forest Biological Diversity. UNEP/CBD/COP/6/4.pp.34. Recommendation IX/6. Ecosystem Approach: Further Elaboration, Guidelines for Implementation and Relationship with Sustainable Forest Management. Annex II. pp.56. SBSTTA. Protected Areas: Report of the International Workshop of Protected Forest Areas. UNEP/CBD/SBSTTA/9/INE/39. Nov 9, 2003.
138. GEE (2005). *GEF In Action: Sustaining Wilderness Areas*. (GEF, Washington). 2-3. GEE (2005). *Making a Visible Difference in Our World*. (GEF, Washington). 32.
139. See IUCN. (1997). *A Global Overview of the Forest Protected Areas on the World Heritage List*. (IUCN, Gland). As discussed, at the 21st (1997) Session of the WHC at 52; and the 23rd (1999) Session of the WHC, at 8.
140. The Montreal Process. (1997). *The First Approximation Report*. (Canadian Forest Service, Ottawa). Appendix 1. The Montreal Process Criteria and Indicators. The Montreal Process. (1999). *Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests*. (Canadian Forest Service, Ottawa). 10.
141. ITTO. (2005). *Revised ITTO Criteria and Indicators for the Sustainable Management of Tropical Forests, Including Reporting Format*. (ITTO, Yokohama, Policy Development Series No. 15).
142. ITTO. (1994). TD/TIMBER. 2/16.
143. ITTO. (2002). *ITTO Yokohama Action Plan 2002-2006*. (ITTO, Yokohama, Policy Development Series No. 11). 11.
144. *Earth Negotiations Bulletin*. United Nations Forum on Forests, 16-27 May, 2005. Volume 13 (133).
145. UNEP. (2002). *Mountain Watch: Environmental Change and Sustainable Development in Mountains*. (UNEP/WCMC, Cambridge).
146. WSS \SD. *Plan of Implementation*. Paragraph 43.
147. *Mountain Biodiversity*. UNEP/C13D/COP/7/L.29..
148. See Chapter 13.7. (b) of Agenda 21.
149. See Recommendation 5.06. *Strengthening Mountain Protected Areas as a Key Contribution to Sustainable Mountain Development*. (Vih IUCN World Parks Congress).
150. GEE (2005). *Making a Visible Difference in Our World*. (GEF, Washington). 23.
151. See MAB. (2003). *Global Change Research in Mountain Biosphere Reserves*. (MAB, UNESCO). UNESCO. (2001). *MAB ICC Bureau Meeting*. SC/-01/CONE-211/13. Apr 10. 19.
152. See IUCN (2002). *A Global Overview of Mountain Protected Areas on the World Heritage List*. (IUCN, Gland). UNESCO. (2000). *Thematic Expert Meeting on Potential Natural World Heritage Sites in the Alps*. WHC-2000/CONF.204/WEB.2.
153. Resolution 8.12. *Enhancing the Wise Use and Conservation of Mountain Wetlands*. (2002, Valencia). Resolution 8.39. *High Andean Wetlands as Strategic Ecosystems*. (2002, Valencia).
154. Anon. (2004). 'Alpine Convention: Implementation in Progress.' *Environmental Policy and the Law*. 34(5): 191-192.
155. Bilobran, I. (2003). 'Convention Signed.' *Environmental Policy and the Law*. 33(5): 203.
156. 156 CBD (2002). *Thematic Programmes of Work: Biological Diversity of Dry and Sub Humid Lands*. UNEP/CBD/COP/6/INF/39. Apr 4, 2002.
157. Recommendation IV/3. *Assessment and Status of ...Dryland, Arid, Semi-arid and Savannah Ecosystems*. UNEP/CBD/SBSTTA/4/14.pp 38. Decision V/23. *Consideration of Options for the Conservation and Sustainable Use of Biological Diversity in Dryland, Mediterranean, Arid, Semi*

Arid and Savannah Ecosystems. UNEP/CBD/COP/5/23. pp 173.

158. See Decision 8/COP.4. Declaration on the Commitments to Enhance the Implementation of the Obligations of the Convention. ICCD/COP (4)/11/Add 1, pp29. UNEP/FAO. (1996). *Our Land Our Future*. (UNEP, Nairobi). 42-46. Ryan, J. (1999). *Desert and Dryland Development: Challenges and Potential in the New Millennium*. (Icarda, Syria). Traylor, I. et al. (1996). *Desert Development: The Endless Frontier*. (International Center for Arid and Semiarid Land Studies, Texas). FAO. (2001). *From Farmer to Planner Back: Harvesting Best Practices*. (FAO, Rome). FAO. (1997). *Negotiating a Sustainable Future for Land*. (FAO, Rome). See UNEP (1977). *United Nations Conference on Desertification: Round Up, Plan of Action and Resolutions*. (UNEP, Nairobi).

159. Resolution 8.11. Additional Guidance for Identifying and Designating Under Represented Wetland Types as Wetlands of International Importance. (2002, Valencia).

160. Decision V11/28. Protected Areas..

161. Kleiner, K. (2003). 'Conserving a Wild World.' *N. Sci.* Aug 23. 6. Drewett, J. (1988). 'Never Mind the Whale, Save the Insects.' *N. Sci.* Dec 17. 32-34. Randerson, I. (2002). 'Glamorous Animals Get All the Cash.' *N. Sci.* Aug 24. 9. Moran, D. (1996). 'Global Biodiversity Priorities.' *Global Environmental Change*. 6(2): 103-119. Ginsberg, J. (1999). 'Global Conservation Priorities.' *Conservation Biology*. 13(1): 5-12. IUCN. (2005). Background Paper for the Special Expert Meeting of the World Heritage Convention on the Concept of Outstanding Universal Value. (IUCN, Gland). 7-8. IUCN. (2005). Background Paper for the Special Expert Meeting of the World Heritage Convention on the Concept of Outstanding Universal Value. (IUCN, Gland). 7.

162. CEO. Decision VII128. Protected Areas. Annex. 1.1.2.

163. Recommendation No 3. (1984). On the Establishment of National Inventories of Three Types of Natural Habitat. Recommendation No 14. (1989). On Species Habitat Conservation and on the Conservation of Endangered Natural Habitat. Also, Resolution No 6, 1998.

164. Final Act of the Ramsar Conference, Annex II. Recommendations adopted by the International Conference on the Conservation of Wetlands and Waterfowl at Ramsar, Iran, 3 February 1971. Recommendation 10. African Wetlands. Recommendation 1.5. National Wetland Inventories. (1980, Cagliari). Recommendation 4.6. Establishment of National Scientific Inventories of Potential Ramsar Sites. (1990, Montreux). Resolution VI.12. National Wetland Inventories. (1996, Brisbane). Resolution 7.20. Wetland Inventory. (1999, San Jose). Resolution 8.6. A Ramsar Framework Inventory. (2002, Valencia). Resolution 8.26. The Implementation of the Strategic Plan 2003-2008. (2002, Valencia). Annex I. Global Implementation of the Targets for the Convention. Resolution 8.7. Gaps In and Harmonisation of Ramsar Guidance on Wetland Ecological Character, Inventory, Assessment and Monitoring. (2002, Valencia). Resolution 8.6. A Ramsar Framework Inventory (2002, Valencia).

165. UNESCO. (1996) Expert Review on Evaluation of General Principles and Criteria for Nominations of Natural World Heritage Sites. WHC-96/CONE202/INE9. Apr 15. 6. UNESCO. (1994). Expert Meeting on the Global Strategy. WHC-94/CONE003/INE6. Oct 13. . 1994. 1. See IUCN (1996). *Earth's Geological History: A Contextual Framework for Assessment of WI-I Fossil Site Nominations*. (IUCN, Gland). IUCN (2002). *A Global Overview of Mountain Protected Areas on the World Heritage List*. (IUCN, Gland). UNESCO. (2000). *Thematic Expert Meeting on Potential Natural World Heritage Sites in the Alps*. WHC-2000/CONE204/WEB.2. IUCN (2002). *A Global Overview of Mountain Protected Areas on the World Heritage List*. (IUCN, Gland). UNESCO. (2000). *Thematic Expert Meeting on Potential Natural World Heritage Sites in the Alps*. WHC-2000/CONE204/WEB.2. IUCN. (1997). *A Global Overview of the Forest Protected Areas on the World Heritage List*. (IUCN, Gland). IUCN. (1997). *A Global*

- Overview of Wetland and Marine Protected Areas on the World Heritage List. (IUCN, Gland).
166. GEE (2005). Making a Visible Difference in Our World. (GEF, Washington). 32.
167. Afrotropical; Antarctica; Australian; Indomalayan; Nearctic; Neotropical; Oceanian & Palaearctic.
168. Mixed mountain systems; Humid Tropical Forests; Tropical Dry/Desiduous Forests; Mixed Island Systems; Subtropical/temperate rainforest; Warm desert/semi deserts; Temperate Broad Leaf Forests; Temperate Needle leaf Forests; Evergreen Forests/Scrub; Tropical Grassland/Savannah; Lake Systems; Tundra/polar desert; Temperate Grasslands & Cold Winter deserts.
169. Udvardy, M. (1984). 'A Biogeographical Classification System for Terrestrial Environments.' In McNeely, J. (ed). National Parks, Conservation and Development. (Smithsonian, Washington). 34-39.
170. Work on a complimentary biophysical coastal and marine classification system (around the Americas) began in the early 1980s Ray, C. (1984). Development of a Biophysical Coastal and Marine Classification System.' In McNeely, J. (ed). National Parks, Conservation and Development. (Smithsonian, Washington). 39-43.
171. IUCN. (2004). Review of the World Heritage Network: Biogeography, Habitats and Biodiversity. (IUCN, Gland). 7-8.
172. UNESCO. (1998). 22nd Session of the W.H. Committee. WHC-98/CONE208/18. Jan 29, 1998. 89-90.
173. Olson, D. et al. (2000). The Global 200: A Representative Approach to Conserving the Earth's Distinctive Ecoregions. (WWF, Washington). 1-4.
174. Olson, D. et al. (2000). The Global 200: A Representative Approach to Conserving the Earth's Distinctive Ecoregions. (WWF, Washington). 1.
175. IUCN. (2004). Review of the World Heritage Network: Biogeography, Habitats and Biodiversity. (IUCN, Gland). 32-34.
176. Anon. (2005). 'Going, Going...' New Scientist. Dec 17. 5.
177. See 'Closing Plenary Session.' In Adams, A. (ed). First World Conference on National Parks. (US Department of the Interior, Washington). 384. Recommendation No 22. The First World Conference, then went onto identify a number of threatened species in need of such protected areas. They were five species of rhinoceroses; the Mountain Tapir, Spectacled bear & Pudu deer. See Recommendations 24 & 25.
178. Stattersfield, A. (1998). Endemic Bird Areas of the World: Priorities for Bird Conservation (Birdlife International, Cambridge). 24.
179. World Commission on Environment and Development. (1987). Our Common Future. (OUP, Oxford). 165-166.
180. IUCN et al. (2004) Review of the World Heritage Network: Biogeography, Habitats and Biodiversity. (IUCN, Gland). 81-82.
181. IUCN/WWE (1995). Centres of Plant Diversity: A Guide and Strategy for Their Conservation. (Chiltern, London).
182. IUCN/WWE Ibid. 2.
183. IUCN/VVVVE Ibid.. 3-4.
184. IUCN et al. (2004) Review of the World Heritage Network: Biogeography, Habitats and Biodiversity. (IUCN, Gland). 100.
185. Recommendation 10. Conservation of Genetic Resources. Recommendations of the World National Parks Congress. In McNeely, J. (ed). National Parks, Conservation and Development. (Smithsonian, Washington). 771.
186. In 1988 Norman Myers identified 10 threatened hotspots in the tropical rain forests of the world, estimating they contained 13% of all plant diversity in just 0.2% of the land area

of the planet. In subsequent analysis, he added four other rain forests and four Mediterranean style ecosystems and came up with a total of 18 areas that accounted for 20% of the global plant diversity in just 0.5% of the land area of the planet. Mittermeier, R & Myers, N. (2000). *Hotspots*. (University of Chicago Press, Chicago). 26-27.

187. Myers, N. (2005). *Hotspots Revisited*. (University of Chicago Press, Chicago)

188. WSSD. Plan of Implementation. Paragraph 44. (g)

189. Not all hotspots, are the same. For example, in South east Asia, although there are many areas under threat, but are not all hotspots of species numbers, or where there are large numbers, they are not always endemic. Indeed, in this area, only 2.5% of the hotspots fulfilled all three criteria, and these were all within the Andes mountains Anon. (2005). 'Some Hotspots Are Hotter than Others'. *New Scientist*. August 20. 19. In addition, many of the following options are constrained by the limitations of what is, and is not scientifically known about both species and habitat, as well as competing arguments on ecological theory. Brummit, N. (2003). Biodiversity: Where's Hot and Where's Not.' *Conservation Biology*. 17(5): 1442-1448. Pearce, E (2000). 'Spread the Wealth.' *N. Sci*. Feb 26. 12.

190. Mittermeier, R & Myers, N. (2000). *Hotspots*. (University of Chicago Press, Chicago). 29.

191. Mittermeier. *Ibid*. 58.

192. The Caribbean, the Philippines and Madagascar and the Indian Ocean Islands are the highest priority hotspots of all. Mittermeier, *Ibid*. 53.

193. Pearce, P (2000). 'Spread the Wealth.' *N. Sci*. Feb 26. 12.

194. Holmes, B. (2005) 'Should We Seek To Save the Earth's Iconic Hotspots ?' *N. Sci*. Feb 5. 10-11.

195. Mittermeier, R & Myers, N. (2000). *Hotspots*. (University of Chicago Press, Chicago). 30-38.

196. IUCN et al. (2004) *Review of the World Heritage Network: Biogeography, Habitats and Biodiversity*. (IUCN, Gland). 72.