Chapter 1

Expansion and Diversification of Protected Areas: Rupture or Continuity?

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These past 30 years, protected areas have experienced a worldwide dramatic increase in their surface area and have been profoundly influenced by the discourses on globalisation and sustainable development. They have become an integral part of a wider framework of environmental policies reaching beyond the physical boundaries of conservation spaces. The dynamics of expansion and diversification potentially best reflect the orientation of current biodiversity conservation policies and protected areas evolution. This chapter attempts to test the validity of these two dynamics of expansion and diversification by using the World Database on Protected Areas (WDPA). Its main hypothesis is that changes in conservation policies can be illustrated by changes in the number, type and surface area of protected areas.

It is well known that *in situ* biodiversity conservation has drastically expanded over the past 30 years, and in fact for more than 100 years. With almost 20 million km² currently under conservation policies, protected areas represent one of the main modes of land tenure worldwide. In this context, protected areas management now embraces the debate around sustainable development and its effective implementation.

Because this rhetoric of expansion and diversification towards sustainable development is scientifically and politically important, this chapter confronts it with an analysis of the most comprehensive information available. The WDPA[1] is managed by the World Conservation Monitoring Center (WCMC) within the United Nations Environment Programme (UNEP), in partnership with the World Commission on Protected Areas of the International Union for Conservation of Nature (IUCN-WCPA). It benefits from the input of most of the major conservation NGOs. It is also used for the four-yearly publication of the United Nations' list of protected areas[2]. The WDPA is the only exhaustive global compilation of its kind concerning protected areas. It utilises classifications based on a categorisation system proposed by the IUCN, which aims to allow conservation regulations within different national systems to be compared internationally.

1 http://www.wdpa.org.

2 See Chape et al. (2003) and IUCN (1998), for the last two publications of the official list of UN protected areas.

This chapter examines current developments in conservation based on the results of processing the WDPA. It shows that, although conservation organisations claim that the rate of creation of protected areas is on the increase, it has in fact been declining in recent years, a possible indication that the golden age of protected areas is now behind us. This could be linked to the diversification of protected areas, which despite mainstream discourse, only marginally involves sustainable forms of nature management, even though these forms could reflect the most innovative management that will define tomorrow's conservation.

The Current Production of Protected Area

For almost 30 years, the world of conservation has been influenced by expansion and diversification. Each trend has sought to overcome various issues as perceived by conservationists, and to give new legitimacy to their practices, in particular in the context of the evolution of environmental international politics (cf. the introduction of this book). The community-based and local participation approach has probably been the most significant change during this period. The move backwards towards fortress conservation policies has partially operated against this community-based policy and its presumed limitations to advance its own agenda. It is within this general framework of divergent political options that conservation experts have increased the number of tools for defining and creating protected areas, while also broadening their scope. First, by identifying both strategically and globally, zones considered to be a high priority for conservation, and with the potential to be classified as protected areas. Second, by seeking a more comprehensive definition of a nature protected area, particularly through the extensive inclusion of less protected, 'sustainable' areas. And finally by allowing private and community-based spaces to be classified as protected areas (cf. the various examples given in Part III of this book).

The Strategic Spatial Approaches

The integrative approach which focuses on community participation and the defensive approach which centres on fortress conservation share the view that there is still a requirement to increase the surface of protected areas. The former includes a spatial dimension in which the co-management is generally carried out either on the periphery of existing protected areas, or within protected areas that had not benefited from effective management plans up to that point (e.g. the 'paper parks'). As such, the participation policies are as much a method of integration as they are a set of tactics for pushing back the interface between the wilderness and society. The latter, while promoting a movement 'back to the barriers', is also developing strategies for the expansion of conservation areas. In this sense, both approaches share a similar attempt to define future endeavours by looking beyond the status quo (Margules & Pressey 2000; Pressey et al. 2007). This attempt is mainly pursued

at two levels. First at the regional level, where the 'ecosystem' approach, initiated by the 1992 Convention on Biological Diversity, which aims to integrate protected areas and surrounding lands (i.e. agricultural, etc.) into a join management plan, is now a prerequisite in all biodiversity management policies (Smith & Maltby 2003). Second, at the global level, where major conservation organisations create protected areas using priority regions defined according to various ecological criteria (endemism, diversity, endangered species, etc.). In this regard, the Conservation International's Biodiversity Hotspots, Birdlife International's Important Bird Areas, the Global 200 ecoregions initiated by the WWF and the portfolios of The Nature Conservancy, compete to shape the actions of conservation worldwide ... as far as ecological priorities and media coverage are concerned[3].

The Compilation Tools for Conservation

Moreover, the globalised approach has been partly based on the compilation and harmonisation of the tools available to evaluate conservation, which have taken on a more inclusive dimension over the last decade. The IUCN has been at the centre of this undertaking since the 1960s, when the First World Congress on protected areas took place and the first protected area classifications were established. Although IUCN categorisation is not binding on national legislations, it has an obvious impact on the clarity and legitimacy of conservation policy. Since the 4th World Congress on National Parks and Protected Areas held in Caracas in 1992, the IUCN has defined seven categories of protection measures (I to VI), with the first category made up of two sub-categories (Ia and Ib) (See Table 1.1).

More recently, the Commission on Environmental, Economic and Social Policies of the IUCN launched a new phase in the expansion of protected areas, by proposing to take into account a typology outlining modes of governance. This means that protected areas are no longer distinguished simply by their degree of protection, but also in terms of the institutions managing them (states as well as private and community-based actors) (See Table 1.1). It is within this framework that new types of protected areas are now included in the WDPA, although these categories are not always filled in properly. Today, the options for designating protected areas favour an inclusive approach indicative of the diversification policies currently being followed, although with clear controversy between experts, as witnessed with the recent cautious stand adopted by IUCN (see Dudley 2008). Finally, this classification work is associated with programmes conducted within the WCMC to expand and modernise the WDPA.

3 See Redford et al. (2003) for a list of these methods and Rodary and Milian (2010) for a critical review.

Table 1.1 The protected area matrix

Protected Area Categories							
Ia. Strict Nature Reserve	Ib. Wilderness Area	II. National Park	III. Natural Monument or Feature	IV. Habitat/Species Management Area	V. Protected Landscape/ Seascape	VI. Protected area with sustainable use of natural resources	No Category
Integral protection, for scientific research	Integral protection	High protection, but tourism authorised	Protection restricted to a specific site	Protection concerns a specific species or ecosystem	Low protection, transformed environment	Low protection, sustainable use of resources	Un-determined

Governance Types										
A. Government			**B. Shared**			**C. Private**			**D. Indigenous and local communities**	
State department or agency	De-centralised government	Other institution (de-legation)	Trans-boundary management	Collaborative management (unique structure with external influence)	Joint-management (different partners)	Individual owner	Non-profit organisation	Commercial organisation	Indigenous peoples	Local communities (sedentary and mobile)

Source: Dudley 2008

Expansion or Diversification: A Cartographic Analysis

The arguments over the opening or closing of conservation to other forms of land use, and the attempts to integrate information and management tools on a global scale, are orientating the categorisation of protected areas. The cartographic analysis presented here makes it possible to evaluate these orientations in regards to the initial hypotheses of protected area expansion and diversification. We present at first the methodological framework that structured our approach, followed by an analysis of the trends of expansion and diversification.

Methodological Considerations

Free access to the WDPA via the Internet has been possible since 2003. At the time, it represented an important novelty for all those who specialised in protected area management. It meant being able to obtain information on a specific protected area or a state and, more importantly, to carry out comparisons at a national or international level. Because attitudes towards conservation are also political choices and not just the application of a supposedly neutral science, analytical and management tools have been at the centre of important arguments. As a result, there is, on one hand, a manifest shortage of studies on the current state of conservation, and of comparative studies on a global scale in specific domains (particularly social sciences)[4], and, on the other hand, a proliferation of studies that exceed mere scientific analyses.

We can easily imagine that, for political reasons mainly[5], the partners of the WDPA project might use the database without necessarily wishing to publish in detail the results of their studies or use their publications for their own promotion. Nevertheless, it is hard to understand why researchers working on conservation issues appear to ignore altogether this type of tool, if not for being too focused on local examples, thereby neglecting global analyses (Rodary 2009).

A large number of WDPA-based studies have been published, but they have been mainly interested in gap analyses between protected areas and ecological conditions, apart from the studies produced directly by WCMC or IUCN experts

4 With an increasing number of exceptions nonetheless. For examples that are not mere compilation of case studies, see James et al. (1999); Redford et al. (2003); Agrawal and Redford (2006); Halpern et al. (2006); Hayes (2006); Naidoo et al. (2006); Depraz (2008); Héritier and Laslaz (2008); Leverington et al. (2008), and more significantly, the recent endeavour by D. Brockington and his colleagues to engage in a global understanding of the social incidences of conservation policies (Brockington et al., 2008).

5 There is a particularly appropriate example of this in the debate created by M. Chapin (2004). In response to his article showing the decline in the collaboration between conservationist and indigenous movements, major conservation organisations – all members of the WDPA consortium – simply gave local examples, making sure not to supply figures of the impacts their policies had at the global level (Collective 2005).

which mainly show the current conditions under which protected areas are distributed, and which are rather biased in favour of the promotion of the WDPA (Green and Paine 1998; Chape et al. 2005; Chape et al. 2008; Hoekstra et al., 2010)[6]. Adopting a more biological stance, the various conservation organisations promoting the prioritisation methodologies, carried out analyses using the WDPA to evaluate the importance of specific biomes or ecosystems. While these analyses give neither specific historical, nor social information and focus on ecological criteria (see Rodary and Milian 2010), they nevertheless comprise the first global analyses that measure the pertinence of the current distribution of protected areas for species and natural environments[7].

Because processing a database leads to an inevitable loss of information, the analyses carried out here are not a description of the reality on the ground but, more simply, an analytical compilation of national figures. Our conclusions must be placed in this specific methodological context. The analyse focuses on two particular themes: the historic development of protected areas and the use of protected area management categories. On both points however, the WDPA reveals limitations: on the one hand the database either contains errors or has not been updated on time where information willingly supplied to the WCMC by national authorities or conservation managers is concerned. We decided for the sake of coherence to keep the database 'as is', even if we were in possession of more recent information for specific regions. On the other hand, not all the attributes of each database entity (i.e. protected area) are filled in. In particular, surface data (and a *fortiori* georeferencing) as well as the date of creation, are not systematically indicated (See Box 1.1).

Trends in Expansion

Figure 1.1 illustrates the evolution of the total surface area of protected areas since 1870, a symbolic date when the first American national park was created (for a general history, see Adams 2004). What can be seen from this graph is obvious: throughout the 20th century, there has been major growth in both the size and importance of protected areas. When considering the way man has defined much of the earth's surface, the 20th century has not only been the century of urbanisation, but also that of the institutionalisation of protected areas as an instrument of environmental management. From 68,000 km² in 1900 to 1 million km² in 1950, the

6 But note the article of K. Zimmerer and his colleagues which proposes an analysis of the historical development of protected areas between 1985 and 1997 (Zimmerer et al. 2004), and also an older article by IUCN experts (Harrison et al. 1982).

7 On this theme of full development, of note are the articles of Myers et al. (2000), Olson and Dinerstein (2002), Rodrigues et al. (2004), Brooks et al. (2004), Hoekstra et al. (2005); Kareiva and Marvier (2007); Langhammer et al. (2007) and Pyke (2007) among many others. For an analysis of these issues on prioritisation, see our article Rodary and Milian 2010.

Box 1.1 Methodological limitations

As a tool, the WDPA has a certain number of technical and informational limitations which we have had to take into account throughout our analysis.
The data for surface area is not available for a limited number of protected areas: 12.3% of the sites listed in the database have been given a value of zero for the surface area field. In the majority of cases, these are protected areas with a surface area of less than 1 ha, most of which are classified under Category III. However, in a small number of cases, these are probably protected areas with larger surface areas. But since this shortcoming is rare, it does not result in a significant margin of error for the results derived from this variable.
We were not able to identify the date of creation for 22% of the protected areas. Concerning Category Ia to VI sites, calculations have been carried out on 65% of the sites. This absence of data concerns a small number of countries, mainly Russia and New Zealand (which represent 50% and 17% respectively of sites with this problem). If we exclude these two countries, only 11.55% of the sites lack values concerning their date of creation. For those protected areas having a degree of protection that has not been evaluated by the IUCN ('no category', cf. hereunder), calculations have been carried out on 51.7% of the sites. Then again, considering their typology, many of these sites probably have a surface area of less than 1 ha.

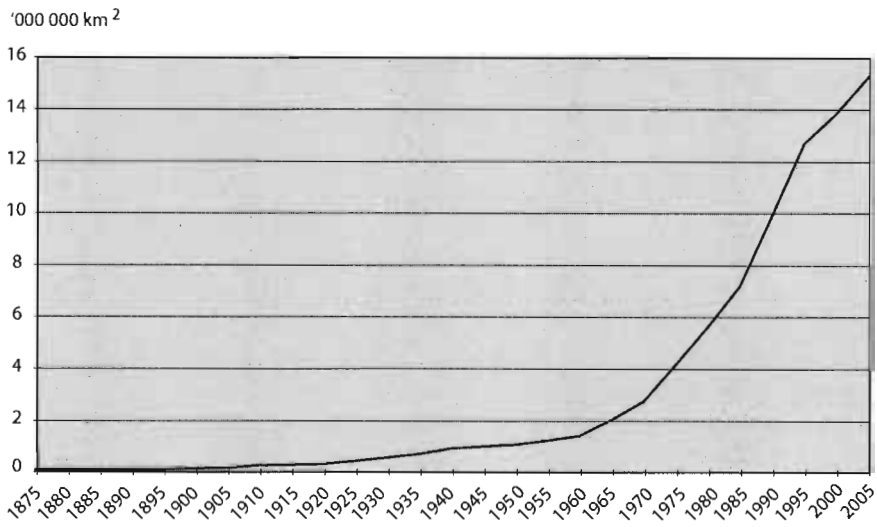

Figure 1.1 Evolution of the total surface area of protected areas worldwide

surface area has multiplied more than tenfold in 50 years, and has grown by a factor of fifteen over the second half of the century, to reach more than 15 million km² in 2005 (19.33 million km² if we take into account areas with an unknown date of creation). Nonetheless, we can also observe a slight inflexion in the rate of increase,

dating from 1995. The highest rate of increase in fact took place during the previous decade, i.e. between 1985 and 1995.

Figure 1.2, illustrates surface areas placed under protection every five years. We can clearly distinguish a slowing down in the creation rate of protected areas since 1995, which was still an important period of growth but was lower than the progress observed between 1975 and 1995.

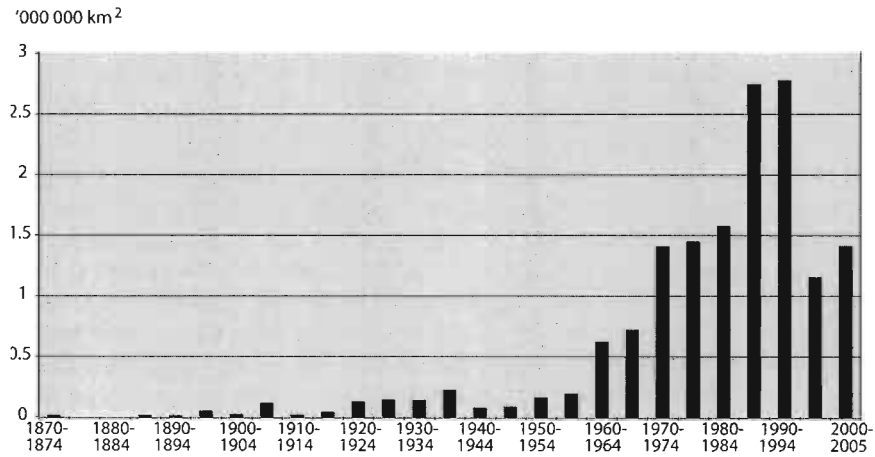

Figure 1.2 Five-year evolution of surface areas under protection worldwide

Plate 1 examines the rate of expansion of protected areas by continent[8]. An initial analysis shows the marked dominance of the North American and African continents. It is not until the 1960s that other continents experienced a noticeable establishment of protected areas. From the 1960s onwards, this is very conspicuous for Asia and South America; from 1975 for Oceania; and from 1985 for the Middle East. After these dates, there is a striking degree of similarity in creation rates across the continents, with the exception of Europe where it has remained constant, though moderate, since 1960.

Trends in Diversification

A reading of the figures by category rather than continent deepens the analysis of recent dynamics in conservation. Plate 2 shows the development of the number of protected areas worldwide since 1900 arranged by categories. Unsurprisingly, Categories III and IV are predominant over the entire period. Category III concerns small protected areas, very often less than 10 km², whereas Category

8 Here we created groups that do not match those used by the WCMC to make the comparisons clearer.

IV includes those areas dedicated to the management of a specific species, or group of species, i.e. animal reserves, game reserves or forest reserves. Up until the 1930s, these reserves represented the main type of protection, and to this day remain the preferred measure when protection is to be ensured through the targeted use of specific natural resources. It comes as no surprise that Category II is represented by only a few sites; national parks usually cover vast territories, which mechanically restricts their numbers (Milian and Rodary 2008). Perhaps more unexpected however, is the low proportion of sites in Category VI: supposedly to represent the paradigmatic form of new policies integrating both conservation and development, these areas are still marginal compared to the other categories. Categories V and VI which were conceived explicitly with sustainable development in mind, constitute little more than 10% of world sites.

Also noteworthy is the parallel increase in the number of sites across almost all categories; with the exception of Category IV, for more than 40 years all those categories historically registered by the IUCN have been following comparable development rates, this being true even for Category Ia which is highly protectionist and forbids any utilisation of natural resources.

'No category' sites also represent an important part of the total number of protected areas: these are spaces with an unknown management strategy, including territories that do not appear in the United Nations list because of their modes of governance. Referring to the designations given by governments to these areas can give us an idea of the major classifications concerned. What emerges from Table 1.2 is that indigenous reserves and forest reserves constitute more than half of the surface area concerned. The former are the direct consequence of community-based policies developed in the 1990s. The latter illustrates the IUCN and the WCMC's desire to integrate types of managed areas that national legislations do not necessarily categorise as tools for conservation. South America (54%), Africa (21%) and Asia (16%) are the continents the most affected by these 'no category' sites. In fact, 99% (i.e. more than 1 million km²) of indigenous reserves are found in South America and close to 60% (i.e. 348,000 km²) of forest reserves in Africa.

Plate 3 also shows different categories of protected areas although this time they are classified according to their respective surface areas on a global scale. Here the orders are reversed: Categories II and VI, on their own, represent more than half of the total surface area of protected areas. The increase has been particularly marked for "areas with sustainable management of resources" (VI)[9].

9 In the WDPA, although Category VI has been registered since the beginning of the 20th century, it actually represents a retrospective categorisation as it was only created at the beginning of the 1990s, and is therefore anachronistic. It highlights nonetheless the existence of 'sustainable' forms of management throughout the century, although it is only since the 1970s that this method of management became obvious geographically. This anachronism enables contemporary conservationists to classify under Category VI reserves

Table 1.2 Classification of 'no category' protected areas

Indigenous Reserves	36.60%
Forest Reserves	19.64
Nature Reserves	8.91
National Parks	8.10
Nature Parks	4.13
Agriculture	3.40
Animals Reserves	2.95
Marine Areas	2.85
Game Reserves	2.62
Monuments	2.24
Wetlands	0.78
Habitats	0.13
Recreation Areas	0.07
Unknown Designation	7.58
Total	100.00

It was also the case for national parks (II) which are generally far removed from sustainable management. It follows that the current dynamic behind the expansion of protected areas cannot be explained entirely by the diffusion of the least protected spaces or, to put it another way, the most integrated spaces. However, we must note that during the last decade when the growth rate decreased compared to the previous period, only 'sustainable categories' experienced a reinforcement of their numbers.

Box 1.2 contains a summary of the main characteristics of protected areas, and compares their surface areas by continent. It also looks at their spatial and geographical evolution as well as status.

A Historical Geographical Synthesis, or How to Conserve Conservation

The Plates 4 to 10 summarise the historical evolution rates of protected areas, the level of their protection and their locations. For all the maps, three historical periods have been defined, each corresponding to major development phases in conservation; and the categories of protection have been represented in two groups[10]. We propose an

that would be more appropriately classified under Category IV (Habitat and Species Management Area, corresponding to hunting or forest reserves).

10 The three historical periods are pre-1970, 1970 to 1985 and post-1985. The extent of protection refers to Highly Protected (Categories Ia to IV) and Sustainable (Categories V

Box 1.2 Main data on protected areas

Protected areas by continent

Continent	Number	Surface Area (in km²)	% of the continent[1]
North America[2]	11,669	3,876,180	17.79
Africa	5,897	3,041,052	10.04
South America[3]	3,904	3,827,243	18.82
Asia	8,273	4,155,537	11.31
Oceania	10,171	1,894,610	21.18
Europe	57,493	1,296,395	12.47
Middle East[4]	786	1,158,365	16.38
Total	**98,193**	**19,249,382**	

(1) Percentage given for information only, considering that a small proportion of protected areas is composed of marine areas.
(2) Including Greenland but excluding Mexico.
(3) Including Mexico, Central America and the Caribbean.
(4) Including Afghanistan and excluding Egypt attached to Africa.

Surface of protected areas

- Constant progression since 1870.
- Historical precedence of the North American and African continents.
- Slowing down in the rate of creation since 1995.
- Predominance of Categories II (National Park) and VI (Managed Resource Protected Areas).

Number of protected areas

- Predominance of Categories III (Natural Monument) and IV (Habitat and Species Management Area).
- In non-categorised protected areas, predominance of indigenous reserves.

interpretation of the maps by continent and according to three modes: by historical phase, zones of high concentration, and categories of protection.

Historical Progression

In terms of historical progression, we can distinguish seven major development phases in conservation over 125 years:

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and VI). Also, the use of dots (as mentioned in the legend) does not refer to small protected areas but to units that are not georeferenced (Box 1).

- An *institutionalisation phase* between 1870 and 1920, which corresponds to the first measures of protection. At this time, most protected areas are either reserve or national park, and are predominantly found in Africa and North America respectively – the two regions most affected by early conservation policies. But interest in conservation begins to spread to other regions of the world, certain British dominions in particular such as New Zealand, to Scandinavian and Western Europe (the first national parks appeared in Sweden, Switzerland and Spain; nature reserves appeared also in the Netherlands, Denmark and Sweden) and to South America (first Chilean reserves).
- A *progression phase* between 1920 and 1940, in line with the consolidation of conservation policies in Africa and North America, and with the associated dissemination of the national park as the main tool for protection worldwide (Japan, Europe and the southern Cone of South America). As the creation of nature reserves spreads throughout Europe, other regions too become aware of conservation, particularly with the creation of wildlife reserves in Asian British dominions (i.e. India, Burma and Sri Lanka), as well as forest reserves in the Dutch East Indies.
- A *slowing down phase* between 1940 and 1960, as a result of the Second World War and decolonisation, with however a few noticeable expansions, in Australia and New Zealand in particular. Yet it is during this period that the structures which will really boost the internationalisation of conservation are going to be set up, such as the IUCN and the WWF. For this reason, the recession phase for the creation of protected areas corresponds to a reconfiguration period, where political frameworks change with decolonisation, and where the economic context also changes with the internationalisation and democratisation of nature tourism.
- A *resumption phase* between 1960 and 1970, during which conservation policies are taken over by post-independence governments. Partially because of this political change, the legitimacy of protected areas shifts towards an economic discourse mainly connected to the development of the tourism industry. During that period, South America and, to a lesser extent Europe and Africa, experience a very clear acceleration in the creation of protected areas.
- A *strong progression phase* between 1970 and 1985, corresponding to the appearance of environmental issues on the international political agenda – what has been called the emergence of global 'eco-politics' (Le Prestre 2005). This phase corresponds to the real globalisation of protected areas as the dominant tool for conservation policies. In this regard, there was strong progress on continents that, until then, were little affected by this movement (Asia, insular Oceania and to a lesser extent the Middle East). Low-density areas also benefited from large-scale protection (Alaska, Northwest Canada, Greenland, Arctic Siberia and the Kunlun Massif).
- An *intensification phase* between 1985 and 1995, during which all the continents, without exception, experience their highest rate of

area protection, associated with the institutionalisation of sustainable development as an international discourse. This phase sees the creation of large Category II parks (the Tassili N'Ajjer National Park and the Ténéré National Nature Reserve in the Sahara; in the Amazon and in the Chaco in South America), as well as the creation of big protected areas of Category V (Tibetan Plateau and the Himalayas) and Category VI (Arabia, Central Australia, Quebec and Argentina). It is during this period that the great majority of governments institute public policies for biodiversity protection, and commit themselves internationally to conservation.

- Finally, a *slowing down phase* between 1995 and 2005, during which several continents experience a decrease in their rate of protected area creation (even though the pace remains sustained in Asia – in China in particular – Oceania and Europe). This occurs as conservation policies come under increasing scrutiny, both at local level with regard to community participation, and globally with the decline of states' commitment towards multilateral agreements on environmental issues (Rodary 2007).

Spatial Configuration

In terms of distribution, the current situation shows a globalisation of the instruments for spatial protection, yet with some marked differences across country and continent. On a regional scale, we can distinguish three main types of configuration in the larger concentrations of protected areas:

- *Very large blocs of protected areas*. These are situated predominantly in the polar or circumpolar areas (Antarctica[11], Greenland, Northern Canada, Alaska, Southern Chile and Siberia) and the great deserts (Arabia, Sahara, Namib, Kalahari, Tibetan High Plateau and Xinjiang as well as Mongolia).
- *Networks of protected areas of lesser importance*. These are found in the circum-Amazonian and Andean area, in Central America, on the Australian coasts, in Eastern Africa and in the Indo-Malaysian Archipelago.
- *Regions with high concentrations of small management units*. These are located mainly in highly urbanised and/or densely populated areas: North-East United States, East-Central Europe, Brazilian coasts, Eastern China, Japan, Korea and India.

In terms of protection categories, there are marked differences by continent (See Table 1.3). On the one hand, all the continents have a special category that represents more than one third of the surface area under protection. On the other hand, we see an obvious relationship between these favoured categories and the

11 Although the Antarctic continent does not appear in the list, it is fully protected by the Protocol on Environmental Protection to the Antarctic Treaty since 1997.

Table 1.3 Main protection category by continent

Continent	Main category in surface area	Percentage of protected surface area
Middle East	VI. Managed Resource Protected Area	76.21
Oceania	VI. Managed Resource Protected Area	50.09
North America	II. National Park	42.56
South America	'No Category' (Indigenous Reserve)	42.43
Europe	IV. Habitat/Species Management Area	35.87
Asia	V. Protected Landscape	35.60
Africa	II. National Park	33.78

main development period of protected surface areas on the continent considered (Plate 1).

From this synthesis one could infer that continents which created conservation areas much later on, favoured sustainable forms of management. But although this analysis is correct for the Middle East and Oceania (even if the data is partially distorted by the creation of some very large units, but which is little representative of the most widespread categories in the region), it indicates above all the strong permanence of older protected areas.

Conclusion

Since the emergence of sustainable development as a dominant discourse, the world of conservation managed to 'conserve' its own means of action, organised mainly around protected areas. Admittedly, some of these areas are becoming increasingly connected to other spaces, integrated with other types of territorial management and have been diversified by giving a more important role to human practices not directed explicitly towards biodiversity conservation. Yet at the same time, there has been an expansion of the more traditional protected areas, which invalidates the perception that 'conservation' has lapsed into 'sustainable development' by having given up the specificities that have defined and founded protected areas for more than 100 years.

The expansion of protected areas has been confirmed in the last few decades, during which even the most marginal states (as far as conservation policies are concerned), have embarked on the creation of protected areas. What we have been dealing with for the past 30 years is the globalisation of this tool, even if the regional differences in surface area and category of protection remain very marked. Does a slowing down of the creation rate of protected areas, as observed in recent years, reflect a rupture in the dynamics of expansion worldwide? Although it is still too early to provide a clear-cut answer, we can envisage that the future of conservation will be characterised by a double-faced trend. One is the consolidation of existing land tenure systems of protection – and therefore the perpetuation of current

conservation policies. The other is the development of experimental and in future more innovative approaches, mainly by marginal organisations in the field of conservation policies. This double trend enables conservation to respond to the constraints of the time, while protecting the conservation legacy.

References

Agrawal A., Redford K., 2006 – *Poverty, development, and biodiversity conservation: shooting in the dark?* New York, Wildlife Conservation Society, Working paper n° 26, p.50.

Brockington D., Duffy R., Igoe J., 2008 – *Nature unbound. Conservation, capitalism and the future of protected areas.* London, Earthscan, p. 240

Brooks T. M., Bakarr M. I., Boucher T., da Fonseca G. A. B., Hilton-Taylor C., Hoekstra J. M., Moritz T., Olivieri S., Parrish J., Pressey R. L., Rodrigues A. S. L., Sechrest W., Stattersfield A., Strahm W., Stuart S. N., 2004 – Coverage provided by the global protected-area system: is it enough? *Bioscience,* 54 (12): 1081–1091.

Chape S., Blyth S., Fish L., Fox P., Spalding M., 2003 – *2003 United Nations List of Protected Areas.* Gland/Cambridge, p. 44.

Chape S., Harrison J., Spalding M., Lysenko I., 2005 – Measuring the extent and effectiveness of protected areas as an indicator for meeting global biodiversity targets. *Philosophical Transactions of the Royal Society B* (360): 443–455.

Chape S., Spalding M.D., Jenkins M.D. (eds.), 2008 – *The world's protected areas. Status, values and prospects in the 21st century.* Berkeley, University of California Press, p. 376.

Chapin M., 2004 – A challenge to conservationists. *Worldwatch Magazine,* November–December: 17–31.

Collective, 2005 – A challenge to conservationists: Phase II. From reader. *Worldwatch Magazine,* January–February: 5–20.

Depraz S., 2008 – *Géographie des espaces naturels protégés. Genèse, principes et enjeux territoriaux.* Paris, Armand Colin, coll. U Géographie, p. 320.

Green M. J. B., Paine J., 1998 – "State of the world's protected areas at the end of the twentieth century." *In IUCN, Protected areas in the 21st century. From islands to networks,* Albany, 23–29 November 1997, IUCN: 104–126.

Halpern B. S., Pyke C. R., Fox H. E., Haney J. C., Schlaepfer M. A., Zaradic P., 2006 – Gaps and mismatches between global conservation priorities and spending. *Conservation Biology,* 20 (1): 56–64.

Harrison J., Miller K., McNeely J. A., 1982 – The world coverage of protected areas: development goals and environmental needs. *Ambio,* 11 (4): 238–245.

Hayes T. M., 2006 – Parks, people, and forest protection: an institutional assessment of the effectiveness of protected areas. *World Development,* 34 (12): 2064–2075.

Héritier S., Laslaz L. (eds.), 2008 – *Les parcs nationaux dans le monde. Protection, gestion et développement durable*. Paris, Ellipses, coll. Carrefours Les dossiers, p. 312.

Hoekstra J. M., Boucher T. M., Ricketts T. H., Roberts C., 2005 – Confronting a biome crisis: global disparities of habitat loss and protection. *Ecology Letters*, 8 (1): 23–29.

Hoekstra J., Molnar J. L., Jennings M., Revenga C., Spalding M. D., Boucher T. M., Robertson J. C., Heibel T. J., Ellison K., 2010 – *The atlas of global conservation. Changes, challenges, and opportunities to make a difference*. Berkeley, University of California Press, p. 272.

James A. N., Green M. J. B., Paine J. R., 1999 – *A global review of protected area budgets and staff*. Cambridge, WCMC/World Conservation Press, WCMC Biodiversity Series n° 10, p. 55.

Kareiva P., Marvier M., 2007 – *Conservation for the people, Scientific American*, 297 (4): 50–57.

Langhammer P. F., Bakarr M. I., Bennun L. A., Brooks T. M., Clay R. P., Darwall W., De Silva N., Edgar G. J., Eken G., Fishpool L. D. C., da Fonseca G. A. B., Foster M. N., Knox D. H., Matiku P., Radford E. A., Rodrigues A. S. L., Salaman P., Sechrest W., Tordoff A. W., 2007 – *Identification and gap analysis of key biodiversity areas. Targets for comprehensive protected area systems*. Gland, IUCN, p. 116.

Le Prestre P., 2005 – *Protection de l'environnement et relations internationales: les défis de l'écopolitique mondiale*. Paris, A. Colin, p. 477.

Leverington F., Hockings M., Costa K.L. (eds.), 2008 – *Management effectiveness evaluation in protected areas – a global study*. Gatton/Gland/Washington, The University of Queensland/IUCN WCPA/TNC/WWF, p. 70.

Margules C. R., Pressey R. L., 2000 – Systematic conservation planning. *Nature*, 405 (6783): 243–253.

Milian J., Rodary E., 2008 – "Les parcs nationaux dans le monde, un aperçu cartographique". *In* Héritier S., Laslaz L. (eds.), *Les parcs nationaux dans le monde. Protection, gestion et développement durable*. Paris, Ellipses, coll. Carrefours Les dossiers: 33–44.

Myers N., Mittermeier R. A., Mittermeier C. G., da Fonseca G. A. B., Kent J., 2000 – Biodiversity hotspots for conservation priorities. *Nature*, 403 (6772): 853–858.

Naidoo R. et al., 2006 – Integrating economic costs into conservation planning. *Trends in Ecology & Evolution*, 21 (12): 681–687.

Olson D. M., Dinerstein E., 2002 – The Global 200: priority ecoregions for global conservation. *Annals of the Missouri Botanical Garden*, 89 (2): 199–224.

Pressey R.L. et al., 2007 – *Conservation planning in a changing world. Trends in Ecology & Evolution*, 22 (11): 583–592.

Pyke C. R., 2007 – The implications of global priorities for biodiversity and ecosystem services associated with protected areas. *Ecology and Society*, 12 (1): http://www.ecologyandsociety.org/vol12/iss11/art14/.

Redford K. H., Coppolillo P., Sanderson E. W., da Fonseca G. A. B., Dinerstein E., Groves C., Mace G., Maginnis S., Mittermeier R. A., Noss R., Olson D., Robinson J. G., Vedder A., Wright M., 2003 – Mapping the conservation landscape. *Conservation Biology*, 17 (1): 116–131.

Rodary E., 2007 – "La gouvernance de la biodiversité et le développement". *In* Jacquet P., Tubiana L. (eds.), *Regards sur la Terre. Biodiversité, nature et développement*. Paris, Presses de Science Po/AFD: 137–152.

Rodary E., 2009 – Mobilizing for nature in southern African community-based conservation policies, or the death of the local. *Biodiversity and Conservation*, 18 (10): 2585–2600.

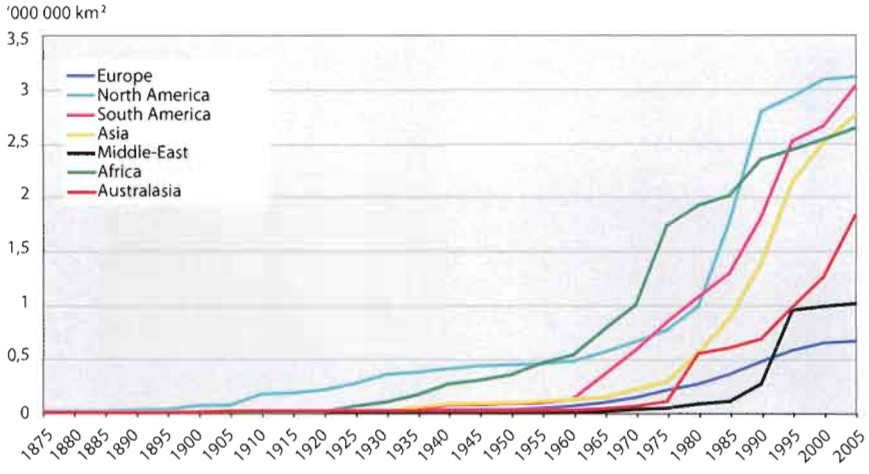
Milian J., Rodary E., 2010 – La conservation de la biodiversité par les outils de priorisation. Entre souci d'efficacité écologique et marchandisation. *Revue Tiers Monde*, (202): 33–56.

Rodrigues A. S. L., Andelman S. J., Bakarr M. I., Boitani L., Brooks T. M., Cowling R. M., Fishpool L. D. C., da Fonseca, G. A. B., Gaston K. J., Hoffmann M., Long J. S., Marquet P. A., Pilgrim J. D., Pressey R. L., Schipper J., Sechrest W., Stuart S. N., Underhill L. G., Waller R. W., Watts M. E. J., Yan X., 2004 – Effectiveness of the global protected area network in representing species diversity. *Nature*, 428 (6983): 640–643.

Smith R. D., Maltby E., 2003 – *Using the ecosystem approach to implement the Convention on Biological Diversity. Key issues and case studies*. Gland/ Cambridge, IUCN, p. 118.

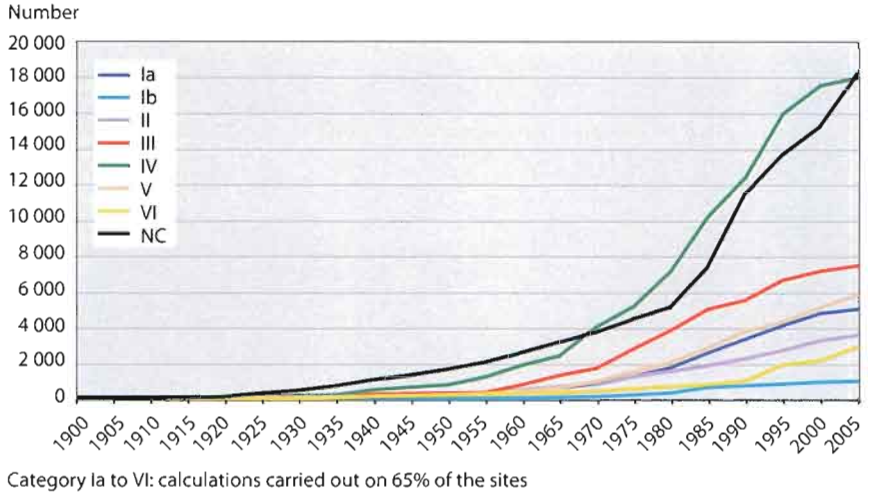
UICN, 1998 – *1997 United Nations list of protected areas*. Gland/Cambridge, UICN, p. 412.

Zimmerer K., Galt R. E., Buck M. V., 2004 – Globalization and multi-spatial trends in the coverage of protected-area conservation (1980–2000). *Ambio*, 33 (8): 520–529.



Calculations carried out on 78% of the surface areas

Plate 1 **Evolution of the surface area of protected areas by continent, 1870–2005**



Category Ia to VI: calculations carried out on 65% of the sites
No category: calculations carried out on 57.1% of the sites

Plate 2 **Evolution of the number of protected areas by categories, 1900–2005**

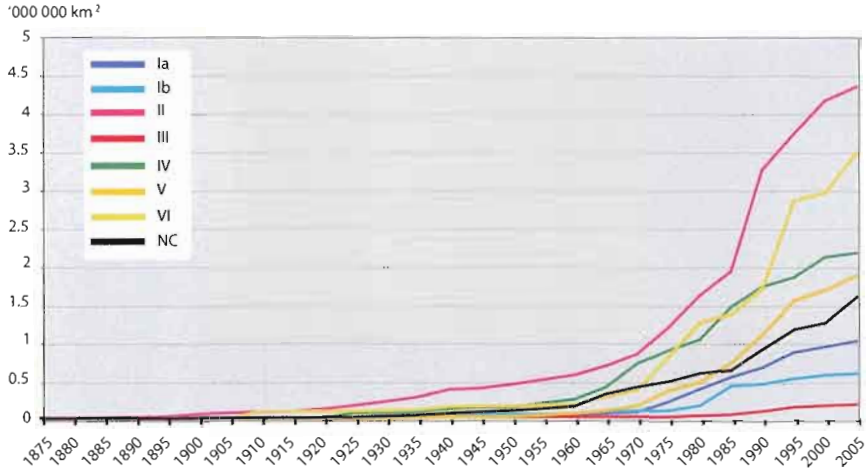


Plate 3 **Evolution of the surface area of protected areas by categories, 1870–2005**

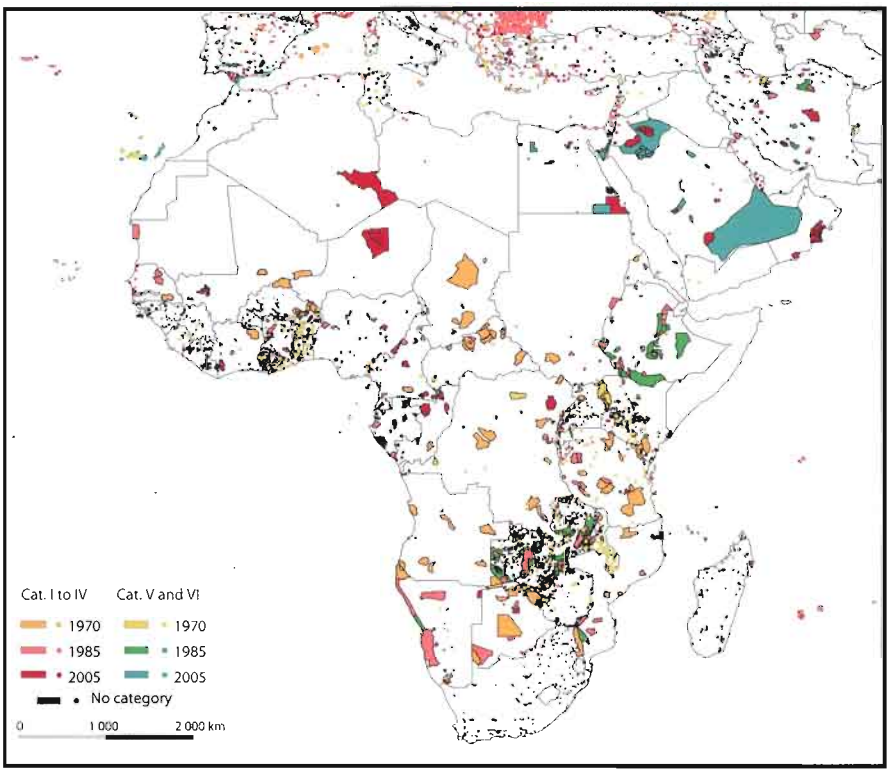


Plate 4 **Evolution of protected areas by categories: Africa**

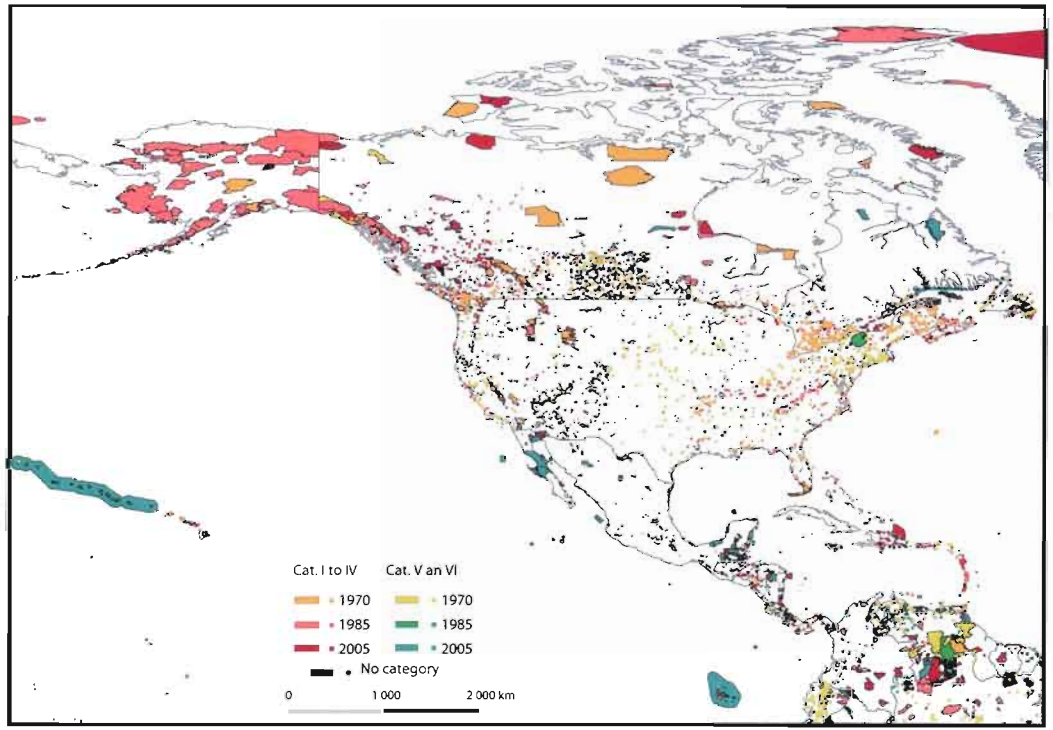


Plate 5 **Evolution of protected areas by categories: North America and Eastern Pacific**

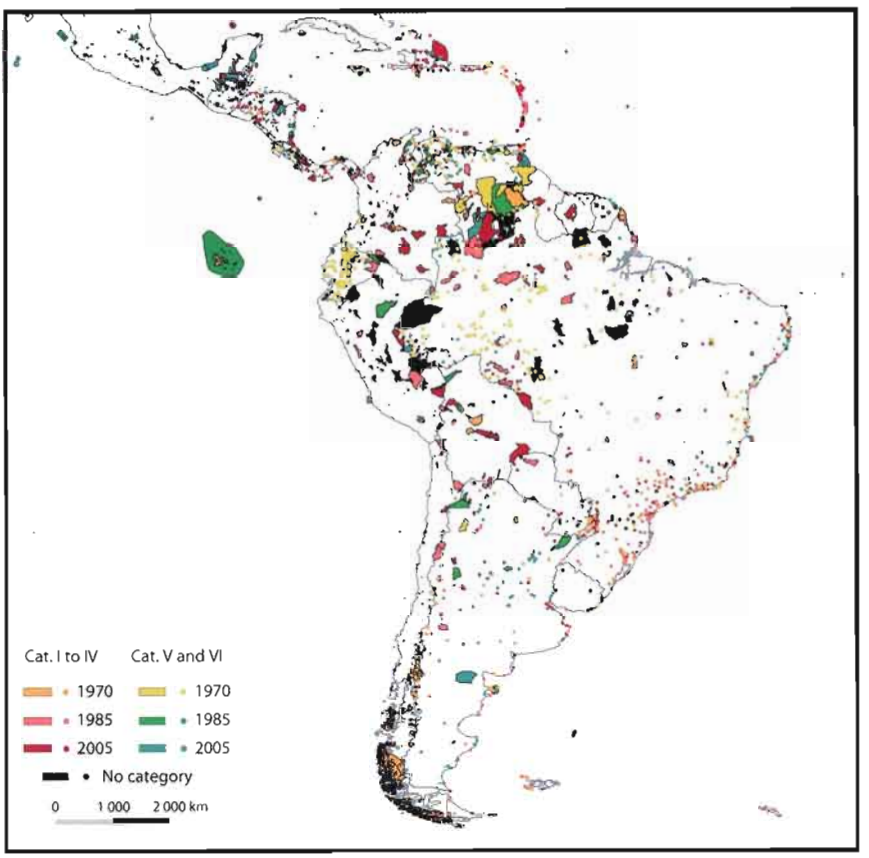


Plate 6 **Evolution of protected areas by categories: Latin America**

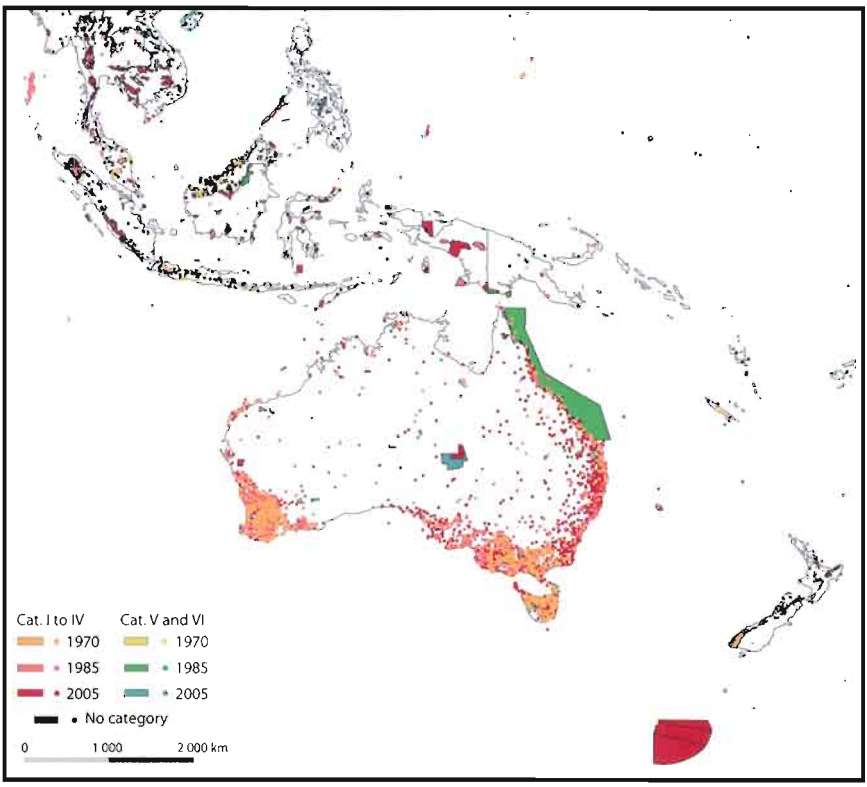


Plate 7 **Evolution of protected areas by categories: Australasia**

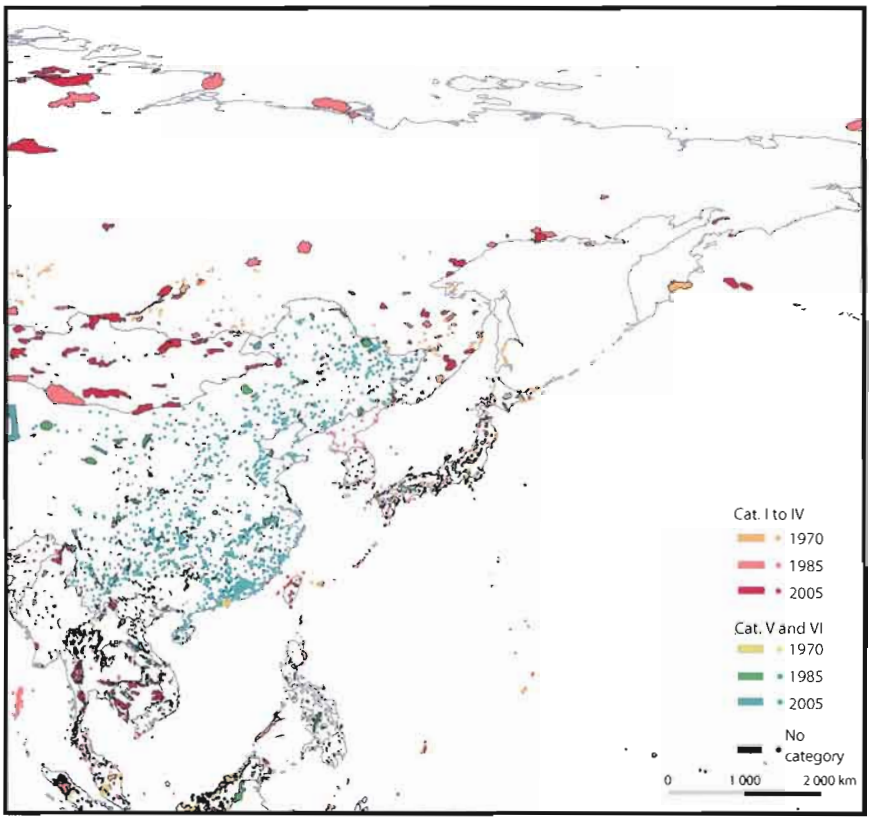


Plate 8 **Evolution of protected areas by categories: Asia**

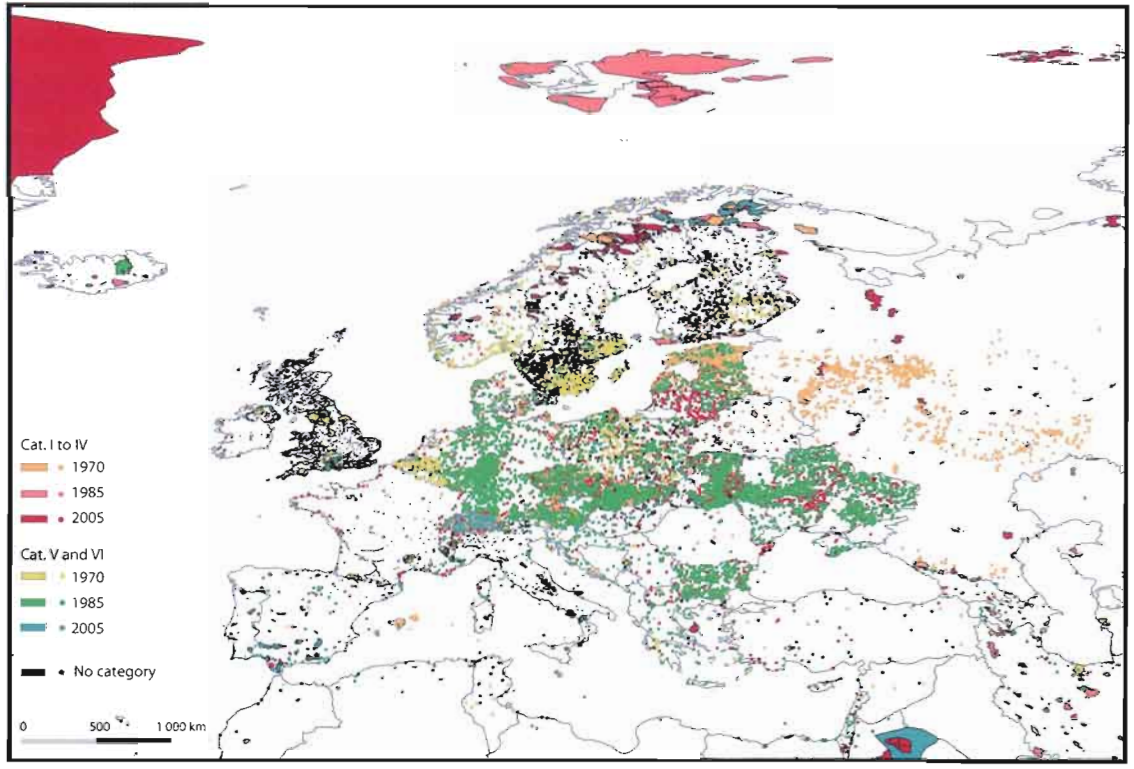


Plate 9 **Evolution of protected areas by categories: Europe**

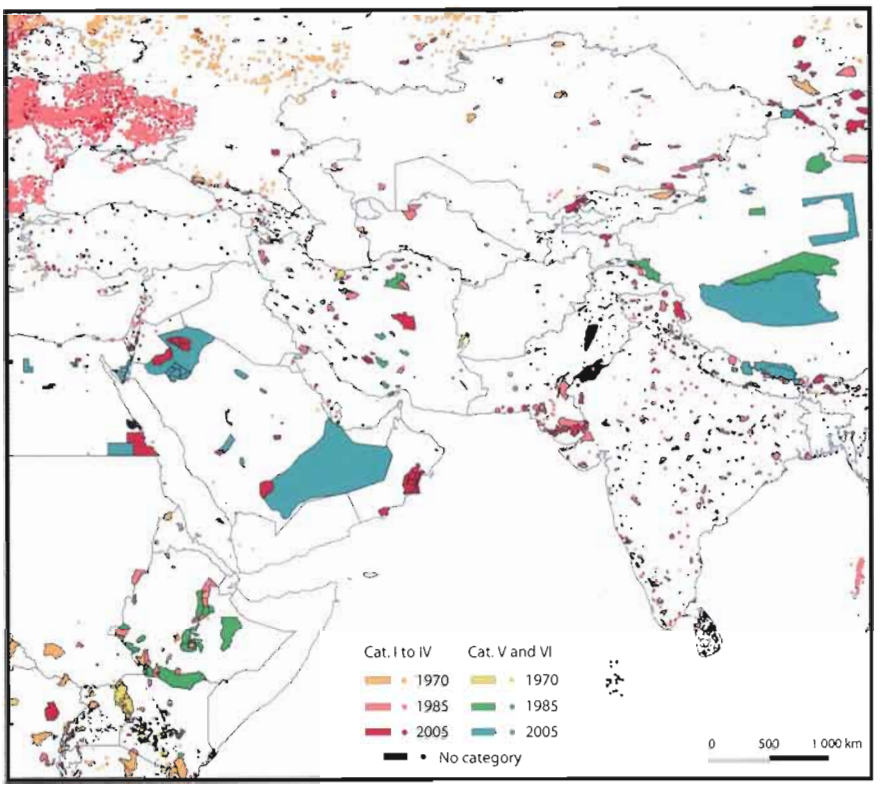


Plate 10 **Evolution of protected areas by categories: Middle East and Indian subcontinent**

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