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The Scientific Council of a national park, the Port-Cros National Park: 50 years of conservation culture

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Résumé. Le Conseil scientifique d'un parc national, le Parc national de Port-Cros : 50 ans de culture de la conservation. Le Parc national de Port-Cros (PNPC) a été créé en 1963. Il s'étend sur environ 700 ha terrestres et 1 300 ha marins (Provence, France, Méditerranée nord-occidentale). Au cours du temps, le PNPC s'est vu confier la gestion de territoires extérieurs au territoire initial : l'île de Porquerolles, des terrains du Conservatoire de l'Espace Littoral et des Rivages Lacustres, des zones Natura 2000 et enfin l'animation de la partie française du Sanctuaire PELAGOS. Depuis 2012, le PNPC est engagé dans un projet de modification de son territoire incluant les îles de Port-Cros, Porquerolles et Le Levant, une dizaine de communes littorales et une vaste 'aire marine adjacente'.

Depuis 1964, le PNPC est doté d'un Conseil scientifique (CS), nommé par le Ministre de l'environnement jusqu'en 1997, puis par le Préfet du Var. Ce CS a été renouvelé à 9 reprises. Le nombre de membres du CS a oscillé entre 15 et 28. Au total, 97 personnes en ont fait partie, pour un ou plusieurs mandats. Le CS a été dominé numériquement d'abord par les biologistes et écologues terrestres, puis par les biologistes et écologues marins (à partir de 1981), avant qu'un équilibre ne s'établisse entre les domaines terrestre, marin et les sciences humaines (depuis 1992). Les membres du CS sont choisis en fonction de leur compétence, mais aussi de leur sensibilité environnementale et conservationniste ; en effet, le CS d'un parc national n'a pas vocation à faire double emploi avec les CS des grands organismes de recherche. Bien que le territoire du PNPC soit largement ouvert à la recherche fondamentale, à laquelle il offre une zone de référence, la recherche doit d'abord aider à connaître le territoire que l'on cherche à protéger ; elle doit également répondre aux questions que se pose le gestionnaire. Enfin, dans le choix

des membres du CS, la connaissance concrète du territoire du Parc national, au moins par une partie des conseillers, constitue un élément important.

Chacun des 9 renouvellements du CS a été marqué par un ajustement entre les différentes disciplines représentées et par un rajeunissement de sa composition. Il a été également marqué par un souci de continuité. En moyenne, 60% des conseillers sortants ont été reconduits. Cette continuité, inhabituelle dans un Etablissement public, a assuré la transmission de la 'culture' du CS, en matière de biologie de la conservation, de gestion des usages et de coévolution entre le CS et les agents du PNPC. Le taux d'acceptation des personnes pressenties pour faire partie du CS (proche de 100%) et l'assiduité aux réunions, de l'ordre de 75%, ce qui est relativement élevé par rapport aux CS d'autres espaces protégés, traduisent l'attractivité du CS du PNPC. Le CS du PNPC est organisé en trois groupes (Terre, Mer et Sciences humaines). Chaque groupe désigne en son sein un responsable, qui est vice-président du CS. Le CS se réunit en formation plénière 1 à 2 fois par an. La Direction, le Service scientifique, un certain nombre d'autres agents du PNPC et des invités assistent aux réunions du CS. Cette large participation permet aux agents du PNPC d'exposer les problèmes environnementaux qu'ils perçoivent et les contraintes de la gestion, aux membres du CS d'intégrer la position des agents et enfin aux agents de s'approprier les débats et les positions du CS. Le Bureau du CS est constitué par son président et ses trois vice-présidents. Il se réunit 3 à 5 fois par an, en présence en particulier de la Direction et du Service scientifique du PNPC. Depuis 2010, l'une de ces réunions se fait sur le terrain, ce qui permet au Bureau de mieux percevoir les problématiques recherche-connaissance-gestion et participe à la coévolution entre personnels du Parc national et membres du CS.

La gestion d'un parc national nécessite une bonne connaissance du patrimoine naturel et culturel, ainsi qu'une évaluation de l'impact réel ou potentiel des activités humaines sur le milieu afin de prendre les mesures de gestion les plus appropriées. Le rôle du CS est de définir les recherches nécessaires à cette connaissance et à cette gestion, et de répondre aux interrogations de la Direction et du Service scientifique du PNPC. Le CS peut également s'autosaisir d'une question sur laquelle il souhaite alerter la Direction.

Au cours de ses presque 50 années d'existence, le CS du PNPC a beaucoup changé, dans sa composition, ses méthodes de travail et son organisation. Les priorités scientifiques ont également évolué ; d'abord centrées sur la description du patrimoine biologique local (espèces, habitats), les recherches ont abordé les problèmes de gestion de la biodiversité et des usages ; enfin, l'expérience accumulée et la longueur des séries de données ont permis de prendre de la hauteur par rapport au PNPC et d'aborder des questions très générales de biologie de la conservation. En revanche, les relations entre le CS, le Service scientifique, la Direction et même le Conseil d'administration du PNPC ont été marquées par la continuité, par l'absence de tensions ou de conflits et par la transmission au cours du temps de la 'culture' acquise, symbiose qui s'est poursuivie au-delà des hommes et des femmes qui ont incarné successivement ces différents acteurs.

Mots-clés : Espace protégé, Parc national, Port-Cros, Conseil scientifique, biologie de la conservation.

Abstract. The Port-Cros National Park (PCNP; *Parc national de Port-Cros*) (Provence, France, North-Western Mediterranean) was founded in 1963. Its territory is both terrestrial and marine. Since 1964, it has been endowed with a Scientific Council (SC). The SC is not intended to play the same role as the scientific councils of the major research organisations. Although the territory of the PCPN is available for basic research, for the purposes of which it offers a reference area, the research should first and foremost serve to help develop knowledge of the territory that is the target of protection; it should also provide answers to questions raised by the managing authority. The management of a national park requires in-depth knowledge of the natural and

cultural patrimony, and an assessment of the actual or potential impact of human activities on the environment, in order to be able to undertake the most appropriate management measures. The role of the SC is to define the research required for this knowledge and to provide answers to questions raised by the Management and Scientific Department of the PCNP. The SC may itself raise issues which it wishes to draw to the attention of the Management. The SC has been reconstituted 9 times; each time, about 60% of the outgoing council members have been reappointed. This continuity has ensured the transmission of the 'culture' of the SC, with regard to conservation biology, the management of uses and the 'co-evolution' of the SC and the PCNP staff. The members of the SC (currently 26) are organised in 3 groups of similar size, each of which designates from among its members a vice-chair: terrestrial biology and ecology, marine biology and ecology and social sciences. The Chair of the SC and the 3 vice-chairs constitute the Bureau. The SC and the Bureau meet 1-2 and 3-5 times a year, respectively. The Management, the Scientific Department and various other members of the PCNP staff, as well as guests, take part in the meetings of the SC and of the Bureau. This broad-based participation facilitates the process of dealing with issues encountered in the field, ensures the efficient transmission of information and guarantees the 'co-evolution' of the SC and the PCPN staff. During the nearly 50 years since its foundation, the SC of the PCPN has changed a great deal, in its composition, its working methods and its organisation. The scientific priorities have also changed; initially centred on the description of the local biological patrimony (species, habitats), research has focused on issues related to the management of biodiversity and of uses. Finally, the accumulated experience and the length of the data series have provided a basis for taking a broader view with regard to the PCNP and dealing with very general conservation biology issues. On the other hand, the relations between the SC, the Scientific Department, the Management and even the Board of Administration of the PCNP have been marked by continuity and by the passing on over the years of the 'culture' acquired.

Keywords: Protected area, national park, Port-Cros, Scientific Council, conservation biology.

Introduction

The island of Port-Cros (Provence, France, North-Western Mediterranean) is situated about 8 km off the continental coast. The island itself, and the neighbouring island and islets (Bagaud Island, La Gabinière Islet, Le Rascas Islet), and a band of sea 600 m wide, were designated as a national park in December 1963 (decree N° 63-1235 of 14 December 1963, founding the *Parc national de Port-Cros ; Journal Officiel* of 17 December 1963). This decree is based on Law N° 60-708 of 22 July 1960 relative to the founding of national parks (Bougeant, 1989).

The surface area of the Port-Cros National Park (PCNP; *Parc national de Port-Cros*) is about 700 ha for the terrestrial part and 1 300 ha for the marine part. The island of Port-Cros is inhabited: several dozen semi-permanent inhabitants; in addition, there are visitors on land and visiting pleasure boat users (300 000 to 350 000/year) and scuba divers (about 60 000 dives/year) (Barcelo and Boudouresque, 2012; Gérardin, 2012). Finally, 10 to 17 artisanal fishers (i.e. small craft fishers) engage in fishing activities in the marine part of the PCNP (Bonhomme *et al.,* 2009; Cadiou *et al.,* 2009; Bonhomme *et al.,* 2011).

Progressively, the PCNP has been entrusted with the management of an increasing number of territories outside the initial territory of the 1963 decree. Since 1985, the PCNP manages the land (bought by the state in 1974) situated on the neighbouring island of Porquerolles (about 950 ha). Since 1984, the park manages the lands of the *Conservatoire de l'Espace Littoral et des Rivages Lacustres*[1] (CELRL) (Letourneux, 1994; Legrain, 2000) situated at Cap Lardier and since 1997 those situated on the island of Porquerolles (Grand Langoustier) and the Giens peninsula (Escampobariou). Since 1999, the PCNP has run Natura 2000[2] (Légifrance, 2013a, 2013b) for the islands of Port-Cros and Porquerolles and the operator of Natura 2000 for the island of Le Levant and the salt marshes at Hyères. Since 2000, the PCNP has been responsible for running the French part of the PELAGOS Sanctuary for marine mammals, an international agreement signed in 1999 between Italy, Monaco and France for the preservation of these animals (Sanctuaire PELAGOS, 2011). Since 2004, the PCNP is the technical and scientific assistant for the *Communauté d'Agglomération 'Toulon Provence Méditerranée'* (TPM) for the management of the two territories of the CELRL (Pesquiers and Les Vieux Salins salt marshes) (Gérardin, 2012). Finally, the PCNP has been responsible for the management of the *Conservatoire Botanique National Méditerranéen*[3]*,* located at Porquerolles then at Hyères, since its foundation in 1979, under a convention between the Ministry of the Environment[4] and the PCNP (Gérardin, 2012).

The PCNP is today engaged in a project for the extension of its territory, redefined to include the three Hyères islands (Le Levant, Port-Cros and Porquerolles), a dozen or so coastal *communes*[5] and a vast Adjacent

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[1] The mission of the *Conservatoire de l'Espace Littoral et des Rivages Lacustres* (Conservatoire of coastal areas and lake shores) is to acquire the coastal lands, to protect them from urban development, to manage them and to make them available to the general public (Letourneux, 1994; Lefeuvre et Dauvin, 1997; Legrain, 2000). Its aims are similar to those of the National Trust (in Great Britain), the Monumentel (in the Netherlands) and the Land Trusts in the USA (*e.g.* the Nature Conservancy and the California Coastal Conservancy) (Falque, 1997).

[2] Natura 2000 is the centrepiece of EU nature and biodiversity policy. It is an EU wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SACs) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive. Natura 2000 is not a system of strict nature reserves where all human activities are excluded. Whereas the network will certainly include nature reserves, most of the land is likely to continue to be privately owned and the emphasis will be on ensuring that future management is sustainable, both ecologically and economically.

[3] The *Conservatoire botanique national méditerranéen* (National Mediterranean Botanical Conservatory) falls under the Ministry of Environment and is operated by the PCNP. Its amenity covers the French Mediterranean regions of Languedoc-Roussillon and Provence-Alpes-Côte d'Azur, where it contributes to preserve the natural biodiversity, amongst which the endangered flora and the traditionally cultivated varieties.

[4] In French : *Ministère de l'Environnement.* The name of this ministry has often changed since 1971, the date of the creation of a *'Ministère chargé de la protection de la nature et de l'environnement'* (ministry responsible for the protection of nature and of the environment), of which the first minister was Robert Poujade. Since the purpose of the present article is not to write a history of this ministry, it will be referred to hereafter as 'Ministry of the Environment'.

[5] The commune is the smallest territorial division in France. Each commune has an elected mayor and a town council.

Maritime Area[6] extending seawards to the edge of the continental shelf (Barcelo and Boudouresque, 2011, 2012; Gérardin, 2012). This project, approved by the Board of Administration (BA) of the PCNP on 22nd December 2010, is covered by decree N° 2012-649 of 4 May 2012 (*Journal Officiel de la République Française,* 6 May 2012). The project makes a distinction between the Core Areas, offering protection and access to the public, the 'Proposed Park Area'[7] and the 'Adjacent Maritime Area', areas for sustainable development. In due course, after the possible inclusion of the *communes*, this project will considerably extend the field of intervention of the National Park and thus of the Scientific Council.

Decree N° 63-1235 of 14 December 1963 concerning the foundation of the PCNP provided for a Board of Administration (BA) (article 26). It also provided for the establishment of a Scientific Committee (SC), by an *arrêté* of the ministry of the environment, at the request of the BA, within a year. The SC is 'made up of personalities chosen on the basis of their field of expertise and has the responsibility for providing the park authority with technical advice and undertaking such studies as will be entrusted to it'[8] (article 30). A SC was actually set up by an *arrêté* of the ministry that was at that time responsible for the environment, dated 30 October 1964. The Chair of the SC was not as of right a member of the BA. He or she could however become a member if among the personalities designated by the ministry responsible for the protection of the natural environment and by the *Conseil national de Protection de la Nature* (CNPN; National Council for the Protection of the Natural Environment) (article 26). This has been the case since 1970: Roger Molinier, Chair of the SC, was a member of the BA as a designated personality until 1985, as is his successor to the chair of the SC, Charles-François Boudouresque (co-author of the present article) from 1986. Since law N° 2006-436 of 14 April 2006 relative to national parks, natural marine parks and regional natural parks, 'the chair of the Scientific Council of the public establishment of the national park is a member as of right of the Board of Administration'[9] (article L331-8 of the Code of the Environment[10]). In addition, this law changed the name of the Scientific Committee to Scientific Council; hereafter, we will make no distinction between these two successive titles.

Since October 1964, the CS of the PCNP has been reconstituted nine times: April 1970, April 1974, December 1978 (replacement of a member

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[6] In French: '*Aire marine adjacente*'.
[7] In French: '*Aire potentielle d'adhésion*'.
[8] In French: the SC is '*composé de personnalités choisies en raison de leur compétence et chargé de donner à l'établissement des avis techniques et de procéder aux études qui lui seront confiées'.*
[9] In French: '*le président du conseil scientifique de l'établissement public du Parc national* [est membre] *de droit du conseil d'administration'*.
[10] In French: *Code de l'environnement.*

following resignation), January 1981, November 1985, September 1992, February 1999, March 2005 and April 2011 (Tabl. I). The duration of the mandate of a SC has thus ranged from 4 years to about 7 years.

Table I. The members of the Scientific Committee, then of the Scientific Council, of the Port-Cros National Park, their specialism (as indicated in the *arrêtés* appointing them) and the year (or years) of appointment. The first name and the specialism are not always specified in the appointment *arrêtés*; they are nonetheless indicated where known to the authors of the present article.

NAME First name	Specialism	Year(s) of appointment
AMI Dominique	Economics of the environment	2005, 2011
ARNAUD Olivier	Continental hydrology, Hydrobiology	2011
ATHIAS-BINCHE Françoise	Microfauna	1985, 1992
AUBLANT Louis	General hygiene	1964
AUGIER Henry	Phycology, Plant biology	1974, 1978, 1981, 1985
BALACHOWSKY Alfred Serge	Entomology	1964, 1970
BALLEYDIER Roger	Botany	1964, 1970
BARNABÉ Gilbert	Marine biology	1978, 1981
BATS Michel	Social sciences	1985
BEISSON Guy	Management of rural territories, Agriculture, Environment	2011
BELLAN-SANTINI Denise	Oceanology	1985
BESSON Jean	Ornithology	1970, 1974, 1978, 1981, 1985
BIGOT Louis	Entomology	1985, 1992
BILIOTTI Emile	Agronomy, Zoology	1964, 1970
BLANC Jean-Joseph	Geology	1970, 1978
BLANC Lucien	Meteorology	1974, 1978
BLONDEL Jacques	Ornithology	1974, 1978, 1981, 1985
BOETTO Giulia	Naval archaeology	2011
BONHOMME François	Genetics of animal populations, Zoology	1999, 2005
BOUDOURESQUE Charles-François	Phycology, Marine vegetation	1974, 1978, 1981, 1985, 1992, 1999, 2005, 2011
BOURY-ESNAULT Nicole	Sponges	1999, 2005
BRESSOU Clément	Zoology	1970, 1974
BRIGAND Louis	Geography	2005, 2011
BRUN Jean-Pierre	Terrestrial archaeology	1992, 1999
BULARD Camille	Botany	1970
CHAUTRAND Louis	Forests	1981
CHEYLAN Gilles	Ornithology	1981, 1985, 1992, 1999, 2005, 2011
CHEYLAN Marc	Zoology	1985
CHOMEL DE VARAGNES	Oceanology	1974, 1978
CLAEYS Cécilia	Sociology of the environment	2011
COLAS Guy	Entomology	1964, 1970, 1974, 1978, 1981
COMBES Claude	Parasitology	1985
DARS René	Geology, Hydrology	1974, 1978
DEVICTOR Vincent	Biology of animal conservation	2011
DE VILMORIN Roger	Botany	1964

NAME First name	Specialism	Year(s) of appointment
DROUINEAU Gustave	Agronomy	1974, 1978, 1981
DUCLERC Jean	Oceanology	1974, 1978, 1981
DUGELAY A.	Botany	1970, 1974, 1978
FADY Bruno	Genetics of plant populations	2011
FARUGGIO Henri	Fisheries	1999, 2005
FAVARD Paul	Entomology	1970
FERLIN Roger	Botany	1964, 1970
FLON Henry	Botany	1974, 1978
FONS Roger	Mammalogy	1992, 1999, 2005
FRANKO Mathias	Tourism, Leisure	2011
GEISTDOERFER Aliette	Ethnology	1985
HARMELIN Jean-Georges	Ichthyology	1981, 1985, 1992, 1999, 2005, 2011
HEERS Jacques	History	1992
HERVÉ Pierre	Entomology	1964, 1970, 1974, 1978
JEUDY DE GRISSAC Alain	Oceanology	1981, 1985
ISNARD Hildeber	Geography	1964
KALAORA Bernard	Sociology	1999, 2005
LABOREL Jacques	Oceanology	1981, 1985
LAPRAZ Guy	Botany	1974, 1978
LARDEAU Patrice	Oceanology	1981
LAURENCIN Claude	-	1970
LAVAGNE André	Botany	1974, 1978, 1981, 1985
LEVEAU Michel	Oceanology	1985
LIEPPE Denis	Maritime and fishery history	2005, 2011
LIOU Bernard	Underwater archaeology	1981
LIVET André	Meteorology	1970
LIVET Roger	Geography	1970
LOISEL Roger	Phytosociology	1985, 1992, 1999
LONG Luc	Underwater archaeology	1992, 1999, 2005
LUMARET Roselyne	Genetics of populations, Botany	1992, 1999, 2005
MARCHESSEAUX Didier	Marine zoology	1985
MARTIN Gilles	Environmental Law	1992, 1999, 2005, 2011
MAYENÇON M.	Meteorology	1981
MÉDAIL Frédéric	Plant ecology, Biology of conservation	2005, 2011
MEINESZ Alexandre	Marine biology	1981, 1985, 1992, 1999, 2005, 2011
MELLON Capucine	Marine biology, Fisheries	2011
MOLINIER René	Botany	1964, 1970
MOLINIER Roger	Plant biology	1970, 1974, 1978, 1981, 1985
MORETEAU Jean-Claude	Marine zoology	1981, 1985
MOULINIER H.	Biology, Microfauna	1964
MOULIS Didier	Coastal Erosion, Sedimentology	2011
MOUTTE Paul	Botany	1981, 1985, 1992
NOËL Pierre Yves	Marine invertebrates	1999, 2005, 2011
ODY Denis	Marine mammals	2011
PIAZZOLA Jacques	Physics at the air- sea interface	2011
PÉRÈS Jean-Marie	Zoology, Oceanography	1964
PONEL Philippe	Entomology	2005, 2011

NAME First name	Specialism	Year(s) of appointment
QUIGNARD Jean-Pierre	Ichthyology	1985
ROMANA Alexandre	Marine pollution	1992
ROS Joandomenec	Marine ecology	1992, 1999, 2005
ROUX Claude	Lichenology	1985
RUITTON Sandrine	Marine ecology	2011
TAILLIEZ Philippe	Oceanology	1964, 1970, 1974, 1978, 1981, 1985
TAUPIER-LETAGE Isabelle	Physics of the sea	2005, 2011
THIBAULT Marc	Management of wetlands	2005, 2011
THOMEL Gérard	Mycology	1974, 1978
TIMON-DAVID J.	Zoology	1964
VACELET Jean	Zoology	1974, 1978, 1981, 1985, 1992
VAISSIERE Raymond	Oceanography	1964
VERGE-FRANCESCHI Michel	History	1999
VICENTE Nardo	Marine biology	1981, 1985, 1992, 1999, 2005, 2011
ZACHARIE A.	Agriculture, Horticulture	1970

How the members of the Scientific Council (SC) are chosen

The members of the SC were nominated by the Minister of the environment until 1997; since then, they have been nominated by the *Préfet*[11] of the *département*[12] of Var (Provence). The nominations are made on the basis of proposals made by the Director of the PCNP and of the recommendations of the BA; the approval of the BA has not been required since 2006. Prior to making his proposals, the Director consults the head of the Scientific Department. The tradition is to also consult the outgoing Chair of the SC, and perhaps the outgoing SC Bureau members[13], but this is not an obligation. For the PCNP, there have been no cases where the Minister or the *Préfet* did not follow the recommendations of the park Director. The number of members of the SC has varied between 15 (1964) and 28 (1985) (Tabl. II); this number takes into account (**i**) the fact that meetings with too many participants are rarely efficient, and (**ii**) the cost of a meeting (travel expenses, board and lodging). In all, over the past 50 years or so, 97 scientists have been members of the PCNP SC for one or more mandates (Tabl. I).

What are the Management's criteria for choosing the members of the SC?

(1) Balanced representation between the disciplines. The balance between the disciplines has varied over time, according to the priorities of the moment and changes in concept regarding the protection of the

[11] The Préfet is the representative of the state at the level of the *département*.
[12] A *département* is an administrative division in France, between the region and the *commune*.
[13] The Bureau of the SC is constituted of a Chair and three SC vice-chairs. See below.

environment. Since Port-Cros is a terrestrial and marine park, the balance was initially related to these two domains (Tabl. II). In the first phase, up until 1978, the majority of the council members were specialists in the terrestrial environment. After 1981, given that the inclusion of a marine area constitutes the originality of the PCNP (compared to other French national parks), it is the marine environment that was the most strongly represented. It was not until 1992 that the social sciences took what is their rightful place in a national park. Specialists in archaeology, environmental law, geography, history, etc., have thus been integrated into the SC. Today, the SC consists of 3 groups of similar size: terrestrial biologists and ecologists, marine biologists and ecologists and researchers in social sciences. Since 2011, the composition of the SC has taken into account the changes in the mission of the National Park following the law of 2006: it now includes experts in the field of sustainable tourism, management of rural territories and agriculture, coastal erosion and the physics of the atmosphere.

(2) Geographical proximity. It is natural that the members of the SC mainly come from the various universities and research centers in the Provence-Alpes-Côte d'Azur (PACA) Region: Nice, Aix-Marseille, Toulon, etc. (Tabl. II). This proximity guarantees a higher level of motivation and at the same time lessens the time spent in travel, which favours frequent attendance. Other somewhat more distant universities and research centers also constitute a suitable source for SC membership: Barcelona (Spain), Brest, Muséum National d'Histoire Naturelle (MNHN; Paris), Montpellier, Station Ifremer de Sète, etc. Over time, the number of members of the SC from regions other than PACA, Languedoc-Roussillon (LR) and Rhône-Alpes (RA) has declined (Tabl. II); this decline mainly concerns Paris and the Paris region. It might have been envisaged to recruit members from still more distant regions (Greece, USA, Canada, Australia, etc.), but the cost of the travel expenses increases very sharply with distance. The means available to the PCNP are by no means unlimited, they are indeed rather modest, and it is imperative to consider the cost effectiveness for each member of the SC.

Table II. Variations in the number of members of the Scientific Committee then of the Scientific Council (SC), over time. Proportion (in %) of the three major fields and geographical origin of members of the SC. PACA = Région Provence-Alpes-Côte d'Azur. LR = Région Languedoc-Roussillon. RA = Région Rhône-Alpes. Other regions = French Regions other than PACA, LR and RA.

Year of nomination to the SC		1964	1970	1974	1978	1981	1985	1992	1999	2005	2011
Number of members of the SC		15	20	20	21	24	28	18	18	22	26
Field	Terrestrial environment	73%	80%	60%	57%	38%	39%	39%	28%	27%	35%
	Marine environment	20%	15%	40%	43%	58%	54%	39%	44%	46%	38%
	Social sciences	7%	5%	0%	0%	4%	7%	22%	28%	27%	27%
Geographical origin	PACA	66%	65%	65%	67%	74%	75%	72%	55%	59%	76%
	LR and RA	7%	10%	10%	14%	13%	18%	16%	22%	18%	12%
	Other regions	27%	25%	25%	19%	13%	7%	6%	17%	18%	12%
	Other countries	0%	0%	0%	0%	0%	0%	6%	6%	5%	0%

(3) An environmental and conservationist focus. The PCNP SC is not intended to replace or cover the same ground as the scientific councils of the universities or national research organisations such as the *Centre National de la Recherche Scientifique* (CNRS)[14], *l'Institut de Recherche pour le Développement* (IRD)[15], the *Institut National de la Recherche Agronomique* (INRA)[16] and international organisations such as the International Panel on Climate Change (IPCC) and the International Union for Conservation of Nature (IUCN). The territory of the PCNP is available for fundamental research, which constitutes one of the aims of the national parks; it constitutes a reference theoretically protected from most forms of human impact (Barcelo and Boudouresque, 2012). But it is clear that fundamental research is not its primary aim. In a national park, research should serve to improve knowledge of the territory that it seeks to protect; it should in addition seek to provide answers to questions raised by the management (Pillet, 1981). It is thus important that the members of the SC should be (**i**) fully aware of the specific aims of the SC of a national park, and (**ii**) that they should possess expertise and a particular interest in phase with these aims.

(4) First-hand ground knowledge and knowledge of the region. A member of the SC may play a useful role solely on the basis of his or her expertise. This is sometimes the case. However, with regard to being able to provide real support for management, for solving environmental issues (*e.g.* proliferation of a species, decline of a population: is it serious? Is intervention required? In what form?), first-hand ground knowledge is clearly primordial, and at least some of the council members should have first-hand knowledge of the territory of the National Park.

How is the SC reconstituted?

At each reconstitution of the SC (Tabl. I), a certain number of members of the SC are reappointed, others are not. Upon which criteria are the choices made by the Management of the PCNP based?

(1) Reconstitution and rejuvenation. Ever since the foundation of the PCNP, on the occasion of each reconstitution of the SC, reconstitution has been linked to continuity. It was important that the SC 'culture', its capacity for 'co-evolution' in phase with the Scientific Department and the Management of the National Park should not be lost. For this reason, the rate of re-nomination of outgoing members of the SC has always been

[14] The French National Center for Scientific Research.
[15] The *Institut de Recherche pour le Développement* is a French research organisation that, together with its partners in countries of the South, addresses international development issues.
[16] The *Institut National de la Recherche Agronomique* is a French public research institute dedicated to scientific studies related to the issues in agriculture.

relatively high (between 35 and 90%; on average 60%) (Tabl. III). In addition, the reconstitution of a SC provides an opportunity for rejuvenation. For example, when Jean Vacelet, a specialist in sponges of worldwide renown, retired, one of his students, Nicole Boury-Esnault, was appointed. Similarly, three generations of entomologists have succeeded each other on the SC: first, Alfred Serge Balachowsky and Pierre Hervé, then Louis Bigot and finally Philippe Ponel.

Table III. Rate of reappointment of members (number of members reappointed and %) of the successive SCs of the PCNP.

Date of nomination of the SC	Number of members re-nominated / number of members of previous SC	Percentage
1970 vs 1964	8/15	53%
1974 vs 1970	7/20	35%
1978 vs 1974 [a]	18/20	90%
1981 vs 1978	12/21	57%
1985 vs 1981	15/24	63%
1992 vs 1985	10/28	36%
1999 vs 1991	12/18	67%
2005 vs 1999	15/18	83%
2011 vs 2005	14/22	64%

[a] Although it was formally a reconstitution (*arrêté* of the ministry of the environment), it was in fact mainly a matter of replacing a resigning member.

(2) The necessity of making room for new disciplines. In order to make room for the marine sciences, it was necessary to reduce the number of specialists in the terrestrial environment. To make room for the social sciences, it was necessary to reduce the number of biologists and ecologists. To make room for genetics, it was necessary to reduce the number of taxonomists. The choices are sometimes difficult, when it involves not re-nominating members who would otherwise deserve to be.

(3) Rate of attendance. Being a member of the SC of the PCNP should not solely be an element to add to a researcher's *curriculum vitae* (CV), which will constitute an asset with regard to his governing administration, but also a real commitment. Absenteeism, or a low rate of attendance at discussions (meetings and *via* e-mail), therefore constitutes an important issue for the Management. Between 2005 and 2012, on average 75% of the members of the SC took part in the meetings. This represents a very respectable attendance rate, especially when it is borne in mind that the SC members undertake this activity on an unpaid voluntary basis as a supplement to their main activity (generally as university staff), that they often have administrative responsibilities, and that the probability of an SC meeting coinciding with teaching or other meetings is high. In all, in comparison with other SCs of protected areas, the PCNP SC is certainly among those that suffer the least from absenteeism. It is of interest to wonder why the PCNP SC exerts a strong power of attraction.

(4) Personal wishes. At each reconstitution, the new candidate members, as well as the old members, are asked whether they wish to take part (or continue to take part) in the SC. The fact that the rate of acceptance is very high, almost 100%, constitutes an additional indicator of the attractiveness of the PCNP and of its reputation.

What are the relations between the Scientific Council, the Scientific Department and the Management of the PCNP?

When the SC was set up in 1964, less than a year after the foundation of the PCNP, the park had neither a headquarters nor a full time Director. The Director, Henri Boissin, was also (and primarily) Director of the Water and Forests Office of the *département* (Bougeant, 1989). The SC met sometimes in a room in the *sous-préfecture*[17], sometimes in the *Foyer de la Marine* in Toulon (Robert, 1997). It was not until 1973 that a full time Director, René Ravetta, was appointed and not until 1976 that a scientific *attaché* (Jannick Olivier) was recruited, the first kernel of a Scientific Department. In 1975, the BA, chaired by Christian Delaballe, gave an emphatic definition of the role of the SC, validated for the first time a budget for scientific studies and decided to launch a scientific journal, *Travaux Scientifiques du Parc national de Port-Cros* (Delaballe, 1975 ; Robert, 1997). Renamed since 1985 *Scientific Reports of Port-Cros National Park,* this journal has been published regularly with a volume virtually every year. Thanks to the commitment of the Scientific Department and the members of the SC, who usually serve as reviewers, the editorial quality has improved over the years. Although the journal is not indexed by the *Journal of Citation Reports* (JCR) and thus has no *Impact Factor* (IF), which in any case is not among its aims, the mean citation rate of articles published is quite respectable. This journal plays an important role in promoting the national and international prestige of the PCNP. In addition, by ensuring the wide diffusion of the research results and experience acquired through the PCNP, it contributes to valorising the financial investments of the State.

At Port-Cros, the scientific research, driven by the Chairs of the SC, René Molinier then Roger Molinier, was launched before the consolidation of the structures of the PCNP (headquarters, full time Director, Scientific Department) (Augier and Boudouresque, 1973, 1974, 1975, 1976 ; Boudouresque, 1976). Thus it was not until the end of the 1970s that a 'culture' of active collaboration between the SC, the Scientific Department and the Management was developed. Collaboration of this kind is not characteristic of all the protected areas (in particular the national parks),

[17] In France, the *sous-préfecture* is an administrative unit situated between the *département* and the *commune*.

in France or in the rest of the world or, when it does exist today, it has not been the case throughout their existence.

(1) In certain protected areas, serious conflicts have arisen between the SC and the Management, leading to either the mass resignation of the SC, or its 100% replacement at the time of reconstitution, resulting in the absence of transmission of its 'culture'.

(2) In other protected areas, the SC is relatively disconnected with regard to the Scientific Department and the Management. The scientific policy is managed internally, and the SC is a statutory body (in the national parks), and thus obligatory, but with a role that is purely symbolic. Law N° 2006-436 of 14 April 2006, relative to national parks, marine natural parks and regional natural parks, referred to as the 'Loi Giran', which has strengthened the role of the SC, has generally made it possible to improve these relations.

At the PCNP, there is a tradition dating back almost 50 years of effective and real collaboration between the SC, the Scientific Department and the Management. There has been no significant conflict. Philippe Robert however relates than between 1976 and 1980, the SC and its Chair, Roger Molinier, complained that the Directors of the PCNP (René Ravetta, then André Manche) did not inform them of the extensive redevelopment work that had been undertaken, on land and at sea, and above all did not consult them (Robert, 1997). There is little trace of this in the archives of the PCNP. (**i**) In the minutes of the SC of 9 April 1976, we read that 'the Chair of the Scientific Committee protested strongly regarding the possible creation of a botanical garden at Porquerolles. The Chair had indeed not been consulted on this matter by the ministry, or on the proposed nominations that had been decided on. This constitutes an infringement of the prerogatives of the Scientific Committee, which should give its opinion when new researchers are appointed'[18]. This referred in fact to the future Porquerolles *Conservatoire Botanique National Méditerranéen,* which was founded in 1979, of which the PCNP is responsible for the management. The SC of the PCNP was therefore not concerned with this establishment, which has been endowed with its own Scientific Council. (**ii**) In the minutes of the SC of 24 March 1977, we read that 'Professor Molinier emphasised the poor coordination in all the national parks between Management and the Scientific Committee (…)'. He nevertheless specified that 'this difficulty does not concern Port-Cros

[18] In French: *'le président du Comité scientifique élève une vive protestation au sujet de l'éventuelle création du jardin botanique de Porquerolles. En effet, le président n'a pas été consulté sur cette affaire par le ministère, ainsi que sur les propositions nominales qui ont été décidées. Cela constitue un empiètement sur les prérogatives du Comité scientifique, lequel devrait donner son avis lorsque de nouveaux chercheurs sont nommés'.*

because of the presence of a researcher responsible for the permanent coordination between the Management and the Scientific Committee of the park'[19]. (**iii**) Finally, in the minutes of the SC of 11 January 1980, Roger Molinier declared that 'the Scientific Committee should be consulted for all operations of redevelopment, which would have avoided serious problems such as the disappearance of the *Discoglossus*'[20]. Overall, these few comments, concerning a limited period of time, reflect but a passing cloud, a reminder of the role of the SC rather than a real conflict. What explanation can be offered for the constructive and sustainable relations between the SC, the Scientific Department and the Management of the PCNP?

(1) The personality of the successive Directors (Henri Boissin, René Ravetta, André Manche, Pierre Bougeant, Emmanuel Lopez, Jean-Yves Astruc, Jean-Pierre Nicol and Guillaume Sellier), of the heads of the Scientific Department (Jannick Olivier, Philippe Robert and Alain Barcelo) and of the Chairs of the SC (René Molinier, Roger Molinier and Charles-François Boudouresque) (Fig. 1). This trio has always worked on the basis of constructive personal and professional relations. The successive Chairs of the BA might be added to the list (Clément Bressou, Christian Delaballe, Charles-Henry Suder, Paul Guimard, Xavier Gouyou-Beauchamps, Jean-Pierre-Giran, Jean Tandonnet and Jacques Politi), and we may thus refer to a consensus-based quartet.

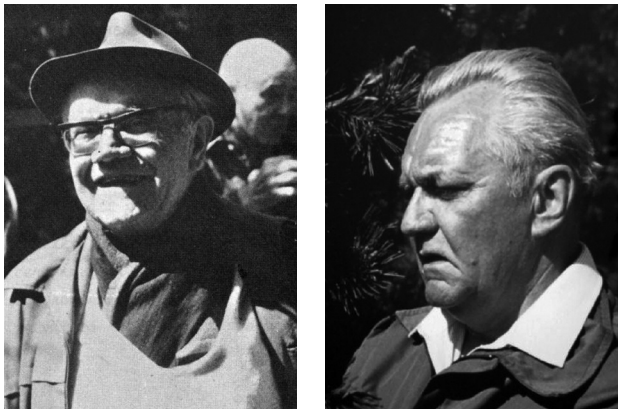

Figure 1. Left: Professor René Molinier, Chair of the Scientific Council (SC) of the Port-Cros National Park (PCNP) from 1964 to 1970 (photo Baudelaire). Right: Professor Roger Molinier, Chair of the SC of the PCNP from 1970 to 1986 (photo Fondation océanographique Paul Ricard).

[19] In French: *'Le professeur Molinier souligne le défaut de liaison qui existe au niveau de l'ensemble des parcs nationaux entre la Direction et le Comité scientifique* (…)'. He nevertheless specified that *'Cette difficulté n'existe pas à Port-Cros en raison de la présence d'un chargé d'études assurant une liaison permanente entre la Direction et le Comité scientifique du parc'.*

[20] In French: *'le Comité scientifique devrait être consulté pour toutes les opérations d'aménagement, ce qui aurait évité de fâcheuses erreurs, telle la disparition du discoglosses'. Discoglossus sardus* (Tyrrhenian painted frog) is a species of frogs mainly restricted to Sardinia (Italy), Corsica (France) and also the islands of Port-Cros and Le Levant in the South of France (Provence).

(2) The 'co-evolution' of the SC and the PCNP staff. By only reappointing the SC in a progressive way, it has been possible for its 'culture' to be passed on over the years. This culture is based on a balance between what is desirable and what is possible. The SC has been able to take into account the requirements and the constraints of management and of the social context. For example, it would not perhaps have been difficult for the SC to demand the banning of recreational fishing, long before the necessity for this was scientifically established and socially acceptable. Similarly, the SC could have insisted, for ideological reasons, on a ban on artisanal fishing, whereas its maintenance, in the context of the Fishing Charter (*Charte de la pêche*) and the rules it lays down appear today as compatible with the preservation of the biological patrimony (Boudouresque *et al.,* 2004; Cadiou *et al.,* 2009). Artisanal fishing is indeed part of the cultural patrimony. The management of the response to the project for exploring the petrol resources ('Permis Rhône Méditerranée') of the North-Western Mediterranean is a good example of the relations between the SC and the PCNP. The issue was raised by the SC, but the content and the level of the response was the result of a tacit consensus with the Management. Overall, and in all cases, there is not one SC response and one Management response, but a response from the Port-Cros National Park, the SC of which is a key component.

(3) The participation of PCNP staff (Management, Scientific Department, other departments, *chefs de secteur*[21]) in the work of the SC and its Bureau, constitutes a strong point in SC-National Park staff relations (Fig. 2). This participation enables (**i**) PCNP staff to raise environmental issues that they have identified in the field and management constraints, (**ii**) members of the SC to take into account the position of the park staff and (**iii**) the PCNP staff to take into account the discussions and positions of the SC.

(4) The participation of organisations outside the PCNP in the work (*e.g.* meetings) of the SC has developed over the past decade (Fig. 2). In addition to the *Conservatoire Botanique National Méditerranéen* at Porquerolles, naturally associated with the PCNP, the attendance of representatives of the *SIVOM du Littoral des Maures*[22], of Toulon-Provence-Méditerranée (TPM) and various scientists from outside, *e.g.* for a talk, depending on the issues dealt with, is common practice.

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[21] In a French national park, the *'chef de secteur'* (sector manager) is in charge, in the field, of a geographical sector of the park, for example (in the PCNP) the island of Port-Cros or the island of Porquerolles.

[22] The *SIVOM du Littoral des Maures* is an inter-communal syndicate applying its competencies in the field of the environment. Its main aim is to enable the members of the *communes* to pool their resources and their knowledge in order to undertake projects that they could not have undertaken alone. The *SIVOM du Littoral des Maures* includes four Var coastal *communes*: Cavalaire-sur-Mer, La Croix Valmer, Ramatuelle and Rayol-Canadel-sur-Mer.

Figure 2. Meeting of the Scientific Council (SC) of the Port-Cros National Park (PCNP), 18 December 2012. Scientific presentation by Sandrine Ruitton (standing, right). From the back facing the screen, from left to right: Nardo Vicente, Jean-Georges Harmelin (Vice-Chair of the Scientific Council), Alexandre Meinesz, Guillaume Sellier (Director of the National Park), Charles-François Boudouresque (Chair of the Scientific Council), Alain Barcelo (Head of the Scientific Department) and Rose-Abèle Viviani (Assistant, Scientific Department). 45 people are present, including 19 SC members, 21 PCNP park staff and 5 guest participants. Photo Christel Gérardin.

Role and functioning of the Scientific Council

The management of a national park calls for in-depth knowledge of the natural and cultural patrimony, and an assessment of the real or potential impact of human activities on the environment in order to be able to decide on the most suitable management measures. The role of the SC is to define the research required to develop this knowledge and on which to base these management measures (Pillet, 1981; Letourneux, 1986; Gérardin, 2012).

Each year the PCNP, with the help of the Scientific Council, draws up a research programme, defines the priorities and seeks scientific partnerships in order to put them into practice (Barcelo and Boudouresque, 2012). Defining priorities is unfortunately necessary given that **(i)** the PCNP's scientific budget and its outside funding (*e.g.* Fondation d'Entreprise Total, Agence de l'Eau Rhône-Méditerranée-Corse) are not unlimited, and that **(ii)** a scientific field study mobilises PCNP technical (*e.g.* accommodation, boats) and human (*e.g.* participation, security) resources that are also not unlimited.

The SC responds to issues raised by the Management of the PCNP and by the Scientific Department. The observations of agents in the field (park wardens, members of the Scientific Department), who are often the first to detect a change, often harmless but sometimes worrying, also

constitute a vital source of information. The SC may also itself raise issues which it wishes to draw to the attention of the Management, as was the case for the Rhône-Méditerranée hydrocarbons prospection permit ('Permis Rhône Méditerranée').

Law N° 2006-436 of 14 April 2006, relative to national parks, marine natural parks and regional natural parks, strengthened the role of the SC. It specifies that the SC 'assists the Board of Administration and the Director in the exercise of their functions, in the accomplishment of the missions provided for in Article R.331-22 and in monitoring, assessment, alteration and revision of the Charter of the national park'[23] (Article R.331-32 of the Code of the Environment). Article L331-14, III specifies that 'When an activity is likely to alter in a significant way the marine environment in the core sector of a national park, the authorisation to which it is subject can only be delivered after due approval of the public authority of the national park, given after consultation with its Scientific Council (…)'[24]. Article L331-4, II stipulates that 'Works or redevelopments planned within the park which should be preceded by an impact study (…), or which are subject to authorisation (…) and which are of such a kind as to significantly alter the core sector or the maritime areas of the national park, may only be authorised or approved after due approval by the public authority of the park, given after consultation with its Scientific Council (…)'[25].

The SC meets in plenary session once (sometimes twice) a year (Fig. 2, 3). In addition to the meetings, the members of the SC are informed by e-mail of events in the life of the PCNP and consulted on matters in progress, either collectively or individually when the subject concerns more specifically one or several council members. For example, in 2012 and 2013, the members of the SC contributed to the planning of the '2013-2022 Scientific Strategy of the Port-Cros National Park' (Parc national de Port-Cros, 2013), in plenary sessions, then *via* e-mail. The planning of the scientific strategy, the founding act of the research activities of the new PCNP launched by the decree of 4 May 2012, is a good illustration of the constructive relations between the Management, the Scientific Department and the SC. Since 1992, the SC includes three groups: the Earth group, the Sea group and the Social Sciences group.

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[23] In French: *'assiste le conseil d'administration et le directeur dans l'exercice de leurs attributions, dans l'accomplissement des missions prévues à l'article R.331-22 et à l'occasion des travaux de suivi, d'évaluation, de modification et de révision de la charte du parc national'.*

[24] In French: *'Lorsqu'une activité est susceptible d'altérer de façon notable le milieu marin compris dans le cœur d'un parc national, l'autorisation à laquelle elle est soumise ne peut être délivrée que sur avis conforme de l'établissement public du parc national pris après consultation de son conseil scientifique* (…)'.

[25] In French: *'Les travaux ou aménagements projetés dans le parc qui doivent être précédés d'une étude d'impact (…), ou qui sont soumis à une autorisation* (…) *et qui sont de nature à affecter de façon notable le cœur ou les espaces maritimes du parc national, ne peuvent être autorisés ou approuvés que sur avis conforme de l'établissement public du parc émis après consultation de son conseil scientifique* (…)'.

Each of these three groups elects a Head, a vice-chair of the SC (currently Jean-Georges Harmelin for the Sea group, Gilles Martin for the Social Sciences group and Frédéric Médail for the Earth group). These groups can meet independently of the SC meetings. The Chair and the three vice-chairs constitute the Bureau of the SC. This Bureau meets 3 to 5 times a year; the Management (Director and/or Deputy Director), the members of the Scientific Department and on occasion other members of the PCNP staff, depending on the subjects dealt with, take part in the meetings of the SC Bureau. Other members of the SC and people from outside the SC can also be invited to take part. The meetings of the Bureau play a fundamental role in cementing the trio SC-Scientific Department-Management. Since 2010, one of the annual meetings of the SC Bureau is held on the islands (Port-Cros or Porquerolles); in addition to the convivial nature of meetings held in the field, which helps in networking, this visit is highly appreciated by the Bureau members and by the PCNP staff as it is a means to be at the heart of research-knowledge-management issues and to participate in the 'co-evolution' between national park staff and SC members.

Each year, an annual activity report of the SC is presented to the PCNP Board of Administration. This activity report takes the form of a written document, which is exhaustive but without frills (*e.g.* Boudouresque and Barcelo, 2011). Since 2009, there is also an oral presentation by the Chair of the SC, which is interesting for the non-specialists, which means most of the members of the BA (mayors, representatives of state agencies, personalities from other professions, etc.). In this presentation, the Chair of the SC chooses certain results from the previous year which offer a particularly good illustration of the response of the National Park to management and economic problems, that is a good account of the issues regarding the stakeholders and the sustainable development of the territory.

Figure 3. View of the meeting of the Scientific Council of the Port-Cros National Park, 18 December 2012. From left to right: Jacques Piazzola, Pierre Yves Noël, Capucine Mellon, Sandrine Ruitton, Philippe Ponel (partly hidden), Marc Thibault, Frédéric Médail (Vice-Chair of the Scientific Council), Gilles Cheylan and Olivier Arnaud. Photo Christel Gérardin.

Conclusions

Possessing a Scientific Council is a characteristic that is common to all the national parks and most protected areas. In the nearly fifty years since its foundation, the SC of the PCNP has undergone many changes, in its composition, its working methods, its organisation and its priorities. The SC used to be numerically dominated by 'terrestrial' biologists and ecologists, then by marine biologists and ecologists, before a balance was struck between the terrestrial and marine fields and the social sciences. The organisation, working methods and the delimitation of the respective roles of the SC and the Scientific Department, which today are clearly established, were only gradually developed. During the first decades of the PCNP, the involvement and the enthusiasm of the various participants, which has certainly not declined, masked a certain fuzziness or even degree of improvisation. It is worth noting here that the establishment of the SC and the launching of research programmes preceded by nearly ten years the organisation of the PCNP itself. The scientific priorities have also changed: initially centred on the description of the local biological patrimony (species, habitats), research dealt with issues related to the management of biodiversity and usages. Finally, the experience accumulated and the length of the series of data obtained provide a basis for taking a broader view with regard to the PCNP for dealing with very general issues in conservation biology. As in the other French national parks, the ratio between research in the park, by the park and for the park has changed (Pillet, 1981; Barcelo and Boudouresque, 2011, 2012).

These changes are perhaps in part related to the wisdom, the foresight and the sense of perspective of the members of the SC and of the PCNP staff. But they also correspond first and foremost to a logical sequence: it is first necessary to have knowledge in order to be capable of managing. Furthermore, these changes overlap with the general and rapid changes in concepts, both with regard to scientific ecology and to conservation biology over the past half-century.

When all's said and done, what best characterises the history of the SC of the PCNP is (**i**) a degree of continuity, over 5 decades, that is rare in a public sector organisation, (**ii**) changes in the concepts of management of biodiversity that have been constant but step-by-step, (**iii**) that capacity for passing on over the years the assets related to its 'culture' in the field of conservation biology and the management of usages, and finally (**iv**) the symbiosis between the SC, the Scientific Department, the Management and even the Board of Administration, symbiosis that reaches far beyond the women and men who have successively incarnated these various roles.

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