



S i e n t i f i c
c e n t i t

strategy 2015 • 2025
of the French National Parks



Supporting our institutions and our partners, for heritage conservation and sustainable uses

The ten National Parks of France are recognized by national and international bodies of environmental protection as major elements of the French natural and cultural heritage. The origin of the vast wealth of their network lies in the diversity of biogeographic contexts in which the different National Parks are situated: the Alps, the Pyrenees, the Mediterranean region, the Massif Central, the Mascarene Islands, the Caribbean and the Amazon basin. All of these are included in at least one of the major types of priority biodiversity conservation sites in the world. For example, five of the French National Parks are located within one of the 35 global biodiversity hotspots. The network of the French National Parks is thus at the heart of major challenges concerning adaptation to global climate change and the transition of energy production towards renewable sources, stopping the erosion of biodiversity and the evaluation of the services provided by natural systems to human societies and the necessary communication to improve public awareness of these issues.

Pyrenees National Park © F. Lepage - Cœur de nature - SIPA



➤ The ten National Parks of France have been established over a period of 50 years: Vanoise (1963), Port-Cros (1963), Pyrenees (1967), Cevennes (1970), Ecrins (1973) Mercantour (1979), Guadeloupe (1989), French Guiana (2007), La Reunion (2007) and Calanques (2012). In 2006 a reform law proposed the establishment of the French National Parks' federation - Parcs nationaux de France (PNF) - responsible for the organisation of the network of French National Parks. Based on a solid legal basis established during their creation, each National Park institution can undertake scientific missions within its territory and each Park has its own scientific strategy. The development of a scientific strategy for the network of National Parks has for its principal goal the strengthening of the coherence of this network in a scientific context, particularly by improving the synergy of scientific strategies for each institution, establishing priorities for knowledge acquisition within the network and by highlighting the importance of joint scientific projects in different National Parks.

➤ This scientific strategy, embodied by the actions of each National Park, is necessary for the French National Parks' network to become an actor capable of producing results on a national and international scale. It will improve the visibility of a network that is unique in the landscape of French protected areas and complementary to other environmental protection actors. The scientific strategy identifies the structural framework of actions for the network over the ten years period

from 2015 to 2025. This document is a summary of the full publication (in French).

- In developing its scientific strategy, the National Parks' network has identified four main questions:
- What are the objectives for knowledge acquisition in the National Parks' network?
 - What are the priority topics for investigation?
 - What is the added value of the network for the different National Parks' institutions and partners?
 - What are the major operational axes for the next ten years?
- The scientific strategy allows the network to contribute collectively, in a scientific context, to strategic considerations related to the creation of the French Biodiversity Agency (AFB) scheduled for early 2016 and within which PNF will be integrated. The institutions of the ten existing National Parks will be closely linked to this agency.



KNOWLEDGE OBJECTIVES

The scientific action of the National Parks that involve knowledge acquisition concerns five main themes.

Management of the core zones, the peripheral partnership areas and adjacent maritime areas in a protective and sustainable manner.

The knowledge acquired in the French National Parks is critical for the conservation management of their natural and cultural heritage. It should contribute to the proposition of methods and to organise human and material resources necessary for the conservation of ecosystems, habitats, species, geological sites, cultural heritage and landscapes and to maintain sustainable practices. The development of scientific bases and innovative methods is of fundamental importance here in terms of:

- the implementation of actions in the environmental engineering field, for example restoration, the fight against invasive species and the reintroduction of keystone species,
- the development of novel frames of references that combine technical, economic and ecological data and allow for the National Park to establish regulations for land-use and practices in the core zone and contractual agreements with actors (municipalities, farmers, fishermen, foresters, tourists, etc.) in the peripheral partnership area of the National Park.

Inspire and support scientific research

The French National Parks' institutions aspire to be actors who are involved in scientific research, including basic research and more targeted, applied research and in a variety of ways which include:

- the formulation of research questions and specific hypotheses,

- collecting data according to scientifically validated protocols,
- providing logistic support and knowledge of the territory to scientific teams that work in National Parks,
- offering the opportunity to work in reference sites provide a series of observations over the long term and in territories that allow for innovation, creativity and experimentation (particularly in the peripheral partnership area),
- sharing research results, publishing scientific articles in specialised journals and encouraging a synthetic approach,
- the transfer of methods and results to other protected areas and actors.

As such, it is important that the French National Parks' network continues to be represented within the Foundation for Research on Biodiversity (FRB) and the research programmes of the French Ministry of Ecology (MEDDE). Maintaining close links with research institutions is essential both for research programmes to adapt to the specific needs of the National Parks and to allow for the expertise of National Park staff to be made available to scientific research policy and to allow the National Parks' institutions to set up formal partnerships with research organizations and to conjointly elaborate research propositions.

Multiple reference sites for long-term monitoring and protection

The French National Parks' network has proposed the establishment of «reference sites» in each National Park. By virtue of their status, it is possible for the National Parks to ensure the long-term continuity of information gathering and data storage for these sites. These sites could host studies in different disciplines and foster interdisciplinary collaborations with and among research teams.

The reference sites can be used to monitor ecosystems representative of those found in the National Parks, their functions, dynamics and uses. Such sites can be used as low intervention situations to compare with other sites on along a gradient of human impact from no or little disturbance to areas in which are controlled by management or incur greater human impacts. In this way reference sites can serve as a control for our understanding of natural dynamics in relation to

changing local customs and practices and to global changes, current and future. They represent ideal situations to put into action an observatory within a territory.

The most emblematic of these are the “strict nature reserves” established in the core zone of two National Parks - Lauvitel in the Ecrins National Park and the islands of Bagaud, Gabinière and Rascas in the Port-Cros National Park. These reserves provide reference sites for scientific purposes and enhance biodiversity protection. Other projects for the establishment of strict nature reserves are being considered in several National Parks. Examples of reference sites include alpine meadows and lakes, permanent forest plots, glaciers, weather stations and thermographs, transient pioneer habitat plots, archaeological sites, view points, footpaths to see and hear birds, etc.

Contributing to strategies, knowledge and management at the international, national and regional levels

The French National Parks' institutions are well known at the international level. They establish privileged relations, particularly in the field of knowledge with their counterparts in neighbouring countries. They are thus not isolated and participate in international actions such as various eco-region based international scientific networks that are oriented at least in part on knowledge, such as the Alpine Network of Protected Areas (ALPARC), the management network of protected marine areas Mediterranean (MedPAN) or the regional activity centre for specially protected species and areas in the Caribbean (SPAW RAC). Two National Parks (Cevennes, Guadeloupe) are Biosphere Reserves, and thus represent model areas for reconciling biodiversity conservation with sustainable development, under the UNESCO Man and the Biosphere (MAB) programme. The French National Parks' network participates in international bodies such as the «Protected Areas» commission of the French Committee of the International Union for Conservation of Nature (IUCN) and the European Federation of National Parks (EUROPARC).

The French National Parks' institutions are establishments under the supervision of the French Ministry of Ecology (MEDDE) and are commissioned by law to contribute to national policies for natural and

cultural heritage protection and the monitoring of the dynamics of ecological systems and global change. They are therefore necessarily involved, in each of their regions or within the National Parks' network, in French strategies for heritage conservation.

Another mission of the French National Parks is to be proactive in terms of producing proposals to anticipate future issues and understand future environmental changes. They should thus play a major role in the definition of public policy such as the French Biodiversity Strategy, the French Information System on Nature and Landscapes, French National action plans for threatened species, regional ecological networks, and the French Strategy for the Creation of Protected Areas, as well as being a key actor in the implementation of European directives (Habitats Directive, Birds Directive, Marine Strategy Framework Directive, etc.) in France.

They also contribute, as local operators, to monitor and implement agricultural policy, forestry, tourism, development and urban planning at the scale of their territories.

Finally, they participate in international programmes (Horizons 2020, PIM Initiative ...) and national inventories and monitoring programmes (ZNIEFF, TAXREF, Ecoscope, Mountain Galliformes Observatory, etc.).

Evaluating public policy and management efficiency

The evaluation of public policy, including those concerning environmental protection is a priority for the French government. The French National Parks network requires substantial financial and human resources. It is therefore appropriate to have knowledge allowing the verification of the effectiveness of actions, to assess how objectives are achieved, and to communicate such action to the public and the state. Such assessment and reporting should also evaluate how other public policies (agriculture, urban planning, energy, tourism, forestry, etc.) integrate biodiversity and features of environmental degradation that influence human societies (quality of life, health). The challenge is to focus on ways to enhance practices that integrate natural biological interactions, ecosystem services or durability, and permit an operational effectiveness of public policy on a variety of issues such as agro-ecology, European Charter for Sustainable Tourism, etc.

The evaluation of the effectiveness of protected areas management also provides essential answers to conservation management staff, and raises new questions that, where appropriate, can help redirect their objectives. Evaluation is also a concrete way for National Parks to illustrate their activity in a given territory. Such evaluation requires the analysis of indicators constructed with knowledge pertinent to the assessment of the conservation status of natural and cultural heritage, anthropogenic pressures, virtuous uses and the results of actions undertaken and the resources mobilised. The actions of knowledge constitute the basis for support tools necessary for administrators and public authorities.

Citizens as actors of knowledge acquisition in National Parks

The establishment of a dialogue between science and society allows for the public to have a better understanding and awareness of the challenges currently posed by natural heritage protection. The conservation and sustainable use of natural resources cannot become a reality without the participation of representatives of all segments of civil society.

This is also the case in the National Parks where it is important to accompany the residents and stakeholders to play a role as actors of knowledge acquisition both in the expression of needs in knowledge, in the collection of data (participatory science) and the enhancement of local and environmentally efficient knowledge. Involvement of residents and consumers in knowledge acquisition can help make them more aware and thus adopt responsible action in relation to biodiversity issues that are at stake in a National Park. This involvement is coherent with the first strategic direction of the French Biodiversity Strategy that argues the need to «promote motivation to act for biodiversity.»

It is essential that knowledge is used as a basis for environmental training and education actions directed at the residents, citizens, consumers and socio-economic actors of the National Park territory and to create new standards, criteria or practice related indicators to enhance environmental friendly practices.



► PRIORITY ISSUES

■ Three major thematic areas for collective exploration

A territory has both political and social dimensions. It includes a set of ecosystems and landscapes, with a history, natural dynamics, and diverse actors with their own objectives and strategies. The territoriality of National Parks leads each National Park institution to consider the questions of a wide range of actors. They must thus work within the relationship between humans, nature and the territories. This structures the scientific questioning of the National Parks and allows them to become observatories of the biodiversity and the societies present in the territory and of their interrelationships.

National Parks are built to last and they can thus address complex questions that require a long-term investment in understanding the socio-ecosystems in which they occur. This context best illustrates the relationship between humans and nature, and the presence of humans in the constitution and the functioning of ecosystems. It also stresses that in most parts of the world, social and ecological systems are closely intertwined, in constant movement and with continuous co-adaptation. The National Parks offer a gradient of socio-ecosystems, with widely varying degrees of human impacts, in terms of the periods, intensity and modality of the relationship between nature and societies. The Parks' institutions lead and thus support scientific activities combining natural, cultural, technical, social and economic dimensions. To obtain a common synoptic vision of the knowledge spectrum to be addressed in the National Parks, three broad thematic areas whose contents are closely intertwined and complementary can be identified.

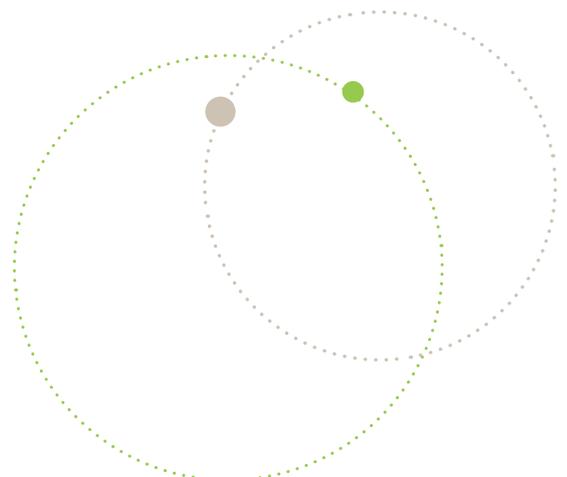
Natural, cultural and landscape heritages

Since the origin of the National Parks, their institutions grant an important part of their resources to the study of the distribution, abundance and development trends of priority elements of their natural heritage. They have led and will continue to lead many inventories on various taxonomic groups and the monitoring of socio-ecosystems, habitats and species. Knowledge of genetic diversity should be more fully integrated, and in some cases be accompanied by research on epigenetics. Data collection focused on the cultural heritage (archaeology,

buildings, real estate and furniture, languages, rituals, etc.) and landscape dynamics are also priorities for future scientific investigation. Taking into account socio-ecosystems as a whole, including human activities, not just species or habitats within them is an approach which merits to be privileged in future work. It involves characterising activities from a global angle including technical, social and economic aspects, on different scales: plot, decision unit, landscape, etc. It provides the scientific basis for understanding the functions and dynamics in action and to elaborate responses for the adaptation of socio-ecosystems to global change.

Territorial functions and dynamics

The challenge here is to understand natural dynamics in relation to changes in land-use and occupation and other social activities that underlie the evolution of socio-ecosystems. The appearance, composition and biodiversity of the territories classified as National Parks today are the result of a very long evolution under the pressure of three major factors: geological history, climate change and human activities. The reconstruction of the history of socio-ecosystems helps to understand the mechanisms operating in the territories and the diversity of uses and actors. This approach is essential to distinguish the role of different factors and implement appropriate management procedures. The need to clarify the role of each National Park within its regional context and the contribution of the National Parks' network to protection and conservation management policies need to focus on several concepts, for which the input and the gain of the National Parks still need to be fleshed out: ecological solidarity and ecosystem services.



Global change

The National Parks are valuable tools for understanding and monitoring processes related to global change such as land use changes, resource scarcity, climate change, invasive species and water quality loss. In particular, the core zones of National Parks and their strict nature reserves are areas of protection and scientific reference, of national and international importance, enabling Parks to monitor the evolution of natural succession on a long term basis. All the National Parks have set up systems

to enhance the knowledge of global change and study disturbances impacting socio-ecosystem dynamics. In addition to such work, it is imperative that National Parks, in connection with researchers and other stakeholders in biodiversity, undertake a prospective view on the adaptation of socio-ecosystems to global change.

Environmental «sentinels»

The National Parks can accompany scientific research in a logic of co-construction of questions related to conservation management. To anticipate the impact of climate hazards and changes in practices while sustainably managing the environment, sentinel sites networks have been set up in several National Parks and include networks of actors working on issues in priority situations such as alpine meadows, alpine lakes and small Mediterranean islands. These sentinel networks link users, researchers and administrators of protected areas, aim to produce knowledge and technical references on the processes that develop between climate, human environments and practices. They monitor and qualify evolutionary trends of the environment in terms of local activities in a context of global change. The actors of these programs act as sentinels who are able to perceive warning signals on the development and changes in natural environments. They develop ways of collective learning to operate a tool for analysis and decision. Sentinel sites are part of the reference sites for on-going research in the National Parks

➤ There is currently an imbalance in knowledge levels between these three thematic areas. Although National Parks have accumulated much knowledge on natural heritage, and although certain mechanisms and ecological functions are starting to be better understood, a general understanding of dynamics and global changes is still embryonic. It is therefore necessary that the institutions rebalance their efforts by investing more in these thematic areas.

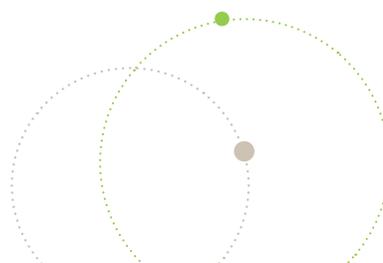
Priority areas for the network

The priority areas for the network on which inter-park knowledge actions should be focused concern the following:

- areas that are poorly represented in France or in their bio-geographic region and who are subjected to considerable threats, for which the network has a great responsibility to protect,
- and/or at a low level of knowledge (biodiversity, uses, dynamics, etc.) or high stakes of knowledge (e.g. for monitoring climate change),
- and/or priority for at least two National Parks.

The priority areas of the French National Parks network are as follows:

- Alpine pastures and meadows (agro-pastoral systems),
- Alpine lakes and associated wetland complexes,
- Glaciers,
- Wetlands,
- Tropical forests,
- Mangroves,
- Seagrasses,
- Coral reefs,
- Coralligenous.



NETWORK BENEFITS

Mobilist expertise for our network, our partners and public policy is made possible through:

- the diversity of skills of the National Parks staffs, at headquarters and in the field,
- mobilising the collective intelligence by National Parks' federation,
- interdisciplinary, expertise capacity and hindsight of National Parks' scientific councils network.

The network operation of the National Parks, and especially of their services and scientific councils animated by the network head which give it institutional stability, is essential for the sharing of experiences. This shared approach applies to knowledge acquisition, conservation management and enhancement of natural and cultural heritage values in the territories concerned. This collective expertise can be made available to other networks of natural areas facing similar challenges and public policy developments.

In 2015, the French National Parks' network includes:

- More than 100 agents, constituting technical representatives of the National Parks' institutions and their network head, responsible for knowledge acquisition, data management, conservation management and sustainable development of human activities,
 - Almost 300 rangers on the ground mobilised in part for the above missions,
 - Close to 300 experts in different scientific councils and working groups.
- These three components are strong and irreplaceable assets of the National Parks' network.

La Reunion National Park © Meigneux - Cœur de nature - SIPA



A strong enrolment in network research and knowledge

Each National Park is involved in networks of actors of knowledge and the conservation of heritage. Although the institution implements a part of its actions itself, it also needs its associative and institutional partners, including research organisations, working in the core zone of the Park and the peripheral partnership area.

National Parks must successfully form a link between the different scales of the territories in order to articulate local and global issues. Although they are under the strong influence of local dynamics, they must develop their contribution and visibility at national and international levels, as actors participating in the global knowledge of biodiversity. This community involvement within regional, national or global networks consolidates the expertise of each National Park. This expertise is irrigated by knowledge from scientific research and is able to mobilise, when necessary, national or international experts beyond the circle of the National Parks.

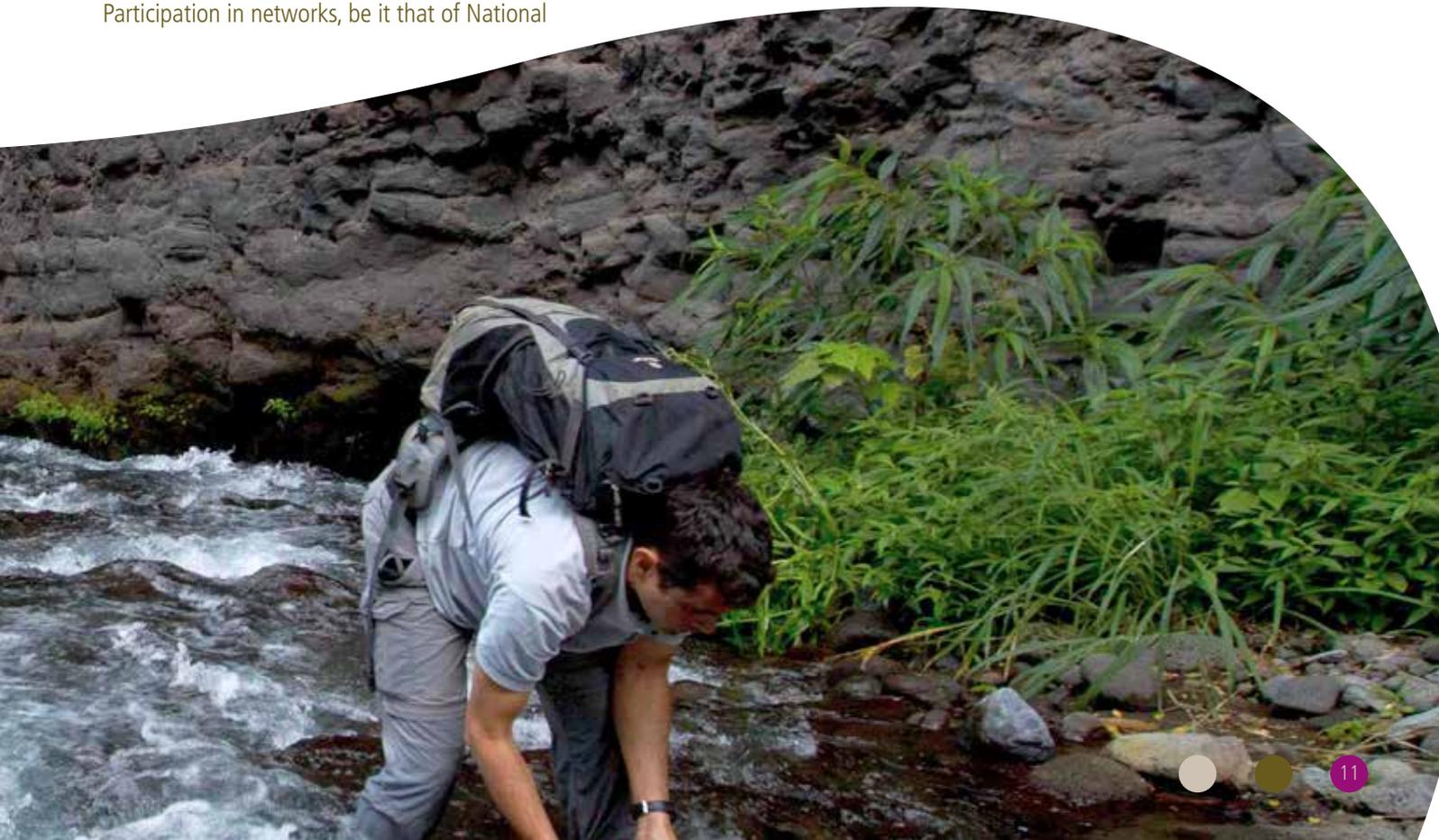
Innovation, creativity and experimentation in the service of knowledge

No National Park institution can examine all the possible issues, even limited to the local context that is its own. Participation in networks, be it that of National

Parks or networks on larger spatial scales, represents an opportunity for each Park to participate in the exploration of themes or new methods and develop complementary skills. In this way, National Parks can be seen as territories of innovation, which help in piloting innovative scientific projects, preparing and monitoring ecological engineering operations, developing global change monitoring mechanisms in connection with local uses, through technological innovation or by experimenting with new governance arrangements and collaborative knowledge acquisitions, provided that these actions comply with the regulations and character of each Park.

Bridgeheads within the network

Each institution is, on many issues, a National Parks' network bridgehead for the benefit of local actors and the transfer of methods and results to other structures. The topics discussed in the page below (list non-exhaustive), in which the National Parks' territories are considered by their peers as role models, are mostly conducted in the framework of effective multi-partner programs.



Bridgeheads and their objectives



Parc national
de la Vanoise

Natural heritage: reference site for monitoring Alpine Ibex (since 1997)

Understand the long-term dynamics of protected populations and develop the National Conservation Strategy (Alpine Ibex National Group).

Ecological engineering: multi-partner collaborative knowledge programme and management of the impacts of dangerous aerial cables for avifauna (since 2000).

Mobilise knowledge (species, electrical infrastructure and lifts, mortality) to identify priority issues and plan actions for neutralising dangerous equipment.



Parc national
de Port-Cros

Natural heritage: development of the French part of the Pelagos Sanctuary (since 1999).

Reconcile human activities with the conservation of marine mammals. Develop passive acoustic underwater techniques for scientific and management needs.

Technology development: edition of the journal «Scientific Reports of Port-Cros National Park» (since 1975).

Provide a framework for developing research studies carried out in Mediterranean protected areas. Develop long-term archiving of scientific results obtained in the National Park.



Parc national
des Pyrénées

Dynamics of territories: reference site for monitoring Pyrenean Chamois in Cauterets (since 1968)

Understand protected population function in the core zone on a long term basis and assess the consequences of management on natural dynamics.

Natural heritage: knowledge program and conservation of *Subularia aquatica* or Awlwort (since 1999).

Identify the probable causes of the regression of this plant species by studying the evolution of sedimentation and of the physicochemical quality of its environment and the genetic structure of the



Parc national
des Cévennes

Dynamics of territories: characterisation of ancient forests, mature or high degree of naturalness (since 2009).

Mapping of these forests, identify taxa related to the age of the woodland and analyse uses and management modes. Construct a low intervention forest network in the National Park.

Natural heritage: monitoring Vulture populations reintroduced since the creation of the National Park.

Study the trends of development and food strategies of different species via a natural rendering plots network. Identify the link between, livestock systems and



Parc national
des Ecrins

Understanding of climate change and adaptation: glaciers monitored (since 2000) and program «Vertical Ecology».

Identify the consequences of global warming and the fate of the glaciers. Improve knowledge on biodiversity during the Ice Age and the mechanisms of high altitude colonisation.

Dynamic territories: Programme «Sentinels of Alpine meadows» (since 2008).

Acquire knowledge and technical references on climate change, pastoral practices and farming systems. Establish a multidisciplinary forum for mountain pasture management.



Parc national
du Mercantour

Natural heritage: first All Taxa Biodiversity Inventory (ATBI) in Europe (since 2006)

Improve knowledge on the biodiversity of the territory on the least surveyed groups (insects, lichens, etc.) and the areas that have difficult management issues. Getting managers and scientists to work together on the identification of species. Establish reference states.

Scientific border cooperation: share knowledge acquisition actions with the Parco Naturale Alpi Marittime (since 1987).

Examples: the ATBI, cross-border atlas, monitoring populations of Alpine Ibex and bird migration, wildflower meadows contests, etc.



Parc national
de la Guadeloupe

Dynamics of territories: monitoring of permanent forest plots (since 2010)

Study and understand the dynamics of tropical forests: dense "primary" rainforests (spatial patterns and trees equipped with dendrometers), swamp forests and dry forests.

Natural heritage: studying of marine zones (10 years of experience on monitoring of corals, seagrasses and mangroves).

Assess the impact of the deterioration of environmental conditions, measure the effects of protection and management, monitor the impacts of climate change.



Parc amazonien
de Guyane
Parc national

Dynamics of territories: adapting of public policies to local practices (since 2012) Acquire the knowledge necessary for co-construction, with the communities concerned, proposals of appropriate management rules: studying and monitoring of hunted wildlife, management of fisheries resources of Upper Maroni.

Understand climate change: monitoring Mount Itoupé cloud forests (since 2010).

Identify indicator species to monitor climate change. Study forest dynamics.



Parc national
de La Réunion

Ecological engineering: preparing and implementing of the strategy for the fight against invasive species (since 2008).

Prioritise actions to limit impacts and actively fight. Improve efficiency by networking across the Indian Ocean. Take positive action, especially after fires.

Natural heritage: knowledge actions and habitats protection and threatened species at different scales (since 2008).

Limit erosion of island biodiversity by acting for the restoration, reconstruction of habitats and the reinforcement of the most endangered species. Involve people in these conservation operations.



Parc national
des Calanques

Ecological engineering: experimental reinforcement of a vulnerable plant species (*Astragalus tragacantha*)

Define a methodology to optimise the successful restoration of large-scale populations. Strengthening ecological continuity.

Global changes: sea pollution.

Expertise and analysis of national issues (e.g. rejection of «polluted industrial waste») and monitor pollution in the National Park. Prepare the creation of an «Observatory of water quality» to centralise information on pollution in marine environments and use this knowledge to management.



GIP du futur Parc national
des forêts de Champagne et Bourgogne

History of socio-ecosystems: data acquisition via LIDAR technology (since 2012)

Improve thanks to data of this laser remote sensing technology, knowledge of the area: archaeological, landscape and forest stands on a dendrometric and ecological, etc.

Cultural Heritage: héritage status of villages

Identify and analyse the urban structure of the villages, understand the composition and identifying characteristics. Assess the heritage interest, the conservation status and the degree of development of villages across the study area.



Parcs nationaux
de France

Knowledge structuring: database of scientific operations of the National Parks (since 2010)

Take stock of inventories and monitoring led by the National Parks, facilitate evaluation of methodologies, prioritisation and sharing of this data collection devices conducted by the institutions.

Territorial functions: valuable elements of the Port-Cros and Guadeloupe National Parks (2008-2013).

Assess the monetary and non-monetary values associated with the protection of natural areas: local spending and visitor satisfaction, ecosystem services, heritage value for



OPERATIONAL AXES

To meet the knowledge objectives of the actions of the National Parks, the Scientific Strategy of the National Parks' network identifies six major operational axes for the period from 2015 to 2025. To accomplish them, several actions for each of these axes are proposed. This present strategy will be completed by a more detailed action programme, that will contribute to its application.

1 • Maintaining the network for National Parks' institutions and their partners

This is a founder axis without which the collective intelligence needed to carry out the actions of the other axes could not be mobilised. It presumes the continuation

of work group animation within the National Parks' network on issues of knowledge and expertise.

Examples of actions:

- the organisation of collective reflection meetings (with the invitation of outside experts) on innovative and emerging issues for the National Parks, analysing complex concepts to help each institution better understand them. The network head of the National Parks has a special role to play in boosting social science studies (which concern all heritages).
- steering through the network of studies on interesting subjects brought forward by several Parks: generalised biological inventories, load capacity of natural areas, ecosystem services, socio-ecosystem approach, etc.
- launching calls for scientific partnership proposals involving several National Parks and collective responses to calls for projects

2 • Strengthening partnerships for better knowledge

The participation of the National Parks in French and international strategies and networks should be maintained or even strengthened. As such, the actions proposed in the

following areas should be conducted primarily through such partnerships, where relevant.

Examples of actions:

- strengthening collaboration between the network head of the National Parks and other national actors of knowledge, to meet priority needs (strategies, methodologies, protocols, tools, etc.)
- achieving a balance sheet and accompanying the Parks on the issue of participatory science, to encourage awareness and citizen engagement.

Ecrins National Park © T. Trossat - Cœur de nature - SIPA

3 • Sharing knowledge acquisition methods

The large number of different protocols and specific tools used to study biodiversity in National Parks is an obstacle to synthetic data analysis. It is therefore necessary that the National Parks share knowledge acquisition devices (inventories, monitoring, studies), if they wish to answer the

same questions. As part of this standardisation it will be critical to ensure that the specific needs of each National Park and the development of innovative methods are effectively taken into account.

Examples of actions:

- the continuation of the implementation of knowledge actions to priority areas of the network (if shared by several National Parks), using the same or similar protocols,
- the development of actions on knowledge gaps in the National Parks: natural heritage (insects, molluscs, bryophytes and lichens, etc.), uses of their territories (monitoring of the tourism flux, pastures, artisanal fisheries, water use, forestry, etc.), relations between the two (biodiversity and human activities). Collective reflections on wild and domesticated pollinators,
- coordinated strengthening of the contribution of National Parks in global changes monitoring.

Cévennes National Park © O. Prohin - PNC



4 • Improving data quality, structure and availability

Improving data quality is based on a shared vision of on-going knowledge acquisition techniques, allowing the identification of the necessary methodological comparisons

and the evaluation of the reliability of the data produced. The data structure should enable the provision of information for local and national needs.

Examples of actions:

- the strengthening of the quality of collected and produced data: regular updating of the database of scientific operations of the National Parks, establishment of common rules for the design of new protocols, regular evaluation of current methods and improving them if necessary,
- improving the structuring: application of the collective and shared schema collection, of management (including storage and archiving) and of data recovery, providing a methodological framework of reference; establishment of identical tools (land records, database) where actions are shared,
- continuation of the provision of data, including the French inventory of natural heritage (INPN) under the SINP which sets the national policy of the movement of naturalistic data.

5 • Making data more available

Having structured knowledge allows for the installation of territorial management, it is essential that collected data is analysed and interpreted. Some of them can contribute

to the calculation of indicators that can assess the state of heritages and uses.

Examples of actions:

- use of data for environmental assessment: diagnostic impact assessment, identification of issues zones for spatial planning, etc,
- establishment of assessment tools and synthetic indicators within the network: state of conservation of socio-ecosystems, habitats and species, instrument panels and system of charters evaluation,
- establishment of analysis of old inter-park data, exploring the interest of data of the National Parks for meta-analyses.

Cevennes National Park © Damourette - Cœur de nature - SIPA





GIP of Futur National Park of Champagne and Bourgogne © F. Fouquet

6 • Distributing knowledge, developing expertise

This last major objective should help strengthen national and international visibility of the French National Parks'

network, positioning it as a major actor in the knowledge of biodiversity.

Examples of actions:

- organization of an annual scientific meeting of the network.
- enriching the scientific content of websites.
- communication of results as summary information and recommendations (notes, articles in scientific journals).
- development of common support systems for the establishment of participatory sciences in National Parks..

Citation: PNF, 2015. Scientific strategy 2015-2025 of the French National Parks. Parcs nationaux de France. Montpellier, 20p.

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