

AnthroNat

Nature Conservation in the Anthropocene

I Proposal's context, positioning and objectives

1 The context

Nature conservation policy has always been elaborated in a potentially contradictory situation: such policy seeks to preserve the natural heritage and its identity and integrity while at the same time taking into account the dynamics and evolution of the nature it seeks to conserve (Soulé 1985; Crandall et al. 2000). This tension may have been partially eluded by the idea of a decoupling between the temporality of human activities and that of natural evolution. However, because development and conservation policies occur at a faster pace than evolutionary change, it has been possible to believe that natural environments could be conserved "as if" they were relatively stable.

This decoupling is no longer acceptable. Human actions impact nature on a large-scale with long-standing consequences and micro-evolution occurs too frequently for it to be neglected by conservation policy (Stockwell, Hendry, and Kinnison 2003; Thompson et al. 2018). We have entered the era of the global influence of humans on the planet: the Anthropocene (Crutzen and Stoermer 2000). We can no longer write a history of humans that rapidly develops on an almost immobile backdrop of natural history; the two evolve conjointly (Chakrabarty 2009). Democracy and fossil fuel resources (Mitchell 2013), industrial capitalism and climate change (Bonneuil and Fressoz 2013), the green revolution and the rupture of the nitrogen and phosphorus cycles (Foley et al. 2005), the world market and the sixth extinction of biodiversity (Kolbert 2014), represent classic examples of how human institutions and the natural world are intertwined with each other in complex causal loops.

In such a context, the protection of nature can no longer be considered as the spatially delimited relief of human influences on the supposedly normal (or natural) functioning of ecosystems. The normal functioning of ecosystems, communities and species cannot be simply identified in reference to what would happen in the absence of "anthropogenic disturbances" (Inkpen 2017). This statement, at first glance trivial, poses however the crucial problem of norms of action in the context of nature conservation. If we no longer protect nature against human influences, on what basis can we discriminate between influences that harm nature and those that are favorable? This question is at the heart of our proposed project: **what precisely does it mean to conserve nature in the Anthropocene?**

Protected areas are the cornerstone of nature conservation policy. They now occupy nearly 12% of the surface area of the globe (Jenkins and Joppa 2009) and this proportion should increase to 17% by 2020 according to Aichi Biodiversity Targets (CBD 2010). In France, a

variety of policies regulate protected areas, ranging from strict protection (e.g. in the core zone of national parks and nature reserves) to areas of integrated management that allow, and even encourage, some human activities favorable to biodiversity such as pastoralism (e.g. sites within the Natural 2000 Habitats Directive). The precarious balance that societies have established between use and preservation of nature is shaken by the eruption of new issues that challenge the boundary between what is natural (and thus falls within the mission of nature protection) and what is not. Three figures of this “new ecological disorder” deserve special attention and form the framework of this proposition:

- **The return of the wild:** When species that were not or no longer present in a protected area upset the socio-ecological equilibrium that has developed in their absence.

This is the case of the wolf in the mountain parks of Europe (Louvrier et al. 2017) which is subject to much debate and controversies both in the media (Chandelier et al. 2018) and scientific circles (Doré 2011; Morizot 2016).

In Europe and France, the return of the gray wolf (*Canis lupus*) gives rise to virulent conflicts within and outside protected areas. Controversies and public policy strategies elaborated since the return of the species have shown the difficulties of humans to insert themselves into a socio-ecological community gathering humans and non-humans in the same collective (Latour 1999). The controversies that the presence of the species generates have been the subject of historical studies (Moriceau 2013), ethnosociological (Lescureux and Linnell 2013), geographical (Benhammou 2012), sociological (Mounet 2007), philosophical (Morizot 2016), ecological and biological, or ethological (Landry 2006). Social science work, mostly on the ground, is spatially anchored and shows that the wolf is an entity around which the actors position themselves and assert themselves (Doré 2011). The “wolf return” case study can help to discuss and reassess both human/nature relationships and domestic/wild interactions in time and space within the frameworks of biodiversity (Blandin 2009) and of our solidarity with humans about biodiversity, as well as our solidarities with non-humans (Mathevet et al. 2016). The return of the wild shows how interactions between domestic and wild world reveal a mode of existence blurring the usual boundaries and landmarks between artificial and natural, restructuring lifestyles and spatio-temporal practices progressively established over time and stabilized in recent decades. The redefinition of a common world, the possibility of living together are made difficult by disqualifications or attempts to control and regulate sometimes the wolf, sometimes pastoral practices. The issue at stake is still to invite stakeholders to (re)engage in dialogue, to negotiate their inter-existence by clarifying the political, social and ecological interdependencies that underlie conflicts, and by valuing these interdependencies.

- **The clandestine passenger:** When populations that are not historically native are transported in the wake of human activities.

Numerous terms are used to denote animals or plants living and reproducing in an environment in which they did not originate: non-native, alien, exotic, invasive, imported, weedy, introduced, naturalized, immigrant, non-indigenous, and so on. In the scientific literature, these terms often lack an explicit definition, and when they are defined, the definitions can be varied, contradictory or even internally inconsistent (Falk-Petersen, Bohn, and Sandlund 2006). Even though biological introductions are as old as human migrations,

they have only become of real concern since the mid-1980s, following the growth and intensification of economic, social and ecological damage related to invasions.

Despite the relative vagueness of the definitions of non-indigeneity, its qualification is based on three criteria, each of which raise some conceptual issues. A first criterion refers to time scale. To be considered as non-native, a species must come from somewhere else and at some point in time, its current location lacked any specimen of that species. But obviously, no species has always been where it is now. Populations disperse, colonize new habitats, and the composition of present communities is a constantly evolving set of species. Thus, since how long must a species be settled somewhere to be considered as native? A second criterion refers to spatial scale. A population is considered to be non-native because it is not *where* it is supposed to be *naturally*. But what does *naturally* mean? A third criterion to define non-nativeness refers to an anthropogenic scale, that is to say the degree to which human activities are responsible for the presence of a given population in a given ecosystem.

- **The ecological refugee:** when one wonders about the advisability of voluntarily transferring endangered species to their site of origin towards a site more favourable to their maintenance.

Species have always evolved in relation to climate change by either migration and range change and/or by local adaptation. An integral element of the contemporary Anthropocene is further climate change, but at a rate which is far faster than has previously occurred. In adaptation, the response of species must occur in a human-dominated landscape that may prevent their evolution by barring their migration or restricting their evolutionary potential due to small population sizes. Assisted colonization has been proposed as a method for addressing these challenges. This technique involves translocation of species to a new range that is predicted to be more favourable for persistence under future climate situations. Inevitably, this proposed management strategy has become the subject of much debate as a result of the major manipulation it requires, its feasibility and likely success, and marked uncertainty associated with the likelihood that the translocated populations become invasive (Ricciardi and Simberloff 2009) and perturb natural function in the new area (Vitt et al. 2010; Loss, Terwilliger, and Peterson 2011). These questions and the whole discussion has a philosophical grounding that has only barely been fully debated (but see (Sandler 2010; Minter and Collins 2010) and has hardly at all percolated into management situations.

This absence of a full-blown debate on this question is dramatic because, not only does it have an ethical basis, many species, primarily those with the most sedentary and small-scale dispersal modes, it has important consequences in terms of ecological function and long-term viability of species. Many species may well have their evolutionary options completely blocked by the contemporary human-induced configuration of their populations and the barriers to their movement that now occur in the landscape.

In addition to these three themes that enable us to question current ideas on conservation action and intervention, there is growing interest in the importance of sites that remain free from human intervention. There is thus an additional figure that provides a sort of control on what is questioned where intervention is proposed.

- **Naturality as a process:** To provide a backdrop to the three issues of human intervention and natural processes we will also develop a theme related to the designation of strict nature reserves where the natural dynamics of an ecosystem and species interactions can be studied in the absence of direct human intervention. The ecological and social implications of this

policy and even the semantic associated with their perception have received little attention (e.g. Larrère & Thompson 2012), despite the ecological values such sites may present (e.g. see Terracol et al. 2017).

The designation of a strict nature reserve that is currently in the process of being proposed in the core-zone of the Mercantour National Park, will allow us to be able to study, right from the onset, how the managers and actors perceive and appropriate such sites. This will allow us to develop the theme concerning the “naturalness and wildness” within protected areas such as national Parks. To a certain degree, it will be a question of confronting the stakes of a return or active maintenance to the naturalness to the simple vision of “laissez-faire”. This would make it possible to understand, from an empirical point of view, theoretical questions related to the notions of baseline, control, baseline vs. reference dynamics, and so on. Comparison with other such reserves that are free of human intervention and currently under study (Terracol et al. 2017) will be an important element of our study of this theme.

Regarding these challenging situations for conservation, different standards can guide action and in particular it will be most interesting and important to assess where “absolute naturalness” may be pertinent and where assisted naturalness in terms of human intervention to a given state and then evolution free of human intervention (“assisted naturalness”) could be prone. This raises the question of when and where should one refrain from intervening? John Thompson, member of the project’s team, has already been involved in the test of such ideas with the Conservatoire du Littoral and the Nature Reserve for the “Ile Ste Lucie” in Mediterranean France where part of the reserve is subject to direct human intervention to maintain a particular ecosystem and part of the reserve is left-free of human intervention.

Other more general questions also arise. Should one maximize biodiversity? Should one ensure the best supply of ecosystem services? Should one rely on participatory decision-making processes? In this project, we will explore the normative justification of conservation policy that has been central in its history. The explicit or implicit reference to nature’s value and naturalness will be a central issue in our investigation. Rather than adopting a ready-made definition of what “nature” is, we will address the theoretical basis for the qualification of “nature” and “naturalness” in a way which integrates evolution and change. We will begin with an empirical analysis of real-life management challenges in this context.

2 *Objectives*

The objective of this project is to reinvest the concepts of nature and naturalness in order to shed light on the way in which global changes complicate the traditional missions of conservation policy and protected area management. Adopting a pragmatic approach (Andrew Light 2005), this theoretical inquiry will be rooted in concrete situations, namely in the challenges faced by managers and decision-makers regarding the relation to naturalness of different situations involving : 1. the “spontaneous return” of species; 2. their “dispersion” after inadvertent introduction; 3. their “introduction” for conservation purposes.

3 *Hypotheses*

Philosophy does not proceed as a hypothesis testing science. It is thus uneasy to formulate the root hypothesis of the project. However, it is enlightening to delineate the fundamental assumptions on which the project relies in order to make explicit some premises of the work

that should not be taken for granted and, possibly, that may be revised during the project. The present project is based on two theoretical hypothesis.

Hypothesis 1: The Anthropocene as a new grand narrative

The place for nature on Earth is dwindling. There are more than 7 billion humans occupying 66% of all land (Mittermeier et al. 2003). The remaining parts of the planet, if not inhabited by humans, are either under permanent ice (for one third), or threatened by diverse human activities such as agriculture, logging, mining, pollution, and so on (for one half). Almost all coastal ecosystems are highly influenced by human activities and no marine areas remain totally unaffected by human influence, indeed 41% are strongly affected by various human-induced drivers as pollution, fishing, species invasions, benthic structures or climate change (Halpern et al. 2008).

That said, the Anthropocene should not be considered as a simple matter of fact. It is not only a biophysical reality, but also a narrative emerging at a specific standpoint from which the current environmental crisis is observed and described (Baskin 2015). It conveys norms and representations that have developed around the central place of human beings in nature. Modern conservation was born in the 20th century and thus conservation has always occurred during the age of the (biophysical) Anthropocene. However, the conceptual landscape in which conservation has to operate now significantly differs from that in which it began. First because the anthropic pressures on natural habitats have intensified and globalized. But also because, the recent coining of new concepts such as “global environment”, “global biodiversity”, “novel ecosystems” produces, up to some point, some new realities that impact the way of considering conservation issues.

By rising human beings as an Earth-shaping force, the Anthropocene discourses tend to dismiss any room left for something such as a wild or autonomous nature. Following Paul Crutzen, the father of the term “Anthropocene” himself: ‘[t]he long-held barriers between nature and culture are breaking down. It’s no longer us against “Nature”. Instead, it’s we who decide what nature is and what it will be. ... [I]n this new era, nature is us’ (Crutzen and Schwägerl, 2011).

Our first hypothesis is that Anthropocene is also – and maybe above all - a matter of discourses and concepts. A thorough attention to the conceptual issues it raised is thus needed.

Hypothesis 2: The necessity to revisit the concept of “nature”

The reference to “nature” remains pervasive in environmental discussion, debate, policy and practice. We firmly believe that a cautious approach to the notion of naturalness is needed to counterbalance the dominant viewpoint in the Anthropocene sciences, which declares that nature is dead and plead for a new conservation free of any reference to naturalness.

This lead us to a second hypothesis, which is the core motivation for this work, that is that against the ideas of the end of nature and an age of the total artifice defended by the proponents of the "New Conservation" (Kareiva 2014). The underlying tenet of this hypothesis is that it is possible and necessary to reinvest / reactivate the strong intuitions that were prevalent during the birth and early development of conservation biology, particularly with respect to the values of naturalness and wildness (Takacs 1996; Piccolo et al. 2018),

while at the same time adjusting them to the contemporary context of human domination of natural ecosystems (Maris 2015).

4 Originality and relevance in relation to the state of the art

Reflection on the nature and relationships between humans and the natural world is as old as philosophy itself. Nevertheless, work on how global change alter these relationships and the underlying conceptions of nature are recent and few. In France, some environmental philosophers have addressed this issue (Larrère and Larrère 1997; Hache 2011; Larrère and Larrère 2015; Maris 2016; Morizot 2016) but they are not primarily focused on the notion of wildness or naturalness. At the same time, there is revival in the United States of the "Great Debate on the Wilderness" (Callicott and Nelson 1998; Nelson and Callicott 2008; Wuerthner, Crist, and Butler 2014; B. A. Minteer and Pyne 2015 for the revival). However, it has developed in an ecological and historical context very different from that in Europe, in particular context that is shaped by the vastness of a territory and the strong cultural reference to "wilderness" (Cronon 1992). In the proposed project, we question the mix of these two fields of thought in a way that is directly connected to the issues of nature management in protected areas.

This project does not intend to juxtapose new analyzes with those already existing on the return of the wolf (e.g. Morizot 2016), biological invasions (e.g. Simberloff et al. 2013) or recent elaboration of conservation tools in a context of global change (e.g. Minteer and Collins 2010; Maris 2018) but it aims to tackle these various issues as different modalities of the same challenge that questions the meaning of contemporary nature conservation.

While philosophy is often asked in interdisciplinary projects to support an analysis of specific disciplines or to provide a link between different disciplines, this project mobilizes a multidisciplinary team (geography, ecology, conservation biology) around a philosophically-based project. At the heart of this project is a philosophical questioning of the concept of nature in a world where human influences are omnipresent.

In addition, this interdisciplinary work aims to inform thinking and decision-making about the adaptation of public policy for protected areas and their management in relation to the challenges posed by the advent of the Anthropocene. The project is composed of several research scientists that are all intimately involved in the articulation between science, expertise and decision concerning nature conservation policy and management.

5 Methodology and risk management

Philosophical pragmatism: The proposed project adopts a pragmatic approach of environmental philosophy (Light 2005; Light and Katz 1996; B. Minteer 2011) to tackle the century old issue of the Nature-Culture dichotomy. As formerly proposed by John Dewey (1938), the pragmatist way to tackle theoretical issues in philosophy is to begin with a problem (here: the practical problems raised by the blurry notion of nature in nature conservation) and to proceed to an empirical enquiry by examining and making explicit what the concepts actually do in the real world, or, to put it differently, how stakeholders use the concepts as practical tools in their actions (including representations and communications).

This is a challenging task, because one cannot lead such an inquiry without being very familiar with the empirical problems faced by the stakeholders. In the proposed project, this means that not only a strong knowledge in environmental philosophy is needed, but also a good understanding of the political, geographical and ecological issues at stake. The interdisciplinarity of the involved team, their close links to protected areas and their staff, and the complementarity of the participants' skills should allow us to overcome this challenge.

Interdisciplinarity: The pragmatic approach adopted necessitate the involvement of different disciplines: philosophy, geography, ecology and conservation biology. By essence, working at the interface of different disciplines is challenging, because each tradition comes with its own methods and concepts. A strong asset of the project is that all the researchers implied are very familiar with interdisciplinary work. We already share a common interest and culture of dialogue with other disciplines. However, a great challenge remains for the selection of the PhD student. We are aware of this difficulty but we believe that the risk worth taking, because the hybridization of curriculum and transdisciplinary researches will be more and more necessary in environmental sciences.

II Project organisation and means implemented

1 Scientific coordinator and its consortium / its team

The project involves five research scientists in the “Biodiversity and Conservation” department of the UMR 5175 Centre d’Ecologie Fonctionnelle et Evolutive in Montpellier (CEFE) in the South of France. The CEFE has a long tradition of diverse interdisciplinary research programs in conservation science. All five researchers have research interests, and participate in collective expert consultancy and scientific commissions in the field of nature conservation and protected area management.

a Scientific coordinator

The project is coordinated by **Virginie Maris** who is a research scientist in environmental philosophy and is particularly interested in the values human societies attribute to biodiversity and nature conservation. She arrived at CEFE in 2009.

Her work lies at the intersection between epistemological and ethical issues regarding biodiversity conservation. She has written scientific papers in various subjects linked to conservation (predictive ecology, Anthropocene, ecosystem services, biodiversity values, invasion biology, sustainable development...) and she is the author of two books : *Philosophie de la biodiversité – petite éthique pour une nature en péril* (Buchet-Chastel, second edition in 2016) and *Nature à vendre – les limites des services écosystémiques* (Quae, 2014).

She is a member of the IPBES (International Platform on Biodiversity and Ecosystem Services) working for the deliverable 3d (Values and methods of valuation). She has been appointed by the French Ministry of the Environment to be member of the CNPN (Comité National de la Protection de la Nature) in the protected areas commission. She has recently been nominated as a member of the National Biodiversity Commission (CNB).

Virginie Maris will coordinate the whole project. She will be the first supervisor of the PhD student and the co-organizer of each subtask (predators, invasions, assisted colonization and synthesis).

b Project's team

John Thompson works on the ecology, evolution and conservation of Mediterranean plant biodiversity since 1989. In 2005 he published the book "Plant Evolution in the Mediterranean" with Oxford University Press (<http://www.oup.co.uk/isbn/0-19-851534-0>), a new edition of which is being written. His current research develops methods to establish conservation priorities for rare species, monitoring and reintroduction projects for rare species and the evaluation of the conservation status and vulnerability of species and their habitats. With Raphaël Mathevet, also involved in this project, he has inspired work on the notion of ecological solidarity and its declination in conservation strategy and action. All his research projects involve interactions with local management staff. He is president of both the Scientific Commission of the Mercantour National Park and the National Parks' Scientific Commission of the French Biodiversity Agency (AFB). He is also member of the scientific commissions of the Mediterranean Botanical Conservancy and the Narbonnaise Regional Park. John Thompson will be the second supervisor of the PhD. He will co-animate, with the PhD student and Virginie Maris, the third subtask about assisted colonization.

Anne Charpentier is an ecologist. She works at the interface between population ecology and conservation biology. Her research focuses on the effects of anthropogenic factors on population dynamics. She is particularly interested in biological invasions. She has been the scientific coordinator of an interdisciplinary research project (ecology, sociology and management) on the colonization of ornamental plants in the Camargue as part of the "Biological Invasions" program of the Ministry of Ecology and Sustainable Development. She participated in the expert group of *Baccharis halimifolia*'s Pest Risk Analysis for the European and Mediterranean Plant Protection Organization. She is also a member of the Conseil Scientifique Régional du Patrimoine Naturel (CSRPN) of the Occitanie region. Anne Charpentier will co-animate, with the PhD student and Virginie Maris, the second subtask on exotic species management.

Raphaël Mathevet is an ecologist and geographer at the CNRS in the Centre d'Ecologie Fonctionnelle et Evolutive in Montpellier (France). He works on the conservation of biodiversity, protected areas and conservation planning tools, adaptive co-management, evaluation of public policies (agro-environmental schemes, Natura 2000, ecological network, nature reserve planning). Working on participatory approaches and decision-support modeling, he applies simulation tools and role-playing game in multidisciplinary approaches to resolving management conflicts, especially in the context of Mediterranean wetlands and natural resources management. His most recent work focuses on the concept of ecological solidarity, the resilience of social and ecological systems, social representations and mental models. He is a regular lecturer on "Integrated management, Biodiversity conservation and dialogue processes" in several "Grandes Ecoles" and French universities. He is also a member of several scientific committees at local, regional and national levels. He is a member of the Protected Areas' commission of the French IUCN Committee, vice-president of the UNESCO MAB France Committee and a member of the international advisory committee for Biosphere Reserves of the UNESCO Man and Biosphere program. During the last decade he focused on science/management and science/policy interfaces at local, regional, national and European levels. Raphaël Mathevet will co-animate, with the PhD student, Olivier Gimenez and Virginie Maris, the first subtask on the return of great predators in National parks.

Olivier Gimenez works in statistical and quantitative ecology. His research is focused on the population dynamics and conservation management of large carnivores. He has recently

participated in the collective expertise on wolf populations in France coordinated by the Ecology Ministry (<http://bit.ly/2hvBKsu>). He is director of several programmes on dynamics and management of carnivore populations and has worked for 10 years in collaboration with the “Office National de la Chasse et de la Faune”, which coordinate the Wolf studies network and the monitoring of wolf populations (and other large mammals) in France. He collaborates closely with several specialists of wolf populations including John Linnell (Norway), Guillaume Chapron (Sweden), Luigi Boitani & Paolo Ciucci (Italy). His work has developed towards an inter-disciplinary analyses with the participation of social scientists in the study of the coexistence of carnivore populations and human activities in and around protected areas. He is currently director of the “Biodiversity and Conservation” department of the CEFE where the proposed project will be undertaken. Olivier Gimenez will co-animate, with the PhD student, Raphaël Mathevet and Virginie Maris, the first subtask on the return of great predators in National parks.

III References related to the project

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