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FORUM

A rewilding agenda for Europe: creating a network of experimental reserves

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Abstract

In the context of aging European conservation institutions rewilding has emerged as a popular and scientific expression of new directions in ecology and conservation management associated with the restoration of ecosystem function through reassembly of trophic levels involving the reintroduction of large mammals. It introduces a radical new natural archetype that evokes a positive environmentalism. The Oostvaardersplassen experiment in the Netherlands demonstrates the agency of rewilding for nature development and engaging diverse publics in debates on what is natural and the future of conservation policy. If conservation is to retain its cultural and policy visibility and influence in a 21st century multi-cultural Europe, our conservation institutions and the natures we value must adapt. In this forum I frame rewilding as an asset for institutional adaptation that is being constrained by substantive institutional and societal resistance. I argue the need for strategic investment in a European network of experimental rewilding sites. These would bring rewilding into densely populated areas, develop the science and practice of ecosystem restoration, and promote public debate on nature conservation futures. The ‘Fitness check’ of European nature conservation legislation mandated in 2014 is a case of high politics. In this situation, compromise and negotiation is inevitable and the environmental lobby needs something to advocate as well as defend. A rewilding agenda could fulfil this need.

Introduction

The term ‘rewilding’ is gaining traction in conservation science and policy but lacks easy definition.

From a scientific perspective it falls within the framework of restoration ecology and is characterized by species reintroductions to restore ecosystem functioning and associated interests in landscape connectivity and the creation of large core reserves (Sandom et al. 2013). In Europe, rewilding may better be understood as signifying an ‘opening’ – a space of innovation in conservation management and research – where the

continent's multi-cultural societies can engage with debates on future natures and conservation policy. The 'rewilding' label can be understood as an expression and emergence of interacting currents in science, practice and society. These include: 1) the imperative to restore ecosystems created by on-going environmental degradations and associated advances in ecology that are affording new understandings of ecosystem dynamics and function (Hobbs and Harris 2001); 2) the project of the European Union that created an imperative for trans-national conservation visions (Jongman 1995); 3) the Oostvaardersplassen 'experiment' in the Netherlands that expressed a theoretical challenge to conventional thinking on European natural archetypes (Vera, 2000), provided a source of inspiration for progressive conservation managers, and provoked high-profile and intense public debate (Lorimer and Driessen 2014); 4) the recovery of large carnivore populations arising from processes of land abandonment and protective legislation that are establishing the idea that humans and megafauna can coexist in Europe (Chapron et al 2014); and, 5) broader commentary suggesting that citizens are suffering 'ecological boredom' (Monbiot 2013), the 'extinction of experience' (Miller 2005) and reacting to 'doom & gloom' environmental messaging with defensive avoidance leading to collective indifference and disenfranchisement from decisions about nature and the countryside (Boyes 2014).

In Europe, rewilding narratives are gaining an organisational, practical and media presence. Since 1998, six pan-European groups promoting rewilding ideals have formed, media articles are increasing (Fig 1) and #rewilding has a growing social media presence. Rewilding is active, controversial and happening: much like the terms 'punk' or 'hippy' it is coming to signify an unsettling – a desire to shake-up the present and shape futures. Simultaneously, the emergence of the rewilding frame coincides with the ageing of European conservation policy instruments. The Birds and the Habitats Directive are respectively 35 and 22 years old and embed the science, values and governance logics of the 1970s. The European Commission has begun an evaluation of the effectiveness of its nature policy, the so-called 'Fitness check' which is due for completion in 2015/16 (European Commission 2014). The EU has also released a bold biodiversity

strategy for 2010-2020 that includes a goal to restore 15% of EC ecosystems (European Commission 2011).

Together these developments represent a policy opening; a window for change. However, institutions are intrinsically conservative and resist change. European conservation institutions emerged in the wake of the cultural shock of environmentalism. They were conceptualized and debated 40 years ago. Society has moved on; it is more multi-cultural and urban in composition and is embarking on a period of rapid technological change. There is a risk that without active public and scientific debate, policy frameworks will stagnate and European nature conservation will lose policy and cultural saliency in the decades ahead. In short, if conservation is to survive, our institutions and the natures we value, must adapt.

In this forum I argue that rewilding embraces progressive inter-disciplinary science and novel forms of conservation management that inspire and unsettle. It provokes debate and innovation across scientific, political and public domains of society and as such represents an asset for recasting and reinvigorating nature conservation for the 21st century. However, realizing this potential will require strategic investment and action on the part of the European commission and EU member states. Here, I make the case for a process of institutional modernization through experiment; the creation of a network of dynamic and experimental rewilding reserves.

The agenda I outline complements and extends Merckx and Pereira's (2015) proposal to promote rewilding through a redesign of farm subsidy payments under the Common Agricultural Policy (CAP); specifically they propose disconnecting subsidies from farming activities on marginal land. I propose a more experimental (and hence active) form of rewilding, conducted at smaller scales in sites interwoven into the fabric of densely populated landscapes. The aim of these experimental reserves is twofold: to reinvigorate the dynamic interactions between nature, society and economy, and to further the development of applied ecological restoration and Earth System science. In contrast, Merckx and Pereira's (2015) 'subsidy' proposal (see also Navarro and Pereira (2012)) emphasizes passive rewilding in large scale

economically marginal landscapes experiencing human depopulation. The agenda I outline would generate positive synergies with this ‘passive’ rewilding approach.

By way of background, I first trace the European origins of rewilding concepts. Next, I illustrate the role of rewilding in making visible the natural archetypes upon which institutions are founded and argue that rewilding generates new archetypes that could support institutional and cultural adaption towards a more functionalist, restoration-based paradigm of conservation. I then discuss how a constellation of legislative barriers constrain the ‘change-agent’ potential of rewilding and why this creates an imperative for policy to create institutional spaces for rewilding to act as a part of a strategy of institutional modernization. I conclude by arguing that such an approach is broadly compatible with emerging policy directions and feasible in terms of land availability and cost.

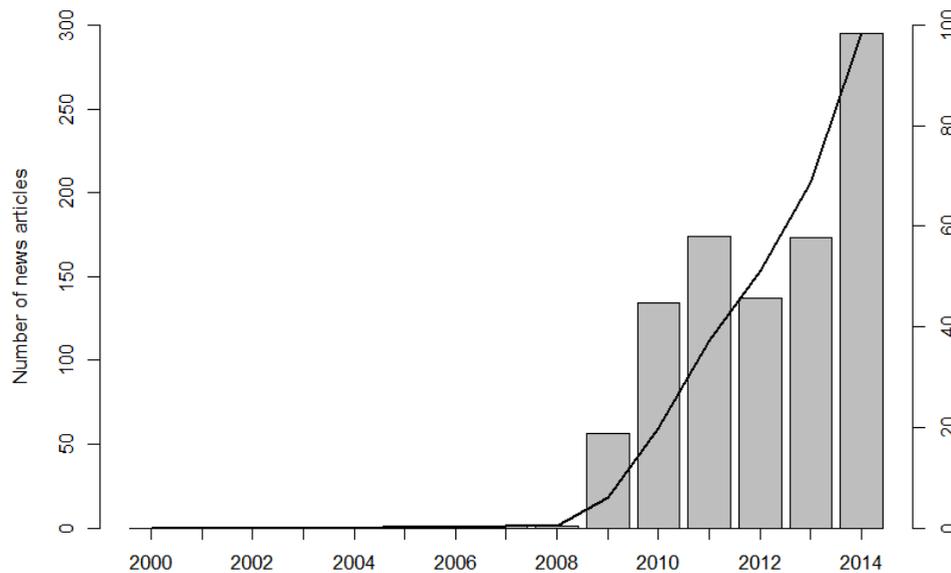


Figure 1. The rise of rewilding news articles in UK print and on-line media. Number of Google news search returns using the terms -104.c Appl. Ecol. Geog. 39: 169-181. Number of news articles (measured on the left axis) and the line represents the cumulative percentage of total news articles (measured on the right axis).

European origins of rewilding

The term ‘rewilding’ was coined in the US by Soule and Noss (1998) in the context of a vision for continental-scale conservation (Sandom et al. 2012) and attracted wider scientific interest with Donlan’s radical (2006) Pleistocene rewilding vision. It is now being applied to a body of European conservation practice and theory that emerged from the interplay between nature conservation policy and the European project.

Most European countries have long histories of nature conservation and regional planning. In the 1970s and 1980s, the theories of island biogeography and meta-population dynamics broadened the focus of nature conservation policy from species and site protection to include spatial structure and coherence. This prompted greater engagement with European traditions of landscape ecology and generated interest in ecological networks in the context of broader policy associated with the planning of trans-European spatial structures (Jongman 1995). Article 10 of the Habitats Directive (Council Directive 92/43/EEC) called for an improvement in the spatial connectivity of European nature and the 1995 Pan-European Biological and Landscape Diversity Strategy (endorsed by 24 EU countries) included the development of ecological networks as a priority.

Among European nations, the Netherlands embraced ecological network planning in the most integrated and extensive manner: the government viewed nature and landscape as essential assets for a liveable and sustainable society and recognized that these assets were deteriorating in quality (Bouwma et al. 2003). The ecological network idea (expressed as a coherent spatial configuration of core areas, corridors, restoration areas and buffer zones, Jones-Walters 2007) interacted with concepts of ecological sustainability and growing interest in ‘naturalistic grazing’ to generate a suite of principles that inform contemporary rewilding.

Interest in ‘naturalistic grazing’ (rewilding without the predators) originated from two sources. First, from changes in farming and concerns associated with the impact of rural depopulation and land abandonment on biodiversity in many areas of Europe (MacDonald et al. 2000). Extensive grazing outside agricultural systems was seen as a promising solution. Second, Vera’s (2000) ‘theory of cyclical vegetation

turnover' which posited that the natural vegetation of lowland Europe was not closed (high) forest as assumed, but a park-like landscape where large grazers played an essential ecological role (Kampf 2000). This produced a vibrant discursive space between two camps. Those who viewed grazing as a tool to preserve or develop certain landscape patterns of vegetation types (predominantly reserve managers) and progressive ecologist who were coming to see grazing as part of a natural process that had been lost, who were looking back to the pre-agricultural Quaternary for models, and who were willing to question the fundamentals of what is the nature to be conserved (see Vakblad Natuurbeheer, special issue 2002)

The Oostvaardersplassen (OVP) reserve, created on a publicly owned polder in 1984, emerged as a site where the interaction of ecological network ideals and naturalistic grazing gained physical form. It was classed as an ecological development area to experiment with passive management: the introduction of large herbivores to fulfil former ecological roles and allowing nature to take its course. This approach was seen as a means to restore ecological processes and reduced the cost of managing an extended network of natural areas (Hootsmans and Kampf 2005; Kampf, 2000).

Together, these developments produced a set of conservation principles that expressed a new 'functionalist' conservation paradigm: 1) adaptive landscape management with the flexibility necessary to integrate conservation with social and economic development, 2) restoration of nature through the facilitation of natural processes, 3) looking to the pre-agricultural era, rather than the pre-industrial, as a baseline to guide restoration, 4) passive management, and 5) the separation of nature development areas from conflicting forms of land use (particularly agriculture). In lowland Europe, this took the form of reintroducing large herbivores, either native species or their domestic analogues, and the restoration of topographies and river flow regimes (e.g. 1986 'Plan Stork', De Bruin et al. 1986). In upland Europe (e.g. Scotland) there has been more interest in reintroducing carnivores. These principles, which are also captured in terms such as 'novel ecosystems' and "ecological restoration' (Hobbs et al. 2009: Hobbs and Harris 2001) propose a dramatic reorientation of conservation policy away from preserving rare species

and compositional analogues of preindustrial-landscapes towards restoring and conserving trophic levels and ecological dynamics.

Rewilding as a radical conservation frame

Rewilding is significant because it is becoming a radical conservation frame that unsettles post WWII conservation frames. A conservation frame comprises imagined natural archetypes and their iconic species, emblematic reserves and media portrayals. It includes scientific technologies, legislative practices and management practices alongside and education and leisure activities (Jepson et al. 2011). Conservation frames become institutionalized and come to signify the natural for particular people and cultures: the taken for granted model of nature from which policy is formulated and assessed. In short they become performative (Bowker 2000).

Vera's (2000) Wood-pasture hypothesis and subsequent foregrounding of the shifting baseline syndrome (Pauly 1995, Vera 2009) explicitly challenges views on what was natural in lowland Europe. He argues that contemporary institutions are built on pastoral, high forest and upland natural archetypes rooted within distinct cultural traditions (Fig 2). The desire to conserve examples of these natural archetypes and their benchmark species assemblages has created a large and complex collection of institutions that determine conservation policy and practice in Europe. Key elements include: species and habitat classifications, flagship and emblematic species and landscapes, a network of managed reserves, conventions, directives supporting legally binding action plans and targets (e.g. CBD, EU Birds and Habitats Directives), and third-sector organizations that co-produce these attributes and mobilize public interest and engagement in their expressions.

Together these institutional elements create a powerful conservative force for the frames that initially mobilized collective action and government buy-in for conservation. Equally, as national political economies and their associated landscapes change, more resources and intervention are required to maintain the natures embodied in 20th century conservation institutions. Over-time an impoverished nature

has become normalized and indeed celebrated (e.g. the anthropogenic upland deserts of the UK, Monbiot 2013). Vera (2009) argues that rewilding projects, such as the OVP, are a case of “re-setting” expectations through adding a novel ‘natural archetype’. This produces two important dynamics: it makes nature conservation political and it creates a ‘post-normal’ conservation that promotes challenges and inspires the conservation profession. These dynamics represent an asset for institutional adaptation (Fig.2).

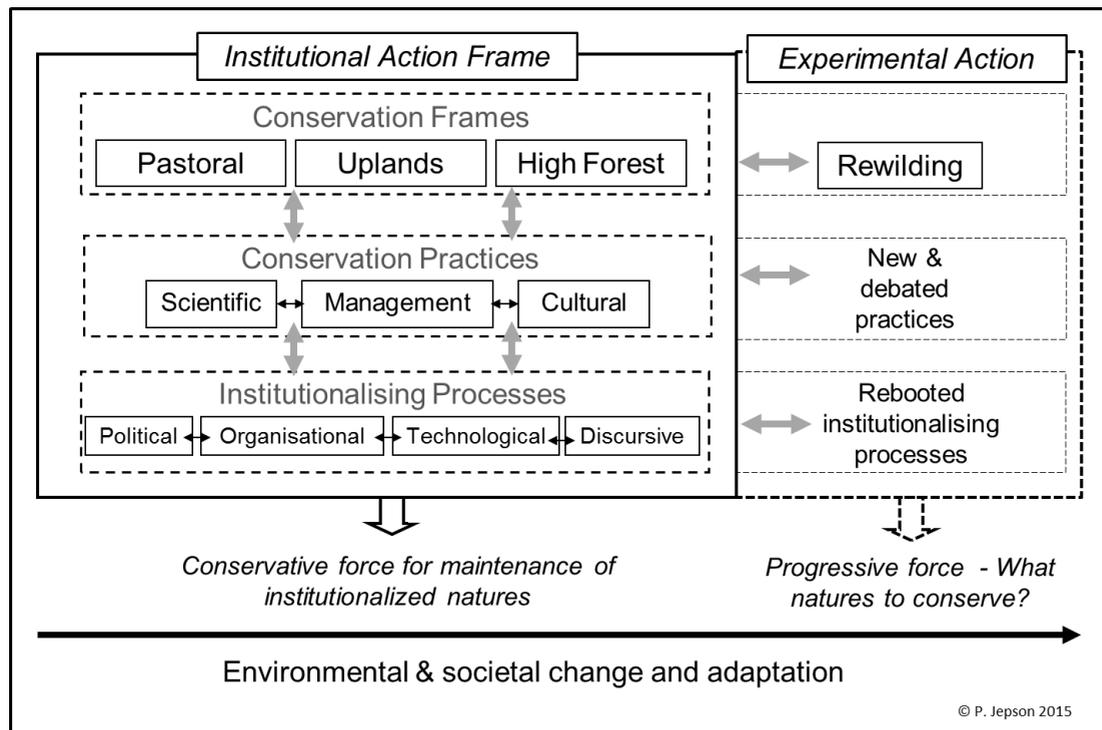


Figure 2. Schematic representation of the dynamic interplay between imagined natural archetypes, conservation practices and institutional processes that establish nature conservation as a domain of public policy. The introduction of an experimental ‘rewilded’ would generate new practices and institutionalising processes that would open debates on what natures to conserve thereby supporting adaptation and modernisation in European nature conservation institutions.

The emerging body of theory and practice associated with rewilding (be this ecological restoration, species reintroductions and/or passive management) has prompted robust debate in the academic and public arena. It challenges conceptions of the natural and stability and balance in nature, it contains paradoxes and inconsistencies and antagonizes powerful animal welfare, farmer, hunting and land-owner lobbies. In my

view, debate and controversy is a necessary and proper component of public policy formulation and review in democracies. This is particularly so in the domain of conservation where nature is neither a static nor singular concept, but one that is co-produced through the interaction of landscape, culture, politics and economy overtime (Braun and Castree 2005). Citizens have a stake in the future natures that emerge, yet the shifting base-line syndrome suggests people value the nature of their youth and are inherently conservative. Rewilding theory and practices confront and unsettle and are therefore an important component of a progressive forward looking conservation policy.

The bio-political and deliberative agency of rewilding is the subject of an increasing body of academic analysis (eg. Marris 2013, Lorimer and Driessen 2014, Verduijn et al. 2015). For instance, Verduijn et al. (2015) identify two issues of debate within Dutch conservation policy circles: 1) what constitutes ‘naturalness’ and whether ‘preserved’ or ‘restored’ nature is more or less natural, and 2) the so-called ‘paradox of restoration’ (Chapman 2006) where the restoration of natural processes to create ‘self-willed’ land requires significant levels of human intervention.

More widely analysed is the public controversy initiated by the policy to allow winter starvation of ‘de-domesticated’ cattle and horses at the OVP (Lorimer & Driessen 2014). This drew fierce public criticism and a Dutch animal welfare charity took the government conservation agency to court arguing that the animals were domesticated. The court ruled that the animals were no longer the property of the conservation agency because they had no intention of bringing them back under their control. As such the Heck cattle and Konik horses in the OVP are not subjected to laws governing the care of domestic animals; they are in effect wildlife. However, to assuage animal welfarist sentiments, a practice of proactive culling was instigated. Subsequently, Dutch ethicists (Klaver et al. 2002) outlined a pragmatic framework for dealing with the complicated ethical problems associated with animals that are neither domesticated nor wild. In short, society had a vigorous debate and negotiated ways to accommodate a novel nature.

The OVPs bird populations exemplify non-equilibrium ecology in action. In 1996 a breeding population of spoonbills fell from 300 breeding pairs to zero causing criticism and panic among naturalists

and managers (reported in Lorimer and Driessen 2014). It later transpired that the birds had set up new colonies elsewhere in European (F.W.M. Vera pers. comm.). This invokes the idea of ‘boom and bust’ reserves pumping species dispersal at landscape scales.

In the UK, the environmental writer George Monbiot has positioned rewilding as a manifesto for a positive environmentalism and topic of popular debate (Fig. 2) (Monbiot 2013). He presents rewilding as an opportunity for environmental-minded citizens to say what they are for rather than against - mass restoration of ecosystems and lost mega-fauna (including wolf and lynx), retreat from the Biblical doctrine of dominion over nature, rescinding perverse agricultural subsidies, reinvigorated nature-based rural economies and the return of more ambitious conservation groups. Such ideas are countered by those who see wildlife as a threat to farming and a danger to humans, and rewilding as a distraction from conserving other vulnerable species and threat to heritage landscapes and public access.

These examples illustrate the capacity of rewilding to promote debate in multiple discursive spaces. This suggests to me that the rewilding frame has the capacity to generate interplays with existing conservation frames to produce the institutional adaptation envisaged in Fig. 2. Further evidence, may be found in the rise of rewilding organizations, indeed Taylor (2014) positions rewilding as a potential social movement.

Rewilding and institutional conservatism

The conservation movement emerged in the late 19th century in response to fundamental changes in world-view concerning the human nature-relationship. It was led by five distinct social movements that emerged in the colonies and in cities of Western Europe and East Coast America (Jepson and Canney 2003). These early conservation movements emerged in a weak institutional landscape that allowed and supported their expression. The same cannot be said of rewilding within today’s complex regulatory landscape. If rewilding does represent an incipient new conservation movement there is a real risk that political and institutional forces will emasculate its change agent potential. In this respect, the flagship OVP

‘experiment’ is a unique case. It was embarked upon by a strong, centralized government agency with the power, resources and vision to create an institutional space where a group of young employees could trial their radical ideas. Centralized conservation agencies with the capacity for large-scale experimentation are probably a thing of the past: big government has transformed to governance whereby society is steered through networks of collaborating actors operating across different levels (Jordan et al. 2006)

Institutions resist change because supporters value stability and coherence, fear that deviation will compromise their political and economic interests, and believe the transaction costs of doing things differently may be prohibitive (Hall and Taylor, 1996). Moreover institutional path dependency is particularly difficult to break when a powerful coalition of actors collude over ideas and core beliefs (Crouch and Farrel 2008). These theoretical insights map easily onto European conservation institutions: EU nature legislation was co-produced by a small group of insider conservation NGOs who have assumed powerful policy influence (Jackson 2013). They view rewilding as a risky approach to managing the (relatively) small amounts of land they own and fear that rewilding agendas might provide an excuse for dismantling hard-fought environmental legislation. Furthermore, CAP subsidies help finance the management of their reserves; land-owning conservation charities in the UK are estimated to receive €27.5 million p.a. for actively managing farmland biotopes (Monbiot 2011).

The functionalist paradigm that rewilding embodies is conceptually distant from the compositionalist paradigm that underpins major components of the institutional architecture of conservation. The former focuses on the maintenance and restoration of ecological process and on creating or maintaining species assemblages that closely resemble past communities (Noss 1990, Callicott et al. 1999). The principles of uncertainty, surprise and novelty associated with the functionalist approach (Fig. 3) run counter to both the ‘orderly biogeography’ that constitutes the institutional infrastructure of conservation (Lorimer and Driessen 2014) and the audit culture that underpins the delivery of modern policy. Moreover, the principle of ‘hands-in-pocket’ reserve management, where natural systems are allowed to take their course and determine the future of an area, is an anathema to many reserve managers.

In addition, some conservationists worry that passive management increases the risk of undesirable emergent properties, such as invasive species, zoonotic diseases and excessive predation that may diminish local and global diversity (Sandom et al 2013). Such factors, compounded by legal requirements of EU member states to maintain the compositional character of Natura 2000 sites, mean that government support for rewilding is unlikely to happen without some form of policy intervention.

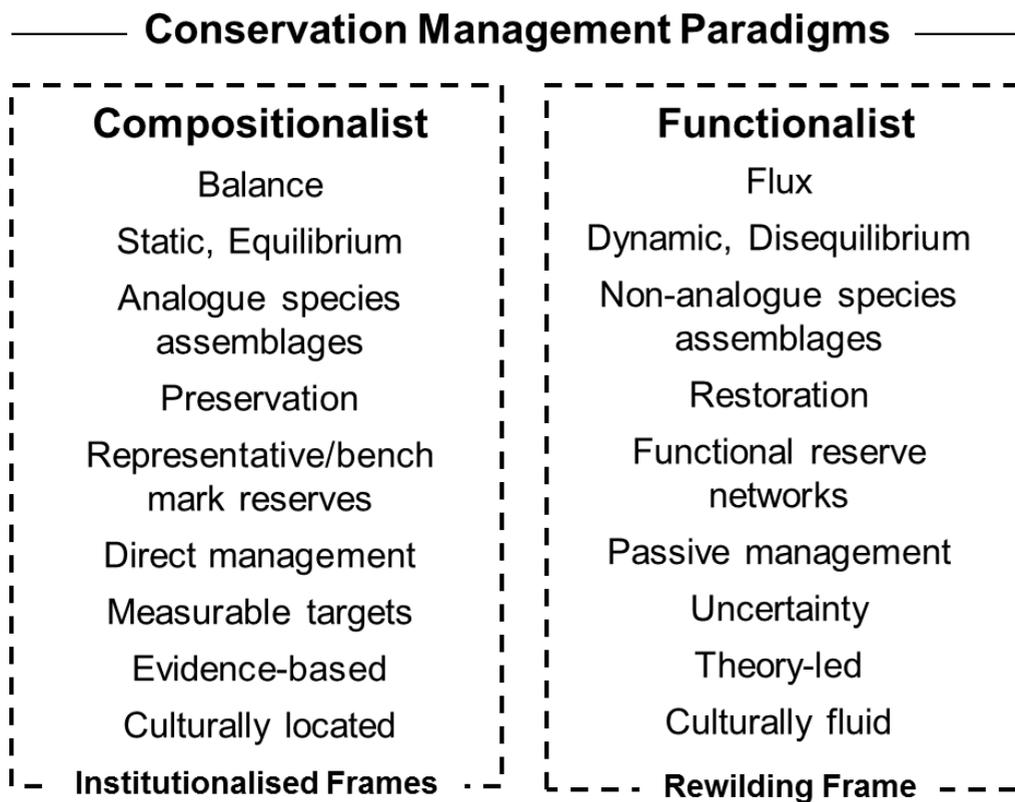


Figure 3. Representation of concepts associated with compositionalist and functionalist conservation paradigms as a heuristic tool to think about the tensions between Rewilding and European conservation institutions.

With the exceptions of the OVP (Netherlands) and two projects in Denmark, rewilding initiatives in Europe are led by private organizations and landowners. Rewilding Europe, a Dutch foundation, is working to bring back large-scale wild ecosystems in seven economically marginal areas including the Danube Delta, the Southern Carpathians and the Rhodope Mountains. Rewilding Europe adopts a rewilding approach that is ‘passive’ from both ecological and institutional perspectives: the goal of ecological

restoration is achieved through ecological succession following the cessation of farming practice and the conditions for this to happen are created through operationalizing a ‘blend’ of existing institutional devices. These include: Natura 2000 management contracts, community conservancies, species recovery plans, and knowledge exchange networks (the European Rewilding Network) (www.rewildingeurope.com).

Here it is important to note that European rewilding is being successfully aligned with a ‘wilderness’ natural archetype. New EC guidelines define wilderness as an area governed by natural processes, composed of native habitats and species, and large enough for the effective functioning of ecological processes (EC 2013). The American construct of wilderness (Nash 1982) is deeply embedded in global culture. It is a conservative term that neither challenges nor unsettles existing worldviews and institutional practice. For urban publics the existence of wilderness is reassuring and many equate it with empty, rather than ecologically functioning landscapes. For instance the UK uplands are anthropogenic deserts – barren of species and ecological processes – yet considered wilderness in the popular mind (Monbiot 2013). In my view, equating rewilding too closely with wilderness frames risks blunting its radical potential.

The academic and policy literature on European rewilding has yet to address the significant institutional barriers that rewilding practitioners experience. These barriers suggest a need for rewilding projects that more actively confront these barriers and open new institutional spaces. The tension with animal welfare and husbandry legislation has already been mentioned. So far as I am aware, only the Netherlands has ruled on the issue of de-domesticated animals. Elsewhere, rewilding projects involving cattle and horse analogues are governed by the welfare standards under the 1976 European Convention for the protection of animals. Fenced rewilding experiments with a commercial approach have been considered safari parks under relevant Zoo regulations and therefore subjected to animal welfare legislation which requires the separation of predator and prey species.

Biohazard legislation also constrains the rewilding vision because it categorizes cattle, horse and pig carcasses as high risk material that must be destroyed thereby removing this important natural process

within ecosystems. Whilst animal by-product regulations allow for feeding animal carcasses to endangered species such as vultures, similar exemptions do not yet extend to providing food sources to species with important functional roles in ecosystems. Legislation regarding public access comes into tension with rewilding initiative particularly in those countries where land is crisscrossed with public rights-of-way such as Scotland. Also at issue here is the requirement of landowners or site managers to provide a safe environment for the public under Health and Safety legislation (Gooden 2014).

The relationship between the Common Agricultural Policy and rewilding is more ambiguous. Agri-environment schemes (EEC Regulation 2078/92), in which farmers are paid to provide environmental benefits, are now integral to the financing of conservation management in Europe (Kleijn and Sutherland 2003). Such subsidies can be accessed by rewilding projects involving heritage breeds and tree planting but recipients (e.g. Knepp Castle Estate, UK) must manage their land and livestock, often for specific target species or habitat conditions, which constrains passive management.

Van den Belt (2012) points to another potential constraint on rewilding in practice, namely the general move towards more participatory and interactive modes of policy making. This favours negotiation and trade-offs between different interest groups rather than substantive societal debate on the conceptions of nature that should be incorporated into conservation policy. In summary, rewilding faces substantive institutional and societal resistance (Lorimer et al. 2015) and is unlikely to gain wider traction and influence without strategic high-level action.

A complimentary system of experimental reserves

Rewilding is exciting, controversial and happening but there is a risk that it will peter out if its transformative potential is not given space to act. In my view, policy makers and conservation lobbies need to be bold and visionary and strategically invest in rewilding as an asset to shape 21st century conservation visions and institutions. The strategy I advocate is the creation of a European network of experimental rewilding sites on land located in easy reach of human population centres. By experimental, I mean sites

that experiment with and study the interplay between ecological restoration design, society and economy. Humanity is close to, or exceeding, the safe operating space of planetary systems (Rokstrom et al. 2009). Restoring and managing ecosystem processes is a vital policy goal going ahead. Opportunities to turn back the clock are limited: restoration at scale will involve the creation of novel, non-analogue ecosystems. It is important that conservationists engage citizen's in the co-production of future natural ecosystems and gain political support for rewilding. To achieve this rewilding needs to be happening in areas where cultural and political futures are being actively shaped and debated. Like it or not these are urbanized areas. Rewilding in marginal lands is a vital part of the equation but if it is limited to such areas it will struggle to influence mainstream culture.

There is no need to position rewilding as a new conservation paradigm that challenges established ways of doing conservation and knowing nature. Rewilding sites can be contained, sit within existing spatial structures, and compliment rather than threaten existing conservation practice. Publics are rightfully fearful of generic change especially where outcomes are uncertain. However, citizens love innovation, controversy and experiments, especially if they are tangible and observable. I see no reason why it cannot be the same for nature conservation; wildlife is part of our media culture and cosmopolitan society. Rewilded sites can complement traditional reserves, parks, heritage landscapes and other forms of green space. We can expect widespread interest in rewilding experiments if they are presented as ecological design in action. Limiting the scale of rewilding to enclosed experimental sites will allay public fears whilst generating the interest and institutional interplay necessary to modernize conservation. In lowland Europe, this will favour rewilding with herbivores, but may generate wider support for predator reintroductions in larger and/or more remote rewilding sites.

Whilst data availability precludes a systematic assessment of potential land availability, three indicators suggest that sites can be found. First, three of Europe's best known rewilding sites are located in densely populated areas: the OVP, the Brandenburg Wilderness (12,000ha) located on old military training grounds outside Berlin, and Millingerwaard (350ha) created on agricultural land between the winter dyke

and the River Waal near Nijmegen. Second, in the UK, 800 ha of a coal-mining landscape outside Leeds and a 400 ha aggregate quarry near Birmingham have been restored as nature reserves. Both could have been candidates for experimental rewilding sites. The extractive sector represents a potential partner in experimental rewilding: they have sites across Europe, fencing and restricted access is normal due to public safety concerns, and restoration is a legal requirement. Lastly, the case of the UK's national forest illustrates the effectiveness of inviting local authorities to bid for a project as a means of locating land. Launched in 1987 with a three year consultation period the process attracted several bids. The locality chosen was in the industrialized midlands region of the UK; Greater Manchester whose bid was unsuccessful went ahead anyway and created the Red Rose Forest (UK Parliament 2010). With the right marketing and policy support many cities might conceivably bid to 'host' a rewilding experiment. This is because they could be designed and presented as a civic asset generating value for universities, green enterprise, recreation, culture, city image and so-forth.

Lorimer and Driessen (2014) deploy the OVP case to discuss the role of experiments in the conduct of science and policy. Their analysis offers deep insight for the design, communication and study of rewilding experiments. In policy speak the OVP and other rewilding sites offer a rich source of 'lessons learnt'. A strategic policy approach to rewilding can be designed with the benefit of hindsight and experience. Furthermore, there is scope to align the creation of experimental rewilding sites at each level of the European policy hierarchy. Europe 2020 is a post-crisis growth agenda but the new commission taking office is likely to give great focus on the relationship between nature, life quality and social inclusion. Sites designed to (re)engage in shaping future natures would support this relationship. The 7th Environmental Action Programme to 2020 has objectives to enhance natural capital and calls for 'urgent concerted action to improve ecological resilience' to assure that citizens live well in the future. In addition, a headline target of the Biodiversity Action Plan to 2020 is restoration of 15% of the EU's degraded ecosystem. The creation of new functional natures on degraded or marginal land would contribute to the delivery of this

target. To mobilize the change agent potential of rewilding, supporters need a clear and feasible ‘ask’ of policy that aligns with current directions and can be delivered using existing instruments.

Rewilding is maturing into a cohesive set of principles and concepts suited to the European condition: reassembly of trophic levels, (re)introduction of large mammal and other ‘functional species, an openness to ‘non-analogue’ species assemblages (so long as they function), allowing ecosystem processes to determining the ecology of an area. Ideally, experimental rewilding experiments should be designed to further the ecological, political and social science of Earth Systems restoration. In my mind key research questions include: 1) at what scales can ecological systems recover - is there a minimum size for rewilding? 2) what types of intervention can effectively ‘kick start’ restoration of ecological processes and trajectories towards passive management? 3) can experimental rewilding create synergies between the science of ecological restoration and Earth System science (see Hamilton 2015), and 4) what practical limits will society and politics put on rewilding? At the same time experimental reserves should inspire, engage and challenge citizens and contribute to liveability through providing new recreational, enterprise and lifestyle opportunities. This multifunctional approach will require the formation of multi-actor interest groups to design, manage, monitor and explain the experiments.

A policy to create a system of experimental rewilding sites could be executed by introducing an article into a future revised conservation directive requiring (or incentivizing) member states to designate one or more experimental rewilding sites. An annex would include guidelines on what qualifies as an experimental rewilding site and establish a new designation of ecological restoration reserves eligible for conservation funding under Natura 2000 and other schemes. As a starting point, I suggest that such guidelines should include: i) specification of interdisciplinary research questions that relate to the techniques and implications of restoring ecological processes at different scales, ii) the involvement of research institutions, local government and enterprise in the governance and management of the site, iii) a strategy for engaging citizens in research and management and in debating the issues that arise, iv) a science-policy interface strategy, and v) a commitment to boldness and innovation. More challenging, but

necessary would be a legislative instrument that balances the needs of nature experimentation with the provisions of animal welfare, biohazard and other relevant legislation.

The agenda I outline here is not without precedent. The 18th century English landscape movement introduced radical new natures combining the picturesque, allegory and contemplative recreation that were later incorporated into national identities and fashioned natures that we now value and conserve (Wulf 2012). A generation ago, ecologists successfully called for the creation of ecological stations to study undisturbed systems and to inform policy on environmental management (e.g. Nogueira-Neto and de Melo Carvalho 1979). Contemporary rewilding scientists are calling for scientific experiments to understand how to manage megafauna as part of ecological restoration of the Cerrado and Pantanal of Brazil (Galetti 2004) and to assess the role of dingos in the restoration of degraded Australian rangelands (Newsome 2015).

The concept of the Anthropocene and the new paradigm of Earth System science recognizes humans as a force of nature that along with other great forces will determine the future of Earth Systems (Hamilton 2015). In this forum article I have foregrounded the bio-political and deliberative agency of rewilding and argued that this is enhanced when rewilding is practiced close to urban centres. The European Union has the landscapes and resources and the scientific, policy and civil society leadership to extend the ambition of rewilding to embrace the scientific and political challenges of restoring ecosystem across multiple scales in densely populated, as well as sparsely populated areas.

The Fitness check is a response to demands at the level of Heads of State prompted by tensions between Natura 2000 and economic development imperatives (Boyes 2014). Agenda setting theory posits that a meeting of ‘high politics’ with ‘low politics’ (the level of EU technocratic institutions) can disrupt policy with unpredictable outcomes (Princen 2007). In this situation, where compromise and negotiation may be inevitable, the environmental lobby needs something to advocate as well as defend. A system of experimental rewilding sites might be just the ticket!

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