
Has the devolution of responsibility for biodiversity conservation to regional governments presented either a boon or barrier to the further implementation of the Convention on Biological Diversity's Ecosystem Approach in the United Kingdom?

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Abstract:

The Ecosystem Approach of the Convention on Biological Diversity, once thought to represent one of the most ambitious global attempts to integrate economic, social and ecological dimensions into a holistic environmental management strategy, has been consistently plagued by under-implementation at domestic scales around the world. This includes the UK who have as recently as 2007 sought to recast it in a simplified format to aid implementation by environmental managers. This paper explores how the devolution of responsibility for biodiversity conservation to the regional assemblies of Scotland, Wales and Northern Ireland has started to affect a reinvigorated wave of implementation manifesting in new and hitherto unseen iterations of the approach. These new iterations challenge the fundamental concept of the ecosystem approach, they offer new insights into the optimal scale and form for promoting final implementation of environmental regimes, as well as suggesting new understandings into notions of regionalism and localism in the UK.

Introduction

The Global Biodiversity outlooks of the Convention of Biological Diversity (CBD) (1993) highlight how the diversity and abundance of non-human life on our planet is in freefall. Biodiversity has precipitously decreased during the later twentieth century, evidenced by species extinction rates of up to 1000 times or more the natural rate (Pimm et al, 1995). This is a trend which has continued into the twenty-first century (Pereira et al, 2010), and it will have significant impacts upon human society and wellbeing (Millennium ecosystem assessment, 2003). It is predicted that the continuing loss of biodiversity will cost the global economy up to 14 trillion Euros by 2050, which is equivalent to 7% of the projected global GDP in that year (TEEB, 2010), though economic metrics fail to adequately capture the true scale and nuance of this tragedy. The scale of this disaster has caused some to suggest that we have now entered the Anthropocene epoch (Crutzen, 2006; Steffen et al, 2007; Smith and

Zeder, 2013), and that the current rates of biodiversity loss could herald the start of the sixth great extinction event (Kolbert, 2014). Whilst the causes of this are well-known (Wood et al, 2000), the solutions are complex and require multifaceted responses (Cardinale et al, 2012). Critical to this is the understanding that solutions must engage all levels of environmental and civil governance, and that they need to be multidisciplinary and inclusive of economic, social, cultural and environmental dynamics. Considering that this problem does not respect human-contrived boundaries, actions to address it often need to be collectivised and internationally originated. Environmental managers have understood for some time the mismatches between the nature and scales of human civilisation, to the rest of non-human life (Hardin, 1966). To mitigate for these mismatches, and to direct the necessary collectivised actions, an architecture for global environmental governance (GEG) comprised of MEA, protocol and regimes was instigated during 1970's (Goeteyn and Maes, 2011). The purpose of this architecture is to bind states together towards common forms and processes which will in turn stimulate domestic behavioural change through policy (Hønneland and Jørgensen, 2003). The CBD represents the preeminent foci for international collectivised responses to the biodiversity challenge (Johnston, 1997), though similar to other multilateral environmental agreements (MEA), its ability to compel, implement and enforce change at domestic scales is weak (Carter, 2007).

The ecosystem approach

The UK was an early signatory to, and ratifier of, the 'self-interest driven grand-bargain' of 168 signatories (Gollin, 1993) that comprise the CBD. The CBD compensates for its lack of hard enforcement regimes with a panoply of weaker implementation institutions (Kotsakis, 2011) such as a Conference of Parties (COP), the Clearing House Mechanism (CHM), and a Subsidiary body on implementation (SBI) all supported by the Subsidiary body on scientific, technical and technological advice (SBSTTA). Though the working structures of the CBD are organised thematically, its decisions are predominately trans-disciplinary, and involve multi-actor engagement. A strong example of this is the ecosystem approach which was designed and envisaged as the strategy, or framework, through which recommendations of the CBD could be put into action. The CBD describes this approach as a:

"Strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way" (CBD online).

This ecosystem approach suggests adopting a 'systems' perspective to managing natural environments (Kay et al, 1999; Farmer et al, 2012). It articulates how managing the natural world is inherently complicated, and that this complexity is often mismatched with reductionist

policy and management strategies predicated upon siloed knowledge, disciplines and institutions (Osterblom *et al*, 2010).

However, not long after launching the ecosystem approach the CBD discovered that comprehension and use of the approach by environmental managers was not forthcoming. Therefore, as way of explaining how this approach should be used, the CBD articulated a series of twelve principles that describe what taking an ecosystem approach should look like:

Malawi principles of the Ecosystem Approach (SBSTTA 5, Recommendation V/10)

Malawi principle
1: Recognise objectives as society's choice
2: Aim for decentralized management
3: Consider the extended impacts, or externalities
4: Understand the economic context and aim to reduce market distortion
5: Prioritise ecosystem services
6: Recognise and respect ecosystem limits
7: Operate at an appropriate scale, spatially and temporally
8: Manage for the long term considering lagged effects
9: Accept change as inherent and inevitable
10: Balance use and preservation
11: Bring all knowledge to bear
12: Involve all relevant stakeholders

SBSTTA Five, Montreal, (2000)

These principles were initially distilled out of the many decades of ecosystem management best practice (and by the Inter-agency Environmental Management Taskforce (IEMT) 1995), by the 1996 Sibthorp seminar and then formally codified by the CBD at a workshop in Lilongwe, Malawi (1998). In time however it was highlighted how these Malawi principles were still not offering sufficient support to put an ecosystem approach into action (JNCC, 2013). Therefore, the CBD sought to offer further support for the operationalization of an ecosystem approach through a series of five points of guidance.

Points of operational guidance

Points of guidance	
1	Focus on the functional relationships and processes within ecosystems
2	Enhance benefit sharing
3	Use adaptive management practices
4	Carry out management actions at the scale appropriate for the issue being addressed, with decentralisation to lowest level, as appropriate
5	Ensure inter-sectoral cooperation

Smith and Maltby (2003)

The ecosystem approach as policy

The UK is a ratified signatory to the CBD. As such, promoting the use of an ecosystem approach is UK national policy, though arguably a weak policy with limited agency to implement. What agency to implement there is can be seen manifested through a web of overlapping commitments and pressures given form through various multi-scale policy frameworks. First and foremost, the UK is a signatory to the CBD, and it can be surmised the Government considers itself a strong player in GEG with particular regard to its commitments under the CBD (DETR, 2001; Defra, 2005^A; Defra, 2009).

Despite the recent UK referendum on leaving the European Union (EU) it has until recently, and will for the near term, provide a strong policy push for UK implementation of the ecosystem approach. The EU is uniquely entangled with the CBD as an entity in its own right, and through its members who are all ratified signatories to the CBD. Unsurprisingly the EU has committed to protecting biodiversity and halting its degradation which is clearly articulated in the EU biodiversity strategy to 2020, along with regard for the ecosystem approach which is 'pushed' through specific policies and directives (Borja et al, 2010). Additionally, the EU also sets an atmosphere for implementation through ancillary environmental directives which, whilst not expressly pushing the ecosystem approach, promote practices congruent to it (Apitz et al, 2006). The two EU directives with the most significant push towards an ecosystem approach are addressed the Water framework directive (WFD) (2000/60/EC) and the Marine strategy framework directive (MSFD) (2008/56/EC). The WFD adopts an integrative approach to catchment-scale water management planning, and can be seen as displaying many of the characteristics of ecosystem approach thinking. It requires members to establish river-basin management plans based upon naturally contrived catchments which are reviewed every six years in a process roughly congruent to adaptive management, as well as displaying other characteristics congruent to the Malawi Principles (Vlachopoulou et al, 2014). Similarly, the MSFD, which seeks to achieve good environmental status (GES) for EU seas by 2020, requires all members to develop a strategy for managing their marine areas using an

ecosystem approach. Whereas the WFD applies a landscape scale and language similar to the ecosystem approach, the MSFD enshrines the taking of an ecosystem approach, from a marine context, into a hard legislative process. Whilst the MSFD does not mandate how states should reach GES, it does explicitly promote a marine use of the ecosystem approach. Critically, the MSFD felt that the CBD's Malawi principles of an ecosystem approach were not entirely appropriate for the marine context, and so sought translocate them into a new format that is operationally focused and stresses an integrative, adaptive management focused perspective (Farmer et al, 2012).

The ecosystem approach is promoted at the domestic national scale in the UK through the UK biodiversity policy framework. The UK Government promoted the domestic use of the ecosystem approach in its full Malawi principles form until 2007, when the Department for environment, food and rural affairs (Defra) published a new report entitled securing a natural healthy environment: an action for embedding an ecosystems approach in response to the new imperatives of climate change, the post-Nagoya strategic timeframe, and UK devolution. This policy-strategy paper asserted the Government's commitment to translocating the approach into a UK policy response. This response took the form of distilling the Malawi principles down into an easier format to aid its translocation into a joined-up biodiversity policy landscape (Haines-Young and Potschin, 2008).

The (UK) Principles of taking an Ecosystem Approach

UK ecosystem approach principles

1. Taking a more holistic approach to policy-making and delivery, with the focus on maintaining healthy ecosystems and ecosystem services
2. Ensuring that the value of ecosystem services is fully reflected in decision-making
3. Ensuring environmental limits are respected in the context of sustainable development, taking into account ecosystem functioning
4. Taking decisions at the appropriate spatial scale while recognising the cumulative impacts of decisions
5. Promoting adaptive management of the natural environment to respond to changing pressures, including climate change.

Defra, 2007

This has since been supported by other policy documents such as the 2011 white paper the Natural Choice: securing the value for nature, the national planning policy framework (2012),

and to a lesser extent Making space for nature (2010). From the perspective of the UK Government they have been making every effort to implement the ecosystem approach domestically (Rosario Ortiz Quijano, 2014). Indeed, the Government feel a strong alignment between the interests and capabilities of the UK and the decisions of the COP of the CBD. This is articulated in the five self-reported progress reviews the UK has submitted to the CBD ahead of COP meetings. These reports suggest that despite having significantly less biodiversity compared to other states, the UK does have strong biodiversity conservation capacities through which promote the ecosystem approach (DETR, 2001).

The problem with the ecosystem approach

As already alluded to the ecosystem approach is a policy that is poorly implemented across all scales of GEG and its actors (Smith and Maltby, 2003; Shepard, 2004; Shepard, 2008). It faces a host of challenges to operationalisation which, whilst they aren't discussed in detail here, can be summarised as problems of concept, of governance, and of capacity. Fundamentally the ecosystem approach concept is one which is poorly understood by its intended audience of policy makers and environmental management practitioners. Attempts by the CBD to improve comprehension, and thus increase implementation, have not succeeded. Furthermore, its intended audiences, not to mention the wider public (Fish and Saritisi, 2015), do not understand how to operationalise its sometimes abstract principles into management practice and decision making (Fish et al, 2011). When coupled to its weak compliance regime, it makes it unlikely to be substantively utilised by signatories; or where it is used, it is in a piecemeal and sporadic fashion that suits their interests. Whilst it may be conceptually and fundamentally flawed (Guruswamy, 1999) recent years have seen a spate of renewed interest in translocating it into practice at the sub-national, and more local scales. Following COP 10 (and the resulting Aichi biodiversity targets), a confluence between the emergent imperative of climate change, the findings of the millennium ecosystem assessment (2003), as well as the ongoing process of devolution led to new, and hitherto unseen iterations of the ecosystem approach being seen in the UK. Whereas the impact of the imperative of climate change and the millennium ecosystem assessment on policy have been explored elsewhere the impact of devolution on biodiversity policy and especially the ecosystem approach remains poorly understood.



Re-ordering the union

The post-world war two dissolution of the British Empire back towards its core nation state of the United Kingdom of Great Britain and Northern Ireland (UK) is both unique, and yet highly typical of other European post-colonial contractions. Similarly, it is not a comprehensive decolonisation and many independent former colonial overseas territories (and the commonwealth) still remain to varying degrees entangled with the UK. The thirst for a repatriation of powers to the nations within the UK that was championed in the nineteenth and early twentieth centuries under notions of 'home-rule' is contemporarily seen through the prism of

'devolution'. Thus, whilst the UK is normatively described as a unitary multi-national state, it is a union of pronounced asymmetry with nations differentiated by population, wealth and constitution, yet intrinsically bound by economic, social and political bonds (Hazell, 2015). Whilst the UK is not unique amongst post-colonial European states in feeling the effects of sub-national devolutionary pressures (see Catalonia or Venice), it is only state attempting to effect a sustainable devolution settlement without the foundation of a national constitution to order such a process (Greer, 2004). Whilst the process of decolonisation of many overseas territories occurred quickly after world war two (Pearce, 2009), the repatriation of powers to the constituent home nations of UK has been necessarily much slower.

Devolution is a fundamental driver of UK politics and manifested significantly under the New Labour administration (1997-2008) which saw seen successes such as the creation of a national parliament in Scotland, a national assembly in Wales and a national assembly in Northern Ireland. Indeed, as often oft-quoted by Davies (1999), devolution in an ongoing 'process and not an event' and continues today. The devolutionary process is one without an overall strategy or plan, and it is advanced in stops and starts through bilateral agreements mandated and legitimised through domestic referenda. Critically, the stop-start devolutionary process is a fraught experience of negotiation, compromise and often appeasement (Leyland, 2011; Hazell, 2015). Just as the nation's comprising the union are asymmetric, so too are

the powers which can be repatriated with some more critical and less likely to be repatriated than others. The differentiation is made between powers which states have the governance capacity to manage effectively, the devolved powers (ie education, health), and those which are best managed in the ongoing interest of the UK, the reserved powers (ie defence, foreign policy). Similarly, the causes that lie behind individual states desire for greater devolution are complex, idiosyncratic and evolving. Whilst some explanations suggest that it is driven by deep-seated cultural differences (Gardiner, 2004), a disenfranchisement from the constitutional legacy of empire (Adams and Robinson, 2002), or the desire for economic self-determination (Cooke and Clifton, 2005); though ultimately any significant exploration of which is beyond the scope of this paper. Whilst the eventual outcome of this process is unknowable; clearly each has unique cultural identities, political eddies to navigate and governance capacities that may constrain the degree of devolution that may be sought. Whilst the multi-nation unitary state that is the UK is not a full federalist arrangement (Keating and Salmon, 2001), and is as Adams and Robinson (2002) suggest a quasi-federalist settlement, perhaps full federalism is the ultimate destiny of the UK. The outcome of the devolution process will be more power and independence devolved to the nations, though whether this repatriation of power is an amicable federalism or an uncivil balkanisation is unknowable. What is salient is that the desire for devolution has deep roots, it is an ongoing process that has already seen significant progress, and there is a clear public appetite for more of it (Smith Commission, 2015).

Each of these outcomes could have ramifications for the domestic natural environments of each nation and may impact upon their ability to formulate collectivised responses to environmental issues. For all of the nation's concerned the 'environment' has become a devolved power. This means each nation has responsibility for managing their natural environments, including biodiversity conservation. All the devolved nations are still technically part of the UK, and the EU, and so are party to the CBD through their membership of these institutions. However, their engagement with the CBD is limited as engagement with GEG remains within the purview of 'foreign affairs' which is a fully reserved power. This engagement with the CBD can be characterised as reactive as the nation's respond to decisions of the COP once they have been filtered through the EU and UK, but they have a very limited influencing role in GEG. Furthermore, the different nations of the UK aim for an overarching cooperative strategic approach to UK biodiversity conservation, and responding to the CBD, as per the UK post 2010 biodiversity framework (JNCC, 2012). Though ultimate responsibility for domestic environmental management now rests with the individual nations. Indeed, each of these nations has chosen to grasp the responsibility for biodiversity conservation in subtly different ways which have, in turn, led to different interpretations and

uses of the ecosystem approach. Considering both its weak nature, and its implementation deficit, the ecosystem approach is being implemented in different formats in each of the devolved nations. Each of these iterations highlights interesting comparative dynamics about the nations approach to biodiversity conservation.

England

England was the founding state of the UK and arguably remains the state with the poorest resilience, both culturally and constitutionally, for the contemporary challenges to its stability (Hazell, 2006). Indeed, England remains the 'gaping hole' in the UK's devolution settlement (Hazell, 2000), and whilst the recent Scottish Independence referendum (2015) may have shored the union for a while longer, other divisive dynamics continue to exert pressure towards its reduction. Critically, the environmental governance challenges facing England in a post-UK, post-EU, world are acute, little discussed and largely unresolved (see: West Lothian question). Whilst a significant proportion of the English electorate disagree with this continued devolution (Curtice, 2010) it cannot be overtly denied by Westminster. Instead power is devolved through the dynamic process of negotiation, compromise and appeasement. Despite this, in the interests of parity across the union, and in trying to meet the looming post-union constitutional crisis in England, options for a devolution of powers within England have been, and continue to be considered. This devolution or decentralisation of powers could be seen as either reactive to the devolution zeitgeist, or proactive in the cause of promoting greater democracy and efficiency through diminishing the 'dead hand of bureaucracy'. This movement in England has been witnessed in two distinct phases over the preceding twenty years. Perhaps the more important of these was the notion of English regionalism which proliferated under the New Labour Governments (1997-2010). New Labour regionalism was championed by Deputy Prime-minister John Prescott (1997-2005) with his dual political and bureaucratic agenda (McLean, 2005). The logic of New Labour regionalism reasoned that regions represented the best scale through which order could be re-established following the collapse of the nationally configured Fordist-Keynesian accumulation regime (Storper, 1997; Harrison, 2009). Indeed, New-Labour viewed regionalism, and the regions, as the key to delivering their sustainable development strategy (Goodwin, 2012), and as the most effective scale for engaging with the 'one planet world' agenda (Defra, 2005^B). Indeed, they sought to construct and coalesce new regional identities through the use of regional networks and institutions (ie regional development agencies, and indirectly-elected regional assemblies in England), and through enabling regional authority over environmental issues such as sustainable development, climate change and

conservation. Critically, they started advancing an English devolution settlement, hitherto unseen, to parallel and mirror those from around the rest of the union (Tomaney, 2002).

However, this regionalist agenda waxed and then waned under New Labour. After many early successes, it was dealt a first blow in 2004 where the English electorate rejected directly-elected assemblies in a referendum (Harrison, 2009). Although regionalism limped on after this (Sandford, 2006), this result ultimately stalled the momentum behind devolution for England. Indeed, the perceived inequalities of the Barnett Formula, regional poverty and identity, and the ongoing devolution in other areas continued to exert a devolution-influence on English politics. The concept of regionalism has dealt a further blow by the Tory coalition (2010-2015), and Tory majority (2015-) Governments, who are profoundly hostile to what they consider the artificial construct of regionalism (Sandford, 2006). This is not to suggest that the Tory administration are anti-devolution, only that powers should be devolved on their terms to the very real governance institutions of local government, communities and cities. This new English devolution agenda is called localism, and it is promoted through the localism act (2011). Theoretically, localism is about 'the transfer of power, authority and resources from central government to local government and other (existing) local public agencies, who in turn devolve to and empower communities' (Jameson, 2011). It suggests the optimal scale of greater devolved governance should be at the local, community or local-government scale, and unlike regionalism, not at the artificially constructed regional scale. Localism could, conceptually, align with the ecosystem approach's mandate for decentralized decision-making (Malawi principle two), or notions of environmental subsidiarity (Jordan, 2010), though concrete examples of the decentralizing power of localism remain elusive. Indeed, localism remains a nebulous concept (Padley, 2013) whose practical impact remains poorly understood. Similarly, whether the localism or regionalism scales are the most effective for biodiversity conservation and the ecosystem approach remain unknown, though Peterson et al (2007) suggests that under regionalism there exists the potential for both enhancing biodiversity conservation outcomes, and for enabling a use of the ecosystem approach. Similarly, the decentralisation thrust of localism conceptually aligns with many of the principles of the ecosystem approach. However how these two agendas work together in practice in England (especially where it clashes with austerity precipitated cuts to conservation funding), remains to be researched.

Congruent with England having the weakest devolution settlement there is no direct legislation governing the English environment or biodiversity, indeed there is no English legislative body from which to create such. Therefore, biodiversity conservation in England falls under UK environmental legislation and law. Despite this, the English approach to

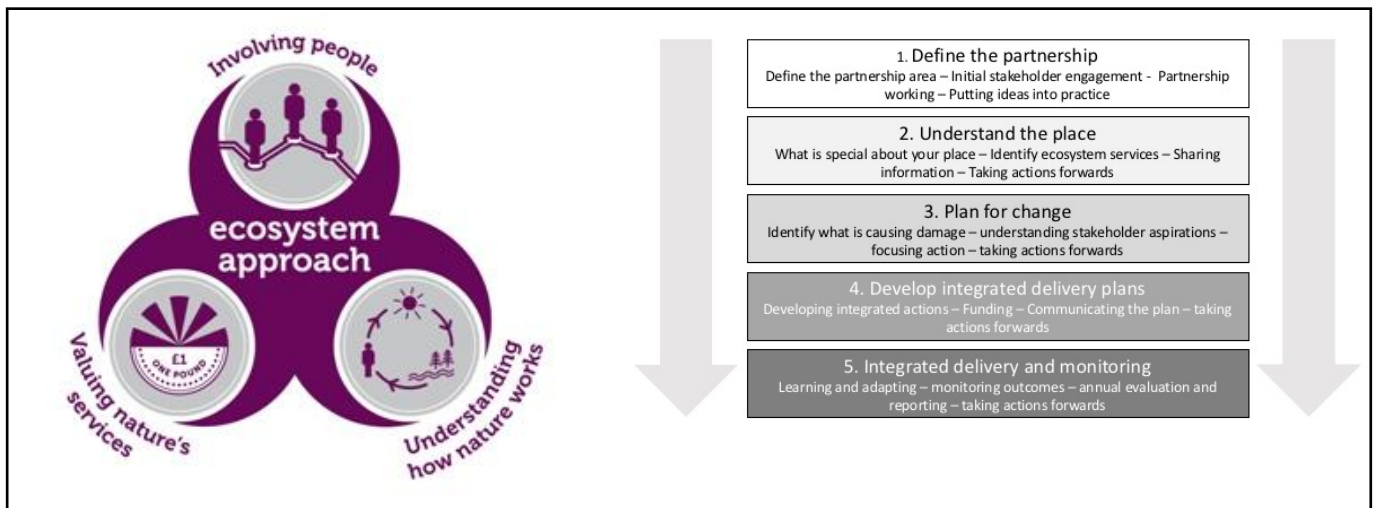
biodiversity conservation has been expressed in policy documents. The first significant articulation of which was in *Working with the grain of Nature: A biodiversity strategy for England* (2002). This policy-strategy document articulated the high-level targets in alignment with the CBD, its use of indicators and monitoring, and talks in broad terms about 'taking a holistic approach' (Chapter Three); without specifically mentioning the ecosystem approach or giving detail about operationalising an integrated holistic perspective. In heralding a re-articulation of environmental policy (inc biodiversity) the coalition Government (2010-2015) announced its overarching environmental programme in a white paper entitled *Natural Choice: securing the value of Nature* (2011). This was followed by the England specific *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* (Defra, 2011), which superseded *Going with the grain of nature*, and specifically articulated the new Government's strategy for biodiversity. This new strategy aligned with much that had come before, though it also reflected the changes wrought by the CBD's post-Nagoya strategic timeframe (2011-2020) and its Aichi targets, the Millennium and national ecosystem assessments, and a changing focus towards a natural capital approach. This can be clearly seen in its renewed focus on ecosystem services, landscape scale and ecosystem valuation. Critically however, it retained a key interest in the ecosystem approach through its 1C outcome which is a partial re-articulation of Aichi Target 11, and states that:

"By 2020 at least 17% of land and inland water, especially areas of particular importance for biodiversity and ecosystem services, conserved through effective, integrated and joined up approaches to safeguard biodiversity and ecosystem services including through management of our existing systems of protected areas and the establishment of nature improvement areas".

The *Biodiversity 2020 – a strategy for England's wildlife and ecosystem services* represents the single document articulating the policy framework relevant to the ecosystem approach in England. This policy document suggests that English biodiversity protection and management should build upon making space for nature (Lawton et al, 2010), the national ecosystem assessments, and the Nagoya Protocol (and Aichi biodiversity targets) to create a national strategy which is integrative, socially minded, economically embedded, and mindful of cultural and spatial scales. It is the pre-eminent policy document considering the English approach to biodiversity conservation and mentions the ecosystem approach briefly in section 3.7 around support for local delivery. None of these documents were used as a basis for proposing an alternative English iteration of the ecosystem approach, instead this was carried out through the use of a handbook for managers and partnerships (Porter et al, 2011) created by Natural England and Countryside. This handbook suggests to landscape scale managers and

partnerships that an application of the approach should instead focus on three core principles of valuing nature's services, involving people, and understanding how nature works. However, it also suggests a process format for operationalising the ecosystem approach based upon five steps. It does not recommend that each of these steps need to be followed sequentially, only that resource constrained partnerships and managers should use it as best they can.

Natural England - ecosystem approach distillation and process



Ecosystems knowledge network and Natural England

Following Porter et al (2011), Natural England are currently conducting an assessment process aimed at land management partnerships that is their fulfilment of the Nagoya outcome 1c target for assessing alignment and implementation of the ecosystem approach (Natural England, 2016). This outcome is being actioned (at present) by Natural England through their outcome 1C self-assessment for English National Parks (completed March 2016) (Natural England, 2016) and planned for Areas of Outstanding Natural Beauty in summer 2016.

Northern Ireland

Following many decades of unrest Northern Ireland has been actively engaged in the post 1997 devolutionary processes. Following two positive referenda in Ireland (Northern and the Irish Republic), the Good Friday Agreement was reached in 1998, which led to the Northern Ireland act (1998). Under this act, certain powers have been devolved (or transferred in this case) to the legislative assembly, and certain 'excepted' or 'reserved' powers remain within the purview of Westminster. However, Northern Ireland has a unique political landscape compared to the rest of the devolved nations, and has enjoyed a more stop-start devolution process compared to the other devolved nations (Trench, 2005). This is broadly mirroring the

stop-start nature of the peace process and the historic failures of power sharing which preceded the Good Friday Agreement (Wilford, 2000). In summary, Northern Ireland has a devolution settlement based upon shared national executive and legislative assemblies (D'Hondt formula) with a reserved powers devolution settlement. This new power sharing has been built upon many decades of failure (Wilford, 2000), is often precarious (Trench, 2005), and critically may not be delivering devolution quickly enough for the citizens of Northern Ireland (Wilson, 2011).

The Northern Irish Assembly now has full-devolved powers over the environment. This includes biodiversity protection, though Northern Ireland has a limited degree of specific environmental legislation, and none particularly focused on biodiversity conservation. Whilst Northern Ireland issued an early, post-devolution response to the ecosystem approach, it has not created any new legislation to cover biodiversity. Indeed, the UK helped establish the Northern Ireland Biodiversity Group in 1999 to oversee the establishment of a comprehensive biodiversity strategy; and the resultant Northern Ireland Biodiversity Strategy (2002) which explicitly mentions the Northern Irish policy alignment towards taking an ecosystem approach. By the second report of the Northern Ireland Biodiversity Group (2009) the ecosystem approach had its own dedicated chapter. This chapter reaffirms the Malawi Principles, suggests a Northern Irish vision towards one day creating a unique iteration of the ecosystem approach, and highlights how not understanding how to apply it makes operationalisation more challenging. Indeed, it reiterated this challenge where it suggested that:

“A major initiative is required to translate the ecosystem approach from being a general concept to a well-defined and actioned policy”.

The most contemporary policy pronouncement comes from Valuing nature: a biodiversity strategy for Northern Ireland to 2020 (2015). This strategy acknowledges the push it feels from the CBD, the WFD and MSFD to use the ecosystem approach. The valuing nature document expresses a desire to see its designated sites managed using an ecosystem approach by 2020 as well as broadly endorsing the ecosystem approach concept. Critically it acknowledges that operationalizing the approach in Northern Ireland will require a unique and proactive policy response. Despite the recognition of this need, no such response has been forthcoming. Northern Ireland has many of the re-cast (and powerful) environmental institutions that are promoting regionalised forms of the ecosystem approach in Scotland and Wales, such as the Northern Irish Environment Agency, though it does not have a comparative agency to Natural England, Natural Resources Wales or Scottish natural heritage.

Scotland

Following many decades of movement towards greater home rule, in 1997 there was a successful pre-legislative referendum on Scottish devolution. Whilst not being a vote for full independence, it led to the Scotland Act (1998) which enshrined in law the devolution of certain governance powers from Westminster to Holyrood. The Scottish devolution settlement is of the reserved form with powers of governance categorised as either devolved (ie health, education, planning, and jurisprudence) or reserved (Defence, non-renewable energy, constitutional affairs). Those devolved powers have passed to Holyrood and the new Scottish Parliament. Responsibility for the environment, including biodiversity conservation, is a devolved power. In 2014, there was a referendum on full independence, and whilst this was ultimately unsuccessful, it led to the creation the Smith Commission (2014) on further devolution. This arguably galvanised and precipitated the Scottish National Party (SNP) landslide of Scottish constituencies at the 2015 general election. Moreover, the Smith Commission found an appetite for further devolution in Scotland, and though a full implementation of its recommendations was promised, they delivery of these is a contested point.

Since devolution, Scotland has introduced unique biodiversity legislation and policies, and the Government have sought to make it a key national issue (Bailey, 2011). In addition to legislation, Scotland articulates its approach to biodiversity through a series of policy documents which began with Scotland's Biodiversity: its in your hands (2004). This document set aspirational non-binding targets for biodiversity by 2030 against the key categories of species and habitats, people, landscapes and ecosystems, integration and co-ordination and knowledge. Whilst not mentioning the ecosystem approach, or indeed explicitly using language common to it, this policy document appears to adhere to the broad themes of ecology, society, economics, scale, and dynamics of the ecosystem approach (Korn et al, 2002; Scott et al, 2014). Following the CBD COP 10 (Nagoya) and the CBD's new 2011-2020 strategy Scotland announced its new 2020 challenge for Scotland's Biodiversity (2013) strategy paper. When taken together with Scotland's biodiversity: its in your hands, these account for the entirety of the Scottish biodiversity strategy (Scottish Government online). Enabled by legislation and policy, responsibility for a range of statutory agencies such as the Scottish Environment Agency, Scottish Natural Heritage and Biodiversity Scotland conducts environmental management activities. The 2020 challenge for Scotland's Biodiversity (2013) sets out craft a unique Scottish response to the CBD ecosystem approach, and that this should be:

“An approach to planning and decision-making that will establish what needs to be done at the landscape scale to solve problems. It provides a unified agenda that public bodies, land managers and marine users can work towards and focuses action on areas in greatest need of restoration based on assessments of ecosystem health”.

In seeking to cast the Scottish response it suggests a distillation down to three broad principles supported by a publically available evaluative tool (Pepper, 2016), and commentary notes for communities and partnerships.

The Scottish principles of taking an ecosystem approach

Scottish ecosystem approach principles

1. Take account of how ecosystems work. Nature connects across landscapes, so we need to consider the broad and local scales. The capacity of ecosystems to respond to impacts and provide resources is not infinite. Ecosystems are dynamic so we must recognise that change will happen. By using up-to-date information, embracing adaptive management principles, and trying to sustain nature’s multiple benefits, we can ensure that nature continues to contribute to Scotland’s growth.
2. Take account of services that ecosystems provide to people, such as regulating floods and climate, breaking down waste, providing food, fuel and water, and contributing to quality of life, culture and wellbeing.
3. Involve people in decision-making, especially those who benefit from ecosystem services and those who manage them. This means valuing people’s knowledge, helping people to participate, and giving people greater ownership and responsibility.

Scottish Government, 2013

Furthermore, the use of an ecosystem approach is explicitly articulated in the Scotland land use strategy 2016-2021, and is further elaborated on an information note for applying the ecosystem approach to landuse (Natural Scotland, 2011). This note attempts to show how to use the approach in practice, including general public and public sector bodies (ie as part of strategic environmental assessments).

Wales

Congruent with the other nations, soon after the start of the New Labour administration the voice for Wales white paper set out the terms for a second referenda on devolution (1997). With 50.3% of the vote, the referendum was a success, and led to the Government of Wales

Act (1998). Unlike Scotland, the Welsh constitutional devolution settlement followed a conferred powers model, and allowed the new Government in Cardiff to make secondary legislation. This 'halfway house' was largely seen as unacceptable however (Hazell, 2006), and following the Richard commission (2004) a second white paper was published (Better governance for Wales, 2005), which in turn precipitated the Government of Wales Act (2006). This act gave the Welsh devolved Government power to make primary legislation in defined areas. Further law making powers were devolved in 2011. Following the Silk Commission (2011), the conferred powers model of devolution was deemed inappropriate to meet Welsh aspirations for its democracy. Indeed, whilst Wales had been subject to more changes in its devolution settlement since 1998 than either Scotland or Northern Ireland, it still enjoyed fewer powers (Silk Commission, 2011) and remained the most un-resolved devolutionary settlement (Hazell, 2006). Operationalising the constitutional recommendations of the Silk Commission involved a necessarily complex set of cross-party negotiations, which led eventually to the St David's Day Agreement (2014) and Wales Act (2014), which sought to devolve more powers, apply a funding floor to the Welsh funding settlement from Westminster, and move towards a reserved powers model. The movement towards a reservation style model is ongoing, though the Wales office suggests that Welsh devolution need not necessarily seek to copy those in Scotland, and should instead continue to seek a unique devolution settlement (Cairns, 2016).

Schedule seven of the Government of Wales Act (2006) identifies 'environment' as a fully devolved-conferred power. Furthermore, the recently enacted Environment Bill Wales (2016) represents the most ambitious and far-reaching consolidation of environmental powers into a single piece of devolved legislation. Wales has historically articulated its environmental and biodiversity strategies through policy documents, such as the Environment Strategy for Wales (2006) which built upon the our environment, our future, your views consultation, and set out a twenty-year strategy for the Welsh environment inclusive of biodiversity protection. This wide-ranging policy document addresses issues such as climate change, environmental hazards and biodiversity. Indeed, the biodiversity chapter (p36-37) highlights how the strategy was to align with the UK BAP format, inclusive of national and local BAP's. Whilst this document used much of the language and terminology of ecosystem services, it did not mention ecosystem approach explicitly. From 1997-2012 Welsh policy alignment to biodiversity conservation can arguably be characterised as reactive to the key environmental governance prescriptions from the UK Government and from the EU. Whilst there was limited interest during this period in the ecosystem approach (Dernie et al, 2006) it was all aligned to the original Malawi principles. However, interest in a more proactive approach to Welsh environmental governance, and specifically towards a stronger national iteration of biodiversity policy was articulated in the Sustaining a Living Wales Green Paper (2012). In

many ways, this Green paper was the watershed when Wales moved from being reactive to UK biodiversity policy and governance towards a more proactive position. This consultation concluded with the suggestion that all environmental governance in Wales become coordinated under a single programme called 'Natural Resource Management' (2013). The NRM programme was fivefold. The third objective of which was:

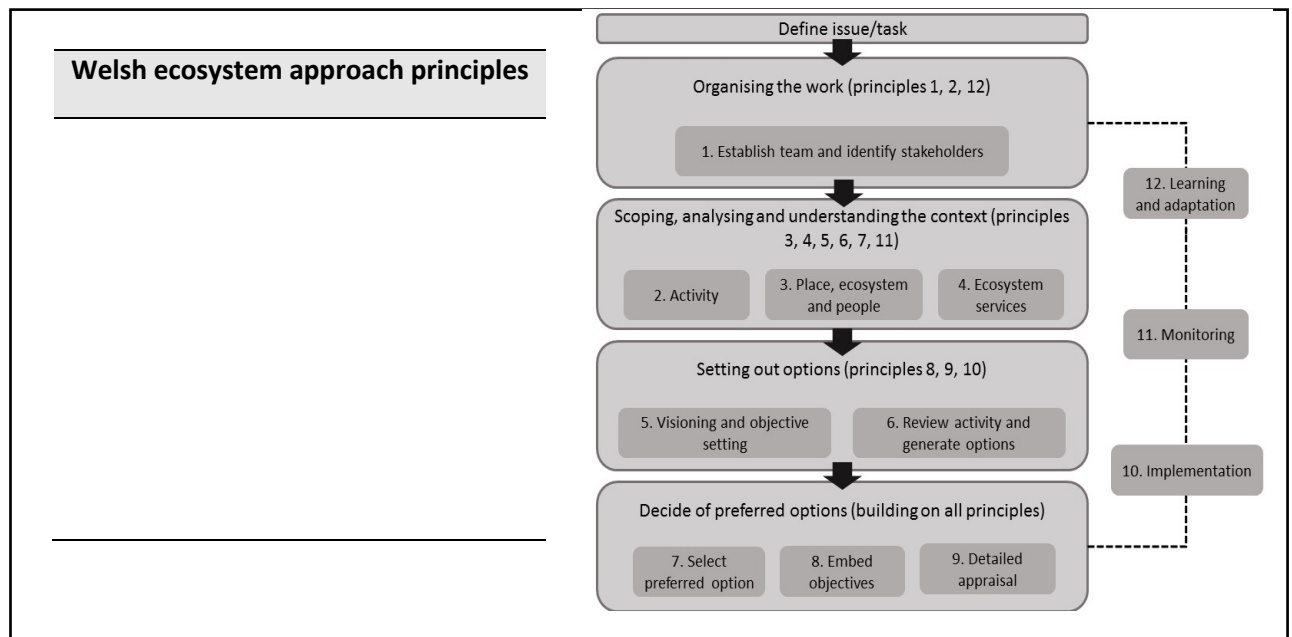
“Embedding the ecosystem approach, (including associated demonstration projects) which will showcase the benefits this approach can bring, and from which we can learn about how and when the approach can be used”. (Welsh Government online)

The fourth action was for the creation of a new Welsh natural environment agency that would consolidate the functions of many other former agencies (Forestry Commission, Environment Agency Wales and the Countryside Council for Wales). Natural Resources Wales (NRW) acts as the central unifying agency for Welsh environmental matters. This agency has a strong legislative and statutory footing, and centralises over forty environmental regulatory functions in one agency. NRW is seeking to construct a unique policy and practice response to the ecosystem approach (Jenkins et al, 2015) based upon Welsh demonstration projects (Scott et al, 2014). Critically, it seeks to make this a statutory policy response to the ecosystem approach. Scott et al (2014:129) has suggested that NRW will place the ecosystem approach at the centre of its thinking and practice, and create a new framework for its operationalisation:

“The NRW ecosystem approach framework is aimed at all staff in NRW. Its purpose is to help staff understand what the ecosystem approach is about, and to start to apply it in everyday work”.

Created in partnership with the TABLES project, this new framework aims to operationalise the ecosystem approach for a Welsh context, which prioritises the values of being integrated, timely, participative, iterative, visionary and outcome driven.

Natural Resources Wales ecosystem approach



Reproduced from Scott et al (2014: 27)

It suggests fusing the principles into a process for NRW's working practices and decision-making (Elliott and Monk, 2014), as well as distilling the principles down into a more operational form. Indeed, it is suggested that the NRM programme more broadly use a distilled form of the ecosystem approach (Natural resources policy statement, 2016), in addition to the process suggested by Scott et al (2014).

Comparative analysis of devolved policy responses

There are many similarities between the different nation cases, both culturally and governmentally. This is especially true of their environmental and biodiversity governance structures and yet, despite this, they have each constructed different policy responses to the ecosystem approach. An understanding of why, and which dynamics are driving this variance may be able to help illuminate the critical structures for advancing devolved biodiversity conservation. Therefore, this paper has undertaken a qualitative comparative analysis of the key variables that influence devolved policy responses to the ecosystem approach. Furthermore, it has opted for taking a positivist approach to comparing objective variables, an approach which is contemporarily under used. Indeed, the selection of the key objective key variables was based upon the availability of data for comparison, and the credibility of the source. This means that, as per Vira et al (2011), qualitative policy-strategy documents and legislation have been used as the primary sources for this comparison, as they offer the most accurate triangulation on governmental intentions and policy responses. To locate the key

variables, it conducted a systematic review of UK, and devolved, biodiversity policy and legislative documents to identify references to the ecosystem approach. Each combination of these variables has led to a different policy response which this analysis then subjectively rates, and argues, in terms of their progressive and innovative response to the challenge of translocating the ecosystem approach. The selection of the key variables omits other variables, due to their subjectivity which may still be influencing the policy responses. Considering the positivist approach adopted by this study these subjective confounding variables, such as leadership, funding or unique political culture, are not included in the comparative analysis, but a perception on their relative impact is addressed in the later analysis.

	Means			Motive	Opportunity		Outcome				
Nation	Biodiversity Agencies	Environment Ministry	Devolution Power	Response requirement	Policy-Strategy Documents	Legislation	Policy Responses				Strength
							Dis	Pro	Vol	Stat	
Northern Ireland	Northern Ireland Environment Agency	Agriculture, environment and rural affairs	Reserved	*	Valuing nature: a biodiversity strategy for Northern Ireland to 2020 (2015)	Nature conservation and amenity land (1985) Environment Order (2002) (relating to SSSI) Wildlife order (1985)			*		Low
Scotland	Scottish environmental protection agency Scottish natural heritage	Environment, climate change and land reform	Reserved	*	Scotland's Biodiversity: its in your hands (2004) 2020 challenge for Scotland's Biodiversity (2013)	Nature Conservation (Scotland) Act (2004) Landuse strategy (2011)	*		*		Medium
England	Environment Agency Natural England	Defra	Localism	*	Working with the grain of Nature: A biodiversity strategy for England (2002). Biodiversity 2020 – a strategy for England's wildlife and ecosystem services (2011) Porter et al (2011)	Countryside and rights of way act (2000) Natural environment and rural communities act (2006)	*	*	*		Medium
Wales	Natural resources Wales	Environment and countryside	Reserved	*	Sustaining a Living Wales (2012)	Environment (Wales) Act (2016)	*	*		*	High

The comparative model above identifies and compares the key variables influencing the emergence of unique translocations of the ecosystem approach in each of the devolved nations. It clusters these together into three overriding variables of 'motive, means, opportunity' (Saxton and Benson, 2008) and then their 'policy response'. The use of a 'motive, means and opportunity' construct, though descriptive of Sherlock Holmes's deductive method is, in this case, more closely resembles a derivation of Kingdon's multiple stream (MS) framework (Kingdon, 1995). The above model suggests that a variable of 'motive', which corresponds to Kingdon's 'problem' stream, is the first key dynamic (ie the deficit of integrated approaches to biodiversity conservation is identified as a problem). It then suggests that there needs to be a 'means' for constructing and actioning the solution to the problem, and finally an 'opportunity' for translocation, which correlates to kingdon's 'policy window'. This study deviates from Kingdon's framework where it suggests that the window is not the final dynamic, but that a unique, but that the varying responses are. It suggests that the separate, yet inter-related streams of policy-strategy, natural environment organisations, and alignment towards the ecosystem approach can intersect to create policy responses, or not, in the case of Northern Ireland. As Zahariadis (2007) suggests, whilst MS theory tends towards being utilised for understanding policy formulation, it also has value for understanding policy implementation.

In this analysis the 'means, motive and opportunity' are independent variables, with the policy response being the dependent variable. Whilst all the nations have a shared 'motive', the streams of 'means and opportunities' for action vary. Having the 'means' to act on the 'motive' is seen through having a natural environment agency who can construct, implement and then monitor the unique iteration. Through devolution, all the nations have the power to create a new version should they wish, and all have environmental ministries who could take high-level ownership of developing an original translocation. 'Opportunities' for crafting unique iterations can be seen to come through either policy-strategy documents or through legislation. The policy-strategy documents in the main represent supplementary updates to existing strategies and legislations to account for the changes wrought by super-national forces that need to be aligned towards; such as climate change, the post-Nagoya 2011-2020 strategic period or the evolving process of devolution itself. These documents often articulate national strategies with aspirational biodiversity conservation targets and non-binding goals for practice. In contrast, the legislative window of opportunity offers the opportunity to institute the ecosystem approach in a statutory format making it much stronger than the aspirational form seen in policy documents. The 'outcome' in this regard refers to the policy response, and not the overall biodiversity outcome, which is a different matter. The effect of the different policy responses to biodiversity outcomes can only be speculated upon at present. In the above

model the 'outcome' is referenced in terms of it being a 'distillative' (dis), or a processive (pro) response, with the logic being that processive being superior to distillative, and distillative and processive together better still. The 'outcome' is also categorised in terms of the response being either a voluntary (vol), or statutory (stat) instrument; which considering the relative strength of statutory environment instruments over voluntary ones, takes statutory to be preferential. From the combination of variables, a subjective 'strength of response' is given in the final column.

As already stated, Northern Ireland has expressed a 'motive' to create a new iteration of the ecosystem approach to suit their unique milieu. In terms of 'means', it has both an environment ministry who could take ownership of this, and the devolved power to take this course of action. What this comparative analysis has shown however is that it perhaps lacks the same form of Natural Environment agency that have led the unique iterations in the other nations. Certainly, it has an environment agency, as they all do, but it lacks a specific organisation with a natural heritage-environment remit. It has had a recent 'opportunity' for creating a new iteration through the Valuing nature: a biodiversity strategy for Northern Ireland to 2020 (2015) strategy document. The lack of a new iteration in this policy document is a missed opportunity, as whereas other nations have used the creation of updated biodiversity strategy aligning towards the CBD 2011-2020 strategic timeframe to construct a new iteration, Northern Ireland has not used this window of opportunity despite a clear motive to do so. Moreover, there is a significant and pronounced lack of recent environmental legislation in Northern Ireland, which could have offered alternative windows of opportunity.

The Scottish government has expressed a 'motive' for constructing a unique iteration of the ecosystem approach. Furthermore, they have the 'means' to do so, through reserved power over the environment, a dedicated environment ministry in Edinburgh, and an agency to take ownership of promoting the ecosystem approach in Natural Heritage Scotland. It has taken advantage of the window of opportunity presented by the strategic pivot towards the CBD 2011-2020 strategic timeframe seen in 2020 challenge for Scotland's Biodiversity (2013) to create a unique policy response. However, considering the non-statutory, aspirational, nature of the biodiversity 2020 strategy documents it does not suggest that this version of the ecosystem approach should be delivered through any hard environmental policy instrument (EPI). There may potentially have been other opportunities, such as the Nature Conservation (Scotland) Act (2004), but it should be noted that pre-2007 (UK Defra ecosystem approach) none of the nations were concerned with constructing new derivative iterations. Indeed, it was devolution itself, which played a fundamental role in Defra doing this in 2007, and so the Nature conservation act (2004) would not have suited. In this way the 2020 challenge for Scotland's Biodiversity (2013) represents the best window of opportunity to date, and one that

was used. The Scottish policy response was to distil the Malawi principles down into a simpler format. There are some supporting texts to go with this (Pepper, 2016), but no mention of operationalising the approach into a process as per England. Moreover, there has yet been no attempt at assessing partnerships and manager's alignment towards using the Scottish ecosystem approach so the impact of this distillation and its subsequent promotion remains unclear.

England has the poorest devolution settlement of any of the nations and as such, it borrows all of its environmental governance architecture from the UK. Whilst Defra have constructed an English policy-strategy response to the CBD 2011-2020 strategic timeframe that extolled the value of the ecosystem approach, and the need for interpretations, it does not actually articulate such a specific reinterpretation. Instead, this is left to Natural England who, in collaboration with countryside, produced the ecosystem approach handbook (Porter et al, 2011). Aimed at landscape scale partnerships this handbook expresses a 'motive' and proposes both a distillation of the ecosystem approach principles and a processive structure for operationalising them. Like Scotland, this distillation seeks to make the principles simpler to operationalise, though unlike Scotland it goes further in producing a process for use. This process is far more proactive than a simple distillation and represents a more ambitious reinterpretation of the ecosystem approach. This is furthered where Natural England is currently attempting what no other nations has done and delivering an assessment of landscape scale partnerships alignment to the ecosystem approach through its outcome 1c self-assessments. The results of these assessments would both satisfy the Nagoya outcome 1C action and highlight how successful their domestic effort at promoting implementation has been. Critically however, Porter et al (2011) is a handbook and has none of the official push of a policy-strategy document let alone legislation. In this way, it is somewhat perfunctory, and its use solely based upon knowledge dissemination, which has historically been shown to be one of the weakest environmental policy instruments (EPI) (Connelley et al, 2014).

Wales has a clearly expressed motive for creating a new iteration of the ecosystem approach. It also has the means for doing so seen in a dedicated environmental ministry, the recently awarded reserved devolution settlement, and most importantly the new NRM programme. The window of opportunity for this new iteration comes not from the CBD 2011-2020 policy-strategy documents seen in England, Scotland and Northern Ireland, but rather through direct legislation in the Environment (Wales) bill (2006). This bill seeks to enshrine the use of an ecosystem approach in a statutory format, and in this way its implementation may go far beyond the non-statutory formats seen in the other nations. In a similar way to Porter et al (2011) in England, its reinterpretation of the ecosystem approach is both distillative and processive. This appears the most powerful form of translocation as it both simplifies the

important points of Malawi principles, but also directs users towards putting them into action. This is preferable to the Scottish distillation that just attempts to make them easier to understand and then offers some supporting documents to guide their use. However, the Welsh translocation is potentially superior to the Natural England version due to its statutory nature inculcated in the functioning of the NRW agency. Considering the significant remit this powerful new agency enjoys this offer the most powerful EPI for delivering the ecosystem approach of any of the nations.

Means, motive and opportunity

This analysis has shown how all the devolved nations have expressed a desire, or motive, to construct a unique translocation. Certainly, the expression alone is not an objective assessment of motive, and many other confounding variables may influence this motive, such as the effects of leadership or national-political culture. That is not to suggest that these dynamics may be not be important in responses to the ecosystem approach. Indeed, there is reference to the important of dynamic leadership (IEMT, 1996; Holt et al, 2011) and political cultures (Garcia and Cochrane, 2005; Cowan et al, 2012) in the literature surrounding implementation of the ecosystem approach. However, these can only be subjectively triangulated upon and so from the positivist perspective are not an explicit part of the analysis.

Instead, the expression of a 'motive' given by each of the nations in policy documents will be taken at face value. Furthermore, each of the nations has had an opportunity, through either policy-strategy documents or through legislation in the post Nagoya strategic timeframe through which to construct a unique translocation. It could be suggested that not all opportunities are alike however, and whilst the post-Nagoya policy-strategy documents offer an opportunity to construct non-statutory policy responses, it is only really in direct legislation that the statutory iteration was constructed. Indeed, considering the complexity and multi-disciplinary nature of the ecosystem approach which is mismatched with siloed governance structures (Osterblom et al, 2010), it is not surprising that a hard iteration needs much careful thought, and a statutory footing.

However, this paper suggests that perhaps the most important variable affecting the outcomes is the means available to the nation. Indeed, at the extremes of this spectrum, in Northern Ireland and Wales, the lack of suitable agency has led to no translocation at all, and where there is a new, powerful and statutory agency there is perhaps the most ambitious iteration in Europe. There are, no doubt, confounding variables which may be affecting the influence of the means, such as the presence or lack of organisational leadership, legacy issues, or capacities. The concept of leadership influencing translocation may correlate to the 'policy

entrepreneurs' of Kingdon's framework, though the lack of objective data means that this is excluded from the conclusions drawn. Indeed, these are considered minor variables compared to the significant, and critical, variables of means, motive and opportunity.

Conclusion

As twenty-first century pressures on the natural world continue to mount (Pereira et al, 2010), finding solutions becomes more complex, and such solutions are necessarily going to have to be integrative and trans-disciplinary (Millennium ecosystem assessment, 2003). The ecosystem approach offers one of the most ambitious blueprints for management practises to meet this need, though, despite the dire need, it suffers from significant implementation deficit at all levels of governance, and in all countries. In the interests of meeting this implementation deficit and operationalising the approach, the devolved nations of the UK, utilising their new powers over the 'environment', have cast translocations of the approach to better suit the national situation. What this paper has sought to highlight, is how variations in their relative 'motive, means and opportunity' have stimulated different policy responses, and perhaps outcomes. The results of this comparative analysis are an asymmetric spectrum of policy responses ranging from 'no significant response' at all, to the 'processive, distillative and statutory' response seen in Wales. Indeed, whilst Northern Ireland shows the least proactive policy response to the ecosystem approach and Wales the boldest, there are interesting conclusions to be drawn from England and Scotland as well. This paper has shown how whilst the other variables can affect the policy response, the 'means' plays the most significant role, and that the respective organisations tasked with reinterpreting, implementing and monitoring the ecosystem approach hold the keys to its success or failure. For example, in England it is led by Natural England who have both commissioned a handbook with its own unique translocation, as well as a self-assessment process for monitoring implementation. In this way, England appears on a relatively comparable state with Scotland without any of the devolved architecture that is facilitating the use of the ecosystem approach in Scotland and Wales, and the credit for this lies with Natural England. In the most positive case Wales gives an example of the opportunities for ambition when a statutory agency is combined with targeted biodiversity legislation backed up by devolved power. That is not to say that the Welsh experiment will necessarily lead to successful outcome, as Waylen et al (2015) highlight organisational inertia, legacies and other confounding variables may yet play a powerful disabling role for inculcating an ecosystem approach in this new organisation. What is required is deeper, longer term, and outcome orientated examination of the Welsh experiment with the ecosystem approach.

Certainly any biodiversity outcomes from devolved biodiversity policy will necessarily only be seen over the long term (Berkes, 2010), and even then, differentiating the source of such outcomes from other international and EU induced policies may be difficult (Little, 2000). However, this paper speculates that the way each nation has formulated policy responses to the ecosystem approach can be used as proxy characterisation of the nation's overall response to using their recently devolved environmental and biodiversity power. In this way, Northern Ireland can be characterised as showing the least amount of proactive ambition to managing their domestic biodiversity. Scotland and England are making efforts to proactively manage their biodiversity, though Scotland has done so through more government and legislation and England through the power and effort of its agencies and in spite of its poor devolution settlement. Wales is being the most proactive and ambitious by constructing a unique approach to NRM based upon a new powerful statutory agency supported by legislation. Critically, what Wales is attempting to do in instituting the ecosystem approach through statutory EPI is truly original internationally. This experiment bears scrutiny, as if their mix of distillative and processive translocations proves successful, it could be a model for future operationalisations of the ecosystem approach around the world to help meet the global biodiversity challenge.

References

- Adams J., Robinson P., (eds) (2002) Devolution in Practice: public policy differences within the UK, London
- Apitz E., Elliott M., Fountain M., Galloway T.S., (2006), European environmental management: moving to an ecosystem approach, *Integrated Environmental Assessment & Management*: 2 (1) 80–85
- Bailey T., (2011), Scotland's environmental laws since devolution – from rhetoric to reality, <http://www.scotlink.org/files/publication/LINKReports/LINKEnvLawsRhetorictoReality.pdf>
- Berkes F., (2010), Devolution of environment and resources governance: trends and future, *Environmental conservation*: 37 (4) 489-500
- Borja A., Elliott M., Carstensen J., Heiskanen A-S., Van de De Bund W., (2010), Marine management – Towards an integrated implementation of the European Marine Strategy Framework and the Water Framework Directives, *Marine pollution bulletin*: 60 (12)
- Cairns A., (2016), UK Parliament (oral answers to questions), <http://www.publications.parliament.uk/pa/cm201516/cmhansrd/cm160224/debtext/160224-0001.htm>
- Cardinale B., Emmett Duffy J., Gonzalez A., Hooper D., Perring C., Venail P., Narwani A., Mace G., Tilman D., Wardle D., Kinzig A., Daily G., Loreau M., Grace J., Larigauderie A., Srivastava D., Naeem S., (2012), Biodiversity loss and its impact on humanity, *Nature*: 486 (7401) 59-67
- Carter N., (2007), *The Politics of the Environment: ideas, activism and policy*, Cambridge University Press, Cambridge, UK, Second Ed
- Connelley J., Smith G., Benson D., Saunders C., (2012), *Politics and the environment: from theory to practice*, London, Routledge, Third Ed
- Convention on Biological Diversity online, country profile: UK, <https://www.cbd.int/countries/?country=gb>
- Convention on Biological Diversity, the ecosystem approach, <https://www.cbd.int/ecosystem>
- Convention on Biological Diversity, the ecosystem approach sourcebook, <https://www.cbd.int/ecosystem/sourcebook/>
- Cooke P., Clifton N., (2005), Visionary, precautionary and constrained varieties of devolution in the economic governance of the UK territories, *regional studies*: 39 (4) 437-451
- Cowan J.H., Rice J.C., Walters C.J., Hilborn R., Essington T.E., Day W., Boswell M., (2012), Challenges for Implementing an Ecosystem Approach to Fisheries Management, *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*: 4 (1)
- Curtice J., (2011), *Is an English backlash emerging: reactions to devolution ten years on*, Institute for public policy research, London

Crutzen P., (2006), The Anthropocene (Chapter 2), in: Ehlers E., and Krafft T., (2006), Earth system science in the Anthropocene, Springer, Heidelberg

Davies R., (1999), Devolution: a process not an event, The Gregynog Papers: 2 (2), Cardiff: Institute of Welsh Affairs, 9-12

Defra, (2002), Working with the grain of nature: a biodiversity strategy of England, available online,
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69284/pb7718-biostrategy-021016.pdf

Defra, (2005)^A, Third UK National report to the CBD, available online
<https://www.cbd.int/doc/world/gb/gb-nr-03-p1-en.pdf>

Defra, (2005)^B, Securing the future: UK sustainable development strategy
<https://www.gov.uk/government/publications/securing-the-future-delivering-uk-sustainable-development-strategy>

Defra, (2007), Conserving Biodiversity – the UK approach, available online
http://jncc.defra.gov.uk/PDF/UKBAP_ConBio-UKApproach-2007.pdf

Defra, (2009), Fourth National Report to the CBD, available online
<https://www.cbd.int/countries/?country=gb>

Defra, (2011), Biodiversity 2020: A strategy for England's wildlife and ecosystem services, available online
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf

Defra, (2014), Fifth National report to the CBD, available online
<https://www.cbd.int/doc/world/gb/gb-nr-05-en.pdf>

Dernie K., Ramsay K., Jones R., Wyn G., Hill A., Hamer J., (2006) Implementing the Ecosystem Approach in Wales: Current status of the maritime environment and recommendations for management , CCW Policy Research Report No. 06/9
<http://ecosystemsknowledge.net/sites/default/files/wp-content/uploads/2013/10/CCW-Policy-Research-Report.pdf>

DETR, (2001), Second UK National report to the CBD, available online
<https://www.cbd.int/reports/>

Department of Environment Northern Ireland, (2015), Valuing nature: a biodiversity strategy for Northern Ireland to 2020, <https://www.cbd.int/doc/world/gb/gb-nbsap-v3-p3-en.pdf>

Elliott R., Monk K., (2014), NEAT Tree case study: Natural Resources Wales,
<http://neat.ecosystemsknowledge.net/wales.html>

Farmer A., Mee L., Langmead O., Cooper P., Kannan A., Kershaw P., Cherrier V., (2012), The ecosystem approach in marine management, EU FP7 KNOWSEAS Project. ISBN 0-9529089-5-6

Gardiner M., (2006), *The cultural roots of British devolution*, Edinburgh University Press, Edinburgh, First Ed

Fish R., Burgess, J., Chilvers, J. Footitt, A., Haines-Young, R. Russel, D., Winter, D.M., (2011), *Participatory and Deliberative Techniques to embed an Ecosystems Approach into Decision Making: an introductory Guide*. (Defra Project Code: NR0124)

Fish R., Saratsi E., (2015) *Naturally Speaking... A Public Dialogue on the UK National Ecosystem Assessment*, Final Report, CRPR, University of Exeter Press, Exeter, UK

Garcia M., Cochrane L., (2005), *Ecosystem approach to fisheries: organisational/institutional capacities: a review*, *ICES Journal of Marine Science*: 62 (3)

Goeteyn N., Maes F., (2011), *Compliance Mechanisms in Multilateral Environmental Agreements: An Effective Way to Improve Compliance?*, *Chinese journal of international law*: 10 (4) 791-826

Gollin M.A., (1993), *An intellectual property rights framework for biodiversity prospecting*, in: Reid W., Laird S., Meyer C., Games R., Sittenfeld A., Janzen, D.H., Gollin M., Juma C., (eds) (1993), *Biodiversity prospecting: using genetic resources for sustainable development*, Washington DC, World Resources Institute

Goodwin M., (2012), *Regions, Territories and Relationality: Exploring the Regional Dimensions of Political Practice*, *Regional studies*: 47 (8) 1181-1190

Greer S., (2004), *Four Way Bet: How devolution has led to four different models for the NHS*, The Constitution Unit, University College London

Guruswamy I., (1999), *The Convention on Biological Diversity: exposing the flawed foundations*, *environmental conservation*: 26 (2) 79-82

Haines-Young, R., Potschin M., (2008), *England's Terrestrial Ecosystem Services and the Rationale for an Ecosystem Approach. Overview Report*, 30 (Defra Project Code NR0107).

Hardin G., (1966), *Biology: Its Principles and Implications*, W.H. Freeman & Co, San-Francisco, USA, Second Ed

Harrison, J., (2005), *Unsustainable regions? The gaping hole in the English devolution settlement continues*, Regional Studies Association Annual Conference, Sustainable Regions Making Regions Work, London

Harrison J., (2009), *Life after regions: the evolution of city regionalism in England*, *regional studies*: 46 (9) 1243-1259

Hazell R., (2000), *An Unstable Union: Devolution and the English Question*, State of the Union Lecture, The Constitution Unit: London.

Hazell R., (2006), *Wave upon wave: the continuing dynamism of constitutional reform*, presented to Institute of Welsh Politics Aberystwyth and David Hulme Institute Edinburgh, <https://www.ucl.ac.uk/spp/publications/unit-publications/129.pdf>

Hazell R., (2015), Devolution and the future of the union, University College London, The Constitution Unit

Holt R., Godbold A., White L., Slater M., Pereira E., Solan M., (2011), Mismatches between legislative frameworks and benefits restrict the implementation of the ecosystem approach in coastal environments, *Marine Ecology*: 434 pp213-228

Hønneland G., Jørgensen A., (2003), Implementing International Environmental Agreements in Russia: Lessons from Fisheries Management, Nuclear Safety and Air Pollution Control, *Global Environmental Politics*: 31 72-98

Inter-agency Environmental Management Taskforce (IEMT), (1995), The Ecosystem Approach: Healthy Ecosystems and Sustainable Economies, Volume I – Overview. Report of the Interagency ecosystem Management Task Force, Washington, DC

Jameson H., (2011), What is localism?, LocalGov online, <http://www.localgov.co.uk/What-is-Localism/35189>

Jenkins R., Drewett H., Bialynicki-Birula N., De’Ath R., (2015), Delivering Biodiversity through Natural Resource Management, Natural resources Wales board paper NRW B 43.15

Johnston S., (1997), The convention on Biological diversity: the next phase, *Review of European Community & International Environmental Law*: 6 (3) 219-230

Joint Nature Conservation Committee, (2013), Points of operational guidance, <http://jncc.defra.gov.uk/default.aspx?page=6381>

Jordan A., (2000), The politics of multilevel environmental governance: subsidiarity and environmental policy in the European Union, *Environment and planning A*: 32 (7) 1307-1324

Kay J., Regier H., Boyle M., Francis G., (1999), An ecosystem approach for sustainability: addressing the challenge of complexity, *Futures*: 31 721-742

Keating M., Salmon T., (2001), The dynamics of decentralisation: Canadian federalism and British devolution, McGill-Queens University Press, Montreal, First Ed

Kingdon J., (1995), *Agendas, Alternatives, and Public Policies*, New York, Harper Collins, Second Ed

Kolbert E., (2014), *The sixth extinction: an unnatural history*, Henry Holt and company, New York

Korn H., Schliep R., Stadler J., (2002), Report of the International Workshop on the “Further Development of the Ecosystem Approach”
<https://www.bfn.de/fileadmin/MDB/documents/skript78.pdf>

Kotsakis A., (2011), *The biological diversity complex: A history of environmental government*, doctoral thesis

Lawton J., Brotherton P., Brown V., Elphick C., Fitter A., Forshaw J., Haddow R., Hilborne S., Leafé R., Mace G., Southgate M., Sutherland W., Tew T., Varley J., Wynne G., (2010),

Making Space for Nature: a review of England's wildlife sites and ecological network, Report to Defra, available online at

<http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>

Leyland P., (2011), The multifaceted constitutional dynamics of U.K. devolution, *International journal of constitutional law*: 9 (1) 251-273

Little G., (2000), Scottish devolution and environmental law, *Journal of environmental law*: 12 (2) 155-174

Millennium ecosystem assessment, (2003), *Ecosystems and human wellbeing*,

<http://www.who.int/globalchange/ecosystems/ecosys.pdf>

Natural Scotland, (2011), Applying an ecosystems approach to landuse: an introductory note, <http://www.gov.scot/Resource/Doc/345453/0114927.pdf>

Northern Irish Government online, (1998), Northern Ireland Act,

<http://www.legislation.gov.uk/ukpga/1998/47/contents>

Northern Ireland Department of Environment, (2015), Valuing Nature: a biodiversity strategy for Northern Ireland, <https://www.cbd.int/doc/world/gb/gb-nbsap-v3-p3-en.pdf>

Österblom H., Gårdmark A., Bergström L., Müller-Karulis B., Folke C., Lindegren M., Casinig M., Olsson P., Diekmann R., Blenckner T., Humborg C., Möllmann C., (2010), Making the ecosystem approach operational - can regime shifts in ecological governance systems facilitate the transition, *Marine Policy*: 34 (6) 1290-1299

Padley M., (2013), Delivering localism: the critical role of trust and collaboration, *Social policy and society*: 12 (3) 343-354

Pearce D., (2009), Decolonization and the collapse of the British Empire, *Inquiries*: 1 (10)

Pepper S., (2016), An evaluation framework for applying the ecosystem approach, *Scottish Natural Heritage*, <http://www.snh.gov.uk/docs/A1933741.pdf>

Pereira H., Leadley P., Proença V., Alkemade R., Scharlemann J., Fernandez-Manjarrés J., Araújo M., Balvanera P., Biggs R., Cheung W.W.L., Chini L., Cooper H.D., Gilman E.L., Guénette S., Hurr G.C., Huntington H., Mace G., Oberdorff T., Revenga C., Rodrigues P., Scholes R., Sumaila U., Walpole M., (2010), Scenarios for Global Biodiversity in the 21st Century, *Science*: 330 (6010), 1496-1501

Peterson A., McAlpine C., Ward D., Rayner S., (2007), New regionalism and nature conservation: Lessons from South East Queensland, Australia, *Landscape and urban planning*: 82 (3) 132-144

Rosario Ortiz Quijano M., (2014), CBDA Implementation analysis

Sandford, (2006), <https://www.ucl.ac.uk/constitution-unit/research/research-archive/regions06.pdf>

Pimm S., Russell G., Gittleman J., Brooks T., (1995), The future of biodiversity, *Science*: 21 (269) (5222) 347-350

Porter J., Jagota L., Brookes J., Mahony P., Howard B., Waters R., Hunt D., (2014) Ecosystem Approach Handbook, Countryside, Manchester.

Scottish Government, (2013), 2020 challenge for Scotland's Biodiversity, <http://www.gov.scot/Publications/2013/06/5538>

Scottish Government, (2013), Scotland's Biodiversity: its in your hands, <http://www.gov.scot/Publications/2004/05/19366/37239>

Scott A., Carter C., Hölzinger O., Everard M., Raffaelli D., Hardman M., Baker J., Glass J., Leach K., Wakeford R., Reed M., Grace M., Sunderland T., Waters R., Corstanje R., Glass R., Grayson N., Harris J., Taft A., (2014), UK National Ecosystem Assessment Follow – on, Work Package Report 10: Tools - Applications, Benefits and Linkages for Ecosystem Science, (TABLES), UNEP - WCMC, LWEC, UK.

Shepherd G., (2004), The Ecosystem Approach: Five Steps to Implementation, IUCN Press, Gland, Switzerland

Shepard G., (2008), The ecosystem approach: learning from experience, Ecosystem management series number five, International Union for Conservation of Nature and Natural resources, Gland, Switzerland

Tomaney J., (2002), The evolution of regionalism in England, Regional studies: 36 (7)

Saxton G., Benson M., (2008), Means, Motives and Opportunities in Ethno-Nationalist Mobilization, International interactions: 34 53-83

Scottish Natural Heritage, (2012), Making the most of communities natural assets: green infrastructure, <http://www.gov.scot/Publications/2012/09/8724>

Smith R., Maltby E., (2003), Using the ecosystem approach to implement the convention on biological diversity, World Conservation Union, available online <https://portals.iucn.org/library/efiles/documents/CEM-002.pdf>

Smith B., Zeder M.A (2013), The onset of the anthropocene, Anthropocene: 4 8-13

Steffen W., Crutzen P., McNeill J.R (2007), The anthropocene: are humans now overwhelming the great forces of nature, AMBIO: A journal of the human environment: 38 (8) 614-621

Smith Commission, (2014), Commission report, <https://www.smith-commission.scot>

Storper M., (1997), The regional world: territorial development in a global economy, Guilford Press, New York

The economics of ecosystem biodiversity (TEEB), <http://www.teebweb.org/>

Trench A., (2005), Introduction: the dynamics of devolution, in Trench A., (eds) (2005) The dynamics of devolution 2005: the state of nations, Imprint academic, London, First Ed

Vlachopoulou M., Coughlin D., Forro D., Kirk S., Logan P., Voulvoulis N., (2014), The potential of using the Ecosystem Approach in the implementation of the EU Water Framework Directive, Science of the total environment: 470-471 684-694

Waylen K., Hastings E., Banks E., Holstead K., Irvine R., Blackstock K., (2014), The need to disentangle key concepts from ecosystem approach jargon, *Conservation Biology*: 28 (5) 1215-1224

Waylen K., Blackstock K., Holstead K., (2015), How does legacy create sticking points for environmental management? Insights from challenges to implementation of the ecosystem approach, *Ecology and Society*: 20 (2)

Welsh Government, (1998), Government of Wales Act, <http://www.legislation.gov.uk/ukpga/1998/38/contents>

Department of Environment Northern Ireland, (2002), Northern Ireland biodiversity strategy, Belfast

Welsh Government, (2004), The Richard Commission, <http://webarchive.nationalarchives.gov.uk/20100410160947/http://www.richardcommission.gov.uk/content/template.asp?ID=/content/finalreport/index-e.asp>

Welsh Government, (2005), Our environment, our future, your views, response to consultation, [www.assembly.wales/Committee%20Documents/EPC\(2\)%2014-05%20Paper%207%20-%20Annex%20A%20\(pdf,%20311%20KB\)-23112005-14013/n00000000000000000000000037893-English.pdf](http://www.assembly.wales/Committee%20Documents/EPC(2)%2014-05%20Paper%207%20-%20Annex%20A%20(pdf,%20311%20KB)-23112005-14013/n00000000000000000000000037893-English.pdf)

Welsh Government, (2006), Government of Wales Act, <http://www.legislation.gov.uk/ukpga/2006/32/contents>

Welsh Government, (2011), The Silk Commission, <http://webarchive.nationalarchives.gov.uk/20140605075122/http://commissionondevolutioninwales.independent.gov.uk>

Welsh Government, (2012), Sustaining a living Wales (Green Paper), <http://gov.wales/consultations/environmentandcountryside/sustainingwales/?lang=en>

Wilford R., (2000), Designing the Northern Ireland assembly, *Parliamentary affairs*: 53 (3) 577-590

Wilson R., (2011), The Northern Ireland Assembly elections revealed the failures of devolution, OpenDemocracyUK, <https://www.opendemocracy.net/ourkingdom/robin-wilson/northern-ireland-assembly-elections-revealed-failures-of-devolution>

Wood A., Stedman-Edwards P., Mang J., (2000), *The Root Causes of Biodiversity Loss*, Earthscan, London, First Ed

Zahariadis N., (2007), The multiple streams framework: structure, limitations and prospects, in: Sabatier P., (2007), *Theories of the policy process*, Westview Press, London, Second Ed