Advancing conservation science thinking on protected areas in the UK

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Joint Nature Conservation Committee

Advancing conservation science thinking on protected areas in the UK

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1. Introduction

1.1. In March 2013 Joint Committee considered the role of protected areas in the context of a wider landscape-scale vision for nature conservation. It considered how the approach to designating protected areas had evolved in the UK and looked at the future for such areas in a changing policy landscape. The discussion emphasised helping stakeholders to understand for themselves the value of protected areas, not only as areas for nature conservation, but increasingly to deliver ecosystem services and provide socio-economic benefits. It also emphasised some further consideration of developing flexible approaches to ensure protected areas are more beneficial for nature conservation in the future.

1.2. Protected areas are generally seen as a cornerstone of conservation policy, as noted by Susan Braatz (Braatz, 1992) “setting up comprehensive and well managed protected area systems is likely to be the most practical way to preserve the greatest amount of the world’s biodiversity ...”. However, the 2010 target to significantly reduce the rate of loss of biological diversity was not achieved and the focus now is on meeting the 2020 international, EU and national targets for biodiversity.

1.3. Protected areas have played an important role in arresting biodiversity declines, but are unlikely to be sufficient on their own to achieve the new targets. Innovative thinking is required to improve the effectiveness of protected areas and investigate other measures that could be put in place to improve biodiversity outcomes, especially when facing restricted or declining financial input. The suite of measures deployed to halt the loss of biodiversity (the ‘solution’) must, collectively, address the main threats to the loss of biodiversity (the ‘problem’). At present that is not the case. For example, although rates of biodiversity loss have slowed since the 1980s, the mix of measures currently deployed is not sufficient to continue the reduction in the rate of loss or to arrest it.

1.4. One of the purposes of this paper is to stimulate debate about what the other measures could be and to clarify a proportionate role for protected areas (including selection, monitoring, evaluation and management) in that mix. The longer term direction of travel for protected areas in the UK will depend on developing the concepts of their value as natural capital and on recognising the importance of increasing localism, including ownership of key strategic decisions. The number, area, location, purpose, and management type and effectiveness of protected areas will be key considerations in delivering these concepts.

1.5. To assist Committee in continuing their discussion, the Support Company has assembled some background information to address three key questions:

i. is the contribution of protected areas to nature conservation as effective as it could be?

ii. what factors influence the effectiveness of protected areas?

iii. are there other approaches to nature conservation that contribute to wider objectives of sustainable communities?

1.6. This paper focuses on sites that are statutory designations for biodiversity protection, that is, Sites of Special Scientific Interest/Areas of Special Scientific Interest (Northern Ireland) (SSSIs/ASSIs), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). There are other areas designated for landscapes that include wildlife conservation in their purpose, but they are beyond the remit of this paper.

1.7. References are included in Annex 1.

2. Is the contribution of protected areas to UK nature conservation as effective as it could be?

2.1. To address this question consideration has been given to: the major threats to biodiversity and their causes; the underpinning scientific principles for protected areas; the protected area resource in the UK and changes over the last 30 years; and the assessment of benefits provided by that resource.

2.2. The main threats to biodiversity and their causes

2.2.1. The main proximate threats to biodiversity are habitat loss (overharvesting and land use change, including fragmentation), climate change, invasive non-native species and pollution (MEA, 2005). However, it is also important to consider the underlying drivers which include population growth, rising incomes and changing consumption patterns (Palmer & Di Falco, 2014). Halting the loss of biodiversity by 2020 will require attention on both the proximate and underlying drivers (e.g. Secretariat of the CBD (2010); Palmer & Di Falco, 2014).

2.2.2. Protected areas clearly have an important role to play in conserving a representative sample of marine, terrestrial and freshwater habitats in the UK. However, on their own they are not well positioned to tackle the loss of biodiversity and need to work alongside other measures. For example, protected areas are often designated on land of little or no commercial interest, at least at the time of designation (which is one of the reasons why they retain a natural or semi-natural character), while the main pressures and underlying causes continue unabated on areas of land of commercial interest (e.g. Margules & Pressey, 2000).

2.3. Scientific principles underpinning protected areas in the UK

2.3.1. Traditionally, in order to fulfil the role of maintaining a sample of biodiversity into the future, protected areas should achieve two things: i) capture that biodiversity within their boundaries, and ii) buffer it from processes that threaten its persistence, while allowing evolution to continue (Margules & Pressey, 2000).

2.3.2. In terrestrial UK the most important principles underpinning protected areas come from the guidelines for setting up the series of Sites of Special Scientific Interest (SSSI). This series was intended to "form a national network of areas containing the most important features for nature conservation, of highest quality and concentration and should be large enough to guarantee the survival of a necessary minimum of Britain's wildlife and physical features" (NCC, 1989). More recently, Lawton *et al* (2010) concluded that in England, a coherent and resilient ecological network was required that was of adequate size, received long-term protection and was sufficiently connected. Ervin *et al* (2010) developed these ideas in more detail at global level.

2.3.3. In the marine environment the overarching principles for protected areas are perhaps best captured in the stated aims of the OSPAR network of Marine Protected Areas, which are broadly:

i. 'to protect, conserve and restore species, habitats and ecological processes which have been adversely affected by human activities;

ii. to prevent their degradation following the precautionary principle; and

iii. to protect and conserve areas that best represent the range of species, habitats and ecological processes in the maritime area' (OSPAR Recommendation 2003).

2.3.4. It is generally acknowledged that for most protected areas some form of human intervention is necessary to maintain, protect or enhance the features for which they were designated. More recent thinking on the management and benefits of protected areas is giving greater focus to including people, particularly at local level. Lawton *et al* (2010) concluded that protected sites should be valued by, and be accessible to, people, and the Natural England Designations Strategy (2012) is a practical application of these ideas.

2.4. The UK protected area resource and how it has changed in the last 30 years

2.4.1. The Sites of Special Scientific Interest/Areas of Special Scientific Interest (in Northern Ireland) (SSSI/ASSI) series has developed since 1949 as the national suite of sites providing statutory protection for the best examples of the UK's flora, fauna, or geological or physiographical features. These sites are also used to underpin other national and international nature conservation designations. Most SSSIs are privately-owned or managed; others are owned or managed by public bodies or non-government organisations.

2.4.2. Special Protection Areas (SPAs) are classified by the UK Government under the EU Birds Directive and Special Areas of Conservation (SACs) are designated under the EU Habitats Directive. The Directives apply to the UK and the Overseas Territory of Gibraltar. SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union. SACs are areas which have been identified as best representing the range and

variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive.

2.4.3. The overall total extent of land and sea protected in the UK through national and international protected areas has increased from just under 0.2 million hectares in 1980 to over 7.5 million hectares. A large contribution to this has been from the marine environment, following the designation of inshore and offshore marine sites under the Habitats Directive – the area of protected areas at-sea increased by more than 5.5 million hectares between 2008 and 2013.

2.4.4. Table1 shows the total area of each designation of the following site designations: ASSIs, SSSIs, SACs (including candidate Special Areas of Conservation and Sites of Community Interest), and SPAs. It includes SSSIs/ASSIs that are designated for geological features. It should be noted that there is overlap across the designations. Annex 2 to this paper provides an overview of all protected area designations across the UK and indicates where ASSI/SSSIs, SACs and SPAs fit in the wider framework.

Table 1. Number and area of ASSI/SSSIs, SPAs and SACs in the UK, as at 31 March 2013

	Number	Area (ha)	Feature protected
Sites of Special Scientific Interest	6,616	2,367,094	Species, habitats, geology
Areas of Special Scientific Interest	360	104,587	Species, habitats, geology
Special Protection Areas	269	2,748,257	Birds Directive Annex I and migratory birds
Special Areas of Conservation	629	2,880,025	Habitats Directive Annex I habitats and Annex II species

2.5. Assessing the benefits of protected areas in the UK

2.5.1. There is evidence that protected areas provide a range of benefits in addition to their designation purpose including: facilitating range expansion of species (Thomas *et al*, 2012); reducing extinction risk (Butchart *et al*, 2012); providing ecosystem services (McInnes, 2013); and acting as establishment centres for colonising species (Hiley *et al*, 2013). There are questions, though, around the ecological effectiveness of protected areas (Gaston *et al*, 2006) and the value of the protectionist paradigm in the long-term protection of biodiversity (Wilshusen *et al*, 2002).

2.5.2. Alexander Pfaff spoke at the Zoological Society Symposium in 2012 (Pfaff, 2012) about the science of assessing protected areas outcomes and provided a long list of biases that de-valued all of the easy, obvious comparisons that were possible (Joppa & Pfaff, 2010). Biases include location of area, who designates, whether designation is for multiple or single features, and future likelihood of pressures increasing or decreasing. A rather complicated and time consuming

evaluation process seems to be the only truly reliable solution. Committee (and the Support Company) do not have the time or resources to commission this type of study so considering the readily available information carefully and in light of the obvious biases seems to be the best option.

2.5.3. The most recent assessments of species and habitats protected under the Habitats and Birds Directives (Article 17 and Article 12 reports respectively) can give some indication of how effective protected areas are in fulfilling their designation objectives and making an important contribution to wider biodiversity protection. Data collected for the UK SPA Review and the Birds Directive Article 12 Report will enable a breakdown of trends for features on designated sites by onsite versus offsite components. The Habitats Directive Article 17 Report, for the first time in 2013, included an estimation of the percentage of each habitat and species reported on within the UK protected area network, thereby providing the potential for future comparison of the conservation status of those with a high proportion of the feature on protected areas with those that have a low proportion. There is also potential to analyse trends for onsite and offsite components of some features.

2.5.4. Other analyses could be undertaken but they would require a lot more work:

i. the proportion of the UK resource of conservation priority species and habitats (those afforded European and national legal status) present on the UK protected area network;

ii. breakdown of trends for non-protected species according to their onsite and offsite components;

iii. an assessment of the protected area contribution to whole ecosystem service valuations.

2.5.5. It might be more profitable to identify conservation priorities and then consider the best mechanisms for delivering them. Species or habitats with characteristics such as being highly localised, dependent on a very high degree of ecosystem functionality or being very susceptible to disturbance might be examples where protected sites would be most effective. Further work could then start to categorise conservation priorities by these characteristics and assess the provision made by the current protected area network.

2.5.6. For example, for terrestrial and freshwater birds, a Site Provision Index has been developed and calculated for each species as part of the ongoing UK terrestrial SPA review. This index takes account of the distribution, population size (national and biogeographic) and ecology of the species. The degree of protection provided by the SPA network can then be calculated for each species and compared across species with similar Site Provision Index values to help the country conservation bodies and others decide whether any species are under-represented. The terrestrial SPA review will be brought to the Committee in early 2014.

3. What factors influence the effectiveness of protected areas?

3.1. In order to address this question consideration has been given to: legal requirements for protected areas; design principles and the possible restrictions they pose to a more flexible, forward looking approach; and the impact of a protected areas approach on the wider social psyche and attitudes to biodiversity.

3.2. The legislative requirements for protected areas

3.2.1. The legislation pertaining to protected areas largely reflects the scientific principles referred to in section 2.3. As a result, a legislative framework has developed that in some cases is costly to administer and not always as effective as it could be.

3.2.2. The SSSI series, set up under the 1949 National Parks and Access to the Countryside Act and then further protected under the 1981 Wildlife and Countryside Act (as amended), provides the underpinning statutory protection for almost all terrestrial sites, including those which are of European and international importance. It has, therefore, determined the approach to terrestrial protected area designation across the UK. These sites are designated following a process of detailed survey, interpretation, notification and formal consultation. There is some flexibility, in that the list of features for which an SSSI is notified may be amended at any time, and the scientific case for an SSSI can be reconsidered every 10 years. Once designated, sites have management statements, and certain operations require consent from the statutory nature conservation bodies.

3.2.3. European requirements for terrestrial protected areas derive from the Nature Directives. Both the Birds Directive (adopted 1979) and the Habitats Directive (adopted 1992) focus on the designation of protected sites (Special Protection Areas (SPA) and Special Areas of Conservation (SAC) respectively) for Annex-listed features. SPAs and SACs together form the Natura 2000 network, which is intended to be 'a coherent European ecological network of sites'. Member States are required to improve ecological coherence through landscape management, land-use planning and development policies (Habitats Directive Article 10). The Habitats Directive is perhaps the most robust legislation because of decision-making processes required under Article 6 concerning management and protection of Natura 2000 sites.

3.2.4. European legislation is more modern in the marine environment and greater consideration has been given to coherent networks of sites and protection of ecosystems as well as listed habitats and species. The Marine Strategy Framework Directive (adopted 2008) requires spatial protection measures to be established that 'contribute to coherent and representative networks of marine protected areas, and cover the diversity of the constituent ecosystems' and make an important contribution to the achievement of good environmental status under the Directive. There is overlap with the Habitats and Birds Directives, which also require protected areas to be designated in the marine environment.

3.2.5. The OSPAR Convention (adopted 1992), the Ramsar Convention (adopted 1971), and the Convention on Biological Diversity (adopted 1992), all make reference to, or have targets for, the establishment of protected areas for important species and habitats. More recently, the Convention on Biological Diversity's Aichi target 11 states: "By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes".

3.3. Design principles and objectives

3.3.1. The current network of designated sites has evolved over time and the process of SSSI/ASSI designation, underpinning SPA and SAC designation with generally small sites, each focusing on one or a few features with carefully defined boundaries, doesn't facilitate the creation of a modern, coherent, ecological network that is flexible and able to adapt and deliver a wide range of services. Consequently, designated sites in the UK make varying contributions to ecological networks, and are not always adaptable to changes resulting from climate impacts, spread of non-native species, and other factors. Furthermore, for European designations, the process of submitting sites to the European Commission for adoption is highly formalised and time-consuming and there is very little opportunity to change factors related to designations once they have been adopted.

3.3.2. In the marine environment a coordinated approach has been taken to protected area designation, guided by the more modern legislative approach outlined in section 3.2. UK Marine Protected Areas (MPAs) being established under international, European and national legislation will all contribute to an ecologically coherent network of sites. The overall aim of the MPA network is to contribute to "clean, healthy, safe, biologically diverse marine and coastal environments, managed to meet the long-term needs of both people and nature".

3.3.3. Biodiversity is experiencing increasing pressures, which lead to conflict and rapid change. Climate change and other factors are causing the distribution of species to change and ecosystems to function in different ways. The traditional approach to protected areas is best suited to a static biodiversity resource; pragmatic solutions have yet to be found for changing the features for which a site is designated without undermining the protection afforded by the site. More progress has been made on how sites might be connected to increase their ability to adapt, to create a coherent network, to be more resilient and to allow biodiversity to change its distribution. More analysis could be undertaken to identify what has been tried on the ground and how well it has worked.

3.3.4. The Natural England Designations Strategy (2012) is making a strategic review of the different designation series to ensure they are designated for the right reasons, and are making an effective contribution to a coherent ecological network for England. The Natural

England SSSI Notification Strategy (NE, 2008) sets out a systematic approach to 'fill existing gaps in coverage, ensure that the series contains the most valuable sites, and that SSSIs are dynamic and resilient to the effects of climate change, as far as is practicable'.

3.4. The impact of a protected areas approach on the wider social psyche and attitudes to biodiversity

3.4.1. Even with a tight regulatory regime, most complex open environmental problems (such as loss of biodiversity and climate change) require public engagement and commitment for significant progress to be made on them (e.g. Brechin *et al*, 2002). This leads into behaviour change which is a complex area involving psychological, sociological and other factors, including the influence of the material world (institutions and infrastructure) (e.g. Scottish Government, 2013). Recent work exploring relationships between values, beliefs, the framing of problems and hence motivations and behaviours reveals some counter-intuitive results (e.g. Chilton *et al*, 2012). For example, exhortations to change behaviour stimulated by short-term personal gain such as saving money or enhancing status by following a celebrity trend can act against compassion and other pro-social and pro-environmental behaviours. In the long term, at least, it seems important that our approaches to halting the lost of biodiversity foster the pro-social and pro-environmental behaviours associated with 'bigger-than-self' problems.

3.4.2. There is a risk that framing biodiversity loss as a complex, specialised and highly technical exercise seen principally through the lenses of protected areas and priority habitats and species (and using language like 'biodiversity' and 'ecosystems') could alienate many people from concerns about nature. Such framing could come about as a result of what we do as much as (or more than) what we say. Blackmore and others (2013) suggest that 'protected areas' could become associated with a 'superhero' frame which can stimulate passive behaviours. For example, highly skilled professionals 'take care' of the complicated issue of loss of biodiversity 'over there' in protected places that are physically and metaphorically far away from where most people live out their lives. This could present a barrier to engaging people over the underlying drivers of the loss of biodiversity, especially those connected with consumption and lifestyle.

3.4.3. The need to address both the underlying drivers as well as the proximate threats to the loss of biodiversity requires us to think much more deeply about the environment as a social problem, including the consequences of the way that we frame loss of biodiversity which is mainly as a natural sciences problem.

4. Are there other approaches to nature conservation that contribute to wider objectives of sustainable communities?

4.1. To address this question consideration has been given to: the ecosystem approach; how much protected areas and other approaches are considered in country strategies; the future potential for protected areas, focusing on work

that could be carried out to support Committee in answering some of the more difficult questions.

4.2. Focusing on the ecosystem approach

4.2.1. Demands on land for different uses are constantly growing. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. As such it is a decision-making framework, which involves the distribution of costs and benefits. It promotes the use of land for multiple benefits with less intense (single purpose) management. It recognises that humans, with their cultural diversity, are an integral component of ecosystems and is the primary framework for action under the Convention on Biological Diversity.

4.2.2. Ecosystem services are also a major consideration. Ecosystems that have greater diversity generally support more resilient and stable ecosystem functions, but the relationship between greater biodiversity and ecosystem services is less clear (e.g. in some cases less diverse systems yield greater food production at least in the short term) (Mace, 2014). However, the links between protected area management and ecosystem service delivery have yet to be fully explored (Eastwood *et al*, in prep.). Designation is most likely to affect ecosystem service delivery in areas which have high potential productive capacity (e.g. change to intensive agriculture), where alternative land uses are required (e.g. development), or where cultural services such as recreation could be either increased or decreased (i.e. impacting negatively on biodiversity from higher visitor numbers or positively due to exclusion to protect species).

4.2.3. It seems that for protected areas to be more effective in the future, becoming a flexible part of integrated landscape-scale planning that balances the needs of many sectors of society is essential. Roads, houses, industry, crops, leisure pursuits, biodiversity and protected areas are all competing for space. A healthy, wealthy, sustainable society requires all of these things, and finding the optimal balance is what the ecosystem approach aims to achieve.

4.2.4. This suggests that a strategy is required that:

i. defines the outcomes and impact protected areas should deliver to a wider conservation plan;

ii. assesses how close the current protected area resource is to delivering the required outcomes and impact and other desired outcomes;

iii. recommends ways for protected areas to be administered so as to be able to ‘flex’ to factors such as climate change in an era of increasing environmental change

4.3. The Tweed Forum: a living example of incorporating protected areas in an ecosystem approach (to be completed)

4.4. Country strategies, protected areas and the ecosystem approach

4.4.1. The 2020 strategy for biodiversity in England (Defra, 2011) is centred on halting biodiversity loss, but also aims to achieve wider benefits to biodiversity and people through applying the ecosystem approach. It has committed to building an ecologically coherent network of bigger, better and more connected sites as a means of achieving this mission. The Natural England Designations Strategy (2012) outlines the approach to be taken over the next five years in England, with a key difference in that it will consider how 'collectively, the whole suite of designations can be used to deliver ecological networks and the full range of ecosystem services. Where more than one designation or notification option exists the solution that addresses the widest range of strategy principles and so delivers the best spread of public benefits will be favoured'.

4.4.2. Scotland has produced the *2020 Challenge for Scotland's Biodiversity* (Scottish Government, 2013), which together with *Scotland's Biodiversity: It's In Your Hands* (2004) comprise the Scottish Biodiversity Strategy. The Strategy aims to "protect and restore biodiversity on land and in the seas, and to support healthier ecosystems". While recognising the importance of protected areas the Strategy also recognises the role of natural capital, the importance of connecting people with the natural world and involving them more in decisions about their environment, and maximising the benefits for Scotland of a diverse natural environment and the services it provides. Scotland also has a Land Use Strategy (Scottish Government, 2011), which aims for sustainable land use, with land-based businesses working with nature, responsible stewardship of Scotland's natural resources and urban and rural communities better connected to the land.

4.4.3. Northern Ireland lists protected areas as a cornerstone of the Northern Ireland Biodiversity Strategy (2002), which is currently being reviewed and supplemented. In the 2009 report on the delivery of the Strategy (NIBG, 2009), much greater emphasis is placed on the ecosystem approach. The report considers that the suite of protected sites, together with agri-environment measures, protect the most specialised, vulnerable and localised species and habitats, but a landscape-scale approach is needed that integrates farming, rural communities, protected sites and habitat restoration, allowing the landscape and biodiversity to adjust to the pressures of human use and the spatial shifts caused by climate change.

4.4.4. The Environment Strategy for Wales (Welsh Assembly Government, 2006) sets the strategic direction until 2026. The Strategy recognises 'the importance of the environment, both for its own sake and for the ecosystem services it provides. It is a framework and vision for a 'distinctive Welsh environment thriving and contributing to the economic and social wellbeing and health of all the people of Wales'. Nowhere, perhaps even globally, is there greater and more obvious commitment to applying the ecosystem approach.

4.4.5. The Welsh Government White Paper consultation on proposals for a Wales Environment Bill, 'Towards the Sustainable Management of Natural Resources', closed on 15 January 2014. The main purpose of the Bill is to create the statutory basis for a more integrated approach to the management of natural resources in Wales. The focus of 'integration' is to ensure that the planning, management and regulation of the use of natural resources is based on the 'ecosystem approach' (as defined under the Convention on Biological Diversity), and delivers social and economic benefits alongside environmental objectives. The proposal is for a Wales-wide statutory framework for integrated natural resource management, including publication by Welsh Ministers of a national natural resources policy statement, setting out strategic priorities for natural resources. A new duty is proposed for NRW – to develop and implement an area-based approach to the sustainable management of natural resources, defining the priorities and opportunities for natural resources on an area basis, aligned with the national policy statement. A Nature Recovery Plan for Wales is currently in preparation, with the aim of it being finished in 2014/15.

4.5. Future potential for UK protected areas

4.5.1. The following is a list of questions about protected areas, with potential actions that could be undertaken to help answer them:

i. Do we need protected areas to do different things? And, if so, how might this be achieved? Possible action: clarification and expansion of some of the key scientific principles underpinning the use of protected areas as a conservation tool within an ecosystem approach and consideration of the wider historical, cultural, social, political and economic factors.

ii. Is there anything that protected areas currently do that we can do without? Possible action: carry out further work to analyse off-site and on-site trends in biodiversity to assist the identification of characteristics that suit a protected areas based conservation approach and those that would suit other approaches.

iii. Is the current and projected cost of protected areas work too much or too little given our nature conservation objectives and all of the other things we need to do? Possible action: compare and contrast the potential usefulness of protected areas against other conservation tools. This would vary according to landscape types and for different conservation objectives but is absolutely critical to achieving an optimal role for protected areas.

iv. How much are protected areas needed to meet legal obligations or to meet conservation priorities? Are they the same thing? Possible action: identify where protected area obligations are in danger of standing in the way of protected areas reaching their full potential and recommend solutions. An example might be where the legal designation requires expensive management to prevent a habitat adapting into a more resilient higher biodiversity value type.

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Annex 2. An overview of the types, numbers and areas of statutorily designated protected areas in the UK. Figures as at 31 March 2013.

Designation	**Number of Sites**	**Area (ha)**	**Features protected**	**Purpose of Designation** (for more details see http://jncc.defra.gov.uk/page-1527)
Special Protection Areas	269	2,748,257	birds	SPAs are classified by the UK Government under the EC Birds Directive. The Directive applies to the UK and the Overseas Territory of Gibraltar. SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.
Special Areas of Conservation*	629	2,880,025	habitats, non-avian species	SACs are designated under the EC Habitats Directive. The Directive applies to the UK and the Overseas Territory of Gibraltar. SACs are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive.
Ramsar*	148	785,361	wetlands and wetland related species	Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. Originally intended to protect sites of importance especially as waterfowl habitat, the Convention has broadened its scope over the years to cover all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.
Sites of Special Scientific Interest	6,616	2,367,094	species, habitats, geology	The SSSI/ASSI series has developed since 1949 as the national suite of sites providing statutory protection for the best examples of the UK's flora, fauna, or geological or physiographical features. These sites are also used to underpin other national and international nature conservation designations. Most SSSIs are privately-owned or managed; others are owned or managed by public bodies or non-government organisations.
Areas of Special Scientific Interest	360	104,587	species, habitats, geology	
SSSI + ASSI	6976	2,471,681	species, habitats, geology	
Marine Nature Reserves	2	17,824	marine species and habitats	The purpose of MNRs is to conserve marine flora and fauna and geological features of special interest, while providing opportunities for study of marine systems. They are a mechanism for the protection of nationally important marine (including subtidal) areas.
National Nature Reserves	388	253,673	species, habitats, geology	NNRs contain examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats or to provide special opportunities for scientific study of

Designation	Number of Sites	Area (ha)	Features protected	Purpose of Designation (for more details see http://jncc.defra.gov.uk/page-1527)
				the habitats communities and species represented within them.
Local Nature Reserves	1681	55, 998	species, habitats, geology	Under the National Parks and Access to the Countryside Act 1949 LNRs may be declared by local authorities after consultation with the relevant statutory nature conservation agency. LNRs are declared and managed for nature conservation, and provide opportunities for research and education, or simply enjoying and having contact with nature.
Areas of Outstanding Natural Beauty	47	2,238,345	landscape	The primary purpose of the AONB designation is to conserve natural beauty – which by statute includes wildlife, physiographic features and cultural heritage as well as the more conventional concepts of landscape and scenery.
National Scenic Areas	40	1,381,118	landscape	National Scenic Areas (NSAs) are designated by Scottish Ministers as the best of Scotland's landscapes, deserving special protection in the nation's interest. National Scenic Areas are broadly equivalent to AONBs.
National Parks	15	2,265,610	landscape	In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well being of those living within them. In addition to the two purposes described above, National Parks in Scotland are designated to promote the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities.
Heritage Coasts	46	2,489 km	landscape	A Heritage Coast is a section of coast exceeding one mile in length that is of exceptionally fine scenic quality, substantially undeveloped and containing features of special significance and interest.

* Figures exclude Ramsar and SAC sites in the UK Overseas Territories and Crown Dependencies.

Many of these site types overlap, so it is at least theoretically possible for an area of land to be simultaneously an SSSI, NNR, SAC, SPA, Ramsar, and within a National Park, AONB or NSA, or Heritage Coast. Some of the site types can be both marine and terrestrial; for this reason it is not straightforward to calculate percentages of land or sea covered by the individual site types.

Many protected areas in the UK are in private rather than public ownership. As an example of the area of land held by NGOs for conservation purposes, the RSPB has 200 nature reserves covering almost 130,000 hectares; collectively The Wildlife Trusts manage more than 2,300 nature reserves; and the National Trust own and manage over 250,000 hectares of land of outstanding natural beauty, and over 700 miles of coastline.

The extent of UK protected areas is published each year by JNCC as part of the set of UK biodiversity indicators http://jncc.defra.gov.uk/page-4241. Figure 1 and Figure 2 are taken from the indicator for 2012, which includes ASSI/SSSIs, SACs and SPAs.

Figure 1. Extent of UK nationally and internationally important protected areas: (i) on land; (ii) at sea, 1950 to 2011

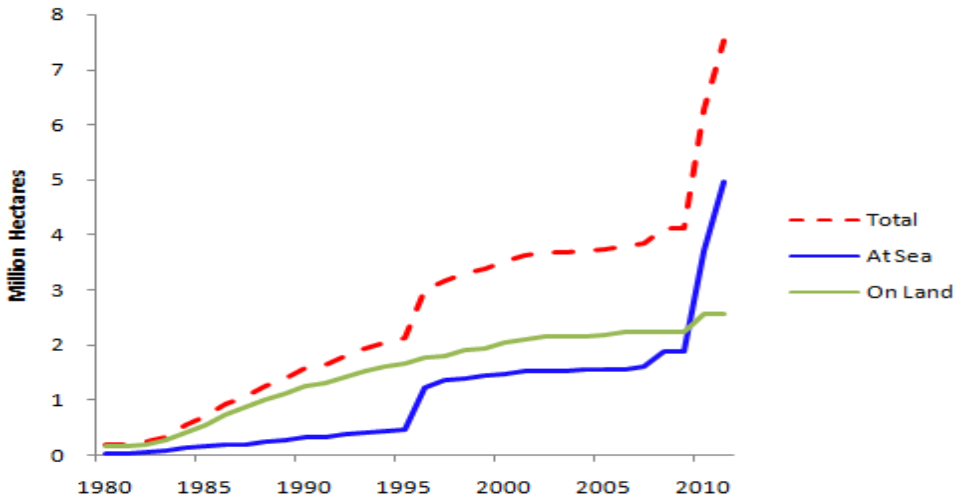

Figure 2. Protected Areas (ASSI/SSSIs SACs and SPAs) in the UK, as at June 2013