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Protected area approaches in the EU

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Table of Contents

Table of Contents **3**
Executive Summary **4**
1 Introduction and background **6**
1.1 Aims and scope of this review of protected areas in the EU 6
1.2 Methods 8
1.3 Structure of this report 9
1.4 The role of protected areas in biodiversity conservation 9
1.5 Protected areas in Europe 16
2 Protected areas in the UK **24**
2.1 The role of protected areas in biodiversity conservation in the UK 24
2.2 Protected area designations and coverage in the UK 26
2.3 Objective setting for protected areas in the UK 30
2.4 Protection levels and approaches in the UK 31
2.5 The monitoring of protected areas in the UK 32
3 Observations on protected area approaches in selected European Member States **34**
3.1 The role of protected areas in biodiversity conservation 34
3.2 Protected area designations and their specific roles 38
3.3 Protected area objective setting 43
3.4 Protection levels and approaches 45
3.5 The monitoring of protected areas 46
4 References **49**
ANNEXES **56**
5 Protected areas in Croatia **58**
6 Protected areas in the Czech Republic **68**
7 Protected areas in Estonia **77**
8 Protected areas in Finland **87**
9 Protected areas in France **98**
10 Protected areas in Germany **110**
11 Protected areas in The Netherlands **122**
12 Protected areas in Spain **130**
References **139**

Executive Summary

This report was commissioned to gather information on the approaches and rationale of designating and managing terrestrial protected areas across the EU. The study aimed to understand how conservation objectives and legislative requirements shape protected area systems in a range of countries in order to provide new insight into the role of protected areas in addressing biodiversity loss. It focused on protected area types that receive some form of national or regional statutory protection primarily for biodiversity purposes, thus excluding geological designations, and designations for landscape and cultural values.

The report outlines the UK approach to protected areas and assesses a sample of eight other EU Member States with a variety of habitats and species across various biogeographical regions; biodiversity threats; historical and current socio-economic and governance characteristics; and nature conservation history, specifically in: Croatia, Czech Republic, Estonia, Finland, France, Germany, the Netherlands and Spain.

This study has shown that the reviewed Member States generally recognise the important role of protected areas in achieving biodiversity conservation targets. Reflecting the long history of protected areas in Europe, countries use a wide variety of protected area designations and management regimes, and in federally organised countries, each region may also have its own system of protected areas. Nevertheless some widely used approaches (which are not followed in the UK) include the designation of National Parks that protect large-scale ecological processes (IUCN category II) and the use of strict biodiversity conservation protection areas (category Ia) (although generally over relatively small areas). Several countries are also showing increasing interest in designating wilderness areas (category Ib).

The overall coverage of terrestrial protected areas that primarily focus on biodiversity conservation aims (i.e. IUCN categories I – IV) varies considerably amongst the countries studied, and cannot be reliably quantified in some due to overlaps in types, i.e. some areas have multiple designations. Moreover, all types of protected area play a role in supporting biodiversity conservation to some extent. The role of protected areas is also dependent on the level of protection (i.e. its strictness), which varies according to type; such that there is a trade-off between coverage and protection level. Furthermore, species and habitats have different needs with respect to the adequacy of protection coverage, and protection strictness. Management requirements also tend to depend on the habitats and species in question. Therefore, it is very difficult to assess the adequacy of protected area network coverage and, in turn, set meaningful targets. Nevertheless, some research and consultees' responses suggest that protected area coverage is inadequate in some countries, or was until obligations under the Birds and Habitats Directives were fulfilled. In some countries (such as Spain and Croatia) these directives have led to major increases in designating protected areas.

It is also widely recognised that protected areas cannot be effective if they are small, fragmented and isolated; and accordingly they need to be part of wider coherent and functionally inter-connected networks. Accordingly, most Member States have some kind of

ecological network strategy, and some are being implemented through binding legislation and spatial planning frameworks (such as in the Netherlands).

In contrast to the UK, the development of management plans for some types of protected area (e.g. National Parks) is commonplace in the studied countries and normally incorporates setting of biodiversity objectives. Most countries also use management plans to develop conservation objectives for Natura 2000 sites. However, such objectives need to be established for each species and habitat of Community interest, and should take into account the site's importance for the overall maintenance and restoration of favourable conservation status of the species and habitat. This has been a challenge for most member states and only the Netherlands appears to adopt a strategic approach to objective setting that considers the importance of each site in relation to higher level conservation objectives.

The recreational, cultural and spiritual benefits provided by protected areas are generally widely recognised, and are consequently often taken into account in objective setting. But the role of protected areas in maintaining other ecosystem services (such as in relation to water, pollination and carbon storage), is less widely recognised and incorporated into management plans etc. The level of public involvement in the setting of protected area conservation objectives also varies greatly amongst the studied Member States. This is despite evidence showing that demonstrating the socio-economic importance of protected areas, and of a specific protected site, can significantly increase political and stakeholder support and resolve conflicts between different interest groups, as described in the report.

Protection levels vary amongst the various types of protected area, with some strictly protected areas preventing all human activities within them (including recreation), or at least all potentially damaging land uses (e.g. forestry and agriculture). These and other protected areas that prohibit damaging land uses tend to be mostly on state-owned land, and/or in wilderness areas (e.g. in Finland and some central and eastern European countries). This contrasts with countries such as the UK where there is less state-owned land and where protected areas therefore need to be designated on private land. Such protected areas tend to have lower levels of legal protection, and rely more on stakeholder involvement and partnership, and financial incentives for management.

Some countries such as Estonia, France and the Czech Republic have developed tiered zones of protection that can be applied to some, or in the case of Estonia all protected areas. This provides an added level of flexibility to protected area management, although information on the actual effectiveness and efficiency of such an approach is lacking.

The monitoring of protected areas in most of the study countries is currently focused on requirements under the Habitats Directive, i.e. the assessment of the conservation status of habitats and non-bird species. Although this is a clear priority, there appears to be little broader monitoring of biodiversity or environmental change in Natura 2000 sites and in other protected areas. Instead the monitoring of nationally protected areas appears to be mainly through assessments of management effectiveness. The reason for this is uncertain, but it seems likely to be related to limited funding and other resources for monitoring, although little information could be found on the costs of monitoring.

1 Introduction and background

1.1 Aims and scope of this review of protected areas in the EU

This report was commissioned to gather information on the approaches and rationale of designating and managing protected areas across the EU. Some countries, including the UK, have well established protected area systems whereas others are in the process of developing theirs, for example in response to new legal requirements. The study aims to understand how conservation objectives and legislative requirements shape protected area systems in a range of countries in order to provide new insight into the role of protected areas in addressing biodiversity loss.

The primary objectives of this study were:

- To outline the different approaches to the role of protected areas in a selected number of EU Member States. Are there different strategic approaches to the designation of protected areas and what are the reasons for the different approaches?

- To understand how different Member States approach their site condition monitoring and evaluation, and where possible how much it costs. Are there other/better approaches elsewhere, compared to condition monitoring as used in the UK, to assess the status of, and contribution of protected areas, for nature conservation?

An additional secondary objective was:

- To establish if there are particular approaches in Member States that effectively align solutions for protecting biodiversity and ecosystem services to pressures. If so what are the different approaches?

In particular the study aimed to examine the following questions as far as available data would allow:

- Is there an overall strategy with defined roles for protected areas, and the protected area network as a whole, and is this part of an integrated wider biodiversity strategy? For example, what role are protected areas expected to play in meeting the EU target to halt the loss of biodiversity and the degradation of ecosystem services by 2020? How significant are these likely to be compared to wider measures outside protected areas (as defined above)?

- What types of protected area for biodiversity are recognised in the country and how do they relate to the IUCN categories?

- Do the protected areas make up a coherent network, with different levels of protection / coverage reflecting their biodiversity importance / role?

- Are there defined roles for each protected area type and/or measurable targets (for instance, related to the coverage of different protected area types, the protected area network as a whole and different habitat types)?

- What is the coverage of each type (e.g. in terms of % of terrestrial area and achievement of any national coverage targets) and is it considered adequate to meet required conservation goals (e.g. Favourable Conservation Status for habitats and species of Community interest)?

- What are the levels of protection for each type protected, i.e. what are they protected against (e.g. destruction, certain activities or all activities), and how are they protected (e.g. strict legal protection or looser consideration in planning system)?

- Are biodiversity objectives for each site defined for each protected area type and, if so, how (e.g. through management plans)?

- Are biodiversity and ecosystem service site objectives reconciled and integrated? And, if so, how?

- How are site nature conservation objectives set and management planned?

- How are site nature conservation objectives monitored (e.g. indirectly via management effectiveness, or direct measures, such as condition assessments)?

- How does the monitoring and/or management pick up and accommodate inevitable change (e.g. that resulting from climate change) within sites?

- What are the costs of monitoring (where possible as separate costs per ha for condition monitoring, and monitoring of management actions/effectiveness)?

The study covered only terrestrial protected areas (which include freshwater bodies and inter-tidal habitats); marine protected areas were not covered.

For this study protected areas were considered to be those designations that are in accordance with the IUCN definition (see section 1.4.3). It focused on areas that receive some form of national or regional statutory protection **primarily for biodiversity purposes**, thus excluding geological designations, and designations for landscape and cultural values etc. (including IUCN categories V and VI). Those included were: Special Areas of Conservation[1] (SACS) and Special Protection Areas[2] (SPAs) (known together as Natura 2000 sites), and national designations in Member States that are broadly equivalent to the biological Sites/Areas of Special Scientific Interest (S/ASSIs) and National Nature Reserves in

[1] As designated under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora wild birds, hereafter referred to as the Habitats Directive

[2] As designated under Council Directive 79/409/EEC on the conservation of wild birds, hereafter referred to as the EU Birds Directive

the UK (see section 2.1). These are Tier 1 sites identified by Lawton et al (2010) (see section 2.2.4), but the study did not include the remaining Tier 1 sites, which are private/NGO nature reserves, unless they are underpinned by statutory protection, nor did it include Local Nature Reserves that are designated by local authorities.

It is important to bear in mind that climate change is affecting habitats and species in protected areas and such impacts are expected to increase over the coming decades (EEA, 2012a; Morecroft and Speakman, 2013). Protected area roles and approaches may therefore need to be modified to further facilitate biodiversity adaptation. It was beyond the scope of this study to consider current and planned climate adaptation approaches in the studied Member States. Proposals for adaptation strategies and measures can be found in a number of publications (e.g. European Commission, 2013; Hole et al, 2011; Huntley, 2007; Natural England and RSPB, 2014; Smithers et al, 2008; Tucker and de Soye, 2011).

1.2 Methods

The study assessed a sample of eight Member States: Croatia, Czech Republic, Estonia, Finland, France, Germany, the Netherlands and Spain. The sample aimed to include Members States that have a variety of habitats and species across various biogeographical regions; biodiversity threats; historical and current socio-economic and governance characteristics; and nature conservation history (including time since accession to the EU). For each Member State, the review involved a literature search and analysis followed up as necessary with targeted correspondence and interviews, primarily with environmental / biodiversity conservation authorities to fill knowledge gaps.

A brief questionnaire was also sent to two selected NGOs (i.e. those most involved in protected areas) in each studied country to ascertain their views on the existing and potential role of protected areas in their country, and their actual effectiveness. Follow-up interviews with NGOs were only carried out for clarification purposes, and not to fill gaps.

It should be noted that this review was undertaken within a relatively short time and restricted budget, and relied on readily available literature and brief correspondence with national authorities and other experts. It was not possible to carry out an in-depth analysis of information or translate lengthy or detailed documents relating to protected areas. Therefore it should be regarded as providing an indication of protected area approaches followed in each of the studied countries and their key aspects of relevance to this study's objectives. These would need to be investigated in more detail if a more comprehensive and systematic comparison with the UK approach is desired. Furthermore, it is clear from the review that governance, administrative and legal frameworks differ greatly between countries and these have an important influence on protected area strategies and practice. Therefore, given the small sample of eight countries, this study is unlikely to provide an indication of the full range of protected approaches taken in the EU as a whole and may not indicate which are the most typical or effective.

1.3 Structure of this report

This report firstly provides a brief introduction to protected areas in Europe, and then an outline of the UK approach, which primarily describes the key issues that this review aimed to compare with the selected countries. The main section of the report provides a comparative analysis of the protected area approaches taken in the eight studied Member States, which are described in detail in separate chapters in the annex. The focus of the accounts is on the protection of Natura 2000 and nationally designated sites, including their types, coverage, objectives and monitoring. To complement this, information is also provided on protected areas designated under other international agreements, but their protection mechanisms, objectives and monitoring are not described.

1.4 The role of protected areas in biodiversity conservation

Protected areas are not a new idea: communities have been dedicating areas of land for cultural or resource uses for centuries, such as sacred groves, royal hunting reserves or areas of reef (Chape et al, 2008). However, the earliest protected areas that we would begin to recognise as modern reserves were established in the late nineteenth and early twentieth centuries. Initially these were large game parks set up by colonial officials to preserve remnants of disappearing habitats and game species in Africa, and large National Parks for public use and recreation in North America. Yellowstone National Park was established in the USA in 1872, driven by an American preoccupation with the concept of wilderness and 'the sublime' (Cronon, 1995). Numerous further National Parks were set up in the USA, Canada, Australia and New Zealand in the following decades (Adams, 2004). In Africa the concern was largely with the preservation of game in large reserves. These reserves were generally nationally designated and covered large areas of land. It was also common for people, particularly indigenous groups, to be excluded from reserves, or forcibly relocated, such as the infamous removal of native Americans from National Parks to create 'uninhabited wildernesses' (Cronon, 1995). These early reserves operated on the principle that nature was protected by excluding people, although use for recreational purposes was sometimes encouraged. In subsequent years many more protected areas began to be designated across the world, including in Europe, as governments and conservationists adapted this model to their own contexts. Nature Reserves also began to be created alongside National Parks, which are typically smaller areas set aside primarily for the quality of their flora and fauna rather than their landscapes (EEA, 2012b). Such reserves are more common in the European context, whereas large wilderness areas are scarce compared to the Americas.

Adams (2004) argues that the establishment of protected areas was the dominant 'big idea' of conservation throughout the 20th century. However, over time the concept has developed, from one largely based on setting aside land, to one which takes more account of cultural values and people's interactions with nature (Eagles et al, 2002). In Europe, there is an understanding that much of our biodiversity is found in semi-natural habitats that depend on continuing human management. This is reflected in the diversity of protected area types and management strategies which have been developed in recent decades. Furthermore, as recognition of the increasing rate at which biodiversity is being lost has grown over the last century, protected areas have been widely expanded to include a range of habitats and species that are not highly threatened, but are nevertheless of particular

importance (e.g. because of their restricted ranges or high concentrations in the region) and/or are declining. Protected sites may be designated because they hold particularly high concentrations of such species or particularly good areas of habitat, but some may simply aim to protect typical examples of semi-natural habitat and associated species. These concepts have been taken up in EU legislation through the Birds and Habitats Directives, which have driven major changes in protected area designation and management approaches.

Furthermore, although climate change may reduce the suitability of some protected areas for the habitats and species that they were designated for, protected area networks form an important means of supporting biodiversity adaptation. Protected areas maintain space for biodiversity, but can also facilitate species range expansions (Thomas et al, 2012) and act as establishment centres for species colonizing new areas in response to environmental change (Hiley et al, 2013).

Modern approaches recognise that not only can well-managed protected areas support important ecosystems and threatened species, but they also provide multiple benefits to people, including a range of ecosystem services (Battersby et al, 2014; Dudley et al, 2010; Kettunen et al, 2009; Kettunen et al, 2011; Stolton et al, 2006). Protected areas can therefore also contribute to local and national economies as part of sustainable development strategies (Bertzky et al, 2012). For example, some are of the opinion that the most successful protected areas in the Natura 2000 network are the ones that focus on sustainable management and the involvement of stakeholders in the protection of sites (EEB, 2007).

Protected areas now represent the cornerstones of almost all national and international conservation strategies and are thus considered to be essential for the conservation of biodiversity. As such, their number and area have increased hugely in the past century. Also in recognition of their importance, the 1992 Convention on Biological Diversity (CBD) requires parties to establish protected area systems to conserve biodiversity (Article 8). The first goal of the CBD 2010 Biodiversity Target called for the protection of areas of particular importance to biodiversity, and the conservation of at least 10% of each of the world's ecological regions[3]. Target 11 of the CBD Aichi Biodiversity Targets calls for the designation and equitable management and conservation of at least 17% of the world's terrestrial and inland water area and 10% of coastal and marine areas by 2020, especially areas of particular importance for biodiversity and ecosystem services (CBD, 2011). In 2010, nationally designated protected areas recorded in the World Database of Protected Areas (WDPA) represented 12.7% of the world's terrestrial area outside of Antarctica, equating to 17 million square kilometres (including inland waters) (Bertzky et al, 2012). The EEA has estimated that almost 21% of the territory of EEA member countries and collaborating countries is currently designated as some form of protected area (EEA, 2012b).

However, some argue that 'leakage' of pressures such as deforestation to areas surrounding protected areas can draw into question their effectiveness as conservation tools (Ewers and Rodrigues, 2008; Joppa et al, 2008; Pfeifer et al, 2012). There is also an argument that

[3] http://www.cbd.int/2010-target/goals-targets.shtml

protected areas are often biased toward areas which are unattractive for other human uses (i.e. areas of low land value, primarily in mountains, forests and wetlands), so are not representative and may thus not be sufficient to adequately protect global biodiversity (Joppa and Pfaff, 2009). For example, in a global study, Barr et al (2011) calculate that 73% of countries have inequitably protected their biodiversity. Given the demand for land the situation is likely to be the same in much of Europe, and indeed the report on Finland notes that this is the case (see Annex section 8). In contrast to this historical somewhat opportunistic approach to the designation of the first protected areas, current approaches attempt to more systematically protect Europe's most threatened species and habitats. Notably, the EU Birds and Habitats Directives have established an approach to identifying areas for protection according to a bio-geographical representation process (see below). The Ramsar Convention also pioneered a systematic scientific approach to wetland conservation; though it has only been applied by some countries (see section 1.5.1).

Protected areas are sometimes regarded as an expensive way to protect biodiversity, and raise the question of whether they are providing effective and sufficient protection of biodiversity, i.e. halting loss (Geldmann et al, 2013; Trochet and Schmeller, 2013). EU Member States are now more systematically evaluating their protected area systems for their coverage of biodiversity, not only to satisfy the demands of European legislation but also in response to international initiatives.

1.4.1 Approaches to Protected Area selection

The selection of areas to include in a protected area network is a key step in ensuring its effectiveness and efficiency because the scale of the threat to biodiversity necessitates prioritisation regarding conservation effort and expenditure (Bibby, 1998). The subject is, however, complex and there are numerous methods for protected area selection. It is not within the scope of this study to provide a detailed review of this subject, but in order to provide background for the country analyses, a summary of the main approaches and their rationale is provided below.

- Site-level threshold-based approach. A site is eligible for designation as a protected area if it meets a specific criterion or set of criteria; for example, the regular presence of a certain number of threatened species, or the presence of a certain percentage of the global or national population of a threatened species. As noted in the GB guidelines for the selection of biological Sites of Special Scientific Interest (SSSIs), it has become a well-established practice in international and UK bird conservation to regard 1% of a bird species' total population in the range under consideration as a significant threshold for the assessment of whether sites should be designated (JNCC, 2013a).

- Biogeographical regions representation approach (as used for Natura 2000 – see section 1.5.2). A large scale approach to conservation prioritisation, where biogeographical or eco-regions are defined, generally according to dominant vegetation type. Protected area networks are then identified and designated within each region to form an adequate representative system of sites, which may be based on a coverage target for each habitats or species that reflects their conservation priority.

Computer algorithms have been developed to help ensure representative networks of sites are selected, which according to Bibby (1998) select sites according to:

- Complementarity objectives: where sites are selected which in sum represent the highest possible diversity in the smallest possible number of sites (or with the smallest land cost). As such, an area with high complementarity may not be the most species-rich, but it contributes more unrepresented species to the network (Margules and Pressey, 2000), effectively increasing network efficiency. The approach generally uses Systematic Conservation Planning computer modelling systems, and such models can also incorporate vulnerability variables and are useful for conservation prioritisation.

- Irreplaceability objectives: which seek to ensure the most irreplaceable sites are prioritised and selected. This can complement a complementarity approach, giving more direction about the order in which sites should be acquired. A basic measure of replaceability would be the proportion of all possible fixed-size combinations of sites which meet the defined algorithm criteria and include the focal site – a site with unique attributes that would occur in all combinations and thus be totally irreplaceable (Bibby, 1998). Bibby argues that this may be the one measure of conservation value that is most defensible, as losing more irreplaceable sites removes the opportunity to ever develop a representative protected area system.

Such approaches to site selection are only as good as the data on which they are based and can also be highly dependent on computer modelling assumptions. In practice, sites within regions are typically selected on the basis of their overall biodiversity value (usually estimated by expert judgement), which favours large and diverse sites. Economic and social interests should not influence the designation of protected areas. This is explicitly recognised in the Habitats Directive and is a legal requirement that has been enforced by the European Court of Justice (European Commission, 2006). But such issues can be a barrier to designation in national protected area networks.

1.4.2 Protection measures

The protection measures employed for different protected area designations can vary significantly, ranging from strict legal (regulatory) protection from development or even access to sites, to guidance and/or incentive-based approaches. Arguably, effective site protection requires a combination of a range of complementary measures. Consistent and distinct protection approaches and levels are difficult to distinguish, but typical categories are:

- Exclusion (regulatory) - Very few reserves in Europe now completely exclude people, but this is the strongest form of protection where sites may be particularly vulnerable to disturbance or where damaging resource use is difficult to control and habitats and species are not dependent on human activities. More often, certain areas within reserves are closed from the public for conservation reasons.

- Protection against development and degradation (regulatory) – Established activities are allowed but statutory protection controls development and activities that may be damaging to biodiversity. Potentially damaging activities (which may be specifically listed for each site in relation to their biodiversity features) are either strictly prohibited or, in accordance with the precautionary principle, must be subject to some form of assessment of their expected impacts (such as under the Habitats Directive for Natura 2000 sites – see section 1.5.2 for details). If the assessment reveals that significant impacts are likely then permission is not granted for the activity, unless there are important overriding reasons.

- Planning restrictions – In some protected areas protection is based on development planning policies and procedures, whereby sites are mapped / listed in planning documents, so that their biodiversity importance can be taken into account in planning decisions, ideally at a strategic planning level, as well as in relation to individual planning applications. For instance, this is the case in UK National Parks and for Local Wildlife Sites.

- Contractual Incentive Based Schemes – In some protected areas, owners and stakeholders may be encouraged to maintain or adopt desired management practices through the use of contractual incentives or payments for actions such as low intensity farming or grazing, or contributing to practical conservation measures. For forest or agriculturally managed land, this commonly occurs through agri-environment or forest-environment contracts agreed under Rural Development Programmes (RDPs) that are part-funded through the Common Agricultural Policy (CAP).

- Payment for Ecosystem Services (PES) schemes – with the increasing recognition of the importance of ecosystem services within protected areas (Gantioler et al, 2010; Kettunen et al, 2013; ten Brink et al, 2011), it is likely that systems based on paying for public goods received from protected areas will increase in future. In a loose form, an entry fee for a nature reserve can be considered to be a payment for an ecosystem service and is effective for conservation if this money is reinvested in the management of the site. Such schemes could possibly be expanded to include other types of service.

Historically, state ownership of land was a means of allowing regulatory protection. For example, some large National Parks are based on hunting reserves previously owned by a royal family or a state authority. Other European national parks have arisen from citizen and NGO initiatives to buy up private or local authority land and dedicate it to conservation. Voluntary and private protected areas without national designations are not covered in this report. For example, a significant amount of land in the UK is protected by the National Trust/National Trust for Scotland, which own or have protective covenants over land of historic interest or natural beauty. The Trusts have powers to create bylaws relating to access and management of land.

1.4.3 Definitions and types of protected areas

As there are many different forms of protected area and many different management aims, the concept has numerous and varying definitions. It is very difficult to establish a definition for protected areas which encapsulates the degree of variety in the forms and objectives of the areas themselves. Article 2 of the CBD defines a protected area as "a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives" (CBD, 1993). However, this study uses the more recent and perhaps the most widely recognised protected area definition, that of the IUCN - a protected area is "*A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*" (Dudley, 2013). Protected areas exist in a great variety of forms and sizes however, with differing aims, management approaches and naming conventions. In an attempt to categorise the different approaches being practiced across countries, the IUCN has developed a typology of protected areas. This consists of six categories, identified on the basis of management objectives, one of which is split into two parts (see Box 1.1).

Box 1-1: IUCN Protected Area Management Categories

Ia Strict nature reserve: Strictly protected for biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values.
Ib Wilderness area: Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition.
II National Park: Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.
III Natural monument or feature: Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove.
IV Habitat/species management area: Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category.
V Protected landscape or seascape: Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.
VI Protected areas with sustainable use of natural resources: Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims.

Source: Dudley (ed) (2013)

These categories have been designed to act as a common language when discussing the various types of protected areas in existence across countries. The category should be based around the primary management objective(s), which should apply to at least three-quarters of the protected area. However, even these categories are difficult to explicitly divide and there can be debate about which management category a particular protected area

designation belongs to. Many larger protected areas in fact consist of a number of zones corresponding to different IUCN categories. The variety in naming conventions between different nationally designated protected areas can also be confusing. For instance, UK National Parks are actually placed within the IUCN category V, rather than II, and as such are not considered by this study (which focuses on categories I-IV). Care should therefore be taken in considering the implications of the names given to nationally protected areas.

One important distinction within the IUCN classification is between ecosystem protection (category II) and habitat protection (category IV). In reality, very few protected areas are large enough to protect entire ecosystems, with their associated migration routes and watershed functions etc (Dudley, 2013). A category II protected area therefore usually aims to protect the majority of naturally-occurring ecosystem functions, while a category IV protected area is usually either a fragment of an ecosystem (e.g. a remnant of a bog) or an area that relies on regular management intervention to maintain a mosaic of semi-natural habitats (e.g. most European grasslands and forests that lack large predators). The IUCN categories do not define size thresholds, but a category II area must generally be large, e.g. several thousand ha (see section 6.2.3).

It is also important to recognise that diverse range of governance types for protected areas can be observed in practice. The IUCN has identified four broad governance types (see Box 1.2), noting that any of these can be associated with any given management objective (Dudley, 2013).

Box 1-2: IUCN Protected Area Governance Categories

A. Governance by government (at federal/state/sub-national or municipal level). A government body holds the authority, responsibility and accountability for managing the protected area, determines its conservation objectives, develops and enforces its management plan and also owns the protected areas land, water and related resources.

B. Shared governance. Complex institutional mechanisms and processes are employed to share management authority and responsibility among a plurality of (formally and informally) entitled governmental and non-governmental actors. Shared governance, sometimes referred to as co-management, occurs in many forms. In "collaborative" management, decision-making authority and responsibility rest with one agency which is required – by law or policy - to inform or consult other stakeholders. In "joint" management, various actors sit on a management body with decision-making authority and responsibility. Another particular form of shared governance can relate to trans-boundary protected areas.

C. Private governance. In these cases a protected area is under individual, cooperative, NGO or corporate control and/or ownership, and management under not-for-profit or for-profit schemes. Authority for managing the protected land rests with the landowners, who determine the conservation objectives, develop and enforce management plans and remain in change of decisions, subject to applicable legislation.

D. Governance by indigenous peoples and local communities. Protected areas where the management authority and responsibility rest with indigenous peoples and/or local communities through various forms of customary or legal, formal or informal, institutions and rules. This type includes two main subsets: i) indigenous people's areas and territories established and run by indigenous peoples, and ii) community conserved areas established and run by local communities. Whatever the structure, the governance arrangements require that the area under the control of indigenous peoples and/or local communities has identifiable institutions and regulations that are responsible for achieving the protected area objectives.

Source: Dudley (ed) (2013)

1.5 Protected areas in Europe

1.5.1 Protected areas designated under international conventions

European countries have signed up to a number of international and regional conventions that include commitments to designate protected areas. These include the following designations.

Ramsar Wetlands of International Importance (or 'Ramsar Sites') are established under the 1971 Ramsar Convention on Wetlands of International Importance. In general, the older EU Member States signed up to the Convention in the 1970s and 80s, and the new EU Member States in the 1990s[4]. Upon joining the Ramsar Convention, each Contracting Party is obliged by Article 2.4 of the treaty to designate at least one wetland site for inclusion in the List of Wetlands of International Importance. Sites are selected by the Contracting Parties for designation under the Convention by reference to the Criteria for the Identification of Wetlands of International Importance (Ramsar Convention Secretariat, 2013). To do this, each country is advised to produce a wetlands inventory according to scientific criteria, with a clear identification and statement of purpose and objectives[5]. The Netherlands and the UK are highlighted as having taken this approach. The site conservation objectives are defined in a Ramsar Information Sheet which provides legal and scientific data on each site and is meant to be updated every six years, and which must be communicated to the Ramsar Convention Secretariat. Up to date information on all Ramsar Sites is available online (Wetlands International, 2014). Ramsar Sites may fall under various IUCN management categories (Dudley, 2013).

The National Ramsar Committees or National Wetlands Committees are responsible for Ramsar Sites and convention objectives, and for negotiating with neighbouring countries to set up transboundary Ramsar Sites. The national committee produces national reports for the triennial meetings of the Conference of the Contracting Parties. The Secretariat has published a series of guidelines for managing Ramsar Sites, including guidance on addressing change in wetland ecological character, for example through the effects of climate change (Ramsar Convention Secretariat, 2010a), and guidance on monitoring Ramsar Sites (Ramsar Convention Secretariat, 2010b).

UNESCO Biosphere Reserves are established under UNESCO's Man and the Biosphere (MAB) Programme dedicated to exploring and demonstrating interdisciplinary approaches to sustainable development. Biosphere Reserves are accredited by UNESCO through nomination by Member States (UNESCO, 2014). Biosphere Reserves aim to be sites of excellence which translate principles of sustainable development into locally relevant contexts, fostering dialogue for resolution of conflicts around natural resource use. Each site should incorporate a highly protected 'core' area for nature conservation (IUCN management category I-IV) with 'buffer' and 'transition' areas containing human

[4] Ratification dates of the Member States profiled in this report: Finland 1975, Germany 1976, UK 1976, Netherlands 1980, Spain 1982, France 1986, Croatia 1991, Czech Republic 1993, Estonia 1994. http://www.ramsar.org/cda/en/ramsar-about-parties-parties/main/ramsar/1-36-123%5E23808_4000_0__

[5] Ramsar Secretariat (2003) A Framework for Wetland Inventory http://www.ramsar.org/cda/en/ramsar-about-sites-a-framework-for-wetland/main/ramsar/1-36-55%5E20836_4000_0__

settlements that are managed sustainably (may satisfy IUCN criteria and management category V/VI) (Dudley, 2013). The responsibility for monitoring biosphere reserves lies with the national MAB committees on behalf of UNESCO.

Natural (and 'mixed' Natural & Cultural) World Heritage Sites are established under the 1972 World Heritage Convention overseen by UNESCO. European countries ratified the convention between 1975 and the 1990s[6]. Article 4 defines the duty of each Party to identify, protect, conserve, present and transmit to future generations the cultural and natural heritage on its territory. Natural World Heritage Sites are not assessed as a stand-alone designation by IUCN and may correspond to any of the IUCN protected area management categories (Dudley, 2013). The World Heritage Committee is responsible for deciding if sites should be registered on the World Heritage List when they are nominated by the Party countries. It is also responsible for requesting and publishing reports on the state of conservation of particular sites that it selects on the basis of their threat level. The committee proposes activities to mitigate threats, and can also include a set of corrective measures and a timeframe for their implementation. Parties were called upon to support a comprehensive 'state of conservation information system' to support analytical studies and assist all stakeholders in site-management; this was launched in 2013 and contains comprehensive data on all sites.

Plant genetic biodiversity conservation sites are established under the European Plant Conservation Strategy[7] adopted by the Council of Europe, to protect particular plant species populations, notably for crop wild relatives. The Strategy does not define designation details or oversight requirements, so countries have taken their own approaches, and only a few sites have actually been designated. The protection of crop wild relatives could also be much better integrated into existing protected area management in Europe (Maxted, 2013).

Several international conventions promote the establishment of coastal and marine protected areas in Europe; however, as these are mainly in marine areas with a small proportion of coastal and inland water area, they are not further considered in this report.

Sites designated under international conventions must all be protected through national-level instruments, as the international agreements do not give rise to binding legislation or policies per se. In some cases the designated sites are already protected under national designations before being nominated under an international agreement.

1.5.2 Natura 2000 network

The Natura 2000 network is the most extensive protected area system worldwide, comprising more than 26,000 sites on approximately 18% of the EU land area (EEA, 2012b). It consists of Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) classified under the EU Birds and Habitats Directives, respectively. The main goal of the SAC network is to contribute to the maintenance and restoration of favourable conservation status of the habitats and species listed in the annexes of the Habitats Directive (see Box 1-3). It is important to note that under Article 3 of the Habitats Directive it is envisaged as

[6] France 1975, Germany 1976, Spain 1982, UK 1984, Netherlands 1992, Croatia 1992, Czech Republic 1993, Estonia 1995, http://whc.unesco.org/pg.cfm?cid=246

[7] http://www.plantaeuropa.net/

being a 'coherent European ecological network'. The SPA network should preserve, maintain or re-establish a sufficient diversity and area of habitats for all the species of birds referred to in Article 1 of the Birds Directive at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or to adapt the population of these species to that level. The SACs and SPAs, forming the Natura 2000 network, should thus not be considered as isolated hotspots of biodiversity, but as part of a broader green infrastructure system with numerous functional links between sites (IEEP, 2011).

Box 1-3: Definition of favourable conservation status for habitats and species under the Habitats Directive

Under Article 1(e), the conservation status of a natural habitat will be taken as 'favourable' when

- its natural *range* and *areas* it covers within that range are stable or increasing, and
- the specific *structure and functions* which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its *typical species* is favourable as defined in (i).

Under Article 1(i), the conservation status of a species will be taken as 'favourable' when

- *population dynamics* data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural *range* of the species is neither being reduced nor is likely to be reduced in the foreseeable future, and
- there is and will probably continue to be, a *sufficiently large habitat* to maintain its population on a long-term basis.

Source: Council Directive 92/43/1992 (Emphasis added).

Under the Habitats Directive, sites are identified for biogeographical regions[8] on the basis of their importance for the 233 habitats listed under Annex I and the more than 900 species listed in Annex II. Member States are required to propose a list of sites that include the most important sites for these habitats and species at a national level and that occur within their European territory. The sites proposed for each Annex I habitat and Annex II species are to be proportional to their representation within their European territory. After consultation with Member States, the Commission lists sites as Sites of Community Importance (SCIs) after which time the Member State has six years to designate the site as an SAC. The Member State must ensure that the required site management measures are carried out, in accordance with Article 6.1, as well as monitoring and other relevant obligations.

Under the Birds Directive Member States must select the most suitable bird sites for designation as SPAs. The identification of these sites must be based on scientific criteria, such as 'the presence of 1% of the population of a listed species', or 'wetlands of international importance for migratory waterfowl', but Member States have a level of discretion in determining the appropriate criteria for assessment (European Commission, 2014a). Once Member States have selected these criteria they must apply them fully in a way that ensures the 'most suitable territories', in number and surface area, are designated.

[8] http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Biogeomap_April2011.pdf

On the basis of data supplied by the Member States, the Commission then decides if the designated sites are sufficient to form a coherent network for the protection of vulnerable and migratory species. These data are communicated using the Standard Data Form (European Commission, 2014a).

Natura 2000 sites are protected by the articles of the Habitats and Birds Directives as soon as they are proposed to the Commission as potential Sites of Community Importance (SCIs) or designated as SPAs. Their surface area must be defined and mapped, to delineate the extent of protection, and the land managers and owners informed. Under Article 6.2 of the Habitats Directive, Member States must take appropriate steps to avoid the deterioration of habitats and disturbance of species for which sites have been designated. Under Article 6.3 they must assess all plans and projects likely to affect sites, and if necessary halt or modify them, although Article 6.4 permits damage to sites if there are overriding public interests and there are no alternative solutions, and any necessary compensatory measures are taken to protect the ecological coherence of the Natura 2000 network. Article 7 specifies that these articles also apply to SPAs designated under the Birds Directive. Natura 2000 sites therefore most closely align with the definition of IUCN category IV sites, 'Habitat/Species Management Areas', although they may overlap with different national designations.

Member States can use regulatory (statutory), contractual and/or administrative instruments to designate and manage Natura 2000 sites. The 13 countries which have joined the EU since April 2004, have often achieved a substantial integration of their Natura 2000 areas into their protected area system through regulation, sometimes by creating new national designations. In contrast, most of the EU-15 countries, i.e. the older EU Members, have half or more of their Natura 2000 network outside their nationally-designated protected area network, using contractual and/or administrative means rather than legal instruments to protect sites. Croatia is still at the beginning of the process of establishing its Natura 2000 network, and is currently exploring different approaches to designating and managing Natura 2000 sites.

1.5.3 Approaches to designation of nationally protected areas

With more than 120,000 nationally designated sites in 52 countries, Europe accounts for more protected areas than any other region of the world (EEA, 2012b). This incorporates a great variety of designations given to areas of land and bodies of water by national legislation. As demonstrated, the term also incorporates a wide range of different management regimes. The EEA (EEA, 2012b) contrasts a landscape protected areas approach in Germany (large reserves, covering 28.5% of the country's land area, focusing on ecosystem services, characteristic natural scenery and human recreation) with a plant micro-reserve in Spain (small reserves, less than 20 ha, that focus on the protection of a selected sample of the main subpopulations of the rarest, endemic or threatened plant species) to demonstrate the diversity of approaches being practiced in Europe. Some protected area types do of course have similar aims and management practices, for example French Natural Parks and Scottish National Parks.

In countries where there is a federal-like distribution of power to regions, such as Austria, Germany, Spain, and Italy, each region may also have its own system of protected areas, adding regional designation-types to those at a national level, and a further layer of

complexity. In Spain, for example, at least 15 different regional designations exist which are specific to different autonomous regions (EEA, 2012b)[9].

The 39 EEA member countries are required to provide regular information on their nationally designated areas, which makes up part of the Common Database on Designated Areas (CDDA). This includes a list of types of protected area designation: so far 685 different types have been recorded (EEA, 2012b). These can be clustered into three main categories:

- statutory designation with the main purpose of biodiversity conservation;
- statutory designations with a sector-specific purpose (e.g. forest protection against fire), which, despite no explicit conservation aim, often have a positive effect on biodiversity; and
- voluntary designation through private ownership, for instance by NGOs.

Although Europe has a very high number of protected areas, their average size is quite low compared to other world regions, reflecting the high degree of habitat fragmentation in Europe. CDDA data indicate that 90% of European protected areas have an area of less than 1,000 ha, although there is a wide range of sizes (EEA, 2012b). The CDDA database should not be considered an exhaustive list as it lacks information on voluntary designations and many locally designated areas. However, these areas have a vital role in enhancing connectivity across territories. It should also be noted that in some countries specific ecosystem-types are protected by law across the national territory, without being specifically designated as protected areas. For instance this is the case to a greater or lesser extent for various wetland habitat types in Croatia, Denmark and Hungary (EEA, 2012b).

1.5.4 Defining conservation objectives and protection levels

Good protected area management requires an adequate legal and institutional framework that aims to achieve clearly defined conservation objectives that are set according to adequate scientific and socio-economic understanding. Without clearly defined conservation objectives it is not possible to identify and prioritise appropriate protection, management and monitoring requirements. Conservation objectives tend to be related to the scale of the protected area: large areas can aim to protect ecosystem functions at the landscape scale, whilst small areas usually focus on management of specific habitats and species. It is a widely held view that conservation objectives should be defined both at the site level and at a higher level; e.g. the regional or national government level and/or for the biogeographical zone/region (European Commission, 2012; Louette et al, 2011).

There are, however, potential pitfalls in objective setting, because biodiversity is a complex, multi-dimensional concept that is difficult to define and measure. It can only really be defined via proxies, such as selected species populations and habitat types defined according to key characteristics, which inevitably will be an imperfect and simplified measure. If conservation objectives and measures are established which only focus on a limited number of components of biodiversity within a site e.g. rare and/or threatened features, this approach can cause problems if the site management fails to protect the wider collection of species and habitats within it. On the other hand, a focus on habitat protection usually benefits a wider range of species even if they are not explicitly the focus

[9] Data source: Observatory of protected areas EUROPARC-Spain, 2009; cited in EEA (2012b).

of the conservation objectives. This was demonstrated in an assessment of the effectiveness of French protected areas (using long-term data on common breeding bird species), which found that the areas were effectively stabilising the populations of the most rapidly declining species (Devictor et al, 2007). However, they did not have any detectable effect on the decline of a few species that are particularly closely connected to human activities (such as barn swallows *Hirundo rustica*). This illustrates that setting objectives that aim to benefit all species within a protected area is often unrealistic. Instead it can be a legitimate conservation objective, within a wider biodiversity protection strategy, to focus efforts on increasing the population of certain particularly threatened species, even if this risks the decline of other lower priority species. The key is that the management measures put in place need to be effective to achieve the particular site-level conservation objectives.

Another potential problem that can arise through objective setting is an inappropriate focus on maintaining the status quo. In other words, conservation objectives may lead to actions that attempt to maintain the habitats and species that were present at the time of designation (i.e. 'designated' or 'qualifying features') when in fact succession and other natural processes might be expected to lead to changes that are acceptable i.e. beneficial from a nature conservation point of view. Furthermore, it might also be appropriate to allow changes in habitat and species features to occur in the light of external pressures that cannot be controlled, such as in response to climate change. Thus, it is important to ensure that objective setting does not simplistically attempt to preserve habitats and species according to their occurrence at specific time, but is more flexible and carefully thought through in terms of the site's role in meeting wider conservation goals and achieving higher biodiversity levels.

The achievement of objectives typically requires the use of management planning tools (contracts, authorisations, sanctions, information etc), societal support and sufficient resources. In protected areas that have only a legal designation without a management framework enabling active intervention, the level of protection tends to be limited to preventing certain damaging actions such as development, and to monitoring change. This may be adequate for some sites that have a relatively stable ecosystem and few threats and pressures, but in most parts of Europe this level of protection is insufficient to prevent biodiversity declines within the protected area.

A further important dimension to choosing management priorities is to recognise and incorporate ecosystem services and other benefits provided by protected areas. Demonstrating the socio-economic importance of protected areas, and of a specific protected site, can significantly increase political and stakeholder support and resolve conflicts between different interest groups (Kettunen et al, 2013). The benefits provided by protected areas are often broadly shared, long-term and non-market, whereas the costs of protection are more immediate and the earning potential from the land and natural resources more short-term and concentrated (Kettunen et al, 2011). Recognising and respecting local rights and creating mechanisms so that beneficiaries pay for what they receive, and managers are rewarded for what they contribute (or compensated for what they forego), can in some cases form a starting point for integrating identified benefits successfully into protected area management. Such actions can also increase the perceived fairness of protected areas and strengthen their contribution to both biodiversity

conservation and human well-being, even when these benefits do not necessarily rely directly on the designation of the site as a protected area.

However, it is not always necessary (or beneficial) to have active stakeholder involvement in defining conservation objectives for biodiversity protection, which should be based on a rigorous and realistically objective scientific appraisal. This is a controversially debated topic, and it was not possible to go into it in the scope of this study.

1.5.5 Monitoring of protected areas in Europe

The monitoring of protected areas can be divided into two categories:

- **site condition assessment** – measuring the conservation status of habitats, species and other special features that are the reason for the protected status; and
- **management effectiveness evaluation** (PAME[10]) – the assessment of how well the protected area (or series of protected areas) is being managed – primarily the extent to which it is protecting values and achieving nature conservation goals and objectives. The term management effectiveness reflects three main themes: design issues relating to both individual sites and protected area systems; adequacy and appropriateness of management systems and processes; and delivery of protected area objectives including conservation of values (Hockings et al, 2006)

Site condition assessment: Most Member States have invested significant resources in establishing national monitoring systems for their habitats and species of Community interest, both within Natura 2000 sites and outside. Monitoring of conservation status is an obligation arising from Article 11 of the Habitats Directive for all habitats (as listed in Annex I) and species (as listed in Annex II, IV and V) of Community interest. This provision is not restricted to Natura 2000 sites and data need to be collected both in and outside the Natura 2000 network to achieve a full appreciation of conservation status[11]. Member States are obliged to report the conservation status of their species and habitats for each biogeographic region in their territory to the Commission at 6 yearly intervals. The monitoring of bird populations is also well established primarily through the national and European bird NGO network[12]. However, the current reporting format means it is difficult to tease out the subset of data that applies only to Natura 2000 protected areas.

Management effectiveness evaluation: The CBD COP 10 Decision X/31 invites parties to assess the management effectiveness of 60% of their total protected area by 2015 and report the results into the Global Database on Protected Areas Management (GDPAME) maintained by the World Conservation Monitoring Centre of the United Nations Environment Programme (UNEP-WCMC)[13]. Information compiled in the GDPAME will be used for reporting on progress towards the achievement of Aichi Biodiversity Target 11 (and

[10] Protected Area Management Effectiveness

[11] Binding requirements for the compilation of monitoring data and for the assessment of the conservation status of natural habitats and species of Common interest were adopted in 2005 by the Habitats Committee, and slightly revised in May 2011.

[12] An important independent dataset has been generated by BirdLife International in its ongoing monitoring of Important Bird Areas (IBAs), which overlap with SPAs to a large degree

[13] http://www.cbd.int/decision/cop/?id=12297

related targets)[14]. In response to this CBD target (and earlier targets[15]), European countries have set up strategies and tools to evaluate management effectiveness of some of their protected areas, though a survey has shown that the CBD target has not been met across Europe (Nolte et al, 2010). The IUCN World Commission on Protected Areas (WCPA) provides guidance in the form of the Protected Area Effectiveness Framework (Hockings et al, 2006) and the Management Effectiveness Tracking Tool (METT)[16]. Other methods include the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM)[17] developed by WWF or the European Site Consolidation Scorecard or the IPAM toolbox[18] (Leverington et al, 2010). Member States are also required by EU legislation[19] to report on the status of management planning, conservation measures, and protection of their Natura 2000 sites, but this information still only allows a quite rudimentary comparison, partly because management instruments and governance vary so widely (European Commission, 2014b).

[14] as well as to the Millennium Development Goals, the Global Biodiversity Outlook, the biannual Protected Planet Report, and the publication of the new edition of the Global Study on Management Effectiveness Evaluation of Protected Areas

[15] CBD COP 7 Decision VII/28 regarding standards, assessment and monitoring required parties to "*implement management effectiveness evaluations of at least 30 percent of each Party's protected areas by 2010 and of national protected area systems and, as appropriate, ecological networks*", Programme Element 4.2.2 (https://www.cbd.int/decision/cop/?id=7765)

[16] METT use is a requirement for funding by WWF, GEF and the World Bank. See http://www.cbd.int/protected-old/PAME.shtml

[17] See WWF http://wwf.panda.org/what_we_do/how_we_work/conservation/forests/tools/rappam/

[18] http://www.ipam.info/index.php/plain/content/view/full/75

[19] Under Article 17 of the Habitats Directive

2 Protected areas in the UK

2.1 The role of protected areas in biodiversity conservation in the UK

2.1.1 Nationally protected areas

Protected areas have played a major role in biodiversity conservation in the UK for over 60 years, primarily through the designation of Sites of Special Scientific Interest (SSSIs) in Great Britain and Areas of Special Scientific Interest (ASSIs) in Northern Ireland. SSSIs were initially designated under the National Parks and Access to the Countryside Act (1949), and subsequently renotified under the Wildlife and Countryside Act (WCA) 1981 (as amended), which at the time was the key legislation governing the protection and conservation of species and their habitats in Great Britain. The law relating to designating ASSIs is contained in the Environment Order (Northern Ireland) 2002, Part IV.

The WCA 1981 consolidated and amended existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and meet EU obligations under the Birds Directive. Equivalent provisions for Northern Ireland are contained within the Wildlife (Northern Ireland) Order 1985 and the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985.

The WCA is supplemented, inter alia, by provisions in the:

- Countryside and Rights of Way Act 2000 (hereafter CRoW Act).
- Natural Environment and Rural Communities Act 2006 (in England and Wales), hereafter NERC Act.
- Nature Conservation (Scotland) Act 2004, which replaces SSSI arrangements, and the Wildlife and Natural Environment (Scotland) Act 2011.

As legally defined, SSSIs are areas which, in the opinion of the Nature Conservancy and its successor bodies, are “of special interest by reason of any of its flora, fauna, or geological or physiographical interest”. In 1989 the basic principle for site selection was “that the series of sites as a whole should contain adequate representation, in the form of the best examples, of the total countrywide range of variation in natural and semi-natural ecosystem types, with their associated assemblages of plants and animals, considered both as communities and as species” (Nature Conservancy Council, 1989). More recently the purpose of English SSSIs has been stated to be “to safeguard, for present and future generations, the diversity and geographic range of habitats, species and geological and physiographical features, including the full range of natural and semi-natural ecosystems and of important geological and physiographical phenomena throughout England” (DEFRA, 2003). In the Nature Conservation (Scotland) Act 2004 the aim of the notification of sites is to contribute towards the development of a series of Sites of Special Scientific Interest in Scotland that represent the diversity and geographic range of the natural features of Scotland, Great Britain and EU Member States.

S/ASSIs are selected entirely on the basis of scientific grounds, according to principles and guidelines that define what constitutes "special scientific interest." These were originally described in *A Nature Conservation Review* (Ratcliffe, 1977), but the rationale and criteria

were substantially revised in guidelines produced internally by the Nature Conservancy Council between 1975 and 1979, and then published in 1989 (Nature Conservancy Council, 1989). The 1989 guidelines have been subject to various revisions, most recently in 2013[20] (JNCC, 2013a), which has given more emphasis to consideration of natural processes and the need for a flexible approach to accommodate environmental change. However, the overall rationale and operational approach have remained largely unchanged. Furthermore, although wildlife legislation and management has been devolved, such that Statutory Nature Conservation Bodies[21] are now responsible for S/ASSIs, all relevant Statutory Nature Conservation Bodies agree that the SSSI selection guidelines should retain a uniform approach across Great Britain. Similar criteria are used in Northern Ireland for the selection of ASSIs.

Two main approaches are used to select S/ASSIs. All sites that significantly support habitats and species that are rare or threatened are included in the series if they meet minimum standards of quantity and quality (i.e. are selected on a site-level threshold basis, as described in section 1.4.1). Most species and some habitats are selected using this approach. In contrast, representative exemplary areas are selected for widespread habitats and species.

Further layers of designation exist in each of the nations of the UK. Of most relevance to this study are **National Nature Reserves (NNRs),** which are considered to be representative of the best sites and/or have a particular role in terms of research or providing opportunities for education or other forms of public enjoyment of nature. They were originally declared under the 1949 National Parks and Access to the Countryside Act and later the WCA in England, Wales and Scotland, and Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 in NI. The NERC Act made a small change to the statutory definition of a nature reserve that applies throughout the UK. In addition most NNRs are designated as S/ASSI and may also be a SAC and/or SPA. Now NNRs are declared and managed by the Statutory Nature Conservation Bodies according to their own policies, which still largely reflect their original purpose. In Scotland, whilst the Statutory Nature Conservation Body still has the legal role to declare NNRs, the governance of the designation is now shared with a partnership of NNR management organisations and community and private land-owner representative bodies.

Several other types of protected area are designated in the UK with various forms of statutory and non-statutory protection for their biological, geological, landscape and recreational values (as listed on the JNCC website[22]). These are not considered in this study because they do not meet the IUCN protected area definition, do not focus on biodiversity aims (and therefore do not equate to IUCN categories I-IV) or are not designated at a national level. However, as discussed in section 2.2.4, it is important to recognise that all of these protected areas contribute to some extent to the conservation of biodiversity.

[20] http://jncc.defra.gov.uk/page-2303

[21] Natural Resources Wales, Natural England, Scottish Natural Heritage, Department of Environment Northern Ireland, and the Joint Nature Conservation Committee.

[22] http://jncc.defra.gov.uk/page-1527

2.1.2 Natura 2000

SPAs are classified in the UK in accordance with the EC Birds Directive for terrestrial areas and territorial marine waters. They have been identified and classified since the mid 1980s based on guidelines developed by JNCC[23], on behalf of the Statutory Nature Conservation Bodies, as detailed criteria are not provided in the Directive.

SACs are identified, designated and protected in accordance with the Habitats Directive, which is transposed into law in England and Wales through The Conservation of Habitats and Species Regulations 2010; and in Scotland through a combination of the Habitats Regulations 2010 (in relation to reserved matters) and the amended 1994 Regulations. The Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) transpose the Habitats Directive in relation to Northern Ireland.

The Regulations build on existing nature conservation legislation for the protection of habitats and species as most terrestrial Natura sites[24] in the UK are underpinned by ASSI or SSSI designation. In accordance with the Habitats Directive, the Regulations also introduce a requirement on decision-making public bodies to assess plans and projects affecting Natura 2000 sites, both SACs and SPAs. They also enable the relevant Statutory Nature Conservation Bodies to enter into management agreements with the owners or occupiers of land within or adjacent to a European site, in order to secure its conservation. If the Statutory Nature Conservation Body is unable to conclude such an agreement, or if an agreement is breached, it has powers to impose management obligations, and ultimately may acquire the land compulsorily. Statutory Nature Conservation Bodies may also use their powers to make byelaws to protect European sites, for example to control damage by third parties.

2.1.3 Internationally protected areas

The UK has designated terrestrial protected areas under the Ramsar and World Heritage Conventions. Ramsar Sites are generally underpinned by S/ASSI designations and many also by SAC and/or SPA designations. As a matter of government policy in all parts of the UK, in all cases they are afforded the same levels of protection as Natura 2000 sites.

2.2 Protected area designations and coverage in the UK

Biodiversity focused protected areas cover around 10% of the UK land area, although the percentage coverage varies amongst the four countries of the UK. Overall, the network protects around a third of the total area of natural and semi-natural habitats in the UK (JNCC, 2013a).

[23] http://jncc.defra.gov.uk/page-1405

[24] Which are typically referred to as 'European sites' in UK legislation.

Table 2-1: The number and extent of protected areas in the UK and their IUCN category

NB. Various site designation types may overlap so the surface area figures add up to more than the total area protected. Natura 2000 figures relate to sites in the terrestrial and inshore domains (see below for more details).

Protected area designation		IUCN category	Number	Surface area (km^2)
Internationally designated sites				
England	Ramsar Sites	IV	67	3,187
Eng/Scot		IV	1	436
Scotland		IV	50	2,830
Wales		IV	7	114
Eng/Wales		IV	3	406
N Ireland		IV	20	881
UK Total		IV	148	7,854
England	Natural World Heritage Sites	III	1	25
N Ireland	Natural World Heritage Sites	III	1	0.7
Scotland	Mixed World Heritage Sites	III	1	242
England	Biosphere Reserves	VI	2	2626
Scotland		VI	3	1634
Wales		VI	1	16
Natura 2000 (terrestrial and inshore domains)				
England	SACs	IV	230	8,459
	SPAs	IV	81	10,544
Eng/Scot	SACs	IV	3	1,125
	SPAs	IV	1	436
Eng/Wales	SACs	IV	7	951
	SPAs	IV	3	2,092
Scotland	SACs	IV	236	9,212
	SPAs	IV	152	12,060
Wales	SACs	IV	85	5,909
	SPAs	IV	17	1,721
N Ireland	SACs	IV	54	666
	SPAs	IV	16	1,141
UK Total land	SACs	IV	615	26,321
	SPAs	IV	270	27,994
	Natura 2000 net (NB terrestrial only)	IV	-	20,824
Nationally designated areas				
England	National Nature Reserve	IV	224	670
	Sites of Special Scientific Interest (SSSIs)	IV	4,120	10,807
Scotland	National Nature Reserves	IV	59	1,328
	Sites of Special Scientific Interest (SSSIs)	III	346	581
		IV	1,099	9,652
Wales	National Nature Reserves	IV	71	255
	Sites of Special Scientific Interest (SSSIs)	IV	1,047	2,660
N Ireland	National Nature Reserves	IV	12	19
	Areas of Special Scientific Interest (ASSIs)	IV	334	1,017
UK Total	National Nature Reserve	IV	366	2,272
	SSSIs/ASSIs	III, IV	6,946	24,716

Sources: National protected area data is collected from the UK's submission to the EEA for its Common Database on Designated Areas from March 2014 (as provided by JNCC); SAC data:

http://jncc.defra.gov.uk/page-1456, correct as of 14 February 2014; SPA data: http://jncc.defra.gov.uk/page-1399, correct as of 5 July 2013; Ramsar Sites- http://jncc.defra.gov.uk/page-1388, correct as of 29 November 2011; Biosphere Reserves - http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/europe-north-america/united-kingdom-of-great-britain-and-northern-ireland/, correct as of June 2014, Natural World Heritage Sites data: http://whc.unesco.org/en/statesparties/GB.com.

Source notes:

National data: It should be noted that not all UK data used in the above table is correct as of the stated submission date (only the Scottish data was updated at this point – England, Wales and Northern Ireland data may be several years old). The extent of individual sites is counted, not adjusting for overlaps. In the UK total cross-border sites are double counted, so it is recognised that these figures may be slightly inflated. It should also be noted that the IUCN classifications listed below are currently being reviewed by the UK's Statutory Nature Conservation Bodies in collaboration with IUCN National Committee UK[25].

Natura 2000 data: All Natura 2000 site area figures for each country relate to both the terrestrial and inshore domains (where the inshore domain equates to waters out to 12 nautical miles from the coast. The number of sites for each country matches with the JNCC website, but the area figures do not take account of overlapping SACs. Total UK Natura 2000 net area is calculated for the terrestrial area only. This was carried out via GIS so that overlapping SAC and SPA areas are only counted once (based on data used in the JNCC protected site indicator calculations for 2014), using OS Boundary-Line Mean High Water line to cut the data to get terrestrial-only values. Sites in the territory of Gibraltar are excluded from all calculations.

2.2.1 Internationally designated sites

The UK contributes to global networks of protected areas with 148 Ramsar Sites, two Natural World Heritage Sites (one in England and one in Northern Ireland), a mixed (i.e. natural/cultural) World Heritage Site (in Scotland) and six Biosphere Reserves, as well as marine OSPAR sites (JNCC, 2014a). This excludes sites in the UK Overseas Territories.

2.2.2 Natura 2000

The UK currently has 615 SACs (covering approximately 2.6 million ha of land/inshore waters) (JNCC, 2014b) and 270 SPAs (covering approximately 2.8 million ha of land/inshore waters) (JNCC, 2013b). The UK's Natura 2000 network in terrestrial areas covers around 85% of the UK S/ASSI area.

2.2.3 Nationally protected sites

In June 2013, it was reported that there were 6,946 S/ASSIs designated in the UK, covering just over 2.4 million hectares (JNCC, 2013b). Sites range in size from a fraction of one hectare (a bat roost) to 63,135 ha (The Wash).

There are currently 224 NNRs in England, 59 in Scotland, 71 in Wales and 12 in Northern Ireland (Table 2-1).

The UK also has 15 National Parks (in England, Scotland and Wales), 46 Areas of Outstanding Natural Beauty (AONBs) (in England, Wales and Northern Ireland) and 40 National Scenic Areas (NSAs) and 3 Regional Parks (in Scotland), covering large proportions of the national territory. However, these protected area designations are not included in the scope of this study as their designation is not directly for the core purpose of biodiversity conservation.

[25] This review is being undertaken as part of IUCN National Committee UK's 'Putting Nature on the Map' project. http://www.iucn-uk.org/projects/protectedareas/tabid/65/default.aspx

2.2.4 The adequacy of the protected area network

No assessment of the adequacy of the UK protected area network as a whole has been undertaken. However, a review by Lawton et al (2010) investigated whether England's existing wildlife sites comprise a coherent and resilient ecological network, and considered its strengths and weaknesses, to inform the development of a Natural Environment White Paper (HM Government, 2011).

The review firstly recognised that England's wildlife site network comprises three tiers (which is broadly applicable to the whole of the UK):

- Tier 1 - Sites whose primary purpose is nature conservation and which have a high level of protection either due to their statutory status or to their ownership, i.e. Natura 2000 sites, Ramsar Sites, SSSIs, National and Local Nature Reserves, and land managed for nature conservation by NGOs (e.g. National Trust, RSPB, the Wildlife Trusts and the Woodland Trust).

- Tier 2 - Sites designated for their high biodiversity value but which do not receive full statutory protection, i.e. Local Wildlife Sites and Ancient Woodlands.

- Tier 3 – Areas designated for landscape, culture and/ or recreation and with wildlife conservation included in their statutory purpose, i.e. National and Regional Parks and Areas of Outstanding Natural Beauty (AONBs).

Tier 2 sites are non-statutory, but comprise widespread habitats of significant ecological value and therefore have important roles to play in providing additional habitat to that within the Tier 1 network. Tier 3 sites may also provide important areas of habitat, as well as buffering or connecting Tier 1 and 2 sites.

Lawton et al also recognised that to be resilient, especially in the face of climate change, protected areas (in England) need to be part of a coherent ecological network, which they propose should have the following five properties:

- The network will support the full range of biodiversity and incorporate ecologically important areas, including special biodiversity.
- The network and its component sites will be of adequate size, taking account of the needs of our natural environment to adapt to climate change.
- The network sites will receive long-term protection and appropriate management.
- Sufficient ecological connections will exist between sites to enable species movement.
- Sites will be valued by, and be accessible to people, including sites close to where they live.

However, they concluded that the existing SSSI series in England, important though it is, does not currently comprise a coherent and resilient ecological network; nor does the wider combined network of Tier 1, 2 and 3 sites have the required properties outlined above. In

summary Lawton et al propose that the site network needs to be “bigger, better and more joined up”. The following broad types of action are necessary to achieve this:

- Improve the quality of current sites by better habitat management.
- Increase the size of current wildlife sites.
- Enhance connections between, or join up, sites, either through physical corridors, or through ‘stepping stones’.
- Create new sites.
- Reduce the pressures on wildlife by improving the wider environment, including through buffering wildlife sites.

In general the first of these actions is considered to be of most immediate importance, though priorities will vary according to circumstances.

In response, Natural England has published a revised protected area designations strategy, defining how protected areas can support ambitions to create more integrated networks to support England’s landscapes, geological features, and important wildlife habitats (Natural England, 2012). The Lawton review also influenced the Environment Strategy for Wales and the Welsh Special Sites Project (CCW, 2011). Scotland is also developing an initiative for a national Green Network, building on the existing ‘Central Scotland Green Network’ initiative[26].

2.3 Objective setting for protected areas in the UK

Management plans, as described and recommended by the European Commission, are not required, or normally developed, for S/ASSIs in most of the UK. However, conservation objectives, in the form of measurable conservation outcomes, are set for all these sites. The setting of objectives is the responsibility of the Statutory Nature Conservation Bodies and although the procedures and documentation varies, the key elements are similar. S/ASSI conservation objectives are based on the site notification statement, which includes a description of the land and the natural features for which it is notified ("the citation"), a boundary map, and a list of the acts or omissions (operations) that the Body regulates through the issue of consents. The conservation objectives then set targets for maintaining or, if necessary, restoring the notified features. These are then taken into account in some form of site management statement, which describes the site management required to achieve its conservation objectives.

Conservation objectives are also set for the qualifying features on all Natura sites, but a recent review of the implementation of the Habitats and Birds Directives in England (Defra, 2012) concluded that they are not always readily accessible or clear, and therefore do not provide adequate information for developers to judge the impacts of potential projects. To address this Natural England and JNCC published a proposed new approach to improving conservation objectives for Natura 2000 sites in England[27], together with a statement of how this would be prioritised. High level conservation objectives have already been revised

[26] http://www.centralscotlandgreennetwork.org/
[27] http://publications.naturalengland.org.uk/publication/6734992977690624

to make them clearer and more readily available for developers and further work is being carried out to provide quantitative targets for qualifying habitats and species, as well as the processes on which the habitats and species rely. A similar approach is being taken in Scotland. In Wales, Natural Resources Wales (NRW) has published management plans for all terrestrial Natura 2000 sites, which include detailed site and feature-specific conservation objectives.

Although the use of management plans is not a formal requirement for S/ASSIs and Natura sites they are being increasingly used, both for single sites, and at the habitat level, e.g. Forestry Commission management plans. Natural England is developing action plans for all Natura 2000 sites in England as part of the LIFE+ funded Improvement Programme for England's Natura 2000 sites (IPENS) (Natural England, 2013). NRW is carrying out similar work for all Natura 2000 sites in Wales.[28] Through a strategic approach the IPENS programme and the Natura 2000 programme in Wales is reviewing for each site the risks and issues that are impacting on and/or threatening the condition of the site; which mechanisms (i.e. actions and measures) could be used to address them, including engagement with key stakeholders; how much it will cost and where the money could come from; and where no suitable mechanisms currently exist. The project also addresses evidence gaps, such as the lack of knowledge of the effects of mechanisms used to improve site condition. Similarly, Scottish Natural Heritage is currently piloting options for producing Natura site plans.

2.4 Protection levels and approaches in the UK

Almost all UK terrestrial protected areas, including those of international importance and Natura sites, are given statutory protection through designation as S/ASSIs[29] (JNCC, 2014a). These sites are protected through four main processes. Firstly, through the development planning processes, as they are taken into account in the preparation of local, regional and national development plans and in decisions on individual projects, which are also informed by the findings of Strategic Environmental Assessment and Environmental Impact Assessment reports.

Secondly, S/ASSIs are protected from potentially damaging activities carried out by landowners or occupiers or their agents, through the notification statement list of the acts or omissions (operations) that Statutory Nature Conservation Bodies (SNCBs) regulate through the issue/refusal of consents. These 'operations requiring consent' or 'operations likely to damage the SSSI/ASSI interest' include activities that could damage the notified features on the site, and owners must therefore obtain written permission from the relevant Statutory Nature Conservation Body to carry such activities out. If they are likely to significantly damage the site the Body may refuse to consent the activity, or consent it subject to conditions. SNCBs also have powers in certain circumstances to require

[28] http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/special-landscapes--sites/the-life-programme/life-natura-2000.aspx

[29] Of the terrestrial sites, 14 SPAs are not S/ASSIs. 6 are designated to protect breeding sites of corncrake *Crex crex*, 6 for golden eagle *Aquila chrysaetos* (http://www.scotland.gov.uk/News/Releases/1998/10/4216a650-1c93-4466-a975-738c306fcb7f, see Q19 via: http://www.snh.org.uk/strategy/GE_consult07.asp), 1 for hen harrier *Circus cyaneus* and merlin *Falco columbarius*, and 1 for hen harrier *Circus cynaeus*.

management operations to be carried out, including to restore damaged features of a site, and can ultimately seek to acquire land through compulsory purchase as a last resort.

Thirdly, the provision of incentives plays a major role in supporting site management. This is important as many sites require active management, which may no longer be financially viable (e.g. low intensity grazing of traditional livestock breeds). Furthermore, a significant proportion of the protected area network in the UK is owned and managed by private individuals; for example, a third of the SSSI network in England (two-thirds are managed by central or local government, or by private companies or NGOs, and/or as common land) (National Audit Office, 2008). The required site management is therefore encouraged through the development of site management statements, which describe the ideal management, together with proposed financial support where required for each owner / occupier. The SNCBs have some funds for supporting the required management, but most funding is obtained through targeted agri-environment measures and to a lesser extent other funds such as LIFE+. Where an owner or occupier is unwilling or unable to carry out management the conservation body can require it to be done. However, the use of statutory powers to enforce positive management practices is rarely required, as for example reported in England (National Audit Office, 2008). Since 2000, each country of the UK has developed and implemented a systematic programme of addressing threats to S/ASSIs and, where necessary, are bringing them into active management in order to achieve a favourable condition target (National Audit Office, 2008).

Fourthly, S/ASSIs are given a degree of protection from damage by the actions of third parties (i.e. bodies other than landowners/occupiers or planning and development control authorities), through the provisions in the Wildlife & Countryside Act (WCA) 1981 (as amended) and later supplementary legal provisions in individual countries, which make it a criminal offence to intentionally or recklessly destroy or damage the features for which a S/ASSI is designated.

Nearly all Natura 2000 areas on land are therefore protected through the underpinning S/ASSI measures described above, but also have additional protection through the legislation that transposes the requirements of the Habitats and Birds Directives, specifically in relation to the assessment of plans and projects. Therefore, as in all EU Member States, any plan or project that may have a significant impact on a Natura 2000 site must be subject to appropriate assessment before it can be approved (in accordance with Article 6.3 of the Habitats Directive). Importantly, the precautionary principle must be followed and the activity refused unless it can be ascertained that it will not adversely affect the integrity of the site, or (in accordance with Article 6.4 of the Habitats Directive) it is of overriding public interest, there are no alternative solutions and compensatory measures are taken to protect the ecological coherence of the Natura 2000 network.

2.5 The monitoring of protected areas in the UK

The Statutory Nature Conservation Bodies are responsible for monitoring protected areas (JNCC, 2012) according to a Common Standards Monitoring (CSM) framework that was

agreed in 1998[30]. The system is designed to implement the protected area monitoring requirements of S/ASSIs, the Habitats Directive (SACs), the Birds Directive (SPAs) and Ramsar Sites designated under the Ramsar Convention (JNCC, 2010). All S/ASSIs are covered by CSM (so the monitoring goes beyond the legal requirements of the Habitats and Birds Directives). The aim of the monitoring is relatively narrowly defined in that it focuses on 'interest features' that are the species, habitats or geological 'components' for which the sites are protected (e.g. not the condition of broader ecosystems or integrity of ecological processes). Although this provides a clear and repeatable basis for monitoring, it can lead to problems where changes in the listed features might be desirable due to natural changes in ecosystem dynamics or revised future strategic objectives.

Condition assessments of each feature are based on assessments of one or more measurable characteristics or attributes (and targets) that together can be used to define favourable condition. The assessment determines whether the feature is in favourable, unfavourable or destroyed condition, and whether its condition is recovering/recovered, maintained, or declining. JNCC has produced generic guidance[31] on the assessment of features, which is being used (with some adaptation where necessary) by the Statutory Nature Conservation Bodies to help ensure a reasonable level of consistency in assessments.

The CSM system is designed to act as an early warning system, and is supported by limited, more detailed monitoring, such as the Environmental Change Network of sites and Countryside Survey /habitat mapping. Originally the intention was to assess all designated features and to repeat this at least once within a six-year period, to meet the reporting requirements of the Habitats and Birds Directives. However, the frequency of condition assessments now varies according to a risk based approach that takes into account the sensitivity of habitats and species to pressures.

Species and habitats of Community interest outside the protected area network are monitored using a range of different approaches.

[30] http://jncc.defra.gov.uk/page-2198

[31] http://jncc.defra.gov.uk/page-2199

3 Observations on protected area approaches in selected European Member States

This section provides a comparative analysis of protected area approaches in the studied countries (as described in the annexes) in relation to the project's objectives and specific questions of interest listed in section 1.1. In particular it aims to point out effective and efficient approaches to the identification, designation, protection, objective setting and monitoring of protected areas, especially where they differ from those typically followed in UK. However, this discussion does not aim to provide a comprehensive summary or analysis of all the approaches followed by the reviewed Member States; instead, we select particularly relevant examples to illustrate each point. It is also important to bear in mind that this study does not provide a comprehensive picture of the European approach to protected areas and the sample size of eight Member States is relatively small. Therefore the conclusions drawn here may not apply to the other 19 Member States.

3.1 The role of protected areas in biodiversity conservation

3.1.1 Protected area roles and coverage

This study has shown that the reviewed Member States generally recognise the important **role of protected areas** in achieving biodiversity conservation targets, including the EU 2020 Biodiversity Strategy target, as articulated in their national strategies and action plans. However, there is wide variability in the types of protected area (as described in section 3.2) and therefore their role in achieving biodiversity conservation. This variability probably reflects the long history of protected areas in Europe, and the influence of changing social, cultural and economic factors on their purposes, designations and locations.

As concluded by the Lawton et al review (2010), all types of nationally protected areas (including those designated for landscape protection, as discussed in section 2.2.4) and other locally protected areas play a role in supporting biodiversity conservation to some extent. The extent to which each area supports biodiversity conservation will be very species and habitat specific. Thus assessing the adequacy of protection coverage, strictness and management is also very difficult as this will be in turn species and habitat specific (Jackson et al, 2009b). In general, species and habitats with narrow specific requirements are likely to depend on focused protected areas with proactive management targeted towards their particular needs. Furthermore, rare specialist species will require a high level of coverage in strict protected areas as losses of any of them could be very significant (Jackson et al, 2009a). On the other hand widespread species are likely to have more general habitat requirements, and therefore the continuation of current land use practices and protection from large-scale development may be more important for them. The maintenance of populations of such widespread species will require extensive protected area networks. However, there is likely to be a trade-off between the extent of protected area coverage and their protection level, especially in the most developed areas of the EU. Thus, effective protected area networks in practice probably need to consist of a mix of moderately protected areas covering a wide area complemented by a smaller network of strictly protected areas.

There is wide variation in the setting of quantitative time-limited protected area coverage targets in national biodiversity strategies, perhaps because of the difficulties associated with assessing the contribution that all types of protected areas make to conserving biodiversity. Some have set targets, including France which has a target of at least 2% of the terrestrial European area of France under strict protection for biodiversity by 2020, whereas other Member States have none, such as the Czech Republic. It is generally only recently that countries have begun to adopt more strategic, systematic and quantified protected area designation approaches, often in connection with international agreements. Where the studied Member States have set targets, they are often linked to CBD targets, most recently Aichi Target 11 for the designation and equitable management and conservation of at least 17% of the world's terrestrial and inland water area and habitats.

The Habitats and Birds Directives have clearly had an important influence - leading to major increases in protected areas in some countries (Gaston et al, 2008) (see section 3.2.3). The directives do not stipulate coverage targets, but instead recognise that the protection required to achieve the aims of the Directives will vary according to the habitats and species involved and type and severity of threats to them. They also explicitly adopt a biogeographical approach to the designation of sites that requires information sharing and collaboration amongst the Member States and with the Commission to assess and agree on protected area requirements. Many countries appear to have recognised the difficulty of setting meaningful quantitative coverage targets. Furthermore, in federally organised Member States, the responsibility for designation and management of protected areas lies at regional level (e.g. the German Länder and the Spanish autonomous communities). This complicates target setting still further, and the scope for enforcement of targets at a national level is limited. So there is a certain tension between regional political demands and national aspirations, as well as between local development aspirations and nature conservation goals.

As it is difficult to set meaningful protected area coverage targets, it is in turn difficult to assess the actual ecological adequacy of **protected area coverage**. Nevertheless, some of the reviewed Member States consider that their protected area networks are insufficient to conserve some of their important habitats and species populations. For example, the Finnish network is considered by experts to be insufficient in extent in the southern region, probably because of conflicting environmental, social and economic interests. Only around 2% of the area in southern Finland is under protection and the majority of the species and habitats covered by the Habitats Directive remain in unfavourable conservation status. However, this will be addressed by a planned national assessment of the connectivity and the ecological representativeness of its protected area network, including geographical coverage of habitat types. This will consider the efficiency and impacts of managing and maintaining the protected area network in order to enhance the conservation of species and habitats, and their potential to adapt to climate change. Finland plans to establish criteria for determining the share (%) of areas protected through conservation and other effective methods, over the total land and marine area of Finland, and where there are key gaps.

France has carried out a very comprehensive gap analysis to identify which species and habitats are not adequately protected by the current sites, and where and for what objectives the protected area network should be expanded (Coste et al, 2010). The study identified more than 50 priority habitat types for which the current protected area network is considered to be insufficient. A total of 535 vertebrate, invertebrate and flowering plant species were identified as being candidates for protection in designated areas because they are rare, localised, threatened, of high national importance, and sensitive to human impact; of these, 188 were found to have the highest priority because of the small proportion of their population within existing protected areas, whilst 58 species are already sufficiently protected by the network. Two National Parks incorporating state-owned forest land have been/are being realised[32]. However, it was not possible to designate a new wetland National Park, primarily due to the opposition of the hunting associations, and very little progress has been made on the target to designate the 300 or so new sites identified in the gap analysis[33].

Croatia is only just setting up its regional protected area administrative structures, and there are large deficits. According to public institutions and key stakeholders, as many as 84% of the counties in Croatia consider the national protected area protection system to be 'totally or mostly inadequate', and there are big gaps in the spatial delineation of protected areas.

Although this review has not covered marine protected areas, it is worth noting that the deficits and challenges are generally much greater in the marine zone than on land, for example Spain has made very little progress and in Croatia, designation of marine protected areas is still in its infancy (with only a 2% coverage at present).

3.1.2 Ecological networks

It appears to be widely recognised that protected areas cannot be effective if they are small, fragmented and isolated; and accordingly they need to be part of wider coherent and functionally inter-connected networks (as for example concluded in the Lawton review). To address this, most of the reviewed Member States have explicitly incorporated protected areas into proposed **ecological networks**, using them as core areas, and aiming to improve their connectivity and thus the resilience of these areas, in particular in relation to their Natura 2000 networks. Their aims are often ambitious, but there appears to be little evidence of practical progress with developing such networks in most countries or resulting significant beneficial biodiversity impacts. They can sometimes even be paper exercises designed to fulfil Member States obligations under Article 10 of the Habitats Directive.

However, some strategies are based on a thorough analysis and plan, and are being implemented through binding legislation and spatial planning frameworks. For example:

- The German ecological network concept identifies core areas of national biodiversity significance, areas with high restoration potential and nationally and internationally significant corridors, which should cover at least 10% of the land area. At the moment protected core areas cover around 5.3% of the land, and a recent analysis

[32] Massif des Calanques was legally designated in 2012, and the forest of Champagne and Bourgogne is in the process of designation

[33] Personal communication, Thierry Lefebvre, protected area programme head, IUCN France

has identified 22 areas where there are significant gaps. In addition, the ecological network requires the establishment of corridors of extensively managed agricultural or forest land on around 4.5% of the land area. The Länder share equal responsibility for this, but the level of implementation and ambition is very varied across the Länder.

- The Netherlands has published a recent government vision in which aims for an ecological network which uses systematic spatial planning to better link existing protected areas with agricultural areas under 'nature-friendly' management.

- France has recently passed national legislation that establishes a legal framework for an ecological network. The strategy envisages an expanding role for the national and regional nature reserves as core areas of the network, i.e. improving the connectivity of the protected areas with the greatest focus on biodiversity protection.

- The Estonian green network concept was developed in the early 1980s, based on a strong land-use planning tradition with wilderness and areas of conservation value considered to be core areas interlinked by natural and semi-natural landscapes. The Act on Planning and Building provides the legal background for the implementation of the network through the national spatial planning process.

3.1.3 Measures outside protected areas

For several reasons, protected area networks alone cannot conserve all habitats and species of conservation importance. Perhaps most importantly, some species are highly dispersed (including for example some widespread declining farmland species) and therefore would require the designation of unfeasibly large protected area networks. Furthermore, many species need to move between protected areas and between other areas (e.g. through seasonal migration) and therefore the habitat matrix in the wider environment has to support such species. Lastly, protected areas are not isolated from external pressures, so the reduction of environmental pressures in buffer areas or the wider environment (e.g. with respect to pollution, agricultural intensification or hydrological change) may be necessary for some habitats and species, even if well covered by protected areas.

In recognition of this, some Member States are taking a strategic approach to ensuring that protected area management is complemented by conservation measures in the wider environment. For example:

- The Netherlands face a significant challenge in achieving conservation goals for their Natura 2000 network, because the combined pressures of fragmentation, nitrogen deposition, desiccation and coastal change are exerting such pressure on sites that it is predicted that even optimal site protection and management will not be sufficient to achieve conservation objectives. In response, the government has developed a vision for nature in which it spells out a new focus on the realisation of conservation objectives at higher levels of scale than before, moving away from managing at the site level only and looking to achieving strategic objectives at the regional and even biogeographical level. In certain restricted circumstances, this might result in

allowable degradation of some habitats and species populations at some sites if they can be more effectively conserved elsewhere.

- German environmental policy recognises that the conservation of wide-ranging species such as large carnivores will only be possible if landscape fragmentation is reduced, and a nationally funded programme was launched to fund measures to minimise the habitat fragmentation caused by roads and railways.

3.2 Protected area designations and their specific roles

It is clear, even from this analysis of just eight EU Member States, that a high diversity of overlapping designations and protection levels have developed especially in Member States where the designation of protected areas is the responsibility of the regional authorities (e.g. Spain). Furthermore, although the IUCN protected area management categories provide a useful guide to comparing different designation purposes, it can be misleading to try to compare them, in particular in terms of their relative impact on biodiversity protection because the criteria and governance of designations are different in each Member State. Much depends on the management and on the details of the effective protection level.

Nevertheless, there are some similarities in approaches and conclusions that can be drawn. Most of the reviewed Member States have declared National Parks that equate to IUCN category II protected areas (i.e. are large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems) with strictly protected core area, National Nature Reserves, some other type of habitat protection (Nature Monuments or similar), and some kind of landscape designation. Other designations that primarily aim for recreational and/or sustainable development objectives often incorporate some biodiversity protection goals, for example Nature Parks and Regional Parks.

Wilderness is not a generally recognised category of protected area in the EU; however, it is a subject of active debates and initiatives. For example, the European Wilderness Society has recently proposed a European Wilderness Quality Standard[34], Germany has created its own wilderness definition in order to recognise certain protected areas and zones within them as wilderness (see section 10.3) and Scotland has created a methodology to map its wild areas[35].

The UK and the Netherlands stand out as having only one or two designations with biodiversity protection as their primary purpose (other than the Natura 2000 designations).

3.2.1 National Parks

This review has indicated that the designation of areas as National Parks to protect large ecosystems and associated biodiversity (i.e. IUCN Category II protected areas) is common across the eight studied countries. In contrast UK National Parks are more focused on

[34] http://wilderness-society.org/european-wilderness-standards-published/
[35] http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/mapping/

landscape and recreational objectives, although (as discussed in section 2.2.4) in practice they contribute to the wider protected area network and biodiversity conservation to some extent. National Parks in much of Europe appear to have an ecological, symbolic, and emotive value for the public that cannot be met by other protected area designations; this is reflected in the current Spanish NGO campaign to maintain the rigorous national definition of the designation, rather than opening up legal flexibilities for the autonomous communities to take their own approaches. This is because many fear this will weaken the legal protection of the features for which National Parks are valued, and result in more development within them.

Despite their relative public popularity, in some countries, the designation of new National Parks has become more difficult. For example in Croatia no National Parks have been designated since 1999, and there is an unofficial understanding in the nature protection sector that no more will be designated (Zupan, 2012). In contrast, both Germany and France have designated new National Parks in the last few years.

3.2.2 Strictly protected areas

Most of the Member States reviewed in this study have one or two protected area designations with a high protection level for biodiversity, particularly in countries with large areas of natural habitat and uninhabited land. Such designations are generally used for particularly threatened or important habitats, which tend to be rare, and therefore the total area covered by strictly protected national designations is typically relatively small (e.g. 1.2% in France). For example:

- In Estonia, in strict nature reserves all types of human activity are prohibited and humans are excluded except in cases of supervision, rescue work or for the purpose of monitoring and assessment.

- In Finland, the majority of protected areas are on uninhabited land, and most land uses are generally prohibited (apart from a general right to hunting and gathering). The Finnish protected area network is also unique in that 90% is on state owned land, and designations are specific to whether the land is state owned or privately owned.

- In France, integral biological forest reserves are given strict protection in that all human interventions that are likely to modify the ecosystem and the achievement of natural forest processes are banned.

- In Croatia, all activities and works that can interfere with natural processes and public access are forbidden in strict nature reserves, and permits for any exceptions must be obtained from the Ministry for Environment and Nature Protection. However, no strict nature reserves have been designated in the last ten years, and all new proposals have been resisted by landowners (Zupan, 2012).

This contrasts with the UK, which is unique in not having a stricter national category of biodiversity protection than is provided by the S/ASSI and Natura site combination.

3.2.3 Natura 2000 designations

It is largely due to the **Natura 2000 network**, which now covers approximately 18% of the EU land area (EEA, 2012b), that the EU meets the Convention on Biological Diversity Aichi Target 11 (in which countries committed to protecting and effectively managing at least 17% of terrestrial and inland water areas, especially areas of particular importance for biodiversity and ecosystem services[36]). In a number of Member States that have completed their Natura 2000 network, this has significantly added to the total land area protected for biodiversity reasons, often dwarfing the area that was previously under national designations for biodiversity protection (as opposed to landscape type designations or biosphere type designations which are more extensive) (EEA, 2012b). For example:

- In Estonia the protected area has increased from 10.7% to 18.1% of the territory because of Natura 2000.

- Spain more than doubled its area of land protected for biodiversity, through establishing its Natura 2000 network, which alone comprises 27% of its land area.

- Croatia has proposed 780 sites for its Natura 2000 network covering more than 36% of the total land territory of the country, compared to the current total protected coverage of 12% with less than 2% protected for biodiversity conservation.

In addition, the requirements under the Habitats Directive for the identification of SACs in a coherent network has forced many Member States to conduct thorough assessments of their biodiversity (habitats and species) and to systematically propose sites for designation. Thus, in Finland for example, the Natura 2000 network has played a key role in increasing the representativeness of the protected area network, especially with regard to coastal, marine and inland water habitats.

However, it is important to interpret the data on designated Natura 2000 areas with care as the approach to deciding on what to include within them differs considerably amongst the reviewed Member States. Some have large Natura sites including 'buffer zones' and some areas of low quality habitat and even villages, while others proposed only core habitat areas. Amongst the countries reviewed here, the UK has a particularly strict approach to the exclusion of lower quality habitat areas from Natura 2000 sites, and this may be one reason it has the second lowest percentage of land area under Natura 2000 in the EU[37]. The UK is also in the minority in having taken a strict line in designating Natura 2000 areas under national designations, because in the UK almost all terrestrial Natura 2000 areas are underpinned by S/ASSI designation. As the GB SSSI network was already quite extensive before Natura 2000, the European legislation did not result in such a substantial expansion of the protected area network as in some other Member States. However, it did lead to the

[36] http://www.cbd.int/sp/targets/rationale/target-11/

[37] UK has designated 8.53% of terrestrial land area, slightly higher than Denmark's 8.32%. From Natura 2000 barometer http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm

designation of a number of the largest SSSIs in Great Britain.[38] The ASSI network in Northern Ireland has mainly been developed since the Habitats Directive came into force.[39]

The degree to which Natura 2000 sites overlap with existing national protected area designations or are underpinned by new designations varies amongst the studied Member States, for example:

- In Finland most Natura 2000 sites have national designations, although some areas – mainly inland waters and shores, and coastal and marine biotopes - are realised through land use regulations stipulated in legislation for forest, water and other land and/or resource use.

- In Spain over half of the Natura 2000 area has no other protected area designation, and rely on the regional authorities taking some other actions for the achievement of conservation management objectives. It is usually necessary to establish site management plans before contractual arrangements can be agreed with landowners and managers, and Spanish regional and local authorities are now working hard to agree management plans for the 82% of sites that still lack a comprehensive plan. But annual investments in protected area management are decreasing (Europarc Espana, 2012).

- In France, most of Natura 2000 sites have no national designation and instead are protected through local contractual measures (the DOCOB[40]).

3.2.4 Special measures for the protection of selected habitats and species

Some Member States have legal instruments that provide protection for specific habitats and/or species through the spatial planning framework, without the need for the designation of spatially defined protected areas, though their effectiveness is often limited. Some examples include:

- In Germany legally protected habitats (i.e. threatened habitats of particular biodiversity value, including moor, fen, wet grassland and dry grassland) are protected by federal state laws and by registration in the land registry.

- In France, biotope protection orders can be issued to protect species' habitats; however, they are relatively ineffectual in actually providing protection in the spatial planning system because they do not legally override pre-existing development plans, and they also do not incentivise active management.

- In Estonia, it is possible to define species protection sites to protect the habitat of a species through a regulation from the Minister of the Environment or directly

[38] Of 32 new SSSI designated in Scotland in 1996, 31 were designated in order to be part of Natura 2000 http://gateway.snh.gov.uk/sitelink/index.jsp

[39] http://www.doeni.gov.uk/niea/a_forward_programme_for_the_declaration_of_assis_in_ni.pdf

[40] '*document d'objectifs*'

through the Nature Conservation Act. There is by default a 'circular species protection zone' around the habitats of eagle species, the black stork (*Ciconia nigra*), and European flying squirrel (*Pteromys volans*) until a species protection site has been defined and approved.

3.2.5 The role of landscape type designations in supporting biodiversity

Generally most nationally designated sites are classified as IUCN category V (protected landscape/seascape) or VI (managed resource protected area) (EEA, 2012b). In most of the reviewed Member States, the areas that are **not explicitly designated for the specific protection of biodiversity** are nevertheless important in terms of overall protection of habitats and species (e.g. German Natural Parks and Regional Parks), as illustrated by the high proportion of their areas designated as Natura 2000 areas. In other cases, whilst they do not contain highly threatened habitats and species, because of their extent they can contain significant proportions of the populations of more common species.

These areas typically have access to fewer resources and personnel than National Parks and most of the much smaller nature reserves, which are often managed by NGOs or local associations who obtain local government and other funding (e.g. through Rural Development Programmes). However, these areas also often incorporate smaller parts covered by stricter protection designations, so it is misleading to compare the designations against each other, as the overlap may serve to optimise protection in one place and flexibility of management for sustainable development with communities in another. On the other hand, in many cases these areas lack any core area dedicated to biodiversity protection although they have the habitats and species.

Notably:

- In Germany, nature parks designated for recreation and landscape cover a significantly larger area than the areas designated for biodiversity protection; if their level of biodiversity protection and prioritisation were increased, for example through core zones, they would have a more significant role to play in contributing to Germany's biodiversity conservation goals. The value of nature parks for nature conservation is currently rather limited because they are not designated or managed for biodiversity, and Natura 2000 takes up only around 12% of the nature park area (BfN, 2010), though some nature parks have made plans to designate core zones for biodiversity conservation[41]. Currently many of the landscapes do not differ significantly from intensively used farms and forests outside protected areas; their nature value could therefore be improved through ecologically oriented farming and forestry, and by restoring habitats that provide ecological connectivity, such as ponds and hedges (BfN, 2010).

- In France, the majority of the protected area network consists of regional nature parks, which are based on a voluntary 12-year agreement among local actors with

[41] e.g. Landesregierung Schleswig-Holstein Landwirtschaft und Umwelt: Teilbereiche von Landschaftsschutzgebieten. http://www.schleswig-holstein.de/UmweltLandwirtschaft/DE/NaturschutzForstJagd/02_Schutzgebiete/04_NSFlaechen/03_Flaechentyp/15_TeileLSG/ein_node.html; e.g. Brandenburg 2014 Massnahmenprogram Biologische Vielfalt.

the emphasis of designation on sustainable development and local involvement, rather than biodiversity conservation.

- In Croatia, the predominance of protected areas in IUCN category V is considered to make the network unbalanced, reducing its effectiveness; it means that the quality of management is more vulnerable to economic and political changes. Designation for recreational purposes is much easier and less liable to cause conflicts; however, forest parks, which are designated for recreational purposes, are actually very valuable in terms of biodiversity conservation (Zupan, 2012).

3.3 Protected area objective setting

3.3.1 Setting conservation objectives

Although approaches to defining conservation objectives and aligning conservation measures to pressures and threats are diverse, the reviewed Member States rely mostly on site management plans to define conservation objectives and reconcile conflicting uses and threats. Management plans are also widely used to set conservation objectives for **Natura sites**, probably in part because they are explicitly referred to in the Habitats Directive and their use is encouraged by the European Commission (European Commission, 2000), although it is not a legal requirement. Whether Natura site objectives are set in management plans or not, they must be much more precisely defined than for most existing protected areas. Some countries appear to use a risk-based approach to deciding on whether to produce a management plan. For example, in Finland some protected areas management plans are not needed for sites that, according to a condition assessment, are at low risk, have low visitor numbers and do not require active management. Similarly, in the Czech Republic management plans are only developed for Natura sites where specific conservation measures are needed beyond basic protection.

In principle, Natura site conservation objectives should be set for all species and habitat types of Community interest of the Habitats Directive and bird species of the Annex I of the Birds Directive that are significantly present on a Natura site, as well as for regularly occurring migratory species (European Commission, 2012). They should also take into account the importance of the site for the overall maintenance or restoration, of favourable conservation status of the habitat types and species present and its role in maintaining the coherence of the Natura 2000 network. Consequently, the setting of Natura objectives in particular has resulted in significant challenges for Member States, and has spurred new approaches. Only a few Member States have taken a **strategic approach** to setting Natura conservation objectives by formulating objectives at both the national or regional level and at the site level (Louette et al, 2011). The advantage of such a hierarchical systematic approach is that it clarifies the relative importance of each site in achieving favourable conservation status for species and habitats at the regional (biogeographic) level. It can clarify whether there are sites on which favourable conservation status does not need to be achieved for some species or habitats, enabling greater flexibility in setting site objectives and management measures (van Apeldoorn et al, 2010).

Of particular interest in this respect is the strategic approach being taken by the Netherlands to setting conservation objectives and establishing management plans for Natura sites. This aims to move away from target setting at a local protected area level to achieving favourable conservation status at the biogeographical region level. Furthermore, the approach to target setting anticipates natural dynamics and climate change, and allows for some local flexibility. Accordingly, each site is set either a maintenance target (current contribution to national targets is sufficient) or an improvement target (a greater contribution is or will be required), according to the principle of 'strategic localisation'. Some sites may also be assigned a 'sense of urgency', which indicates a fast pace of objective realisation is required, for example for sites that are particularly important for certain habitats or species and have an unfavourable conservation status. Finally, in a minority of cases, 'credit formulation' may be applied, which means that a slight reduction in status or area may be permitted for one species or habitat type in the interest of improving the status of another, rarer or more nationally significant species or habitat. The Netherlands is also going through a process of integrating the specific Natura conservation objectives focusing on target species or habitats into its current national nature reserve planning, which is based on more broad and descriptive site objectives.

The level of public involvement in the setting of protected area conservation objectives also varies greatly amongst the studied Member states. In many countries the process is primarily science based and carried out by the competent environmental authorities. By contrast France has developed a localised process with considerable stakeholder involvement because the establishment of the Natura 2000 network was heavily influenced and delayed by local stakeholder resistance. In response, France created a new locally negotiated legal instrument (the DOCOB[42]). The **process of agreement** of the DOCOB contract between the regional and national authorities, the land owners and managers, and local stakeholders is crucial to reconciling biodiversity objectives and the interests of site users. The contract is agreed by a committee[43] assembled by the departmental prefect to include the land owners and managers and users of the site (e.g. hunters, recreation interests, tourism), and any other relevant stakeholders as well as local government representatives. The DOCOB may include a socio-economic assessment of the beneficiaries and benefits arising from the site, and which uses are detrimental, neutral or positive for the biodiversity objectives. The DOCOB process is managed within the French hierarchical administration; a strength is the key role assigned to the mediator[44] who is appointed to manage the whole process. However, it is also susceptible to the ability of reluctant local elective representatives, who account for a large proportion of the committee's representatives, to delay the process or weaken the biodiversity conservation objectives in favour of stakeholder interests (Baffert, 2012). The outcome of the process in terms of biodiversity protection is therefore unreliable.

3.3.2 Consideration of ecosystem services

In the Member States reviewed in this study, the recreational, cultural and spiritual benefits provided by protected areas are generally widely recognised. For example, in Finland, the use of the larger protected areas for hunting, fishing and other recreational provisioning

[42] '*document d'objectifs*'
[43] '*comité de pilotage - Copil*'
[44] The '*Chargé de mission*' or '*animateur*'

services is highly valued. In addition the German government has commissioned a number of studies that attempt to estimate the value of protected areas for ecosystem services, such as drinking water provision, fishing, and the contribution of peatland restoration in Germany's protected areas to carbon sequestration and storage. However, the role of protected areas in maintaining regulating ecosystem services, such as water provisioning, pollination and carbon storage, is still not widely recognised in the studied countries.

Recommendations have also been produced in some countries on how to maximise synergies between biodiversity conservation and the supply of ecosystem services in protected areas (e.g. in Germany). However, although the incorporation of ecosystems into protected area management could not be examined in detail in this study, it appears that this is largely developing in a piece-meal way.

3.4 Protection levels and approaches

In much of Europe (e.g. in Finland and much of Central and Eastern Europe) the establishment of protected areas has relied to a greater extent on state-owned or state-controlled land, particularly forest. This has enabled countries with large areas of state-owned land to develop relatively large protected area networks, and to avoid, at least initially, the need for the protected area network to extend onto significant areas of private land. This has also enabled them to have relatively high protection levels. For example most protected areas in Finland prohibit land uses such as forestry. This contrasts to the situation in the UK, where less land is under state-ownership (except for some forests). Thus, the protected area system in the UK has been founded to a large extent on privately owned land. To enable this, protection (outside Natura sites) is less stringent than in many other Member States. Instead protection relies more on partnerships between authorities and landowners facilitated through encouragement/advice by conservation bodies and financial incentives (e.g. agri-environment schemes) backed up by legal measures as a last resort.

It is difficult to assess the adequacy of protection levels in most countries, especially outside Natura sites as most are inadequately monitored (as discussed in the next section). Nevertheless, some consultees considered that protected areas in their countries are not sufficiently protected. For example, though the Spanish protected area network has increased its coverage greatly over the last decade (largely through designation of Natura sites), a survey of experts in 2013 concluded that the protected area network is inadequately protected, managed and funded.

Unlike in the UK, several member states (e.g. France, the Czech Republic and Estonia) apply tiered zone protection to at least some protected areas. For example, the Estonian protected area legislation has developed a **systematic zoning approach to protection levels** that applies to all their types of protected area. It defines three protection regimes: a strict nature reserve area, a conservation zone, and a limited management zone. All types of human activity are prohibited within the strict nature reserve area, and persons are prohibited from staying in such reserves, unless they are carrying out supervision, rescue work or other essential nature protection activities. The conservation zone can be classified either as managed area or as wilderness. In the limited management zone economic activities are allowed subject to certain restrictions. All three regimes can be applied to zones within national parks and national nature reserves, whilst species protection sites and

protected landscapes can contain a conservation zone and a limited management zone. The limited conservation area designation is also used for some Natura sites that do not overlap with existing national protection areas (in which activities are allowed subject to an appropriate assessment). This zoning provides a wide degree of flexibility that enables application of an appropriate legal and administrative framework for each site, which both provides sufficient protection for the key species and habitats, and allows compatible human activities.

The Czech Republic has created the legal possibility of declaring a protective zone around a protected area if the area is considered to be under threat from influences from its surroundings.

3.5 The monitoring of protected areas

3.5.1 Monitoring approaches and coverage

All the reviewed Member States have invested most of their recent monitoring efforts in meeting the requirements of the Habitats Directive in terms of assessing the conservation status of species and habitats of Community interest, and to a lesser extent the Birds Directive. For example:

- Finland has implemented a systematic site condition monitoring system which has similarities to the UK approach, though with less detailed specifications. The Finnish system includes the systematic monitoring of management planning. Currently a baseline site assessment cycle is being carried out, which after completion by 2018 will be repeated at regular intervals.

- The Netherlands are in the process of setting up a new monitoring regime for protected areas that will need to coordinate the activities of the provincial governments. It is hoped that this will help to unify monitoring efforts to benefit Natura 2000 reporting requirements.

- In Spain, Natura 2000 management plans must define a system of indicators for specific aspects which allow comparison throughout a period of time and evaluate the impact of the actions that have been carried out (European Commission, 2014b). However, as so many plans remain undefined, it is not yet possible to undertake a systematic site condition assessment across Spain as a whole.

According to EUROPARC Espana, these obligations have helped to develop a culture of evaluation and reporting. However, although the monitoring requirements imply that data should be collected both inside and outside the Natura 2000 site network to achieve a full appreciation of conservation status, this is not definitely routinely carried out in the studied Member States other than Germany (where it also depends on the distribution of the habitat and species). This is similar to the current situation in the UK, although the conservation status of habitats and species of Community interest are assessed in all S/ASSIs, so monitoring does extend to some extent beyond the UK Natura 2000 network.

Most of the Member States reviewed in this study have not yet managed to implement a standardised national protected area site condition assessment system that goes beyond Natura 2000, in some because monitoring is a regional responsibility. Instead monitoring seems to focus on **management effectiveness assessments,** especially of large-scale protected area types, in response to the CBD targets. For example Germany, Estonia, and Croatia have all carried out management effectiveness evaluations of their national parks and some other protected areas (depending on the country). Finland carried out a systematic comprehensive international Management Effectiveness Evaluation of its protected area system in 2004-2005. These assessments use a range of different tools (as described in section 1.5.5) or are developing new tools for particular designations.

A further important observation is that broader monitoring of biodiversity beyond protected species and habitats (i.e. the designated features) and of ecological processes/functions and environmental conditions does not appear to be widely carried out in Natura sites or nationally protected areas. Consequently, in most of the Member States, monitoring of the conservation status of habitats and species could be better complemented by improved surveillance of long-term environmental changes (e.g. climate change). This is illustrated in a gap analysis of species and habitat coverage by protected areas in France, which concluded that the weakness of current information on species distribution and responses to climate change make it difficult to plan how the protected area network can be expanded to increase species resilience to climate change (Coste et al, 2010).

Nevertheless, some initiatives are underway, such as in Germany, where the state nature conservation agency has built up a long-term programme of research, capacity building, and communication on **climate change** and biodiversity. This may support efforts to adapt protected area management to climate change, for example through the climate-change adapted management planning approach developed by the HABITAT-CHANGE project (Wilke et al, 2013).

3.5.2 The costs of monitoring

Very little information was found on the cost of monitoring protected areas as this sort of information is not normally made publically available, or cannot be separated from other protected area costs. The only cost data found were for the Netherlands, where the responsibility for monitoring has recently been delegated to the provinces, and the national government is making €2 million per year available to the provinces as a contribution to the cost of monitoring. However, it is not possible to reliably equate this to a monitoring cost per designated feature or hectare of protected area.

Recent information on the costs of managing and monitoring the Natura network for some of the selected Member States in this study are listed in Table 3-1 below, though this is only of limited help as the monitoring costs are combined with management and maintenance costs. It should also be pointed out that this study relied on cost estimates supplied by the Member States, which differed significantly in their underlying assumptions and methodologies, and are therefore not directly comparable (Gantioler et al, 2010). It should also be noted that at the time of collecting these data, several of the Member States had not yet completed their site designation process and thus found it difficult to estimate

recurrent costs for the complete network. In general these are considered to be underestimates.

Table 3-1 Estimated recurrent costs for Natura 2000 management in some Member States

Source: (Gantioler et al, 2010)

Member State	Estimates of recurrent costs (annual € million)		total estimated costs (annual € million)
	management planning	habitat management and monitoring	includes one off and recurrent costs
Czech Republic	4.8	53.9	84.0
Estonia	0.8	25.0	54.6
France	40.5	413.3	473.8
Germany	117.0	343.0	620.0
Netherlands	-	110.0	315.4
Spain	332.8	705.5	1556.9[1]
UK	18.4	107.4	138.3

[1] NB: Spain is the only Member State which has actually estimated desirable costs of its Natura 2000 network – however, current "real" costs are estimated at €968 million.

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ANNEXES

ANNEXES **56**
5 Protected areas in Croatia **58**
5.1 The role of protected areas in biodiversity conservation in Croatia 58
5.2 Protected area designations and coverage in Croatia 58
5.3 Protected area objective setting in Croatia 64
5.4 Protection levels and approaches in Croatia 65
5.5 The monitoring of protected areas in Croatia 66
6 Protected areas in the Czech Republic **68**
6.1 The role of protected areas in biodiversity conservation in the Czech Republic 68
6.2 Protected area designations and coverage in the Czech Republic 69
6.3 Protected area objective setting in the Czech Republic 72
6.4 Protection levels and approaches in the Czech Republic 74
6.5 The monitoring of protected areas in the Czech Republic 75
7 Protected areas in Estonia **77**
7.1 The role of protected areas in biodiversity conservation in Estonia 77
7.2 Protected area designations and coverage in Estonia 79
7.3 Protected area objective setting in Estonia 82
7.4 Protection levels and approaches in Estonia 82
7.5 The monitoring of protected areas in Estonia 85
8 Protected areas in Finland **87**
8.1 The role of protected areas in biodiversity conservation in Finland 87
8.2 Protected area designations and coverage in Finland 87
8.3 Protected area objective setting in Finland 92
8.4 Protection levels and approaches in Finland 95
8.5 The monitoring of protected areas in Finland 97
9 Protected areas in France **98**
9.1 The role of protected areas in biodiversity conservation in France 98
9.2 Protected area designations and coverage in France 99
9.3 Protected area objective setting in France 104
9.4 Protection levels and approaches in France 105
9.5 The monitoring of protected areas in France 108
10 Protected areas in Germany **110**
10.1 The role of protected areas in biodiversity conservation in Germany 110

10.2 Protected area designations and coverage in Germany 111
10.3 Protected area objective setting in Germany 117
10.4 Protection levels and approaches in Germany 119
10.5 The monitoring of protected areas 120
11 Protected areas in The Netherlands 122
11.1 The role of protected areas in biodiversity conservation in the Netherlands 122
11.2 Protected area designations and coverage in the Netherlands 123
11.3 Protected area objective setting in the Netherlands 126
11.4 Protection levels and approaches in the Netherlands 128
11.5 The monitoring of protected areas in the Netherlands 129
12 Protected areas in Spain 130
12.1 The role of protected areas in biodiversity conservation in Spain 130
12.2 Protected area designations and coverage in Spain 131
12.3 Protected area objective setting in Spain 134
12.4 Protection levels and approaches in Spain 136
12.5 The monitoring of protected areas in Spain 137
References 139

5 Protected areas in Croatia

5.1 The role of protected areas in biodiversity conservation in Croatia

The protection of natural areas in Croatia has developed over a period of almost 100 years and played an important role in nature conservation. The current system of protected areas in Croatia was established in 1976 under the Nature Protection Act[45], and, notwithstanding several updates, has remained largely intact. Under the 2008 version of the Nature Protection Act, the network of protected areas is identified as "*a system of interconnected or spatially close ecologically significant areas (which significantly contribute to the conservation of natural balance and biodiversity with their balanced biogeographic distribution), which should include ecologically important areas of international and national importance (international conventions, the relevant EU Directives, national Red Lists of threatened species and habitats)*" (The Republic of Croatia Ministry of Culture, 2009).

Between 2000 and 2007, 40 new large protected areas were designated (Rajkovic, 2009). The rate of protected area designation slowed after the 2003 Nature Protection Law, which introduced the obligation for public consultation during the designation process. A lack of preparedness on the part of the designating authorities and the absence of compensation for income foregone in relation to restricted activities in protected areas resulted in a high degree of opposition to designation (Zupan, 2012). Several Special Reserves and one Nature Park failed to be designated as a result – frequently opposition was mounted against any category with the terms "reserve" or "park" in the title.[46] This opposition, coupled with a new caution on the part of the state administration in designating National and Nature Parks that would have to be financed by the state budget, has resulted in a higher rate of designation of Significant Landscapes instead. This situation is likely to remain until nature conservation receives more support from the public and/or the economic situation of the country improves (Zupan, 2012). The predominance of protected areas in IUCN category V means that the quality of management is more vulnerable to economic and political changes. According to a local wildlife NGO, Croatia is missing a co-ordinating strategy outlining the priorities of the protected areas at the national level, which limits an overarching approach for both designation and management of the protected areas.[47]

5.2 Protected area designations and coverage in Croatia

Around 419 areas have been protected in the Republic of Croatia in various categories, according to the Protected Areas Register of the Ministry of Environmental and Nature Protection (as of 14 October 2013). Those of interest in this study are summarised in Table 5-1 below.

The 2007 Regulation on the *Proclamation of the Ecological Network*[48] established a regulatory framework to allow for the protection of the sites proposed for inclusion in

[45] Nature Protection Act published in *Narodne novine*, no. 70/2005, as amended by no. 139/2008 and 57/2011
[46] *Pers. comm.*, Irina Zupan, State Institute for Nature Protection
[47] *Pers. comm.*, Ivan Budinski, Association BIOM
[48] as published in *Narodne novine*, no. 109/07

Croatia's Natura 2000 network. This was in effect a 'trial period' for the designation of the Natura 2000 network, based on existing information (i.e. prior to 2007).[49] It included sites designated for nationally important species and habitats alongside the proposed SCIs and, as such, covered 47% of the land and 38% of the sea area (Rajkovic, 2009). Following significant additional field research and collection of biodiversity data, a new Regulation on the Ecological Network came into effect in 2013, which reduced the size of the network on the basis of the improved information. The network is now composed of 780 pSCIs and SPAs, whilst sites of national importance have been removed.

5.2.1 Internationally designated sites

Croatia has one UNESCO Natural World Heritage Site (Plitvice Lakes National Park), with another two sites on the Tentative List (Kornati National Park and Lonjsko Polje Nature Park). Croatia has one UNESCO biosphere site (Velebit Mountain) (UNESCO, 2014).

Croatia has five Ramsar Wetlands of International Importance covering 944 km^2 as of 15 June 2014 (Wetlands International, 2014). Croatia began its inventory of wetlands in 2003, with support from the Ramsar Convention Fund (The Republic of Croatia Ministry of Culture, 2009).

5.2.2 Natura 2000

Croatia has identified SPAs and has provided a proposed list of SCIs. Based on Croatia's proposals, 12 species and two habitat types specific to Croatian and Dinaric karst have been added to Annex I and Annex II of the Habitats Directive, for which Natura 2000 sites must be designated (as well as two species listed only in Annex IV)[50]. Croatia contains 87 resident bird species, 53 regularly occurring migratory bird species, 135 other species and 74 habitat types of European importance[51].

5.2.3 Nationally protected sites

The Nature Protection Act 2008 defines nine protected area designations, seven of which are of interest to this study (Spurgeon et al, 2009; Zupan, 2012). The regional park designation was introduced in Croatia by the Nature Protection Act of 2003 (Rajkovic, 2009). Each of the national designations corresponds, to the greatest extent possible, to one of the internationally recognised IUCN protected area categories; however, Croatian protected area designations have not yet been officially categorised using the IUCN system (Zupan, 2012). Note that none of the national designations correspond with IUCN categories Ib (wilderness areas) or VI (protected areas with sustainable use areas). The protected area designations are as follows (adapted from Zupan, 2012):

- **Strict Nature Reserve** - areas of land and/or sea with unmodified or slightly modified nature, dedicated to the conservation of untouched natural areas, scientific research and monitoring of nature and education activities which do not disturb or interrupt the natural processes.

[49] Personal communication, Irina Zupan, State Institute for Nature Protection
[50] http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Changes%20HD-Croatia.pdf
[51] http://www.iucn.org/news_homepage/news_by_date/?13491/Natura-2000-Network-enlarged-with-Croatias-accession

- **National Park** - large, predominantly unchanged areas of land and/or sea, with exceptional and multiple natural values, covering one or more conserved or slightly changed ecosystems. These have scientific, cultural, educational and recreational purposes. While national parks are generally identifiable with IUCN Category II, in reality some may more closely resemble special reserves due to the high percentage of actively managed semi-natural habitats such as species-rich grasslands maintained through grazing.
- **Special Reserve** – protection of habitats of special importance (e.g. endangered habitats; habitats of endangered species).
- **Nature Park** – protection of a large natural or semi-natural area with high biodiversity or geo-diversity, and characterised by significant landscape, educational, cultural and historical values.
- **Regional Park** - large natural or partly cultivated areas of land and/or sea with ecological characteristics of international, national or local importance, with landscape values characteristic of the region in which it is situated.
- **Natural Monument** - small strongly protected areas focussed on a particular natural feature, i.e. an individual unchanged part, or group of parts, of living or not-living nature with ecological, scientific, aesthetic or educational value.
- **Significant Landscape** - natural or cultivated area of high landscape value and high biological diversity; or with cultural and historic values or landscape with preserved features characteristic for specific region, dedicated to leisure and recreation; or especially valuable landscapes as identified according to the Nature Conservation Law.

The designations **Forest Park** and **Monument of park architecture** do not correspond to IUCN categories, and are not discussed further in this review.

5.2.4 Protected area coverage in Croatia

Protected areas account for just under 12% of the terrestrial territory and 1.97% of the marine territory – resulting in just over 8% of the total area of the Republic of Croatia (see Table 5-1). (This includes IUCN category V protected areas, which cannot be separated from the data. In Croatia, many of these sites are important biodiversity areas and are vital for the overall coherence of the network).

38 SPAs have been designated[52], and the State Institute for Nature Protection (SINP) has proposed 742 potential SCIs for the Natura 2000 network in Croatia, together covering 36.67% of Croatia's land and 16.39% of its sea territory[53]. The proposal is based on detailed data collection and analysis of the distribution of the species and habitat types listed in the directives.

[52] Ordinance on conservation objectives and general conservation measures for SPAs
[53] https://www.cbd.int/doc/meetings/nr/rw5nr-ceecasi-01/other/rw5nr-ceecasi-01-croatia-en.pdf

Table 5-1: Croatia's protected area number, land surface area, and IUCN category

NB the total land area of Croatia is 56,590 km^2

Category	IUCN Category	No. of PAs	Area (km^2)	% area of Croatian territory
Internationally designated sites				
Natural World Heritage Sites	-	1 (2)	295	0.5%
Biosphere Reserves	-	1	2,000 (219 + 1,781[a])	3.5%
Ramsar Sites	-	5	944	1.7%
Natura 2000 sites				
Special Protection Areas	**IV**	**38**	**17,107**	**30.2%**
Proposed SCIs	**IV**	**742**	**16,060**	**28.4%**
Natura sites combined	**IV**	**780**	**20,755**	**36.7%**
Nationally designated sites*				
Strict Nature Reserves	Ia	2	24	0.04%
National Parks	II	8	736	1.3%
Special Reserves	IV	80	321	0.6%
Nature Parks	V	11	4,008	7.1%
Regional Parks	V	2	1,028	1.8%
Natural Monuments	III	85	2	0.004%
Significant Landscapes	V	87	1,199	2.1%
Forest Parks	n/a	32	33	0.1%
Monuments of park architecture	n/a	128	9	0.002%
Excluding areas duplicated in other PA categories:	n/a		**- 578**	-1.0%
Total		**435**	**6,782**	**12%**

Source: UNDP and GEF (2013), World Heritage Sites List[54], UNESCO (2014), Wetlands International (2014). Notes: *Excluding IUCN category V and VI sites. [a] core area + buffer zone. For 'Percentage of terrestrial area of Croatia' a land area of 56,594km^2 was taken[55] - calculations are own. Note: IUCN categories V are included as they cannot be separated from the rest of the data without affecting the calculations regarding duplicated areas. The correspondence between the national protected areas and IUCN categories are taken from Zupan (2012).

[54] http://whc.unesco.org/en/list/
[55] http://en.wikipedia.org/wiki/Croatia

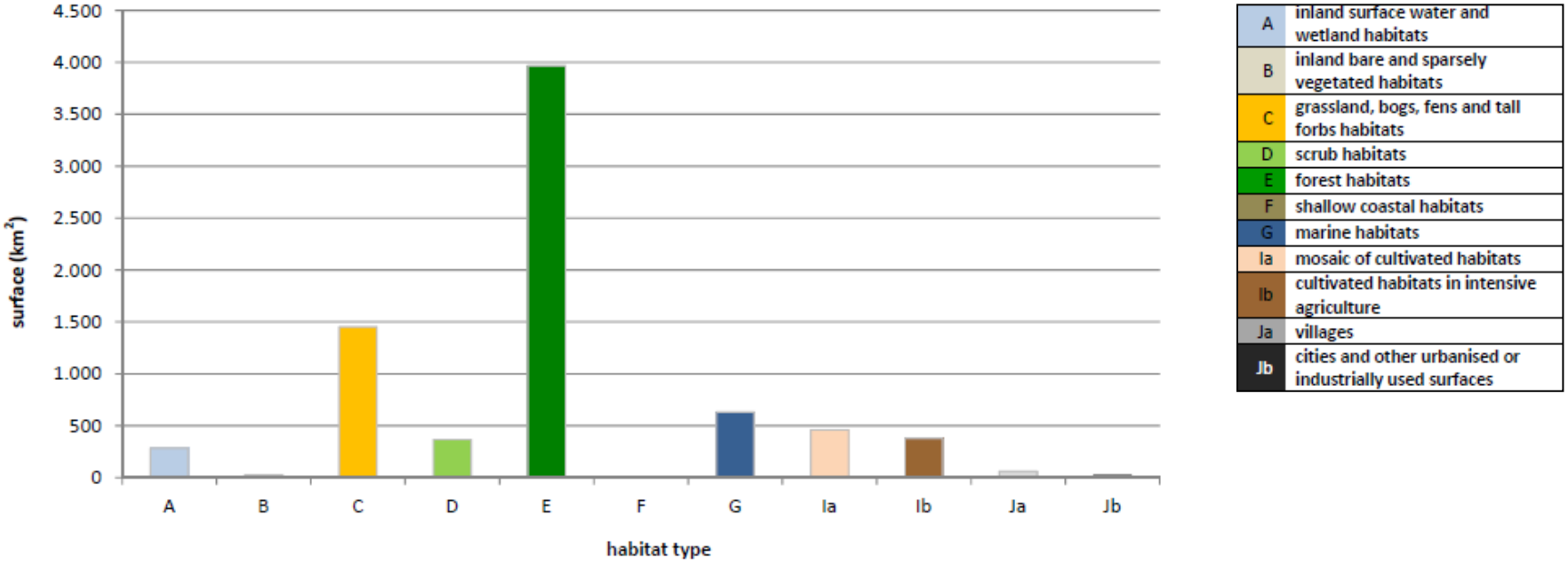
More than half the protected area surface in Croatia is in Nature Parks. Additionally, considerable area is designated as Significant Landscape, Regional Park and National Park which together cover 84% of the protected area. As a consequence, protected areas that come under IUCN Category V represent by far the most prominent protection category in terms of area covered. This, according to the current Head of Protected Areas Department in the State Institute for Nature Protection, is unbalanced and reduces the network's effectiveness (Zupan, 2012).

The geographical distribution of Croatian terrestrial protected areas reflects the reality of Croatian history and demographics rather than necessarily the sites' relative importance in the country. Of the three European biogeographical regions represented in Croatia, it is the smallest but least densely populated Alpine biogeographical region that is best covered by protected areas; while the Mediterranean region is proportionally most poorly represented, primarily as a consequence of the poor coverage of marine areas (Zupan, 2012). There has also been a trend for designation of the more strictly protected area categories in Alpine and Mediterranean regions (predominately in karstic parts of the country) while in the Continental biogeographical region, most of the protected areas are of IUCN category V (Zupan, 2012).

Freshwater and wetland habitats are proportionally the most covered by protected areas (46% of the habitat type area) but predominately afforded protection equivalent to IUCN category V (37% of total habitat type area) (Zupan, 2012). Forests represent the largest habitat type within protected areas (see Figure 5-1). However, with only 2.5% of total forest area in categories strictly preventing their economic use (strict reserve, national park or special reserve), there are large areas of important woodland that are not adequately protected by the Croatian protected area network (Zupan, 2012). Overall, 16% of forest area is within some form of protected area.

Figure 5-1 Representation of habitat types in protected areas of Croatia (terrestrial & marine)

Source: (Zupan, 2012)



5.3 Protected area objective setting in Croatia

5.3.1 Natura 2000

There is currently no plan to systematically designate Natura 2000 sites under national designations, but 26.14% of the Natura 2000 sites are already protected under a national designation, i.e. 87.17% of nationally designated are (or will be) part of Natura 2000.[56] In these cases, the Natura 2000 conservation objectives for each site will be integrated into each protected area planning framework (see below). For the future SACs outside current protected areas, the SINP is proposing a number of suitable management models for Natura 2000 sites, with the aim of exploring a range of options, and a unified national management framework will be finalised in discussion with stakeholders within the next 5 years.[57]

5.3.2 Nationally protected areas

The Nature Protection Act 2008[58] specifies that strict reserves, national parks, special reserves, nature parks, regional parks and protected landscapes are managed on the basis of management plans (Rajkovic, 2009). These plans should define management objectives, activities necessary to achieve the objectives and the indicators needed to assess progress. The Nature Protection Act does not refer to ecosystem services (Zupan, 2012). Plans are developed for a period of ten years with the option for change or amendment after five years. The need for protected areas to develop management plans was established by the earlier Nature Protection Act 2003, and efforts to standardise the management of protected areas intensified from 2005 in order to ensure minimum protected area management standards (Rajkovic, 2009).

The Croatian Parliament is responsible for designating **National Parks** and **Nature Parks** and they are managed by park authorities set up and at least partially funded by the state (UNDP and GEF, 2013). Of the 19 national and nature parks, 14 had implemented management plans as of 2009, while a further three were in development (Rajkovic, 2009).

Strict Nature Reserves and **Special Reserves** are designated by the Government but managed by the county (UNDP & GEF, 2013). As of July 2009, all counties – except the City of Zagreb - established public institutions for the management of protected areas and/or other protected natural assets, and most of them have already become operational (Rajkovic, 2009). Management plans are expected to serve as a basis for the annual protected area programmes[59] adopted by the relevant public institutions, subject to a prior opinion of the State Institute for Nature Protection and approval from the Ministry of Culture.

Currently, only around 15 protected areas (national parks and nature parks) have defined conservation objectives and management plans, whilst the majority of Croatian protected

[56] Personal communication, Irina Zupan, State Institute for Nature Protection
[57] Personal communication, Irina Zupan, State Institute for Nature Protection
[58] Nature Protection Act 2008 Art. 138
[59] Annual Protected Areas Protection, Maintenance, Conservation, Promotion and Utilization Programmes

areas have no defined objectives. There is an ongoing effort to do this for all existing areas through the management planning process.[60]

5.4 Protection levels and approaches in Croatia

5.4.1 Natura 2000

Croatia's 38 SPAs and its 742 proposed SCIs are all covered by the Ecological Network Regulation. All plans, programmes or projects that may significantly affect the conservation objectives and integrity of the SPAs and the sites that are proposed as SCIs are subject to appropriate assessment, as defined by the regulation[61].

General protection measures for all the habitat types listed by the EU Habitats Directive, the Bern Convention[62], and those threatened on the national level are set out in the 2006 Ordinance on the "*Classes of Habitat Types, Habitat Maps, Threatened and Rare Habitat Types and Measures for the Conservation of Habitat Types*". The Ordinance covers most of the natural or semi-natural types of habitats and ecosystems in Croatia (The Republic of Croatia Ministry of Culture, 2009). The specific Natura 2000 site protection measures must be further developed and embedded into spatial plans and sectoral plans as well as any site management plans. The SINP recognises that as Croatia is proposing a large Natura 2000 network, and its capacities are limited, it needs to be inventive and explore all options thoroughly.[63] Currently the site management relies on agri-environment contracts under the Rural Development Programme.

5.4.2 Nationally protected sites

The Nature Protection Act 2008 regulates the methods of protection designation, the administration, management and control of particular protection designations, and establishes the procedure for the revocation of protection if the features of a site that led to the designation of a protected cease to exist. Under the instrument of preventative protection, all proposed protected areas[64] are subject to all provisions of the Nature Protection Act for a period of three years so that endangered sites can have emergency protection even if the designation process is not completed (Rajkovic, 2009).

According to a national NGO, although National Parks and Strict Nature Reserves offer high protection from hunting and exploitation of resources, implementation is often quite poor.[65] In particular, there appears to be an emphasis within government of ensuring the protected area network pays for itself though tourism, which has led to inappropriate developments (such as ski resorts and hotels) within protected areas themselves. Nature Parks were deemed to have been relatively successfully at halting trends in biodiversity loss,

[60] Personal communication, Irina Zupan, State Institute for Nature Protection
[61] Regulation on Proclamation of the Ecological Network as published in *Narodne novine*, no. 109/07
[62] Convention on the Conservation of European Wildlife and Natural Habitats (1996) Resolution 4
[63] Personal communication, Irina Zupan, State Institute for Nature Protection
[64] From the initiation of the protection procedure, and/or after identification as a potential protected area in a baseline study by the State Institute for Nature Protection (SINP)
[65] *Pers. comm.*, Ivan Budinski, Association BIOM

but less so at restoring populations, as, typically, they do not prohibit hunting and resource exploitation.

In **Strict Nature Reserves**, all activities and works that can damage the free evolution of nature and public access are forbidden, and any exceptions for permits must be granted through the Ministry for Environment and Nature Protection. In **National Parks**, the economic usage of natural resources is forbidden. In **National Parks** and **Nature Parks**, the organization of space, land uses, physical planning and protection are governed by spatial plans for areas with special characteristics, adopted by the Croatian Parliament (The Croatian Parliament, 2008). National Parks and Nature Parks are managed by park authorities set up and at least partially funded by the state.

Internal Organization Rules regulate and lay down in more detail the issues of and measures for the protection, conservation, enhancement and utilization of protected areas (Rajkovic, 2009). The SINP and the Ministry of Culture's Nature Protection Directorate updated and digitalised the boundaries of more than 50 protected areas within a national GIS database at a 1:25,000 scale (Rajkovic, 2009). However, much legal uncertainty remains with regard to the boundaries of the other areas.

The protected area zoning system is considered to be "totally or mostly inadequate" to achieve the protected area objectives in as many as 84% of the counties in Croatia according to a survey of the opinions of public institutions and stakeholders (Rajkovic, 2009). The same survey produced responses that suggested land use in the surrounding area fully or mostly fails to enable effective protected area management in as many as 53% of the counties, which suggests that it constitutes a major issue (Rajkovic, 2009). Most of the county-level public institutions feel that the spatial planning sector (responsible for the issue of location and building permits) fails to involve them in procedures for the issue of permits and documents when needed. It has also been stated that the existing amendments to spatial planning documents fail to take due account of the ecological network. The Ministry of Culture claims that the ecological network is now being incorporated into amendments made to spatial planning documents, but its sites are still ignored when planning the use zones of particular areas (Rajkovic, 2009). According to a local NGO, insufficient work is being carried by the government in this area. [66]

5.5 The monitoring of protected areas in Croatia

5.5.1 Site condition assessment

The Croatian Government reported in 2009 that it has started an inventory of habitats, and developed a manual for inventory and monitoring of habitats and held educational workshops (The Republic of Croatia Ministry of Culture, 2009). Monitoring the state of species and habitats of European significance in Natura 2000 sites is "mandatory" (The Republic of Croatia Ministry of Culture, 2009) – although no more details were provided. The main challenge in the coming decade will be to develop the monitoring system along with the effective management of national protected areas and Natura 2000 sites.

[66] *Pers. comm.*, Ivan Budinski, Association BIOM

The Croatian Environment Ministry maintains a Register of Protected Areas, which covers national designations, and contains the basic information on designation, but no spatial data (GIS), conservation objectives or any management related data. Since some protected areas have over time lost the values for which they were designated, and the boundaries of some areas were not precisely defined at the time of designation, the Register has been reviewed (Zupan, 2012). This resulted in the termination of only a few designated sites, mainly solitary trees which had died, and did not affect representativeness or coverage. The Register is not currently useful for site monitoring, but there are plans to link it to the spatial data[67], and to make it all public on one website by the end of 2014.

5.5.2 Management effectiveness evaluation

The Nature Protection Act does not set any requirements for conservation planning or management effectiveness (Zupan, 2012). To establish initial assessment of management effectiveness, Croatia has started to use the Management Effectiveness Tracking Tool, and is now piloting the use of CMSi software[68] for site management and monitoring – initially for nationally designated areas and later, if found suitable, for some or all Natura 2000 sites.[69] The management effectiveness of national and nature parks and public institutions at the county level in Croatia was assessed in 2008 using the Rapid Assessment and Prioritisation of Protected Area Management (RAPPAM) system (Rajkovic, 2009). According to the assessment, the existing ecological and socio-economic data are deemed to be totally or mostly inadequate for management planning in as many as 84% of the counties. While adequate means for collecting new data exist or mostly exist in the majority of public institutions at the county level (74%), there are insufficient systems for processing and analysing data in almost two thirds of the county-level public institutions (63%). Similarly, research on key ecological issues is fully or mostly consistent with the needs of protected areas in only 42% of the county-level public institutions. Only 74% of the county-level public institutions identify and prioritize their critical research and monitoring activities.

[67] Available at: http://www.arcgis.com/home/webmap/viewer.html?webmap=20428a6f76494689b680a161698da414&extent=11.9733,42.2877,21.7896,46.5836.

[68] http://www.software4conservation.com/

[69] Personal communication, Irina Zupan, State Institute for Nature Protection

6 Protected areas in the Czech Republic

6.1 The role of protected areas in biodiversity conservation in the Czech Republic

'Territorial protection' is an important instrument of Czech Nature and Landscape policy, which contributes to biodiversity conservation (Ministry of the Environment of the Czech Republic, 2014a). The Czech National Biodiversity Strategy (2005) considers *in-situ* biodiversity conservation to be "the most effective approach", including management of protected areas, provision for an ecological network, and species protection in their natural habitats (Ministry of the Environment of the Czech Republic, 2005). It states that the objective of protected area management is to preserve a representative sample of ecosystems, species and habitats of special conservation interest. These Czech National Biodiversity Strategy objectives were directed towards achieving the CBD target to protect areas of particular biodiversity importance by 2010, as noted by the Czech Republic government National Report to the CBD in 2009 (Ministry of the Environment of the Czech Republic, 2009). As no new national report or biodiversity strategy has been published since, the envisaged role of the Czech protected area system in achieving the goals of the EU 2020 Biodiversity Strategy is unclear. However, it seems reasonable to assume from the approach to the 2010 target that protected areas will remain a key instrument in conserving biodiversity.

The Czech protected area network has been gradually established over many decades, and the goals and outcomes have changed several times during this period. In the opinion of the Czech NGO CSOP, the network is quite varied, but, in total, more or less sufficient.[70] However, nature protection is still largely the task of NGOs and private landowners, rather than state-led.

Czech legislation gives general protection to populations of all wild fauna and flora from activities which may cause deterioration in their condition, including protection of wild birds in accordance with the Birds Directive[71]. Special, stricter protection applies to a list of specially protected species and categories of endangerment, including species listed in the Habitats Directive[72] (Ministry of the Environment of the Czech Republic, 2005). This legislation protects species, habitats and ecosystems across the Czech territory and prohibits activities which may cause deterioration in their condition; however, it does not make provision for the implementation of active management measures to maintain the quality of these features. Nevertheless, it does constitute some legislative provision for biodiversity conservation outside protected areas as well as within. In practice, however, the protection of species and natural habitats faces significant difficulties.[73]

[70] Personal communication, Stanislava Bartošová, CSOP

[71] Act No. 114/1992 Coll., on the Protection of Nature and the Landscape, as amended by Act No. 218/2004 Coll. (henceforth the Nature Protection Act) as well as other legislation on the conditions for the import and export of wild fauna and flora; the species and habitats of European importance present in the Czech Republic are listed in Decree No. 166/2005 Coll. and in Government Regulation No. 51/2005 Coll. (Ministry of the Environment of the Czech Republic, 2009).

[72] Decree No. 395//1992 Coll., as amended due to implementation of the Habitats Directive

[73] Personal communication, Stanislava Bartošová, CSOP

There is provision for habitat protection in Czech law through the territorial system of ecological stability (TSES), an ecological network dating back to the 1970s. This is a network consisting of 'biocentres' and 'biocorridors', which can be optionally included in spatial planning (Bucek et al, 2012). Biocentres are areas that should enable, due to their size and ecological conditions, the permanent existence of a variety of species in the landscape and include a range of natural and more man-made or agricultural landscapes. Biocorridors are designed to connect biocentres and thus enable migration, interaction and landscape permeability (Bucek et al, 2012). These areas need not be designated as protected areas. Protection of this network is mandatory however for all landowners within its boundaries (although it is a little unclear exactly what this entails – it seems to be some form of planning restriction).

6.2 Protected area designations and coverage in the Czech Republic

Protected areas are designated under the Nature Protection Act[74], according to the territorial protection framework. The framework makes provision for the designation of protected areas: Natura 2000 sites, nationally designated large-scale sites (two designations), and nationally designated small-scale sites (four designations) (Miko and Hosek, 2009).

The national categorization of protected areas is not based on the IUCN categorization system. Czech classifications are made on the basis of a current value or quality of nature, rather than a type of management. As such, Hošek (2013) notes that alignment of Czech protected areas with the IUCN categories can be confusing.

6.2.1 Internationally designated sites

The Czech Republic has 14 sites designated as Wetlands of International Importance under the Ramsar Convention, which have an area of 60,207 ha (Wetlands International, 2014).

No Natural World Heritage Sites have been designated in the Czech Republic (although the country has several cultural sites).

Six Biosphere Reserves have been designated in the Czech Republic, one of which (the Krkokonose Mountains) is a trans-boundary reserve with Poland (where it is known as Karkonosze) (UNESCO, 2014).

6.2.2 Natura 2000

On its accession to the EU in May 2004 the Czech Republic accepted commitments to develop a network of PAs of European importance as part of the Natura 2000 network. These responsibilities, under the Birds and Habitats Directives, were transposed into Czech law through the Nature Protection Act.

[74] Act No. 218/2004 Coll., which amended Act No. 114/1992 Coll. (Ministry of the Environment of the Czech Republic, 2009)

- SPAs – Currently 41 SPAs have been designated for the protection of listed rare and migratory bird species, covering 8.92% of Czech territory.

- SACs – The Czech Republic consists of two biogeographic zones, as defined by the European Commission (the Continental zone, which covers 96% of Czech territory, and the Pannonian zone, which covers 4%). SCIs have been proposed for each of these zones and are listed in a Government Regulation most recently amended in 2013. Currently 1,075 of these areas have been fully designated and protected as SACs, covering 9.96% of Czech territory.

It should be noted that SPAs and SACs can overlap with each other, and with Czech protected area designations. The full extent of Czech territory currently covered by a Natura 2000 designation is 14.03%.

6.2.3 Nationally protected areas

Six national protected area designations can be used in the Czech Republic[75]. In Czech legislation, these are referred to as **Specially Protected Areas** (not to be confused with SPAs designated under the Birds Directive) (Ministry of the Environment of the Czech Republic, 2009). Specially Protected Areas covered 15.8% of the country in 2010, and they are increasing in number and area (Zedek et al, 2010). Protected areas are split into 'large-scale specially protected areas' (covering 15.3% of total country area) and 'small-scale specially protected areas', which may be located either within or outside large-scale protected areas (covering in total about 1% of the Czech Republic) (Zedek et al, 2010).

The types of large-scale protected area designations are:

- **National Parks** – extensive territories that are considered nationally or internationally unique, a considerable part of which consist of natural ecosystems or ecosystems little affected by human activities, in which plants, animals and inanimate nature are of exceptional scientific and educational significance[76]. Four National Parks have been designated, covering an area of 119,120 ha, equivalent to 1.51% of the country's surface area.
- **Protected Landscape Areas** – These areas are defined as extensive territories having a harmoniously formed landscape, characteristic relief, a significant proportion of which consist of natural forest or grassland ecosystems, or with preserved monuments of historical settlement[77]. Although the designation has purposes specifically biodiversity conservation, the preservation of 'natural values' is one of the key aims, so the designation is included in this review. 25 Protected Landscape Areas are currently designated, covering 13.81% of Czech territory.

The small-scale protected area designations are:

[75] Under the Nature Protection Act (114/1992) (Sec. 14)
[76] Art 15 of the Act on the Conservation of Nature and Landscape
[77] Art 25 of the Act on the Conservation of Nature and Landscape

- **National Nature Reserves** – These protected areas are defined as smaller territories of exceptional natural value, where the natural relief, together with a typical geological structure, forms ecosystems which are unique and significant on a national or international scale[78]. 109 National Nature Reserves have been designated which in total cover 0.39% of Czech territory.

- **National Nature Monuments** – Smaller 'natural formations' can be designated as National Nature Monuments, in particular geological or geomorphologic formations, mineral deposits, or rare and endangered species in fragments of ecosystems that are of national or international environmental, scientific or aesthetic significance (Art 35). Currently 113 National Nature Monuments have been designated, which only cover 0.06% of Czech territory.

Additional small-scale protected areas include **Nature Reserves**[79] and **Nature Monuments**[80], which receive similar protection to their national relatives, but are defined on the basis of regional or local significance, and are the responsibility of regional authorities, unless they are located within the boundaries of a National Park or Protected Landscape Area (Ministry of the Environment of the Czech Republic, 2009). These protected areas are designated by regional nature protection agencies and are therefore not considered further in this review. However, these designation categories do include by far the greatest number of individual protected sites of all the Czech protected area designations (see Table 6-1). Many Natura 2000 sites are designated as either Nature Reserves or Nature Monuments, especially where protected species populations or habitat fragments may not be large enough for designation as National Parks or Protected Landscape Areas.

6.2.4 Protected area coverage

It is calculated that 21.4% of Czech territory is designated as some form of protected area[81], considering both the nationally designated specially protected areas and Natura 2000 sites outside these areas (but not including international designations).

[78] Art 28 of the Act on the Conservation of Nature and Landscape
[79] Art 33 of the Act on the Conservation of Nature and Landscape
[80] Art 36 of the Act on the Conservation of Nature and Landscape
[81] Czech government figures provided by Pavlína Kuncová of the Ministry of the Environment of the Czech Republic, current on 09/08/2013.

Table 6-1: Protected area number, land surface area, and IUCN category in the Czech Republic

NB site designations are overlapping so this list adds up to more than the total protected area. Czech Republic land area is 78,866 km^2.[82]

Protected area designation		IUCN category (indicative)	Number	Area (km^2)	Percentage of terrestrial (%)
Internationally protected sites					
1	Ramsar Sites	-	14	602	0.76
2	Natural World Heritage Sites	-	0	0	0
3	Biosphere Reserves	-	6	4,505	5.71
Natura 2000					
1	Special Protection Area	IV	41		8.92
2	Special Areas of Conservation	IV	1,075		9.96
	Natura 2000 sites combined	IV	1,116	11,061	14.03
Nationally protected areas*					
1	National Parks	II (or V)	4	1,191	1.51
2	Protected Landscape Areas	II (or V)	25	10,889	13.81
3	National Natural Monuments	III	113	45	0.06
4	National Nature Reserves	IV	109	286	0.36
5	Natural monuments (provincially designated)	III	1329	255	0.32
6	Nature reserves (provincially designated)	IV	804	393	0.50

Sources: Natura 2000 and National protected areas - Ministry of the Environment figures[83]; Ramsar Sites Database (Wetlands International, 2014); Directory of the World Network of Biosphere Reserves: Czech Republic (UNESCO, 2014). Notes: *Excluding IUCN category V and VI sites.

6.3 Protected area objective setting in the Czech Republic

6.3.1 Natura 2000

In the Czech Republic, SCIs may be nationally designated as Specially Protected Areas (see above), or given so called 'basic protection' in cases where a satisfactory conservation status can be maintained without any special or active management measures at site level (these sites are assigned no national designation). All SPAs receive 'basic protection'. Where Natura 2000 sites are nationally designated (in the majority of cases), management plans should be prepared according to a methodology outlined in a ministerial decree, and they must be approved by the Ministry of Environment (European Commission, 2014). For sites given 'basic protection' a special 'set of recommended measures' should be prepared as a shorter alternative to a management plan. Only internal guidance has been developed on how to produce these documents, but they should basically consist of an identification and description of the protected area and an expert explanation of the goals and management measures proposed for the target species or habitat. These documents are not published on

[82] http://en.wikipedia.org/wiki/Czech_Republic

[83] Czech government figures provided by Pavlína Kuncová of the Ministry of the Environment of the Czech Republic, current on 09/08/2013.

the ministerial website, but full details of adopted sets of recommended measures can be found in the Central Register of Nature Conservation[84].

6.3.2 Nationally protected sites

The conservation objectives for the different Czech Specially Protected Area designations are defined in the legal designation act for the site and are further elaborated in management plans. The structure of these plans is specified in a ministerial decree[85].

The nature conservation authorities are required to propose and approve a plan for the care of each **National Park** (the Management Plan), which usually details the management for a ten-year period, under the Nature Protection Act. The plan must be based on the zoning of the National Park territory into three zones according to 'natural values', with the strictest protection granted to the core area. The Management Plan should specify the long-term and short-term tasks for the protection of flora and fauna, for forest and soil care, and landscape protection. It should also outline the limits of settlements, and actions regarding transport, tourism and other management issues. This plan should serve as a binding foundation for the activities of the nature conservation authorities. Objective setting and management planning for Czech National Parks involves voluntary bilateral collaboration, as these are effectively cross-border parks, linked to protected areas in Germany, Austria and Poland.

Protected Landscape Areas are also split into at least three zones (usually four), with specific conservation objectives adjusted accordingly. The appropriate nature conservation authorities are required to preserve and approve Care Plans for these areas, detailing the management for a period of 10-15 years. These plans are designed to regulate and influence human activities with regard to the mission of Protected Landscape Areas and to set medium and long term nature conservation tasks, particularly for the care of flora and fauna. These plans arise from the conditions of protection detailed in the Nature protection Act and form the foundation for other planning.

As **National Nature Reserves** are designated to protect specific ecosystems that are considered unique and significant on a national or international level, the maintenance or improvement of the ecosystem must be the primary conservation objective of the protected area. Management Plans which detail proposed conservation measures (and which must therefore set out conservation goals) must be prepared for each site and approved by the national nature conservation authority[86].

Similarly, as **National Nature Monuments** are designated to protect natural features of smaller extent, such as rare or endangered species in habitat fragments that are considered to be of national or international importance, the maintenance or improvement of this feature must be the primary biodiversity conservation objective for the protected area (where appropriate – some National Nature Monuments are designated to protect geological or geomorphic features). Management Plans which detail proposed conservation

[84] However, an overview of several existing sets of recommended measures, produced for SPAs, can be found here: http://www.mzp.cz/cz/souhrn_doporucenych_opatreni
[85] Ministerial decree No. 64/2011 Coll
[86] under Sec. 38 of the Nature Protection Act

measures (and which must therefore set out conservation goals) must be prepared for each site and approved by the nature conservation authority[87].

6.4 Protection levels and approaches in the Czech Republic

6.4.1 Natura 2000

Once SCIs have been established, these sites can be protected under Czech law under one of the national specially protected area designations where strict protection is required to meet conservation objectives, or given general protection, where maintenance targets have been set (i.e. current species or habitat levels and quality are satisfactory). These areas are protected through the Government Regulations that transpose the protection requirements for Natura 2000 areas as defined in EU legislation (see section 1.5.2).

Under Czech nature conservation law SPAs are awarded 'general protection', but are not given a national designation and so the law sets no specific protection conditions for them.

6.4.2 Nationally protected sites

The Nature Protection Act defines general protection conditions that prohibit certain activities for every specially protected area designation. More specific protection conditions, detailing activities that will require prior approval by the nature conservation authority, are specified in the designation acts for specific protected areas, according to their conservation objectives.

The level of protection accorded to areas within **National Parks** is dictated by the territorial zoning of the park. These protected areas are split into three zones, with the strictest protection in the core and measures and forms of protection adjusted accordingly. The Nature Protection Act defines numerous basic restrictions for National Parks with regard to intensive farming, waste disposal, recreational or mass public activities, development and extraction of materials. Access to national parks is generally limited, particularly for vehicles and tourist activities, and a binding set of visitor rules apply. No new building is allowed within the core zone of a National Park, visitors must keep to paths and the alteration of cultivation regimes is restricted.

In **Protected Landscape Areas,** general, recreational use is admissible, provided it does not damage the natural values of the area. The Nature Protection Act defines basic restrictions on waste disposal, development, off-road driving and pollution. Further restrictions apply according to the zones of graded protection (Ministry of the Environment of the Czech Republic, 2014b). For instance, the placing of new buildings within the core zone is prohibited, as is a change in land use.

The Nature Protection Act states that the utilisation of **National Nature Reserves** is possible only if their natural environment is preserved or improved, and applies strict restrictions on development, intensive agriculture, mineral extraction, the use of motor vehicles and camping. As in all specially protected areas, the exact conditions of the protection of

[87] under Sec. 38 of the Nature Protection Act

National Nature Reserves are designated by the national nature conservation authority, who also specifies the conditions of their protection.

The alteration of, or damage to, **National Nature Monuments** is strictly prohibited in the Nature Protection Act. It is also specified that state owned natural areas within these protected areas cannot be 'alienated' (sold by the state). The particular conditions of protection for each National Nature Monument are specified by the appropriate conservation authority when the protected area is designated.

If a Specially Protected Area is under threat from "disturbing influences" from its surroundings, a **protective zone** may be proclaimed for this area, where it is possible to specify actions that require prior approval from nature conservation authorities. National Nature Reserves, National Nature Monuments, Nature Reserves and Nature Monuments automatically have a protective zone which extends 50m from the border of the protected area[88].

The quality of conservation in protected areas is very variable, depending on who is responsible for management and what resources they have. In general, the smaller protected areas (nature reserves and nature monuments) have sufficient legislative protection, but management is inadequate, and in many areas their valuable features are threatened. In the large scale protected areas (national parks and protected landscape areas) the problems lie mainly with insufficient regulation of housing development. In forest areas, there is a conflict with the national forest law, which is oriented to productive forestry and not nature protection. A more general problem is the use of agricultural payments for intensive agriculture which is damaging sites, rather than environmental options.[89]

6.5 The monitoring of protected areas in the Czech Republic

Monitoring of protected areas is the responsibility of county and state administrators, and there is little information available at the national level to assess the extent of monitoring.[90] It appears that there is no comprehensive monitoring scheme or system focused specifically on protected areas in operation in the Czech Republic, neither at site nor network scale. The Nature Conservation Agency of the Czech Republic does carry out regular surveillance to collect information on the conservation status of species and habitats (both protected and unprotected) at a national level in order to meet the requirements of the Habitats Directive) The second round of this surveillance and mapping is currently underway, having begun in 2007, and will be spread over a 12 year period. This information is used for various purposes which can include the evaluation of protected areas, however, the surveys in question have not been designed for this purpose and this surveillance does not constitute a protected area monitoring system.

A protected area-specific evaluation (which does not specifically require the collection of any new data) is carried out only when site management plans are due to be updated (every

[88] Defined in the Nature Protection Act Sec 37
[89] Personal communication, Stanislava Bartošová, CSOP
[90] Personal communication, Stanislava Bartošová, CSOP

10-15 years, as determined by law) and focuses on the period for which the previous management plan was valid. Site-specific monitoring within individual protected areas may occur at the discretion of the appropriate management authority, for example for international designations or for specific research purposes, but this does not form part of any national system and is not required by law.

7 Protected areas in Estonia

7.1 The role of protected areas in biodiversity conservation in Estonia

The objectives governing the designation of protected areas in Estonia have evolved over a period of 100 years with the approach to protecting species and habitats changing significantly over that time. Until recently, nature conservation had mostly been focused on the protection of individual objects or territories (Klein and Hermet, 2012) with protected areas designated on the basis of preventing the extinction of rare habitats and species (Vellak et al, 2009). Consequently, species with a widespread distribution dependent on extensive agriculture had been ignored until relatively recently, with the consequence that the occurrence and distribution of these species and habitats have depended to a greater extent on sectoral policies (Vellak et al, 2009). Increasingly, however, the modern approach aims to consider the countrywide network of habitats and valuable landscapes as a whole (Klein & Hermet, 2012). This has led to the establishment of the Estonian Green Network and an increase in protected areas created through a series of legal acts influenced by international approaches to conservation biology (Vellak et al, 2009).

The main legal instrument governing nature conservation in Estonia is the Nature Conservation Act (2004) which establishes the general framework for the designation of protected areas, and sets out the rules for territorial zoning and management plans. Under the Act, nature is protected via regulating the use of areas important for nature conservation; namely establishing protected areas, limited-conservation areas and species protection sites, regulating transactions with individuals of protected species and establishing liability for violations.

The approach to nature conservation was further updated by the *Nature Conservation Development Plan until 2020* (Estonian Ministry of Environment, 2012), which sets out how Estonia intends to meet the headline target of the EU Biodiversity Strategy. Protected areas form an important part of meeting Estonia's obligations under the CBD and EU strategy. The plan is focussed around three strategic goals:

- increasing awareness of nature amongst the general public;
- achieving favourable conservation status of habitats and species and ensuring the diversity of landscapes through a coherent ecological network; and
- achieving long-term sustainability of natural resources through adopting an ecosystem approach.

The plan states that "*the network of protected areas should be developed on the basis of representativeness and the principle of ecological coherence*" (Estonian Ministry of Environment, 2012). Although it does not set out its underlying principle on how this is to be achieved, the plan does specify national targets for the protected area network and a number of quantitative targets are set for achieving favourable conservation status of different habitat types and species. Targets included in the plan that refer to protected areas include:

- Due protection is to be ensured for a typologically representative set of forests (10% - up from 8.7% in 2011), and the habitat requirements of old growth forests species are to be known by 2020.
- Restoring threatened mire habitats in protected areas – specifically 10,000 ha of fen and transition mire habitats and raised bog margins restored in protected areas by 2020.
- Improve the conservation status of 14 habitat types and establish the conservation status of all habitat types by 2020.

Nevertheless, some of the targets are less clear about the role that protected areas will play, and could be referring to areas in the wider countryside, including targets to:

- Increase area of mire communities with a restored natural water regime from 100ha in 2011 to 10,000ha by 2020.
- Increase number of species with appropriate conservation guidelines from 45 in 2011 to 155 by 2020.
- Increase the conservation status of 28 species by 2020 and establish the conservation status of all species listed under Annexes II, IV and V of the Habitats Directive.
- Increase the percentage of wild bird species in a good conservation status from 65% in 2011 to 80% by 2020.

Estonia has a specific system for protecting species outside the main designated protected areas (so-called species protection sites), which impose restrictions on activities within important areas for protected species (see below).

An important framework for nature conservation in Estonia, especially concerning areas that are not legally protected, is the Green Network. The network primarily aims to ensure the ecological coherence of habitats and to facilitate the migration of species but incorporates broader goals that incorporate elements of sustainable development such as, buffering undesirable impacts on habitats, efficiently planning human settlements, reducing pollution, increasing recycling and providing opportunities for recreation (IEEP and Alterra, 2010). The concept of a green network was developed in Estonia in the early 1980s originally known as “network of ecologically compensating areas” and adopted a multi-functional approach to ecological networks based on a strong land-use planning tradition with wilderness and areas of conservation value considered to be core areas interlinked by natural and semi-natural landscapes (Sepp et al, 2002). The Act on Planning and Building provides the legal background for the implementation of the network through the national spatial planning process (Kimmel et al, 2010). The concept and functioning of the Green Network is to be reviewed in light of the EU Green Infrastructure Strategy (Estonian Ministry of Environment, 2012).

7.2 Protected area designations and coverage in Estonia

7.2.1 Internationally designated sites

The Ramsar Convention came into force for Estonia on 29 July 1994. The country now has 17 sites designated as Wetlands of International Importance under the Convention, which have a surface area of 305 km^2 (Wetlands International, 2014).

Estonia has no Natural World Heritage Sites despite there being several cultural sites. Nevertheless, the country has submitted a proposal for Wooded Meadows to be accepted as important Cultural Landscapes, identifying eight separate locations throughout the country as the most representative habitats.[91]

7.2.2 Natura 2000

Estonia has 608 Natura 2000 sites as of 2012 (Peterson et al, 2014). Estonia's Natura 2000 areas were predominately selected at the time of European Union accession in 2004. An analysis by the European Commission into the adequacy of the Sites of Community Importance (SCIs) used as its basis the principle that at least 20-60% of the total area of every habitat and 20-60% of the population of each species (or of all places in which they are found in the country) must be under protection (Klein & Hermet, 2012). The assessment, along with the boreal regional seminar (2005) and the Baltic Sea region seminar (2009), identified particular species and habitat types that required further protection and the network has been subsequently supplemented (Klein & Hermet, 2012).

7.2.3 Nationally protected sites

The approach to protected areas in Estonia is set out by the Nature Conservation Act 2004. The Act sets out six different "*protected natural objects*" – i.e. designated areas - representing different approaches to nature conservation. (Note: the Estonian government's English language literature uses the term 'Protected Areas' to refer to only a particular designation category). These protected natural objects include:

1. Protected Areas
2. Limited-conservation area;
3. Species protection sites;
4. Individual protected natural monuments; and
5. Natural objects protected at the municipal level.

The Forest Act 2007[92] outlines an additional category:

6. Woodland key habitats

Note, however, that the actual regulatory restrictions are determined by the 'protection regimes' (see below). In addition, there are 107 protected areas with unrevised protection rules – i.e. those dating back to the Soviet era but for which no new designations have been given (Klein & Hermet, 2012).

The protected area category is itself split into three distinct designations:

[91] http://whc.unesco.org/en/tentativelists/1854/
[92] http://www.legaltext.ee/text/en/XX00045K1.htm

- **National parks** – these combine the conservation, research and introduction to nature with the protection of landscapes and the cultural heritage. Special attention is paid to the balancing of activities and cooperation between different parties. (Estonian Ministry of Environment, 2012)
- **Nature reserve** – described as "*a protected area prescribed for the preservation, protection, restoration, research and introduction of the natural environment*." [93]
- **Landscape protection area** – described as "*an area prescribed for the preservation, protection, restoration, research, introduction and regulated use of landscapes of the protected area*."[94]

A **limited-conservation area** is an area set aside for the protection of habitats where the impact of planned activities on the key features for which the area was established has to be evaluated through an EIA or subjected to a 'notification of limited-conservation areas' process[95]. Those activities that negatively affect the conservation status of the key features are prohibited. Limited-conservation areas were designed specifically to implement requirements under the Habitats Directive.

Species protection sites are habitats permanently or periodically inhabited by a protected species that is designated to ensure the protection of the species in question. By definition, it is an area not already within a protected area or limited-conservation area and is identified and defined by a regulation from the Minister of the Environment or directly through the Nature Conservation Act. Until a species protection site has been defined and approved, there is by default a circular species protection site around the habitats of eagle species, the black stork (*Ciconia nigra*) and European flying squirrel (*Pteromys volans*).

Protected natural monuments are living or non-living natural objects with scientific, aesthetic or cultural value. A **natural object protected at the municipal level** may be a landscape, valuable cropland, valuable natural community, individual element of a landscape, park, green space or individual element of landscaping which has not been placed under another form of protection (Klein & Hermet, 2012).

The Forest Act defines a **woodland key habitat** (WKH) as an area of at least seven hectares requiring protection and which is outside a protected nature object, where the likelihood of endangered, vulnerable or rare species is high. It is identified as a part of a forest in which no active economic activity has taken place and where, as a result, a number of conditions have persisted (dry and decomposed wood of different ages, gaps in forest stands etc) that may support a high diversity of species sensitive to change (Estonian Ministry of Environment, 2008). The protection of WKHs in state forests (circa three quarters of WKHs) is coordinated by the State Forest Management Centre; in private forests, forest owners are encouraged to enter into an agreement whereby the owner undertakes to refrain from activities that may lead to the damage or destruction of the WKH in return for compensation from the state for income foregone (Estonian Ministry of Environment, 2008). 1,063 km^2 of state forests managed by the Estonian State Forest Management Center

[93] Estonian Nature Conservation Act 2014. https://www.riigiteataja.ee/en/eli/508112013010/consolide
[94] Estonian Nature Conservation Act 2014. https://www.riigiteataja.ee/en/eli/508112013010/consolide
[95] as outlined in Art. 33 of the Nature Conservation Act

(RMK) have received Forest Stewardship Council (FSC) certification (Estonian Ministry of Environment, 2008).

7.2.4 Protected area coverage

Before accession to the EU in 2003, 10.7% of the terrestrial area of Estonia was under protection through national designations. Due to the formation of the Natura 2000 network, the amount of protected terrestrial area had increased to 16% by 2007 (Estonian Ministry of Environment, 2008) and 18.1% in 2011 (Klein & Hermet, 2012). By 2011, 18.1% of the land area and 31% of the water area of Estonia had been designated for conservation (Klein & Hermet, 2012).

Table 7-1: Protected area number, land surface area, and IUCN category in Estonia

NB site designations are overlapping so this list adds up to more than the total protected area. The total land area of Estonia is assumed to be 45,226 km^2.[96]

Protected area type		IUCN category (indicative)	Number	Surface area (km^2)	Percentage of terrestrial area (%)
Internationally protected sites					
1	Ramsar Sites[97]	-	17	3,047	7%
2	World Heritage Sites	-	0	0	0%
3	Biosphere Reserves[98]	-	1	156,000	34%
Natura 2000					
1	Combined Natura 2000 (SPAs and SCIs)	IV	608	7,203	16%
National designations by protection type*					
1	Protected Area				
1(a)	National parks	*Dependent on protection regime*	5	1,295	3%
1(b)	Nature reserves	*Dependent on protection regime*	131	2,444	5%
1(c)	Landscape protected areas	*Dependent on protection regime*	689	1,889	4%
2	Limited conservation areas	*unconfirmed*	344	1,145	3%
3	Species protection sites	*Dependent on protection regime*	1,158	803	2%
4	Protected nature monuments	*Unconfirmed*	1,197	12	0.03%
5	Natural object under protection at the municipal level	*Unconfirmed*	19	35	0.08%
6	Woodland key habitat	*Unconfirmed*	9,124	226	0.5%
7	Protection regime pending	*Unconfirmed*	107	278	0.6%
Nationally protected areas by protection regime*					
1	Strict nature reserves	*Unconfirmed*	29	70	1%
2	Conservation zones	*Unconfirmed*	565	3,65	45%
3	Limited management zones	*Unconfirmed*	3,322	3,040	37%
4	Limited conservation areas	*Unconfirmed*	344	1,145	14%
5	Protection regime pending	*Unconfirmed*	107	278	3%

Sources: adapted from Klein and Hermet (2012) unless otherwise stated (see footnotes). For 'Percentage of terrestrial area of Estonia' a land area of 45,227 km^2 was taken[99]- calculations are own. Notes: *Excluding IUCN category V and VI sites.

[96] http://en.wikipedia.org/wiki/Geography_of_Estonia
[97] http://www.ramsar.org/pdf/sitelist.pdf
[98] http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?code=ENA+01&mode=all

7.3 Protected area objective setting in Estonia

Protected areas and limited-conservation areas have been designated on the basis of protecting key representative habitats in Estonia (Estonian Ministry of Environment, 2012).

7.3.1 Natura 2000

The government's review of nature conservation in Estonia (Klein & Hermet, 2012) states that the "*goal of the Natura 2000 network is to preserve or, if necessary, restore a favourable status for species and habitats that are endangered on a pan-European level*". Of the 60 Habitats Directive habitat types and 96 Habitats Directive species found in Estonia, 42% of the habitat types and 24% of the species were found to be a favourable conservation status (Klein & Hermet, 2012). Conservation management planning is therefore seen as a priority to improve conservation status in each Natura 2000 area, and management plans are expected to be complete by 2014. These plans will list the measurable conservation objectives and the activities required to meet the objectives. Each plan must be formally approved through a directive of the Director General of the Environment Board (European Commission, 2014).

7.3.2 Nationally protected sites

In accordance with the Nature Conservation Development Plan (Estonian Ministry of Environment, 2012) by 2020 all nationally protected areas and limited conservation areas are expected to have conservation management plans (except Natura 2000 areas, for which the deadline is 2014). As of 1 June 2013 there were 147 valid management plans with a further 181 in preparation (Hermet, 2014). The conservation management plan sets out a general description of the natural object and its values. It must list key factors influencing the status of the natural object, establish the objectives of the designated area, list and prioritise any necessary measures, and make available the timetable and budget required to implement the plan.

7.4 Protection levels and approaches in Estonia

In the case of Estonia, an understanding of how site protection is set at the national level is required before covering European designations, as Natura 2000 protection depends on overlap with national sites. As such, in this case, to improve clarity the Nationally Protected Sites section is covered first, before Natura 2000 sites.

7.4.1 Nationally protected sites

For protected areas, species protection sites and protected nature monuments, the protection regime required for the preservation of the natural values is established by specific protection rules on a site-by-site basis. These specify the conservation objectives and measures needed to achieve them and provide an additional level of detail to the specifications of the Nature Conservation Act. For species protection sites, a protection regime is established separately for each species or group of species. No protection rules are drawn up for **limited-conservation areas** and permissible activities are described

[99] http://en.wikipedia.org/wiki/Estonia

directly in the Nature Conservation Act. The conservation management activities are established in a conservation management plan (Estonian Ministry of Environment, 2012).

In principle, a protected area may have up to three zones of management or protection, in graduation from strict to limited protection as follows:

- **Strict nature reserve** (no management zone): an area of land or water within a protected area whose natural status is to remain unaffected by direct human activity and where the preservation and development of natural biotic communities is ensured only through natural processes. All types of human activity are prohibited and humans are excluded except in cases of supervision, rescue work or for the purpose of monitoring and assessment.
- **Conservation zone** (some management allowed or mandatory for conservation purposes): this is an area of land or water within a protected area designated for the preservation of natural and semi-natural biotic communities therein. Extraction of mineral resources, use of natural resources, erection of construction works, camping, driving motor vehicles or floating vessels are all prohibited. Certain activities are nevertheless allowed provided the they do not harm the object of the designation: activities necessary for guaranteeing the preservation of the characteristic features and species composition of semi-natural biotic communities; maintenance work on existing land improvement systems; restoration of the water regime; development of biotic communities; foraging of berries, fungi and other forest by-products; hunting; fishing; construction of roads; and gathering of reed and seaweed.
- **Limited management zone**: This is an area of land or water within a protected area where economic activities are permitted taking into account certain restrictions as listed in the Nature Conservation Act. These activities include constructing new land improvement systems; extraction of mineral resources; planting of forests for biomass; regeneration cutting; use of biocides, herbicides and fertilisers; hunting and fishing; and camping and building fires.

Thus, a protected area, either of national or international designation (e.g. SPA, SCI or Ramsar Site) is managed/ protected via various protection regimes as Table 7-2 illustrates.

Table 7-2: Distribution of protected sites into management zones in Estonia

Protection Type	Protection regime			
	Strict nature reserve	Conservation zone	Limited management zone	Other protection regime
Protected area:				
National parks	x	x	x	
Nature reserves	x	x	x	
Landscape protected areas		x	x	
Limited conservation areas				x
Species protection sites		x	x	
Protected nature monuments			x	
Natural object protected at municipal level			x	
Woodland key habitat				x

Source: Klein and Hermet (2012)

7.4.2 Natura 2000

The protection regime for Natura 2000 in Estonia is set out in the Nature Conservation Act 2004, which updated earlier legislation to ensure compliance with the Birds and Habitats Directives (Peterson et al, 2014). All Natura 2000 sites are given a national designation type. Within this area, the site is protected by one or more protection regimes (see Figure 7-1).

Source: based on Peterson et al (Peterson et al, 2014)

Figure 7-1: Examples of protection regimes applied to protected areas of various protected designations in Estonia

Table 7-3 shows the way in which Natura 2000 areas have been designated by protection type (A) and by protection regime (B). Limited conservation areas are in effect both a specific protection type and protection regime as the rules governing their protection are set out clearly in the Nature Conservation Act. The predominant form of protection regime adopted for Natura 2000 sites is through conservation zones (45%), followed by limited management zones (37%) and limited conservation area (14%) and by area. Less than 1% of area designated as Natura 2000 is protected through a strict nature reserve. According to the Estonian Ornithological Society, the actual protection of SACs is weak with limited powers to regulate human pressures including reed cutting and hunting. Although the management plans are in place, implementation is lagging behind. Management of semi-natural communities (such as different types of meadows) is evolving, but these measures are expensive (mainly funded through the RDP) and the quality of grazing/mowing is often

low and does not meet the requirements of target species. Sometimes appropriate assessments of certain plans and projects (Art. 6.2 & 6.3 Habitats Directive) are still inadequate and fail to avoid impairment of conservation objectives of Natura 2000 sites.[100]

Table 7-3: The distribution of Natura 2000 areas among protected area types & among protection regimes in 2011 in Estonia (terrestrial and marine)

Protection type	%
National designations by protection types	
Protected areas	44%
Limited conservation areas	51%
Species protection sites	4%
Protected nature monuments	0.005%
Protection regime pending	1%
National designation by protection regime	
Strict nature reserves	1%
Conservation zones	26%
Limited management zones	21%
Limited conservation areas	51%
Protection regime pending	1%

Source: Klein & Hermet (2012) page 28

7.5 The monitoring of protected areas in Estonia

7.5.1 Site condition assessment

The Environment Board is tasked with monitoring the effectiveness of Natura 2000 management planning on a five year cycle (European Commission, 2014). Monitoring programmes and specific scientific studies have been developed to monitor changes taking place in natural environments (Estonian Ministry of Environment, 2012) although specific details of what this entails were not found in the English language literature in this study.

The Nature Conservation Development Plan to 2020 (Estonian Ministry of Environment, 2012) has set objectives to improve the coverage of monitoring of habitat and species protected under the Birds and Habitats Directives (Table 7-4). The Plan recognises that the distribution and conservation status of several habitat types (e.g. marine habitats, karst lakes, heaths, petrifying springs, alluvial forests) has been insufficiently studied to date and further monitoring schemes will need to be developed. The Government has set an objective of establishing systems for periodically collecting data on little studied habitat types and for continuous monitoring of threatened habitats to be in place by 2015. The Nature Conservation Development Plan to 2020 has also set an objective of developing 15 indicating species to provide information on the "*coherence of the ecological network*" by 2020 (Estonian Ministry of Environment, 2012).

[100] Veljo Volke, Conservation Officer, Estonian Ornithological Society (BirdLife Partner in Estonia)

Table 7-4: Targets to improve monitoring of habitats and species in Estonia

Items to be monitored	Baseline in 2011	Target for 2020
Species of the Habitats Directive	74	96
Species of the Birds Directive	120	221
Habitat types	26	60
Category I species	54	All

Source: Estonian Ministry of Environment (2012)

7.5.2 Management effectiveness evaluation

In response to the CBD COP7 Decision on the management effectiveness evaluation of protected areas (see section 1.5.5), Estonia commissioned the University of Tartu to review the effectiveness of protected areas management using the Management Effectiveness Tracking Tool (METT) (Külvik and Leibur, 2010). These results find that, on average, implementation of management procedures in protected areas (i.e. National Parks, Nature Reserves and Landscape Protected Areas) was reported to be quite high at 75% of the maximum level (Kukk, 2012). However, it should be borne in mind that the individual evaluations were carried out by staff at the protected area, and therefore cannot be regarded as independent. The Estonian review concluded that protected areas with management plans demonstrate greater conservation achievements than those without management plans. The main problem facing the protected areas is lack of sustainable financing to develop and implement the management plans (Külvik & Leibur, 2010).

8 Protected areas in Finland

8.1 The role of protected areas in biodiversity conservation in Finland

The aim of the Finnish national protected area network is to support nature conservation in Finland by providing a comprehensive, efficiently managed, ecologically functional and representative network of protected sites (Ministry of the Environment 2013). The network is foreseen to function as a buffer against and means of adapting to the impacts of climate change while also maintaining ecosystem services. Completing and strengthening the regional network, and the protection of insufficiently protected habitats, are defined as key tasks in the current and future development of the protected area network. In particular, the implementation of conservation measures in line with the conservation targets for Natura 2000 areas is a high priority, in order to achieve and maintain a favourable conservation status. In general, the national protected area network is expected to play an integral role in meeting both the global and EU targets for biodiversity by 2020.

The role of protected areas in biodiversity conservation in Finland is outlined in the national biodiversity strategy and action plan (NBSAP) 2013-2020 (Ministry of the Environment 2013) and in the national action plan 2012-2020 for the implementation of the CBD Programme of Work on Protected Areas (Anonymous 2012). As yet, there is no overall national development plan for protected areas, however it is foreseen that a plan will be developed as a part of the protected area-related actions in the NBSAP. The national protected area development plan will include an assessment of the connectivity of the protected area network, its ecological representativeness and geographical coverage by classification of habitat type, as well as proposals for measures required for the long-term development of the network of protected areas. The efficiency and impacts of managing and maintaining the protected area network will be assessed in order to enhance the level of conservation of species and habitat types, and their adaptability to climate change. To that end, a Government resolution has been made to continue the national (voluntary) programme for establishing protected forests in south Finland (so called METSO programme[101]).

Furthermore, the 2013-2020 NBSAP plans to establish criteria for determining the share (%) of areas protected through conservation and other effective methods for safeguarding Finland's biodiversity over its total land surface, inland waters, and coastal and marine areas. This assessment will help to better identify – and quantify – the overall role of the protected area network in achieving the 2020 biodiversity objectives.

8.2 Protected area designations and coverage in Finland

8.2.1 Internationally designated sites

The main international protected areas in Finland are the Ramsar Wetlands of International Importance and the Baltic Sea coastal and marine protected areas (BSPA) established under the Helsinki Convention (HELCOM). There are 49 Ramsar Sites covering an area close to

[101] http://www.metsonpolku.fi/en/index.php

8,000 km^2. In addition, 11 Ramsar Sites are under preparation. Under HELCOM, 23 coastal and marine BSPAs have been designated and 11 are currently being nominated (Heinonen and Juvonen, 2013). All Ramsar and BSPA sites are an integral part of the Natura 2000 network (see below).

There are two UNESCO Biosphere Reserves in Finland: Archipelago National Park with its buffer zone and North Karelia Biosphere Reserve (inc. Patvinsuo and Petkeljärvi National Parks and their buffer zones). The Kvarken Archipelago situated in the Gulf of Bothnia is nominated as a World Natural Heritage Site.

8.2.2 Natura 2000

Finland's contribution to the EU-wide network of Natura 2000 protected areas accounts for about 6% of the total EU-28 network area (European Commission, 2013). Altogether 1,865 sites have been designated as Natura 2000 sites based on Council of State Decisions. The total surface area of the Natura 2000 sites is 48,400 km² and covers 15% of Finland's territory. The Finnish terrestrial Natura 2000 network is now complete[102].

Finland's Natura 2000 network is almost entirely designated using the national designations. A single Natura area may include one or several national protected areas (see nationally designated sites below). In some cases, a single national protected area designation may contain several Natura sites, for example the Bothnian Sea National Park hosts altogether ten Natura sites.

8.2.3 Nationally protected sites

The majority of the Finnish protected area network (over 90%) is state-owned and managed by Metsähallitus[103] Natural Heritage Services. The network consists of a range of different types of sites, with the most relevant types briefly described below.

Table 8-1 provides a more detailed overview of the types of different protected areas within the network and their areal coverage, both in terms of absolute and proportionate coverage. The table also summarises the IUCN protected area categories for these different areas.

National Parks and Nature Reserves: a major part of the Finnish network is formed by National Parks and Nature Reserves on State land, established under the national Nature Conservation Act (Table 8-1, protected area designations 1-8). Established since the 1930s, National Parks and Nature Reserves are the oldest form of Finnish protected areas. National Parks and Strict Nature Reserves are usually large (over 1,000 ha) whereas other Nature Reserves are usually smaller (under 1,000 ha). At present there are about 550 state-owned National Parks and Nature Reserves covering around 49% of the total protected area network. In addition to the above, another 1,700 sites (17% of the total network) were designated as protected sites by Council of State Decisions in 1976–1996 but are yet to be statutorily established as Nature Reserves (Table 8-1, protected area designations 9 – 10).

[102] http://www.metsa.fi/sivustot/metsa/en/NaturalHeritage/ProtectedAreas/Natura2000Sites/Sivut/Natura2000AreasEstablishedtoProtectBiotopesandSpecies.aspx

[103] Metsähallitus is a state enterprise that administers of state-owned land and water areas.

These Nature Conservation Programme Sites are - as the name indicates - established based on the identification of areas in national ecosystem-specific Conservation Programmes, including for example the Mire Conservation Programme (1979 and 1981, to be supplemented in 2015), the Shoreline Conservation Programme (1990) and the Old-growth Forest Conservation Programme (1993 and 1996).

Wilderness Reserves (WRs) and **National Hiking Areas (NHAs):** the protected area network on state land consists also of WRs and NHAs (Table 8-1, protected area designations 13 – 14). The former are located solely in Lapland and established under the Wilderness Act (1991) whereas the latter are located in Southern Finland and in the area of Ostrobothnia, established under the Outdoor Recreation Act (1973). **Wilderness Reserves** were initially established to preserve wilderness and safeguard the culture and subsistence nature-based livelihoods of the indigenous Sámi**. National Hiking Areas** were established to promote outdoor recreation. These areas also host a range of habitats and species of European interest and therefore they have been - for the most part - also designated as Natura 2000 sites (see below).

Other protected areas on state land: in addition to National Parks, Nature Reserves, Wilderness Areas and National Hiking Areas, the Finnish protected area network on state land also includes certain protected forests (Table 8-1, protected area designation 11) and some other protected sites (Table 8-1, protected area designation 12), including habitat and species protection sites, sites protected in land use plans, and Natura 2000 sites without national protected area designation. These other protected areas on state land add up to 1,048 sites and cover around 8% of the total protected area network.

Private Nature Reserves and other protected areas on private land: Nature Reserves and other protected areas on state land are complemented by Private Nature Reserves and other sites protecting habitats or species on private lands (Table 8-1, designations 15 - 18). Over 90% of the private sites are small (less than 100 ha) while the largest twenty - mostly marine and coastal sites - cover more than 40% of the total area of these designations. Some 6-7% of the protected area network in Finland is privately owned. The Private Nature Reserves are owned by individual or multiple landowners and/or trusts, private non-profit organisations (such as church communities), corporate owners (such as forestry companies) and municipalities (urban and rural). It is to be noted that Private Nature Reserves in Finland retain their designation as Private Nature Reserves when ownership is transferred (Table 8-1, protected area designations 7 and 15).

Temporarily protected sites (with 10-20 year contracts) and ‘forestry-set-asides’ established by forestry companies to fully or partly restrict cutting are not considered as a part of the Finnish protected area network (as defined by the IUCN). However, although these areas lack a permanent or statutorily gazetted status, it is commonly recognised that they provide green infrastructure that plays an important ecological role, such as in connecting and buffering core protected areas.

Table 8-1: Biodiversity protected area number, land surface area, and IUCN category in Finland

NB site designations are overlapping so this list adds up to more than the total protected area. It is to be noted that information for sites on privately-owned land are not yet available, thus the estimated total protected area number and coverage are known to be underestimates. The percentage of terrestrial area was calculated by IEEP using the total terrestrial area of Finland of 338,145 km^2. n/a = not available

Protected area type		IUCN category (indicative)[104]	Number	Surface area (km^2)	Percentage of terrestrial area (%)	Percentage of the network
	International designations					
1	Ramsar Sites[1]	-	49	7,995	2.36%	n/a
2	Baltic Sea coastal and marine protected areas (BSPA) under HELCOM[2]	-	22	6,100	1.80%	n/a
3	World Heritage Sites (natural)[3]	-	1	3.4	0.001%	n/a
4	Biosphere Reserves[4]	-	2	n/a	n/a	n/a
	Natura 2000					
1	Special Protection Areas[7]		468			
2	Special Areas of Conservation[7]		1397			
	Natura 2000 sites combined	Depending on the site	1,839	55,986	87%	n/a
	National designations*					
1	Strict Nature Reserves (mostly over 1000 ha)	**Ia** With the exception of Karkali Nature Reserve as IV	19	1,535	0.45%	3%
2	National Parks (mostly over 1000 ha)	**II** With the exception of Lemmenjoki National Park as Ib	37	9,796	2.90%	21%
3	Old-growth Forest Reserves	**Ib** for areas > 1,000 ha **IV** for areas < 1,000 ha	91	97	0.03%	< 1%
4	Mire Reserves	**Ib** for areas > 1,000 ha **IV** for areas < 1,000 ha	171	4,617	1.37%	10%
5	Herb-rich Forest Reserves	**IV (and Ia)**	51	12	0.004%	< 1%
6	Other Nature Reserves on state lands	**Ib (and Ia)** for areas > 1,000 ha **IV (and III)** for areas < 1,000 ha	45	667	0.20%	1%
7	Private Nature Reserves on state lands	See category 15, private Nature Reserves in Finland retain their designation as private Nature Reserves when ownership is transferred to the State	114	85	0.03%	< 1%
8	Nature Reserves based on Metsähallitus decision	**IV**	24	8	0.002%	< 1%

[104] In the revised NBSAP (2012) Finland adopted an objective to update national PA management categories and link them with IUCN categorisation, this process is still to be finalised.

Protected area type		IUCN category (indicative)[104]	Number	Surface area (km^2)	Percentage of terrestrial area (%)	Percentage of the network
	(mostly under 100 ha)					
9	Protected areas designated in land use plans, based on Regional Council decision (mostly over 1000 ha)	**IV**	n/a	n/a	n/a	< 1%
10	Nature Conservation Programme sites on state land, based on Council of State decision (will be established as statutory Nature Reserves)	**Ib (and Ia)** for areas > 1000 ha **IV** for areas < 1000 ha	1,714	7,704	2.28%	17%
11	Protected Forests based on Metsähallitus decision	**Ib** for areas > 1000 ha **IV** for areas < 1000 ha	327	514	0.15%	1%
12	Other Protected Sites on state lands	**IV**	721	3,588	1.06%	7%
13	Wilderness Reserves	**Ib**	12	14,891	4.40%	32%
14	National Hiking Areas	*Categories not assigned*	7	355	0.10%	< 1%
15	Private Nature Reserves	Not yet officially assigned but the corresponding principles to state protected areas above apply. Most sites comply with category IV definition.	8 717	2,634	0.78%	6%
16	Habitat or Species Protection Areas		1 306	25	0.007%	< 1%
17	Nature Conservation Programme sites on private lands		n/a	n/a	n/a	n/a
18	Other Protected Sites on private lands		n/a	n/a	n/a	n/a
Total			**> 13,000**	**> 46,000**		**100 %**

Source: [1]Ramsar (Wetlands International, 2014), [2]HELCOM (2013), [3]UNESCO (2014), [4,5]EEA (ETC/BD, 2014), [6]Heinonen (2013), [5,6]Heinonen and Juvonen (2013), [5]Natura 2000 barometer (European Commission, 2013), [2,6]Ahokumpu et al. (2013), [7]Natura 2000 database end 2013. Note: * Excluding IUCN Categories V and VI

8.2.4 Protected area coverage in Finland

The Finnish protected area network includes over 13,000 sites and covers an area of around 46,000 km² (i.e. 10% of Finland's surface area) (Heinonen, 2013). According to the national experts contacted during this review, there are still gaps in the Finnish national protected area network. This is the case especially for southern Finland. This area suffers from considerable habitat fragmentation; rural traditional biotopes are considered as among the most threatened habitats. In addition, the status of shores, peatlands and certain (old) forest habitats in southern Finland is generally acknowledged to be alarming. Only around 2% of the area in southern Finland is under protection and the majority of the species and habitats covered by the Habitats Directive remain in unfavourable conservation status. Furthermore, while some forest species show signs of recovery the total number of nationally endangered species in southern Finland has not been decreasing. Even local extinctions of species are known to take place (e.g. insects and fungi).

As highlighted in section 8.1, a national protected area development plan is foreseen to be drafted in the future, building on a further analysis of gaps and needs. The Natura 2000 network has played a key role in increasing the representativeness of the protected area network, especially with regard to coastal, marine and inland water habitats. However, it is generally considered that both the coverage and representativeness of the protected area network requires further improvement, especially in southern Finland. In particular, there is a need to improve the connectivity between protected areas and/or natural areas in the south, enhancing the protected area network and also through the use of conservation tools such as agri-environment measures. Further emphasis is required on the quality of areas outside the protected area network, in particular the forested landscape. The voluntary forest conservation programme METSO is foreseen to play an important role in the future improvement of protected area network in the south. However, in order to be carried out in a timely and effective manner the programme is expected to require more resources than are currently earmarked. Similar concerns related to available financial resources also apply to, for example, the (active) conservation of meadows and farmland habitats, and peatlands.

8.3 Protected area objective setting in Finland

8.3.1 Natura 2000

The requirements of the Birds and Habitats Directives are implemented at the national level through the Nature Conservation Act (1996). According to the Act, the key objective of the Natura 2000 sites is to maintain or restore the identified conservation values of a site. Projects or plans with possible negative impacts on these values are required to undergo an assessment and actions with negative impacts are not to be authorised, at least not without a clear mitigation plan. As most of the Natura 2000 sites are primarily designated as national protected areas, their objective setting is integrated into the objective setting and management planning of the given national protected area category and related requirements and obligations (see below). Management plans are used to define the conservation objectives of most sites (see below). The conservation objectives of the Natura 2000 sites that are not designated as national protected areas – mainly inland waters and

shores, and coastal and marine biotopes - are realised through land use regulations stipulated in legislation for forest, water and other land and/or resource use.

8.3.2 Nationally protected sites

Most of the sites within the Finnish protected area network share the same overall objective to maintain protected areas in - and when necessary restoring them to - a (semi)natural state (Heinonen, 2013).

Specific prerequisites of the establishment of sites - as well as provisions and derogations to them - are stated in statutes and management plans. Management plans are a statutory requirement for National Parks, Wilderness Reserves and National Hiking Areas (Heinonen 2013). Site-specific conservation objectives and provisions for Nature Reserves are stated in the statutes establishing each site.

For all **National Parks and Nature Reserves**, the core aim is to conserve all biodiversity within the protected area (from genetic variation to ecosystem level), preserve the site's ecological integrity (composition, structure and function) and its evolutionary potential[105]. The key objective of National Parks and Nature Reserves (including sites with pending Nature Reserve enactments) is to protect large mosaics of typical and threatened Finnish ecosystems and associated species, including old-growth forests, mire complexes, inland and marine waters and northern fells. According to the Nature Conservation Act (1996), the general prerequisites for establishing a Nature Reserve are that it has at least one of the following attributes:

- hosts an endangered or rare species, population or ecosystem, or one that is becoming scarce;
- has breeding sites or resting places of species referred to in the EU Habitats Directive;
- hosts a special or rare natural formation;
- is of outstanding natural beauty;
- hosts a type of natural heritage which is becoming scarce within the area; or
- is necessary for attaining or maintaining the favourable conservation status of a natural habitat or species.

Strict **Nature Reserves** are non-intervention areas reserved mostly for scientific research whereas National Parks, in addition to their conservation goals, also promote recreation and education. Other Nature Reserves are usually smaller than National Parks and Strict Nature Reserves, focusing on the protection of specific ecosystems (individual mires and forests and areas of shoreline) as well as habitats of breeding and migrating water birds. In general, National Parks and Strict Nature Reserves in northern Finland are large areas that do not need active management, contrary to National Parks and (smaller) Nature Reserves in southern Finland. These southern protected areas often require either restoration or active management to protect specific habitats and/or species.

As **Wilderness Reserves** and **National Hiking Areas** have for the most part been designated as Natura sites, their conservation objectives must be defined according to EU legislation

[105] Nature Conservation Act (1996), http://www.ym.fi/en-US/Nature/Legislation/Nature_conservation_legislation

(see above). Management plans are a statutory requirement for Wilderness Reserves and National Hiking Areas (Heinonen 2013). It is to be noted that unlike in some other countries **Wilderness Reserves** in Finland are not under strict protection but some human interventions are allowed, in particular to safeguard the culture and subsistence nature-based livelihoods of the indigenous Sámi.

As for **protected areas on private land**, there can be quite a lot of variation in the specification of conservation objectives and provisions. Site designations stipulated in the national conservation programmes are often the most specifically and clearly laid out whereas the objectives and provisions for other sites – especially the ones established several decades ago - can be rather ambiguous.

As mentioned earlier, most of the Finnish protected area national network area is designated as Natura 2000; therefore the biodiversity values forming a basis for the designation are also taken into consideration in a site's conservation objectives and management plans. The majority of private Nature Reserve areas have also been designated as Natura 2000 sites and the relevant objectives also apply (see below).

Even though management plans are not mandatory for all Finnish protected areas, they cover nearly 80% of the total protected area network surface, with plans for the remaining sites to be drafted if considered necessary (Heinonen, 2013). For the sites with no mandatory requirements for management planning, the need for a site specific management plan is determined by site condition assessment. For example, many large and remote protected areas need no active management, have few visitors or significant threats, and thus have no need for a detailed management plan, as long as conservation values are retained. Small sites forming a larger geographical and functional planning entity are often coupled up in a single management plan. The key aim of the management plans for National Parks - and other sites that attract large numbers of visitors – is to take into consideration the impacts of visitor flows and direct these flows away from areas with sensitive conservation values.

The authority in charge of the protected area is responsible for preparing the management plan, based on a participatory approach involving local and/or regional stakeholders[106]. In addition, the management plans for National Parks must be ratified by the Ministry of the Environment. In case of state-owned land the authority responsible for developing management plans is Metsähallitus, whilst the management of protected areas on private land is planned through cooperation between the landowner, an ELY Centre and Metsähallitus.

The integration of ecosystem services into the current regulatory basis for Natural Parks and Nature Reserves (i.e. the Nature Conservation Act 1996) is relatively limited, recognising their role in recreation, education and research and their scenic values. Wilderness Reserves and National Hiking Areas take into consideration also reindeer herding and recreation. The Natura Conservation Act is currently undergoing a revision and it is foreseen that in the

[106] Ymparisto (2014) Protected areas – summary, Finnish Environment Administration Website, http://www.ymparisto.fi/en-US/Nature/Protected_areas

future ecosystem services linked to the protected area network will be more explicitly addressed (e.g. the role of protected area network in maintaining green infrastructure and benefits related to restoration). In practice, the management planning of state-owned protected areas always includes assessment of their cultural and other socio-economic values (e.g. reindeer herding in Lapland). Building on this assessment, the protected area management plans integrate both conservation objectives and multiple uses of the site, with an aim to maximise overall benefits and minimise harmful impacts.

8.4 Protection levels and approaches in Finland

8.4.1 Natura 2000

Most of the Finnish Natura 2000 network is established and governed based on the national designations (see below). For non-designated areas the conservation objectives and management actions are set on a regional basis, based on other related sectoral legislation (e.g. forestry, water, environment protection). Most commonly the actions limit the possible land use practices in the area which, in turn, are governed though permit procedures managed by regional environmental authorities. Occasionally these Natura 2000 designations also introduce active management requirements, such as the management of traditional rural biotopes by active grazing.

8.4.2 Nationally protected sites

Most of the Finnish protected areas are under legal protection. National Parks and Strict Nature Reserves are established by site-specific law whereas other Nature Reserves are established by different types of legislative enactments based on the Nature Conservation Act (1996) (see Table 8-2). Wilderness Reserves and National Hiking Areas are based on the Wilderness Act (1991) and the Outdoor Recreation Act (1973), respectively. Sites established by Metsähallitus decision generally enjoy a level of protection comparable to legal protection and are managed according to the same principles as statutory sites. Only a minority of the sites, including Natura 2000 sites without national protected area designation, are protected based on provisions of the Nature Conservation Act and/or other relevant legislation.

As regards specific provisions for land use, the majority of Finnish protected areas are located on uninhabited land. Generally prohibited land use activities include: forestry, extraction of peat, land or minerals, and construction of roads or buildings (except for visitor infrastructure). Removal of animals or plants is also generally prohibited, with the exception of harmful or invasive species. A number of low-impact activities that are also part of so called everyman's right are generally permitted, including small-scale fishing, and berry and mushroom picking. In the large State-owned wilderness areas of sparsely populated northern Finland, hunting of game by locals is permitted by law. In Finland, this kind of hunting pressure is mostly seen as compatible with nature conservation objectives.

In general, National Parks, Strict Nature Reserves and other Nature Reserves are subject to similar provisions regulating land use, both on state and private lands. Similarly, any actions which jeopardise the conservation objectives of sites with pending Nature Reserve status (i.e. Nature Conservation Programme sites) are prohibited based on the national Nature

Conservation Act. Actions with foreseen negative impacts are specified in individual programmes. Nature Reserves and Protected Forests established by Metsähallitus decisions are managed according to similar principles and guidelines.

As for protected areas on private land, the approaches taken to implement protection depend on the location and type of protected area as well as site-specific conservation values and management objectives. The regional environment administrations (Centres for Economic Development, Transport and the Environment) coordinate the management planning and implementation of Natura 2000 sites on private land, based on joint collaborative management with local stakeholders. Metsähallitus Natural Heritage Services (NHS) coordinate the conservation of private forests, with small private sites often being combined in larger integrated management plans drafted by the NHS. Management measures can also be delegated from the regional administration to the private owner by contract.

Table 8-2: Finland's protected areas and their level of protection

	Protected area type	Level of protection
1	Strict Nature Reserves	(Strict) legal protection: established by site-specific law
2	National Parks	Legal protection: established by site-specific law
3	Old-growth Forest Reserves	Legal protection: special protected areas based on the old national Nature Conservation Act (1923-1996)
4	Mire Reserves	As above
5	Herb-rich Forest Reserves	As above
6	Other Nature Reserves on State lands	Legal protection: established by act, decree or conservation provisions (see protected area category 10)
7	Private Nature Reserves on State lands	Legal protection: Private Nature Reserves acquired for the State
8	Nature Reserves based on Metsähallitus decision	Comparable to legal protection: established by Metsähallitus decision, to be re-established as Nature Reserves
9	Protected areas designated in land use plans, based on Regional Council decision	Pending legal protection: approved by Regional Council decision, will be established as statutory Nature Reserves.
10	Nature Conservation Programme sites on State land, based on Council of State decision	Pending legal protection: based on Council of State Decision, these areas are to be established as statutory Nature Reserves
11	Protected Forests	Comparable to legal protection: established based on Metsähallitus decision, to be re-established as Nature Reserves
12	Other Protected Sites on State lands	Integration in land use and planning: Habitat and species protection sites, sites protected in land use plans, Natura 2000 sites without national protected area designation
13	Wilderness Reserves	Legal protection: based on Wilderness Act (1991), established on State land
14	National Hiking Areas	Legal protection: based on Outdoor Recreation Act, established on State land
15	Private Nature Reserves	Legal protection: based on Nature Conservation Act, established by the decision of Regional Environment Authority (ELY-centre[107])
16	Habitat or Species Protection Areas	As above
17	Nature Conservation Programme sites on private lands	Legal protection: based on Council of State decision, acquisition to State and established as Nature Reserve, or established as Private Nature Reserve
18	Other Protected Sites on private lands	Integration in land use and planning: sites protected in land use plans, Natura 2000 sites without national protected area designation

[107] Centres for Economic Development, Transport and the Environment

8.5 The monitoring of protected areas in Finland

8.5.1 Site condition assessment

The majority of the national protected area network is overlapping with the Natura 2000 network. The latter are all subject to regular monitoring (as per Article 17 of the Habitats Directive) and also a national site condition assessment. The Finnish site condition assessment process is similar to the value and threat assessments linked to site management planning, however it is designed to be less time and resource intensive. Special emphasis is placed on features and values of European interest, but all domestic red-listed habitats and species as well as cultural features are also assessed. Based on the assessment, management measures are prescribed, including further management or operational planning if considered necessary. Site condition assessments have been performed since 2010 and they now cover about half of the Natura 2000 network area in Finland. The goal is to have the first site assessment cycle completed by 2018 and renewed at six to twelve year intervals thereafter.

8.5.2 Management effectiveness evaluation

The scope and implementation of existing management plans are scrutinised as part of the Natura 2000 site condition assessment process. In addition to site condition assessment of Natura sites, systematic management effectiveness evaluations have been performed in National Parks at approximately 5-10 year intervals. Different methods have been used, but they have mostly been based on the IUCN model for protected area management effectiveness evaluations.

A comprehensive international Management Effectiveness Evaluation (MEE) of the Finnish protected area system was commissioned by Metsähallitus Natural Heritage Services (NHS) in 2004.[108] While the framework for, and level of, monitoring is considered relatively adequate, the evaluation identified a number of concerns (Gilligan et al, 2005). These include securing resources and comprehensive plans for long-term monitoring, expanding the information base from case studies and individual projects into broader monitoring schemes, and the need for a more unified monitoring approach, rather than studies being carried out by several different authorities and/or research institutes as is currently the case.

[108] http://www.metsa.fi/sivustot/metsa/en/NaturalHeritage/ProtectedAreas/ManagementEffectivenessEvaluation/Sivut/ManagementEffectivenessEvaluationofFinlandsProtectedAreas.aspx

9 Protected areas in France

9.1 The role of protected areas in biodiversity conservation in France

The French biodiversity strategy 2011 to 2020 includes an objective to construct an ecological infrastructure including a coherent network of protected areas (Premier Ministre, 2011). The biodiversity strategy states that protected areas must be sufficiently numerous, representative of different habitats, and effectively managed. It considers protected areas to be key tools for biodiversity conservation and assigns to them a major role in the response to global environmental change, notably climate change, contributing to the resilience of ecosystems and the maintenance of ecosystem services (Premier Ministre, 2011). A key action is the recently developed French ecological network strategy[109] ('*Trame Verte et Bleue*'), and France's protected areas (particularly Nature Reserves) are seen as the core areas of this network (MEEDDM, 2010). However, the question of how to reconcile the objectives of biodiversity conservation and ecosystem services supply in protected areas, such as conflicts between recreation goals and species conservation, is underexplored in France[110]. A national ecosystem services accounting system is being prepared for 2015. When it is operational this will allow the examination of interactions between biodiversity conservation and ecosystem services within the national protected area system.

The French strategy for the creation of protected areas[111] sets a target of at least 2% of the terrestrial European area of France under strict protection for biodiversity by 2020, corresponding to the French implementation of CBD Aichi Target 11 (MEEDDM, 2010). This target specified the creation of three new terrestrial National Parks, but also envisages an expanding role for national and regional Nature Reserves as core areas of the ecological network (Lefebvre and Moncorps, 2013). The strategy also plans the creation of ten marine National Parks. Furthermore, the French strategy for the creation of protected areas sees the ecological network, the protected areas target (including the marine target), the national wetlands strategy, and focused action for threatened species as necessary integrated components to achieving the EU 2020 targets (MEEDDM, 2010).

The targets of the French strategy for the creation of protected areas were based on a very thorough gap analysis to identify which species and habitats have the highest priority for the target to increase the protected area (Coste et al, 2010) (see section 9.2.4 below). As a result of the recommendations, two National Parks incorporating state-owned forest land have been/are being realised[112]. However, it was not possible to designate a new wetland National Park, primarily due to the opposition of the hunting associations, and very little

[109] Décret no 2014-45 du 20 janvier 2014 portant adoption des orientations nationales pour la preservation et la remise en bon état des continuities écologiques. JORF n°0018 du 22 janvier 2014 page 1166 texte n° 27. Annexe: Document-Cadre Orientations Nationales pour la preservation et la remise en bon état des continuities écologiques http://www.developpement-durable.gouv.fr/IMG/20131008_doc_cadre_ONTVB.pdf.

[110] Personal communication, deputy director of protected areas, French Ministry of Ecology, Sustainable Development and Energy

[111] '*Stratégie Nationale de Création des Aires Protégées terrestres métropolitaines (SCAP)*'

[112] Massif des Calanques was legally designated in 2012, and the forest of Champagne and Bourgogne is in the process of designation

progress has been made on the target to designate the 300 or so new sites identified in the gap analysis[113].

French nature conservation governance has historically been highly centralised, though split between a number of different national agencies. Legal powers for biodiversity conservation are being increasingly devolved to regional and local authorities, including the designation of regional reserves and the establishment of biodiversity protection tools within the spatial planning framework (Clap and Moral, 2010). This has stimulated the regional authorities to take an increased interest in protected area strategies, and has also enabled the funding to be maintained from regional budgets, rather than the shrinking national budget.[114]

The process of setting up the Natura 2000 network in France was heavily influenced and delayed by local stakeholder resistance during the 1990s (Rauschmayer et al, 2009). In response, France created a new instrument which combines legislative, regulatory and contractual tools; it is a locally negotiated agreement between the regional and national authorities, the land owners and managers, and local stakeholders. This has enabled the establishment of Natura 2000 areas outside the protected area system (see below for more details).

9.2 Protected area designations and coverage in France

9.2.1 Internationally designated sites

France has declared 31 mainly terrestrial Ramsar Wetlands of International Importance, nine UNESCO biosphere reserves, and two Natural World Heritage sites on the European continent, both of which incorporate a number of designated national and regional Nature Reserves. France has designated 35 sites for the protection of plant genetic resources, under the Council of Europe European Plant Conservation Strategy (all within National Nature Reserves) (Lefebvre & Moncorps, 2013).

9.2.2 Natura 2000

France has assigned over 17% of its terrestrial area to its Natura 2000 network, including 1,368 SACs/SCIs and 385 SPAs. France has taken a contractual approach to its Natura 2000 designation, and most of the French Natura 2000 sites, particularly grassland and heathland areas, do not fall within existing statutory protected areas, instead being designated under a site contract equivalent to a legally defined management plan, known as a **DOCOB**[115] (Guignier and Prieur, 2010).

9.2.3 Nationally protected sites

French law recognises a broad range of protected area designations (Guignier & Prieur, 2010; Lefebvre & Moncorps, 2013). The French protected area designations are frequently deliberately overlapped (Guignier & Prieur, 2010). The designations can be regarded as

[113] Personal communication, Thierry Lefebvre, protected area programme head, IUCN France

[114] Personal communication, Thierry Lefebvre, protected area programme head, IUCN France

[115] '*Document d'objectifs (DOCOB)*' as defined by Environment Ministry Circular DNP/SDEN 2007-3 of 21/11/2007

complementary (Lefebvre & Moncorps, 2013), but can also be regarded as an unnecessary plurality (Landelle, 2007).

The following **regulatory** designations provide strict protection of biodiversity according to the protected area strategy:

- **National Park**[116]: A National Park is designated for the preservation of special features of the natural environment (i.e. flora, fauna, soil and subsoil, air and water, landscape, and as appropriate, the cultural heritage), when it is important to protect them by preventing degradation and damage likely to have an impact on their diversity, composition, appearance and evolution. Special provisions apply to parks in France's overseas territories. The legal status was reformed in 2006 to put emphasis on sustainable development and increased local involvement.
- **National Nature Reserve**[117]: National Nature Reserves are primarily designated for the protection or rehabilitation of animal or plant species and habitats that are endangered in all or part of the national territory, or are of outstanding value, the protection or creation of stop-over sites in major wildlife migration routes, and scientific research. They can also protect botanical gardens, geological formations, and sites of special value for the study of the evolution of life and early human activities (but not landscape protection).
- **Regional Nature Reserve**: As National Nature Reserves, but designated by the regional councils. This category replaces voluntary Nature Reserves, which no longer exist. There is also a special category for Nature Reserves on Corsica.
- **Biotope Protection Order**[118]: An order to protect the habitat (feeding, breeding or resting site) of a protected species, defining regulatory measures (banning or restriction of activities) and the demarcation of the area. Biotope Protection Orders can be issued regardless of land ownership. They are designed for targeted species protection on usually small areas, less than 50 ha.

In addition, the following designations protect important areas for biodiversity:

- **Biological Forest Reserve**[119]: Forest reserve designated by the National Forestry Office with the purpose of protected and maintaining natural forest cycles and genetic diversity. They may be designated as integral reserves (see below) or managed reserves.
- **Hunting and Wildlife Reserve**[120]: Reserves designated nationally by the National Office of Hunting and Wildlife[121] or locally as the result of an initiative of the hunting association or hunting rights holder, with the aim of establishing a sustainable hunting regime in rural areas, protecting migratory bird populations, and protection of threatened species. They include the obligatory 10% of area that must be protected by local hunting associations[122]. The national reserves must aim to

[116] '*Parc nationale'* according to Environmental Code Art. L331-1
[117] '*Réserve naturelle nationale'*, Environmental Code Article L332
[118] '*Arrête préfectoral de protection de biotope'*
[119] '*Reserve biologique forestière (RBF) /Réserve biologique domaniale (RBD)'*
[120] '*Réserve nationale de chasse et de faune sauvage (RNCFS)'*, Environmental Code Article L422, or '*Réserve de chasse et de faune sauvage (RCFS)*' Environmental Code Article L422-27
[121] '*Office National de la Chasse et de la Faune Sauvage* (ONCFS)'
[122] '*Associations communales de Chasse Agréés (ACCA)*'

preserve habitats and species of national importance, promote scientific research, and contribute to public appreciation of the protected species.

- **Classified or Registered Site***:* Sites of general public interest from a historical, artistic, scientific, legendary or aesthetic point of view are designated in order to prevent the degradation or loss of their features. They may be large or small, in rural or urban areas, and on public or private property.

The highest value areas for biodiversity, e.g. the most intact part of the core area of National Parks or Biological Forest Reserves, may be additionally designated as an 'integral reserve[123]' for their value for biodiversity conservation and for scientific research.

The following categories are not covered in this report:

- Marine Nature Park[124]: This category was created in 2006 for fully marine areas (including intertidal zones), to create a less restrictive category than National Parks, and the zoning is therefore more flexible, with no predetermined zoning categories.
- Regional Nature Park[125]: A voluntary 12 year agreement among local actors. The emphasis of designation is on sustainable development and local involvement. Corresponds to IUCN category V, but sites overlap with Nature Reserves, Protected Biotope Areas, Classified Sites, Ramsar Sites, Biosphere and Natura 2000 sites.
- Coastline and Lakeshore Protection site[126]: Land acquired by the coastal protection agency through its pre-emptive purchase right, and managed for nature conservation. Corresponds to IUCN category IV if it protects a specific habitat, otherwise it falls into IUCN category V.
- Sensitive Natural Area[127]: Land designated by the French regions[128] at the regional and local level, which brings land into public ownership, or which can be associated with a land tax.

Contractual arrangements are important in the French protected area network. Natural area conservation societies in France manage more than 2,000 sites for nature conservation on more than 1,316 km^2 (Lefebvre & Moncorps, 2013). A new law in 2010 provides for the legal recognition of such societies, and they can own or rent land, or enter into management agreements with private landowners or local governments.

9.2.4 Protected area coverage in France

The protected areas for biodiversity in European (metropolitan) France as of 1 January 2010 are listed in Table 9-1 (Lefebvre & Moncorps, 2013)[129]. The table lists the main French designations and areas, and their general relationship to the IUCN protected area categories. It is difficult to establish a direct correspondence between the IUCN protected area categories and French protected area designations, as the applicable legal and

[123] '*Réserve intégrale'*
[124] '*Parc naturel marin'*
[125] '*Parc naturel régional'*
[126] '*Site du Conservatoire du Littoral et des Rivages Lacustres'*. The Conservatoire is a public administrative entity under the authority of the ministry in charge of nature protection.
[127] '*Espace Naturel Sensible (ENS)'* and associated '*Taxe Départementale d'Espace Naturel Sensible (TDENS)'*
[128] The General Council of each French département
[129] http://www.donnees.centre.developpement-durable.gouv.fr/SCAP/Chiffres_aires_protegees.pdf

management frameworks, zoning and other features may differ for areas with the same designation (Guignier & Prieur, 2010).

Table 9-1: France's biodiversity protected area number, land surface area, and IUCN category

NB site designations are overlapping so this list adds up to more than the total protected area. The total land area of France on the European continent is 552,695 km^2.[130]

Protected area type	IUCN category (indicative)	Number	Surface area (km^2)	Percentage of terrestrial area (%)
Internationally protected sites				
Ramsar Sites	-	32	7,701	1.2
Natural World Heritage Sites	-	2	424	0.1
Biosphere Reserves (including buffer zones)	-	9	42,629	7.7
Natura 2000				
SACs/SCIs	IV	1,368	74,575	11.6
SPAs	IV	385	78,684	12.3
DOCOB sites	IV	1,749	108,628	17.0
Nationally protected areas				
National Parks core area	II	6	3,550	0.6
National Parks peripheral	VI	6	9,553	1.5
National Nature Reserves	Ia, III or IV	149	1,754	0.3
Regional Nature Reserves	III or IV	76	169	
Corsican Nature Reserves	III or IV	6	834	
Biotope protection orders	VI	726	1,517	0.3
Biological forest reserves	IV (Ib)	225	398	0.1
National hunting & wildlife reserves	IV	9	360	0.1
Hunting & wildlife reserves	IV	12,000	c. 25,000	c. 3.9
Classified sites	III	2,429	9,233	4.1
Registered sites	III	4,796	16,820	
Regional nature parks	VI	45	75,265	11.7

Source: (MEDDE, 2014), (Lefebvre & Moncorps, 2013), (ONCFS, 2012), [131], [132], [133], [134], [135], [136], [137], [138]

[130] http://en.wikipedia.org/wiki/Metropolitan_France

[131] Ramsar sites of metropolitan France; http://fr.wikipedia.org/wiki/Liste_des_sites_Ramsar_de_France, http://www.ramsar.org/cda/en/ramsar-documents-list-annotated-ramsar-16400/main/ramsar/1-31-218%5E16400_4000_0__

[132] Bassin de la Dordogne (2,393,780 ha on land), Camargue (13,117 ha), Cévennes (323,000 ha), Luberon-Lure (179,600 ha), Marais Audomarois (22,539 ha), Mont Ventoux (85,000 ha), Fontainebleau et du Gâtinais (307,370 ha), Vallée du Fango (23,500 ha), Vosges du Nord/Pfälzerwald (301,800 ha), Mont Viso (133,164 ha); Iroise (45,049 ha) is mainly marine. http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/europe-north-america/

[133] Gulf of Porto in Corsica (Calanche of Piana, Gulf of Girolata, Scandola Reserve) (11,800 ha) http://whc.unesco.org/en/list/258

[134] Pyrénées - Mont Perdu together with Spain (both natural and cultural designations) (30,639 ha) http://whc.unesco.org/en/list/773

[135] http://www.onf.fr/onf/sommaire/developpement_durable/actions/20080707-150833-949463/@@index.html

[136] National park cores of metropolitan France with terrestrial area: Parc nationale des Cévennes (93500 ha), Parc national des Ecrins (91800 ha), Parc national du Mercantour (68500 ha), Parc national de Port-Cros (700 ha), Parc national des Pyrénées (45700 ha), Parc national de la Vanoise (53500 ha), Parc national des

The coverage of protected areas contributing to the target of 2% strictly protected for biodiversity conservation is currently at 1.23% of the French European terrestrial area[139]. (NB this total includes National Park core areas, National Nature Reserves, biological forest reserves, biotope protection orders, but does not include Regional Nature Reserves due to lack of data). The overall coverage of protected areas is reported to be around 20% of the land area of European France (MEDDE, 2014).

The expansion of France's protected area network in the last decade is primarily due to Natura 2000 areas and new regional nature parks; in 2010 there were around 20 ongoing projects to designate new Regional Nature Reserves on 30,000 ha (Lefebvre & Moncorps, 2013). Regional nature parks also make an important contribution to species protection (Lefebvre & Moncorps, 2013).

France has one of the highest national levels of biodiversity in Europe, illustrated by the fact that it submits the highest number of species and habitat assessments under the Habitats Directive. A detailed gap analysis was carried out in 2009-10 to identify which species and habitats have the highest priority for the target to increase the protected area (Coste et al, 2010). A total of 535 vertebrate, invertebrate and flowering plant species were identified as being candidates for protection in designated areas because they are rare, localised, threatened, of high national importance, and sensitive to human impact; of these, 188 were found to have the highest priority because of the small proportion of their population within existing protected areas, whilst 58 species are already sufficiently protected by the network. In addition, 119 habitat types were identified as priorities for protection[140]. The current protected area network is considered to be very insufficient for more than half of the habitat types and none are considered to be sufficiently protected at present. The analysis has also pointed out the gaps in knowledge of species in protected areas in France, notably the lack of species distribution data on many groups and species other than the species of Community interest listed in the Habitats Directive (Coste et al, 2010).

France has also initiated a national mapping of species habitats known as natural areas of particular interest in terms of ecology and wildlife (**ZNIEFF**[141]). The site inventories are validated at a regional level by the scientific nature councils (CSRPN[142]) and then by the National Natural History Museum. The sites are not protected by any legal designation but are supposed to be taken into consideration in environmental impact assessment. Type I ZNIEFF sites are small homogenous areas of habitat; Type II ZNIEFF sites are large areas of rich or largely unaltered natural areas which have considerable biological potential.

Calanques (8500 ha); http://www.parcsnationaux.fr/Decouvrir-Visiter-Partager/Les-dix-parcs-nationaux-francais

[137] http://www.reserves-naturelles.org/patrimoine/chiffres-cles

[138] http://www.onf.fr/onf/sommaire/developpement_durable/actions/20080707-150833-949463/@@index.html

[139] http://www.donnees.centre.developpement-durable.gouv.fr/SCAP/Chiffres_aires_protegees.pdf

[140] 112 habitat types listed in Annex I of the Habitats Directive plus 7 other habitat types considered important in the national species habitat mapping network ZNIEFF

[141] '*Inventaire des Zones Naturelles d'Intérét Ecologique Faunistique et Floristique (ZNIEFF)*'

[142] '*conseil scientifique régional du patrimoine naturel*'

9.3 Protected area objective setting in France

9.3.1 Natura 2000

The DOCOB document defines the conservation objectives of each Natura 2000 site, and defines the conservation measures necessary to achieve those objectives, including both prohibitions and active measures. It includes an assessment of the conservation status of the habitat types and species present in the site, an overview of the human activities that take place in the site, and an analysis of their effects on the habitats and species. The DOCOB may include a socio-economic assessment of the beneficiaries and benefits arising from the site, and which uses are detrimental, neutral or positive for the biodiversity objectives. DOCOBs can specify contractual measures, administrative, regulatory or land holding measures, as well as measures for communication and awareness-raising and monitoring and research to improve management (European Commission, 2014). The process of agreement of the DOCOB contract is crucial to reconciling biodiversity objectives and the interests of site users. The contract is agreed by a committee[143] assembled by the departmental prefect to include the land owners and managers and users of the site (e.g. hunters, recreation interests, tourism), and any other relevant stakeholders as well as local government representatives. The DOCOB can also lead to a voluntary Natura 2000 Charter, which states all the actions and recommendations that may be applicable to the site, and provides clarity and commitment for both administration and land managers on what is needed to achieve the conservation objectives for the site (European Commission, 2014).

The recent French report under the Habitats Directive Article 17 provides an update on the status of management planning for Natura 2000 sites, reporting that 76% of the network is covered by comprehensive management plans (i.e. DOCOBs); 591 sites have completed and adopted plans (compared to 264 under preparation) (ETC/BD, 2014).

9.3.2 Nationally protected sites

Conservation objectives are defined at a site level for National Parks, National and Regional Nature Reserves, forest reserves, and most other designations. Conservation objectives are not defined at site level for Biotope Protection Orders, and for Classified and Registered Sites. Conservation objectives may be defined – but not always – for hunting reserves and for Biosphere Reserves.

National park charters define each parks' conservation objectives, including a land use scheme that delineates the ecological links between the park's core areas and its surrounding areas, and any necessary additional connectivity measures (Guignier & Prieur, 2010). The National Park charter defines the active conservation measures and zones (i.e. its management planning). Those parks designated before the introduction of the charter should gradually be replacing their management plans with a charter. The charter is drafted by a public interest group, which comprises at least one public entity and can include private entities, in consultation with the municipalities and other local authorities involved. If it is a new National Park, the entire case file for the park's creation, including the draft charter, is

[143] '*comité de pilotage - Copil*'

submitted to a public enquiry, and the final authorisation must be given by the environment minister.

The role of **National Parks** in France has been strongly influenced by the debate surrounding the establishment of a National Park in French Guyana, which has an indigenous population and where the region was focused on economic and social development (Guignier & Prieur, 2010). The legal status of National Parks was reformed in 2006 to put emphasis on sustainable development and increased local involvement. As described by Guignier & Prieur (2010), French National Parks now seek to maintain a delicate balance between biodiversity protection and sustainable development, combined with a greater role for regional and local authorities. The reform introduced a new zoning system that lays out core areas and peripheral zones integrated into the area of the park, and introduced the National Park charter as a more locally focused planning instrument to 'define a land use scheme that reflects the ecological links between the park's core areas and its surrounding areas'[144]. However, their strict protection role and their differentiation from Regional Nature Parks is no longer so clear (Guignier & Prieur, 2010).

National nature reserves are created by ministerial decree, and the lengthy establishment process must meet a set of formal obligations (Guignier & Prieur, 2010). Regional Nature Reserves are created by a decision of the regional council, following consultations. Nature reserves must have management plans defining the conservation objectives and measures (at the latest three years after designation), and submit annual reports on management progress and budgeting. National Nature Reserves must have a scientific council that supervises the conservation objectives and measures. The management of national or regional reserves may be entrusted, through agreement, to public entities, public interest groups, non-profit organisations such as conservation societies, foundations, owners of protected land, or to local government groupings.

9.4 Protection levels and approaches in France

9.4.1 Natura 2000

Natura 2000 sites outside nationally designated protected areas are defined by the obligatory objectives document (DOCOB), which is approved by the departmental Prefect. The DOCOB delineates the site and defines the site's conservation objectives and conservation measures (see above), and is legally binding on the public authorities. The management of sites is then implemented through a contract between the site holder (land owner) and the local authority, including a precise description of the obligations of the contractor (paid or unpaid), the total budget and how it is calculated, details of funding, and indicators for monitoring and evaluating the implementation of measures (European Commission, 2014). In agricultural areas, this contract is usually an agri-environment agreement. Contracts with Natura 2000 landowners are signed for 5-year periods. In addition, the Natura 2000 charter, which does not involve financial compensation, can initiate the right to benefit from land tax exemptions on unbuilt property, and allow access to certain public funds (e.g. for forestry).

[144] Environmental Code Article L331-3, as quoted in (Guignier & Prieur, 2010).

The DOCOB development process was given a high political priority and sufficient funding, so that now most sites have a DOCOB. Over 12,000 management contracts for nearly 200,000 ha have been agreed with farmers, and over 1,090 contracts with other land managers[145]; however, there are concerns that the overall uptake of management measures by land managers (e.g. through agri-environment schemes), has not been very successful (BirdLife Europe, 2012).

9.4.2 Nationally protected sites

National Parks, National and Regional Nature Reserves, Biological Forest Reserves and national Hunting and Wildlife Reserves are protected through **regulatory** instruments. The principles laid out in the French Environmental Code apply to all areas protected through regulation – this includes the precautionary principle, the principle of preventative action and correction of environmental damage at the source, the polluter pays principle, the reparation principle, and the participation principle (Guignier & Prieur, 2010).

National Park core areas are protected by certain specific provisions in French law, including an obligation to bury all electrical and communication cables, ban on industrial and mining activities, and a ban on works, buildings and facilities. However, legal provisions provide flexibility that could increase the core area's vulnerability, such as provisions giving National Park authorities permission to authorise works for the public interest (Guignier & Prieur, 2010). Some of these provisions also apply to National and Regional Nature Reserves.

National Parks are designated through a Prime Minister's decree[146], with political approval at the local level. The decree delimits the core area or areas, applies general protection rules, and establishes the park's administrative public entity (Lefebvre & Moncorps, 2013). The legally binding National Park charter can apply further protection measures for a period of 12 years, including for example a ban on the cultivation of genetically modified crops on all or part of the park territory, on the basis of the consent of all local farmers[147]. The decree and charter can establish specific protections for the park core area by banning certain activities such as hunting, fishing, commercial activities, extractive activities, water use, etc. It can grant derogations for particular groups (e.g. the hunting rights of park inhabitants).

The peripheral zones of National Parks are subject to much less protection, for example industrial and mining activities are allowed. Municipalities located in the peripheral area decide voluntarily if they wish to subscribe to the charter and join the National Park area. They can also decide to withdraw from the charter, either 15 years after its approval, or when it is revised, and the boundaries of the park would have to be revised accordingly.

National Nature Reserve ministerial decrees and **Regional Nature Reserve** decisions can define or prohibit specific activities which could potentially damage the natural development of fauna and flora, and more generally modify the reserve's characteristics[148]. This may include agriculture, livestock husbandry, forestry, industry, mining, infrastructure works, traffic, dumping of waste and other materials and other acts which affect wildlife.

[145] http://www.developpement-durable.gouv.fr/Les-chiffres-cles-du-reseau-Natura.html
[146] '*Décret en Conseil d'Etat*'
[147] Environmental Code Articles L331 and 2335
[148] Environmental Code Article L332-3.I

The departmental prefect can also define surrounding protection zones with restrictions on damaging activities, following public consultation[149], but cannot regulate hunting and fishing (Guignier & Prieur, 2010). Management responsibility lies with a consultative committee and a management group. The committee can issue special authorisations, for example for a road project.

Biological Forest Reserves are created by inter-ministerial decree[150] either in public forest areas or in other forests subject to the French forest code, on the initiative of the national forest office. They may be designated either as 'integral' reserves, meaning that all human interventions that are likely to modify the ecosystem are banned, or as managed reserves, or a mix of both. Integral reserves aim to achieve a state of natural forest processes (i.e. wilderness), but allow the removal of alien species, risk prevention measures, and if necessary the control of deer populations. National **Hunting and Wildlife Reserves** are designated by ministerial decree, with an obligatory management plan and reserve director.

Biotope Protection Orders created by order of the departmental prefect may regulate activities and prohibit actions that are likely to damage the species and their habitats that the order protects, and/or the biological balance of the natural area (for example, destruction of a hedge or ditch) (Guignier & Prieur, 2010). The order can also establish some legal obligations for site management and development (Lefebvre & Moncorps, 2013). The measure is relatively quick as it is not subject to a public enquiry, but its effectiveness is limited by the fact that the order cannot override an existing development permit, because the principle of independence of legislative tools in France makes it impossible to invoke a biotope protection order in response to a development permit (Guignier & Prieur, 2010).

The protection of regional nature parks and other designations relies on **contractual** agreements with land owners. Local **Hunting and Wildlife Reserves** are established through 5-year contracts under the hunting law (Lefebvre & Moncorps, 2013). The contract can regulate or prohibit vehicle access, entry of domestic animals, making noise (e.g. through use of horns), burning and fires, destruction of habitats (e.g. hedges), or use of pesticides. Exceptionally, public access can be blocked, except for the landowner.

Protection through the French **planning** system varies. Nature Reserves, core areas of National Parks, and Biological Forest Reserves have strict legal protection and must be included in land use plans[151]. The protection can only be modified by changing the boundaries of the protected areas. **Classified Sites** may not be destroyed or modified in structure or appearance without special authorisation[152]. **Registered Sites** have no protection from potentially harmful work or activities, but the owner must report any work other than normal maintenance (Guignier & Prieur, 2010). Classified and Registered Sites must also be included in land use plans. Biotope Protection Orders are designed as species protection tools at the local level, but their usefulness in spatial planning is limited by the fact that there is no obligation to append them to local land use plans, nor can they override an existing development permit (Guignier & Prieur, 2010). In practice they can only

[149] Environmental Code Article L332-16
[150] '*Arrête interministeriel - Ecologie & Agriculture*'
[151] Land Use Planning Code Article R126-1 Annex
[152] Environmental Code Article L341-10

effectively be protected against activities that can easily be policed (Lefebvre & Moncorps, 2013).

Despite this legal protection, an examination of the effectiveness of the legal instruments protecting French sites from the impact of road construction projects showed that they are often ineffective, particularly for the designations based on landscape protection under the 1993 Environmental Code and/or planning restrictions (Mallard and François, 2013). The prohibition to alter or destroy National Parks or National Nature Reserves can only be circumvented through decommissioning of the site designation or through site boundary modification; however there is an option to authorize new roads for the purpose of improving National Park access. The French protected area designations are frequently deliberately overlapped, but it is debatable whether this actually achieves a higher level of protection than the individual designations (Mallard & François, 2013).

A new planning instrument to implement the national ecological network, the Regional Ecological Coherence Scheme (SRCE)[153], was created in 2010[154]. Each French administrative region is now obliged to define its SRCE scheme, after which these documents should be taken into account in local planning decisions (i.e. the decisions should be compatible and coherent with the SRCE). However, there is no legal obligation on planning authorities to defer planning decisions to the SRCE.

9.5 The monitoring of protected areas in France

9.5.1 Site condition assessment

Apart from the obligatory nation-wide monitoring for France's reporting under the Habitats and Birds Directives, monitoring of habitats and species in protected areas is regarded as highly fragmented and lacking in standardisation (Coste et al, 2010). Responsibilities for the monitoring of protected areas are dispersed amongst various French government agencies, depending on the types of designation. For example, biological forest reserves are monitored by the Office of National Forests[155], whilst the National Office of Hunting and Wildlife monitors the hunting and wildlife reserves.

All National Parks have adopted certain indicators for conservation status, and all the National Nature Reserves report on certain species and habitats using a common protocol. These systems are now feeding their monitoring results into the national biodiversity observatory using the system to standardise national-level monitoring[156], which is considered to be the appropriate framework for biodiversity monitoring as a whole at the national level[157].

[153] '*Schéma Régional de Cohérence Ecologique'*
[154] Grenelle 2 law (n° 2010-788 of 12 July 2010)
[155] '*Observatoire du patrimoine naturel des réserves biologiques*'
[156] '*Système d'Information sur la Nature et les Payages (SNIP)'*
[157] Personal communication, deputy director of protected areas, French Ministry of Ecology, Sustainable Development and Energy

A gap analysis of species and habitat coverage by protected areas concluded that the weakness of current information on species distribution and responses to climate change make it difficult to plan how the protected area network could expand to increase species resilience to climate change (Coste et al, 2010).

9.5.2 Management effectiveness evaluation

All National Parks have adopted a common framework for reporting management effectiveness.

There is no standardised costing of monitoring schemes in French protected areas. The national government has instructed that 5% of the total budget of implementing a National Park charter should go to monitoring and evaluation, but does not have any effective means of enforcing this measure[158].

[158] Personal communication, deputy director of protected areas, French Ministry of Ecology, Sustainable Development and Energy

10 Protected areas in Germany

10.1 The role of protected areas in biodiversity conservation in Germany

German policy recognises protected areas as one of the most important instruments for biodiversity conservation in a countryside almost wholly dominated by human use, but also recognises that effective biodiversity conservation requires measures to reduce pressures in the wider landscape (BfN, 2010a; BMU, 2007). The German biodiversity strategy (BMU, 2007) contains a goal plus associated actions to strengthen the protected area network, and in particular its ecological connectivity, corresponding to the German implementation of CBD Aichi Target 11. The 2010 target to complete the designation of Germany's Natura 2000 network on land has been achieved (BMU, 2013). Other national level targets relevant to protected areas include the promotion of large-scale nature conservation projects that protect significant core areas in the national ecological network (including the expansion of the core areas of National Parks); protection of disused military sites and extraction sites for nature conservation; establishment of wilderness reserves on 2% of the land area; 5% of woodland with minimal management intervention; and the advancement of research into how ecological networks and protected areas benefit biodiversity conservation. However, the German biodiversity strategy has been criticised as being vague with regard to the role of protected areas and lacking in quantitative targets and indicators (Scherfose, 2011). From the point of view of the NGO EUROPARC Germany, the National Park network is still incomplete, particularly with regard to wilderness areas.[159]

The role of protected areas is also recognised at federal state level. For example, in the federal state Schleswig-Holstein, protected areas are recognised as having played a key role in reversing the declines of some threatened species, particularly amphibians and large birds (Romahn et al, 2008), but are less successful in protecting dry and nutrient-poor habitats because of the increasing pressure of eutrophication from intensive agricultural practices in the surrounding areas.

Germany has developed a national **ecological network** concept and plan that aims to build up a coherent network based on protected areas linked by corridors and green infrastructure areas that provide ecological connectivity, covering at least 10% of the land area. The plan identifies core areas of national biodiversity significance, areas with high restoration potential and nationally and internationally significant corridors (including woodland, wetlands, dry and freshwater habitats) (BfN, 2011a). Of the planned core areas on 6.1% of the land area, around 3.5% is already protected as National Park, nature reserve or Natura 2000 site (BMU, 2013). However, this still leaves over 9,000 km^2 of core biodiversity area without any legal protection. The analysis identifies 22 areas where there are significant gaps, particularly in the federal states Bayern and Niedersachsen (BfN, 2011a). In addition, the ecological network concept requires the establishment of corridors of extensively managed agricultural or forest land on around 4.5% of the land area (Drobnik et al, 2013). German environmental policy also recognises that the conservation of wide-ranging species such as large carnivores will only be possible if landscape fragmentation is

[159] Personal communication, Elke Baranek, EUROPARC Deutschland

reduced. A nationally funded programme was launched in 2012 to minimise the habitat fragmentation caused by the German motorway network[160].

The scope for action at the national level is limited because protected areas are essentially a federal state responsibility, and there is little funding for protected areas available at national level[161]. The federal states are legally bound[162] to a target to create an ecological network covering at least 10% of their surface area, corresponding to an equal portioning of the national target (see below) and are responsible for planning the regional connectivity components of the ecological network concept (BMU, 2013). Some federal states, for example Brandenburg[163], have also set their own goals for protected areas within their regional biodiversity strategy.

The German government has commissioned a number of studies that attempt to estimate the value of protected areas for ecosystem services, for example: drinking water provision (BfN, 2013), fishing in the Müritz National Park (BfN, 2013), and the contribution of peatland restoration in Germany's protected areas to carbon sequestration and storage (Drösler et al, 2012).

10.2 Protected area designations and coverage in Germany

10.2.1 Internationally designated sites

Germany has the following protected area designations under international conventions:

- Ramsar: currently 34 Wetlands of International Importance, 27 of which are mainly terrestrial. Ramsar Sites are mostly designated as SPA and/or as national nature reserve.
- Biosphere: Germany has 16 biosphere reserves covering 3.7% of the land area[164]. German law specifies that biosphere reserve areas have a core zone also designated as national park or nature reserve, and additional large areas also designated as landscape protected area and/or as Natura 2000 area[165].
- Natural World Heritage: Germany has declared three Natural World Heritage Sites; one for nature conservation on land (which is part of a serial site with Slovakia and Ukraine) (Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany[166]), one marine site shared with the Netherlands and Denmark (The Wadden Sea[167]), and one for geology (Messel Pit Fossil Site[168]).

[160] http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/bundesprogramm_wiedervernetzung_bf.pdf
[161] The main funding programme is the '*Naturschutzgrossprojekt*' see http://www.bfn.de/0203_liste_laufend.html
[162] Through the German nature conservation law (*Bundesnaturschutzgesetz*)
[163] MUGV (2014) Massnahmenprogram Biologische Vielfalt Brandenburg. http://www.mugv.brandenburg.de/cms/detail.php/bb1.c.319386.de
[164] Bundesamt für Naturschutz website 'Biosphärenreservate' http://www.bfn.de/0308_bios.html
[165] German nature conservation law BNatSchG §25 paragraph 1
[166] 33,670 ha plus 62,403 ha of buffer zone, http://whc.unesco.org/en/list/1133
[167] 982,004 ha, http://whc.unesco.org/en/list/1314
[168] 42 ha plus 23 ha of buffer zone, http://whc.unesco.org/en/list/720

10.2.2 Natura 2000

The designation of Natura 2000 sites (SACs and SPAs) is the responsibility of the German federal states[169]. As of 2013, Germany had almost 5,300 Natura 2000 sites, on around 15.4% of the land area (BMU, 2013). This means Germany has a high number of sites in the EU context, but many sites are small; a quarter are less than 50 ha[170]. Around 95% of the National Park area is designated as Natura 2000, and over 60% of the biosphere reserve area is designated as Natura 2000 (BfN, 2010a). Germany's terrestrial Natura 2000 network is considered to be complete. There is substantial overlap between SACs and SPAs in Germany: around half of the Natura 2000 (net) area has both designations.

Natura 2000 sites should be designated under one of the German protected area designations as defined by the German federal nature conservation law[171], but the law also gives the federal states the option of using other instruments that provide for an equivalent level of protection. It has therefore been handled differently in each state. In four states they are designated as Nature Reserves or landscape protected areas[172], but in two states they are designated under the state law only[173], and other federal states rely on management plans only or on management contracts with no protected area designation (Rosenkranz et al, 2014).

10.2.3 Nationally protected sites

Germany has the following protected area designations corresponding to the IUCN categories I to IV:

- **Nature Reserve**[174]: area where nature and landscape is protected for the protection and restoration of habitats or communities of wild animal and plant species, for scientific, natural heritage or landscape reasons, or because of its rarity, uniqueness, or distinctive beauty.
- **National Park**[175]: National Parks must be large, mostly non-fragmented and unique landscapes that fulfil the Nature Reserve criteria over most of their area. The protection goal of National Parks is primarily that natural processes should be undisturbed with their natural biodiversity in all the ecosystems for which Germany bears national and global responsibility (Europarc Germany, 2012). As far as this protection purpose allows, other goals such as education, public information, contact with nature, research and monitoring are also to be implemented. Only four of the 11 terrestrial German National Parks currently officially meet the IUCN category II criterion of 75% of core area, and the German law was revised in 2002 to make it easier to designate National Parks 'in development', i.e. with only 50% core area. However, almost all the National Parks are larger than 10,000 ha[176].

[169] According to the German nature conservation law BNatSchG § 33 paragraphs 2, 3 and 4
[170] http://www.deutscher-naturschutztag.de/fileadmin/user_upload/FV_Vortraege_PDFs/FV3_PDF/FV3_1_Krueger_FFH_NABU.pdf
[171] According to BNatSchG §32
[172] Nordrhein-Westfalen, Niedersachsen, Brandenburg, Sachsen-Anhalt
[173] Schleswig-Holstein, Rheinland-Pfalz, Saarland
[174] '*Naturschutzgebiet*' according to German nature conservation law BNatSchG § 23 paragraph 1
[175] '*Nationalpark*' according to German nature conservation law BNatSchG § 24
[176] This is an interpretation and not defined in the IUCN category II (Dudley, 2013)

- **Legally Protected Habitat**[177]: threatened habitats of particular biodiversity value, including moor, fen, wet grassland and dry grassland. Habitats are defined by environmental conditions, vegetation, species composition and other characteristics.

In addition, **Nature Heritage Areas**[178] are designated under federal state laws, usually for small areas of particular features or habitats up to 5ha, such as hedge-banks, small lakes or ponds, bogs, trees.

Germany has also created the designation **National Nature Heritage Area**[179]: Areas of national importance because of their scientific, natural heritage, cultural heritage or landscape value (including geological or geomorphological), and because of their rarity, uniqueness or beauty, to be protected in the same way as Nature Reserves. This designation follows IUCN category III. They may be of any size. They differ from National Parks in requiring active management to maintain their valued features and/or to protect them from visitor pressure. No areas have been designated so far[180], but some areas are in discussion[181].

The following German protected area designations do not correspond to the IUCN categories I, II, III, or IV, and are therefore not considered further in this study:

- **Nature Park**[182]: Nature parks are large areas designated for the purposes of recreation and sustainable tourism, and also to protect landscape, habitats and species through diverse and ecologically sustainable land uses, and to ensure a sustainable regional development. In 2011 they covered about 27% of the terrestrial area of the country[183].
- **Landscape Protected Area**[184]*:* Landscape areas are designated to protect the natural diversity, uniqueness and beauty of the landscape, and also serve to protect or restore ecosystem functions and natural capital. This designation is used for areas of particular significance for recreation and also to create buffer zones to Nature Reserves. They currently cover about 28% of the terrestrial area of Germany[185].

10.2.4 Protected area coverage in Germany

Table 10-1 lists the biodiversity protected area designations, area and % coverage in Germany. Germany is continuing to designate both large and smaller scale protected areas: since 2004, four new National Parks have been designated, covering 514 km^2, and 1,205 new Nature Reserves were designated between 2004 and 2009 on over 2000 km^2 (Scherfose, 2011). However, this is primarily due to designations in only eight federal states.

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[177] '*Besonders geschützte Biotoptypen*' according to German nature conservation law BNatSchG § 30
[178] '*Naturdenkmal*'
[179] '*Nationales Naturmonument*' according to German nature conservation law BNatSchG § 24 paragraph 2
[180] Bundesamt für Naturschutz webpage ‚Nationale Naturmonumente', http://www.bfn.de/0308_nationale_naturmonumente.html
[181] including Siebengebirge (4,500 ha), Kap Arkona (1,800 to 7,000 ha), and Insel Vilm (94 ha)
[182] According to the German nature conservation law BNatSchG § 27
[183] Bundesamt für Naturschutz website 'Naturparke' http://www.bfn.de/0308_np.html (Information correct as of October 2011).
[184] '*Landschaftsschutzgebiet*' according to German nature conservation law BNatSchG § 26
[185] Bundesamt für Naturschutz website 'Landschaftsschutzgebiete' https://www.bfn.de/0308_lsg.html (Information correct as of end 2012).

In 2011, 4.2% of Germany's land area was in strictly protected areas (i.e. National Parks or Nature Reserves) (BMU, 2013). As not all of the German Natura 2000 areas were counted in this statistic, it is expected that the future designation of some of these as Nature Reserves will increase this percentage. The German government considers this amount of strictly protected area to be low in both a European and international context, and the area of large-scale relatively undisturbed habitat is particularly low. Only 1.9% of the forest area has been secured long-term as a minimum intervention area[186].

Table 10-1: Germany's biodiversity protected area number, land surface area, and IUCN category

NB site designations are overlapping so this list adds up to more than the total protected area. Total land area of Germany is 357,168 km^2.[187]

Protected area type	IUCN category (indicative)	Number (land only)	Surface area land (km^2)	Percentage of terrestrial area (%)
Internationally protected sites				
Ramsar Sites	-	27[188]	1,404	0.4
Natural World Heritage Sites	-	1	337[189]	0.1
Biosphere Reserves[190]	-	16	13,123	3.7
Natura 2000				
SACs[191]	IV	4,606	33,233	9.3
SPAs[192]	IV	738	40,096	11.2
Nationally protected areas*				
National Parks[193]	II or III	11	2,044	0.6
Nature Reserves[194]	Ia or IV	8,589	10,733[195]	3.0
Legally Protected Habitat[196]	IV	not known	n/a	c 10

Sources: (BfN, 2011b), (BMU, 2013). Note * Excluding IUCN category V and VI protected areas

[186] Bundesamt für Naturschutz 14 October 2013 press release 'Aktuelle Daten zur natürlichen Waldentwicklung in Deutschland' http://www.nw-fva.de/nwe5/downloads/Pressemitteilung.pdf

[187] http://en.wikipedia.org/wiki/Germany

[188] The mainly terrestrial sites only as listed on Bundesamt für Naturschutz website ‚Ramsar-Gebiete in Deutschland' http://www.bfn.de/0310_ramsar-gebiete.html

[189] 33,670 ha plus 62,403 ha of buffer zone, http://whc.unesco.org/en/list/1133

[190] Bundesamt für Naturschutz website 'Biosphärenreservate' http://www.bfn.de/0308_bios.html

[191] FFH-Gebiete in Deutschland, Meldestand 03 Januar 2014. http://www.bfn.de/fileadmin/MDB/documents/themen/natura2000/gebiete/meldestand_ffh_03012014.pdf Information correct as of Jan 2014

[192] Vogelschutzgebiete in Deutschland gemäss der EU Vogelschutz-Richtlinie, Meldestand 31 Oktober 2013. http://www.bfn.de/fileadmin/MDB/documents/themen/natura2000/gebiete/meldestand_spa_31102013.pdf

[193] Bundesamt für Naturschutz website 'Nationalparke' http://www.bfn.de/0308_nlp.html. (Information correct as of Jan 2014).

[194] Bundesamt für Naturschutz website 'Naturschutzgebiete' http://www.bfn.de/0308_nsg.html. (Information correct as of end 2012).

[195] Total area minus marine areas (14,510 ha Roter Sand, NI; 53,500 ha Küstenmeer vor den Ostfriesischen Inseln, NI; and 160,142 ha Schleswig-Holstein marine areas)

[196] Personal communication, Dr. Volker Scherfose, Bundesamt für Naturschutz

Only Brandenberg and Nordrhein-Westfalen meet the 10% ecological network target for federal states, and very little progress has been made in the other federal states, according to an assessment of federal states progress on some of the biodiversity strategy targets published by German nature conservation NGOs (NABU and BUND, 2014). Only Saarland and Thüringen have designated any wilderness areas and minimal intervention forests, and overall progress on these targets is extremely slow. The Nature Reserve network is notably small in Bayern (NABU & BUND, 2014).

Germany's protected area network has essentially been developed at federal state level without an overall national strategy defining roles or targets for protected areas. However, one key national level action to enhance the protected area network has been a programme to secure the designation of 125,000 ha of disused military sites and extraction sites, areas along the old border between east and west Germany, and areas that belonged to the previous east German state, which are often hotspots of biodiversity (DBU, 2014).

An analysis of the role of protected areas for species conservation found at least 15 key mammal, bird and fish species[197] for which Germany has a particular responsibility and which have their population either totally or almost totally within National Parks, biosphere areas or nature parks (Scherfose and Riecken, 2011). Germany's protected areas also contain endemic and very rare species not covered by the Habitats Directive including various plant species[198]. However, it has also been estimated that only 30 to 40% of the native bird species can be maintained in viable populations solely by the current protected area network (Sudfeldt et al, 2010).

Over half of the habitat types of Community interest in Germany (i.e. 88 of the 192) have 80 to 100% of their area within Germany's protected areas (Sachteleben and Behrens, 2010). But several of the habitat types for which Germany has European and international responsibility, notably European beech forest types (of which it has a quarter of the European range), are not adequately represented in German protected areas. For example, old beech forests (over 160 years) now occupy only 0.27% of Germany's land area (BfN, 2013), and only 50,000 ha of beech forest is strictly protected (i.e. without forestry use) (Panek, 2011); most of the forest area continues to be managed on a large scale for timber with removal of deadwood.

Some ecosystems and habitats remain in unfavourable states even though they are well represented in protected areas. Floodplain ecosystems have a central role in the conservation status of many habitats and species in Germany, but currently have a particularly poor condition (BfN, 2014). Though half of the still functioning floodplain area lies within Natura 2000 areas, the measures needed to improve the conservation status of floodplain habitats are often outside the control of protected area managers.

[197] European Lynx (*Lynx lynx*), Alpine Ibex (*Capra ibex*), Western Capercaillie (*Tetrao urogallus*), Black Grouse (*Tetrao tetrix*), Little Tern (*Sterna albifrons*), Arctic Tern (*Sterna paradisaea*), Common Tern (*Sterna hirundo*), Sandwich Tern (*Thalasseus sandvicensis*), Ruff (*Philomachus pugnax*), Lesser Spotted Eagle (*Aquila pomarina*), European Pond Turtle (*Emys orbicularis*), several endemic Whitefish species (*Coregonus lavaretus* var., *Coregonus lucinensis*), Stechlin cisco (*Coregonus fontanae*), Vendance (*Coregonus albula*).

[198] E.g. *Astragalus exscapus, Dianthus gratianopolitanus, Diphasiastrum issleri, Campanula baumgartenii*

The protected area designations differ in their contribution to biodiversity protection:

National Parks: There is recognition of the primary importance of National Park designations for their combined benefits, compared with other protected area designations (BfN, 2013). There are currently 15 National Parks (of which four are primarily marine), the most recent designated in January 2014[199], covering around 0.57% of the German land area. This is very low in comparison with most European countries, and Germany has several areas which are suitable for designation as National Parks in future, particularly on disused military sites. There are notable deficits in the coverage of mires and moorland, and of priority woodland habitat types (Job, 2010).

Nature Reserves: Germany has over 8,589 Nature Reserves occupying 3.8% of the land area as of the end of 2012[200]. Around 60% of these sites are smaller than 50 ha in size, and may therefore not be adequately buffered from negative environmental pressures such as eutrophication or sinking groundwater tables. Small reserves are more common in the hilly and mountainous areas. Large reserves are more common in the flat landscape of northern Germany; 208 Nature Reserves are more than 1,000 ha in size.

Legally Protected Habitat areas mostly fall within National Parks, Nature Reserves and Natura 2000 areas[201]; outside Nature Reserves and National Parks the Legally Protected Habitat areas are generally small, only in a few cases larger than 3 ha.

Nature Parks: In terms of land area, Nature Parks are much more significant than the National Parks and Nature Reserves; if their level of biodiversity protection and prioritisation were increased they would have a very significant role to play in achieving Germany's conservation goals. The value of Nature Parks for nature conservation is currently rather limited because they are not managed for biodiversity, and Natura 2000 takes up only around 12% of the nature park area (BfN, 2010a), though in some areas there are plans to designate core zones for biodiversity conservation within them[202]. The law specifies that the majority of the nature park area should be designated as Nature Reserve or landscape protected area[203]. The German nature conservation agency stated in 2010 in a position paper that the role of biodiversity conservation in the German nature parks should be strengthened by ensuring their clear legal designation including designation of Nature Reserve areas, by improving their nature value through ecologically oriented farming and forestry, and by restoring habitats that provide ecological connectivity, such as ponds and hedges (BfN, 2010a).

Germany's wilderness target is being achieved firstly through defining certain National Park zones as wilderness, and through defining and managing (or rather withdrawing from

[199] Bundesamt für Naturschutz website 'Nationalparke' http://www.bfn.de/0308_nlp.html
[200] Bundesamt für Naturschutz website 'Naturschutzgebiete' http://www.bfn.de/0308_nsg.html
[201] Personal communication, Dr. Volker Scherfose, Bundesamt für Naturschutz
[202] e.g. Landesregierung Schleswig-Holstein Landwirtschaft und Umwelt: Teilbereiche von Landschaftsschutzgebieten. http://www.schleswig-holstein.de/UmweltLandwirtschaft/DE/NaturschutzForstJagd/02_Schutzgebiete/04_NSFlaechen/03_Flaechentyp/15_TeileLSG/ein_node.html; e.g. Brandenburg 2014 Massnahmenprogram Biologische Vielfalt.
[203] Bundesamt für Naturschutz website 'Landschaftsschutzgebiete' https://www.bfn.de/0308_lsg.html

management) state-owned forest areas as wilderness.[204] To this purpose Germany has adopted its own definition of wilderness. However, the national nature conservation agency plans a more strategic approach which will designate wilderness areas in a representative range of habitat types, with a minimum area of 500 ha, ideally several thousand ha, which are characterised by the presence of large predators and species characteristic of old succession habitat. Achieving the national biodiversity strategy for wilderness will require the designation of new National Parks. The strategy will also aim to create some near-wilderness zones close to human settlements (which will not fulfil all the criteria because their recreational purpose will necessitate active management interventions).

10.3 Protected area objective setting in Germany

10.3.1 Natura 2000

German Natura 2000 areas that are not designated as Nature Reserves or landscape areas (see below) define their conservation objectives and measures primarily through site management plans. However, the designation instruments, and therefore the objective setting process, vary in each region. For example, Sachsen-Anhalt uses a multiple-site plan for small Natura 2000 sites. The recent German report under Article 17 provides an update on the status of management planning for Natura 2000 sites, reporting that 20% of the network is covered by comprehensive management plans, and 1,740 sites have completed and adopted plans (compared to 591 under preparation).[205] These plans are sometimes the same as agri-environment contracts or Natura 2000 payment contracts (Wippel et al, 2013). However, the management plan often provides little assistance for assessing the legal obligation for a specific site (Wippel et al, 2013). The management plan has to be formally adopted only in certain Länder (European Commission, 2014).

10.3.2 Nationally protected sites

The biodiversity objectives of National Parks and Nature Reserves are defined individually for each area in its legal statute, and detailed in the site management plan. Management plans are also expected to provide a structure to reconcile biodiversity conservation and site use objectives. The German nature conservation agency position paper 2010 (BfN, 2010a) provides recommendations on how to develop the synergies between biodiversity conservation and the supply of ecosystem services in protected areas, such as to:

- establish water retention zones for drinking water supply
- reduce nutrient and pesticide inputs for drinking water quality
- give rivers and their floodplains more space in order to restore their ecosystem services
- conserve habitat features in farmland in order to maintain the biological control of pests and diseases
- develop innovative financial instruments that implement payments for ecosystem services

[204] Bundesamt für Naturschutz 2010 Wildnis und Wildnisgebiete in Deutschland. http://www.bfn.de/fileadmin/MDB/documents/presse/Wildnis_Hintergrundpapier_Presse_20100511_final_1.pdf

[205] ETC/BD (2014) Habitats Directive: reporting under Article 17 (progress). National summaries. Reporting under the Nature Directives working group. Published on CIRCABC.

- restore wetlands and convert peat soils under arable use to permanent grassland to reduce greenhouse gas emissions
- increase the area of woodland under minimum intervention and reduce the intensity of forest use
- stimulate energy saving investments and the use of renewable energy on buildings and farms within protected areas, and inform the population within and around protected areas about climate mitigation measures
- establish a systematic and continuous socio-economic monitoring system for all the large-scale protected areas
- promote and increase funding for rural development measures in and around protected areas
- promote education for sustainability in all protected areas systematically, including greater investment in trained personnel.

German National Parks are designated with the objective of preserving and restoring large-scale undisturbed natural processes and ecosystems, and therefore have the potential to be significant providers of certain ecosystem services such as carbon storage, climate regulation, and cultural and aesthetic services. However, almost all have areas of non-natural vegetation and lack large predators such as lynx, wolf, and bear. This creates management dilemmas in the choice of whether to actively interfere by removing non-natural vegetation and invasive alien species, and whether to control high ungulate and wild boar populations that often limit the regeneration of native vegetation (Europarc Germany, 2013). Coastal parks are faced with similar choices with respect to the impact of climate change on coastal dynamics.

Furthermore, a number of the National Parks have use-exemptions written into their management plans which contradict the process-protection objective (Europarc Germany, 2013). National park authorities sometimes have difficulties in negotiating sustainable use with other authorities at the regional and local level, for example with regard to hunting, fishing, hydropower, and navigation (see below).

Recreation is considered to be one of the major impacts in German protected areas, but recreation management is perceived to be a lower priority by German park managers, mainly due to the lack of resources (von Ruschkowski et al, 2013). The German National Parks receive over 50 million visitor days per year, with a total value of around 2.1 billion Euros annually (Job, 2010). The German nature conservation agency together with stakeholders has developed guidance on how to reconcile tourism and protected areas (BfN, 2010b).

Natural and Regional Parks and Biosphere Reserves have a broad suite of goals aiming to balance both biodiversity objectives and ecosystem services. For example, the Schorfheide-Chorin Biosphere Reserve has a breeding programme to protect and cultivate ancient grain and vegetable species.

10.4 Protection levels and approaches in Germany

10.4.1 Natura 2000

Natura 2000 areas are designated in different ways in each federal state. Where they are not designated under one of the national protected area designations, they are declared through federal-state level ordinances and through management plans. Natura 2000 management plans differ significantly in their binding character for different types of land owner / manager and the nature and extent of compensation (Wippel et al, 2013). Natura 2000 areas that are not designated as Nature Reserves are protected according to the national implementation of Article 6 of the Habitats Directive (see section 1.5.2 for details of how protection of Natura 2000 areas is defined in the EU legislation).

It is argued by German nature conservation groups that most or all Natura 2000 sites should be designated as Nature Reserves, in order to ensure the protection of habitats and species beyond those specified in the site's conservation objectives, to regulate specific use restrictions, to ensure the right of land purchase, and to designate the site as a component of the ecological network (Scherfose, 2011) [206].

10.4.2 Nationally protected sites

Although **National Parks** are strictly protected with the primary objective of maintaining and restoring natural processes, legal conflicts between the protection status of National Park protections and nationally guaranteed rights of transport or hunting and fishing use are frequent (Europarc Germany, 2013). The objective of 75% core area with undisturbed natural processes is defined in the legal statutes of only half of the German National Parks (Europarc Germany, 2013). Most of the German National Parks are relatively well buffered by bordering protected areas (Europarc Germany, 2013) but half the National Parks are significantly fragmented by transport corridors (road, rail or seaway). Some National Parks have settlement enclaves that are excluded from the National Park restrictions but completely surrounded by the park area, and that may pose some problems for achieving conservation objectives. In contrast, conflicts over forestry usage in National Parks are rare as in most cases the forestry authority is conjoined with the National Park authority.

National Parks and **Nature Reserves** are each protected by a legal statute or ordinance[207] at the federal state level and therefore have the highest level of protection in the spatial planning system (Europarc Germany, 2013). Over 90% of the National Park area is publicly owned; conflicts between National Park authority and public land owners (local authority or nation) are present in a few cases.

The **Nature Reserve** designation prevents landowners from intensifying or expanding activities that might threaten the conservation objectives. However, the German law provides little general protection and most of the protection measures must be explicitly listed in the Nature Reserve statute before they become legally binding, including any

[206] e.g. BUND (2012) Positionen Naturschutz; NABU Saarland 2011 Pressemitteilung: NABU fordert Naturschutzgebietsausweisung fuer alle Natura-2000-Gebiete. http://www.nabu-saar.de/lv/index.php?option=com_content&view=article&id=980:nabu-fordert-naturschutzgebietsausweisung-fuer-alle-natura-2000-gebiete&catid=162:pressemitteilungen-2011&Itemid=92

[207] In German '*Erlass*' or '*Rechtsverordnung*'

restrictions on rights to hunting, fishing, navigation, access and recreation, etc[208]. Nature reserve management plans are not legally binding, and so active protection measures can only be achieved through 'soft measures' - incentives, persuasion, and information.

Legally protected habitats are protected by federal state laws and registration in the land registry[209]. It is forbidden to carry out activities that could destroy or damage the habitat; however, established agricultural, forestry or fishery uses are allowed (unless the habitat lies within another protected area designation). Legally protected habitat that lies outside other protected areas (including Natura 2000 areas) can only be effectively protected from developments once the habitat is mapped, verified, and registered in the land register[210] [211]. Around half the area is well protected; around half is disappearing due to environmental change (both natural and human driven), and lack of management and control[212].

Landscape Protected Areas and **Nature Parks** (which currently primarily rely on designation as Landscape Protected Areas) are relatively poorly protected from land use change compared to National Parks and Nature Reserves.

10.5 The monitoring of protected areas

The monitoring of terrestrial protected areas is the responsibility of the federal states; therefore Germany does not have a national evaluation system for Nature Reserves (Scherfose, 2011). However, an integrated long-term monitoring system for all the large-scale protected areas is being established, which will establish the monitoring of ecological objectives as well as management effectiveness (Kowatsch et al, 2011). National Parks and large Nature Reserves generally have their own monitoring system in place; for example the trilateral Waddensee monitoring programme[213]. Biosphere Reserves are monitored by the German MAB-national committee on behalf of UNESCO.

10.5.1 Site condition assessment

Germany has established a systematic monitoring of the conservation status of habitats and species covered by the Habitats and Birds Directives, based on around 9,380 sampling sites (Sachteleben & Behrens, 2010)[214]. As required by the directives (Articles 11 and 17), this monitoring takes place both inside and outside protected areas, depending on the distribution of the habitat or species. The German nature conservation agency stated in 2010 in a position paper that the monitoring and control of biodiversity conservation

[208] http://de.wikipedia.org/wiki/Naturschutzgebiet_%28Deutschland%29
[209] '*Naturschutzbuch*'
[210] 'Naturschutzbuch'
[211] See for example Landesregierung Schleswig-Holstein Landwirtschaft und Umwelt: Gesetzlich geschützte Biotope. http://www.schleswig-holstein.de/UmweltLandwirtschaft/DE/NaturschutzForstJagd/02_Schutzgebiete/04_NSFlaechen/03_Flaechentyp/13_GeschuetzteBiotope/ein_node.html
[212] Personal communication, Dr. Volker Scherfose, Bundesamt für Naturschutz
[213] See The Trilateral Monitoring and Assessment Program of the Common Wadden Sea Secretariat, http://www.waddensea-secretariat.org/TMAP/_Monitoring.html
[214] Bundesamt für Naturschutz website ‚Monitoring gemäß FFH-Richtlinie' http://www.bfn.de/0315_ffh_richtlinie.html

measures in protected areas should be strengthened, using synergies to the Article 17 reporting system (BfN, 2010a).

There is as yet no systematic approach to surveillance monitoring of the impacts of environmental change, including climate change, in German protected areas. However, the German nature conservation agency has built up a long-term programme of research, capacity building, and communication on climate change and biodiversity, including protected area managers[215]. The Vessertal-Thuringian Forest biosphere reserve has participated in a pilot systematic climate-change adapted management planning (Wilke et al, 2013). A project from 2006 to 2009 carried out a risk assessment of impacts of climate change on German protected areas[216], and another project from 2008 to 2011 carried out an extensive literature review and modelled impacts on German species and habitats[217]. Another important research issue is where improved connectivity between protected areas is essential for adaptation, and where improving connectivity might have detrimental effects (Korn et al, 2014).

Some protected areas have developed their own initiatives. For example, the alpine National Park Berchtesgaden and the surrounding Biosphere Reserve are being systematically monitored with a GIS based system combining aerial photography, climate measurements, hydrological modelling, monitoring of springs, vegetation and phenology (Franz et al, 2014).

10.5.2 Management effectiveness evaluation

The National Parks were all evaluated for their management effectiveness between 2009 and 2012 by a specially assembled national committee coordinated by EUROPARC Germany (Europarc Germany, 2012). The evaluation was based on national standards and management criteria developed for the large protected areas[218] (National Parks, Biosphere reserves and Nature Parks) by the national committee. The German biodiversity strategy includes the goal of a 'well-functioning management system for all large protected areas and Natura 2000 areas' established by 2020; therefore this will require an evaluation of management effectiveness to measure achievement of the target. In most areas, there is currently no monitoring of socio-economic impacts of protected areas.[219]

[215] Bundesamt für Naturschutz website 'Naturschutz und Klimawandel' https://www.bfn.de/0307_klima_aktiv.html and website, Forschungsprojekte zum Thema "Biodiversität und Klimawandel"' http://www.bfn.de/0307_klima_forschung.html

[216] https://www.pik-potsdam.de/services/infodesk/protected-areas

[217] http://www.biologie.uni-bayreuth.de/KLINAT-FFH/de/mitarbeiter/gru/html.php?id_obj=78057

[218] Known as 'Nationale Naturlandschaften'

[219] Personal communication Elke Baranek EUROPARC Deutschland

11 Protected areas in The Netherlands

11.1 The role of protected areas in biodiversity conservation in the Netherlands

A white paper outlining the Netherland's vision for nature in the coming years published on 11 April 2014 sets out the current government's vision for nature policy over the next fifteen to twenty years (Ministerie van Economische Zaken, 2014a). The paper emphasises the need to reinforce a link between nature and society, the health benefits of green spaces and biodiversity in the city, and the economic value of nature and biodiversity. There is also an emphasis on increasing connectivity amongst natural areas and between these spaces and urban areas. A theme of the paper is recognising the value of nature to society not just in protected areas, but also in other urban and rural areas. Nevertheless, protected areas lie at the heart of the biodiversity conservation strategy in the Netherlands, making up a large part of the country's National Ecological Network.

The development of an ecological network is central to the Dutch biodiversity strategy. The National Ecological Network[220], is a network of areas designated by provincial governments which aims, using systematic spatial planning, to better link existing protected areas with agricultural areas under 'nature-friendly' management (Government of the Netherlands, 2014a). This policy framework was first laid out more than a decade ago (Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, 2000). The Dutch government has set a target that by 2021 the network should cover roughly 18% of the Netherlands' area (Ministry of Agriculture, Nature and Food Quality, 2005a). The network includes all the existing National Parks and Natura 2000 sites, and the Dutch government have also set a target to designate new areas of protected waters and wetlands in the ecological network.

According to the Netherlands Environmental Assessment Agency, the expanded network would be sufficient for the sustainable conservation of over 65% of animal species under the Birds and Habitats Directives by 2027, as opposed to 45% conserved by the current network (Ministerie van Economische Zaken, 2014a). These goals are set out in the Pact for Nature agreed between national government, the provinces and social partners in September 2013. The white paper notes that the protection of Natura 2000 sites and the development of the ecological network are essential strategies to meet its international biodiversity obligations under the EU Biodiversity Strategy 2020 and the CBD, as well as measures to promote 'green growth'.

The Netherlands face a significant challenge in achieving conservation goals for their Natura 2000 network, because, combined with a high level of fragmentation, the key pressures affecting terrestrial sites originate from outside the protected sites. The most important pressures are: nitrogen deposition from intensive animal husbandry and traffic; desiccation and lowered groundwater levels due to agricultural drainage, irrigation, and drinking water abstraction; and habitat change due to coastal change and realignment, such as the loss of

[220] Known in Dutch as the *Natuurnetwerk Nederland (NNN)*, formerly known as the *Ecologische Hoofdstructuur (EHS)*

sand flats, or the re-establishment of tidal inundation on coastal grasslands. A scientific study concluded that environmental and spatial conditions in the Netherlands will prevent the achievement of favourable conservation status for some habitats and species (Wamelink et al, 2013). The nature white paper therefore spells out a new focus on the realisation of Natura 2000 objectives at higher levels of scale than before, moving away from managing at the local protected area level only and looking to the achievement of favourable conservation status at the biogeographical region.

National protected areas are currently established and designated under the Nature Conservancy Act, whilst protected areas established under the ecological network are now the responsibility of the provincial government. There are plans to amalgamate all of the Netherland's conservation legislation into one nature conservation act[221], which may lead to more clearly defined roles for the various types of protected areas in the Netherlands in relation to the national biodiversity strategy (Government of the Netherlands, 2014b). The proposed Nature Act has failed to gain parliamentary approval so far[222].

11.2 Protected area designations and coverage in the Netherlands

11.2.1 Internationally designated sites

The Netherlands has designated 53 Ramsar Wetlands of International Importance, covering 823,181 ha (Wetlands International, 2014). All Dutch wetlands on European territory (i.e. excluding the ten reserves designated in Dutch overseas territories) submitted to Ramsar are also designated as Natura 2000 sites (Ministry of Agriculture, Nature and Food Quality, 2005b).

One Natural UNESCO World Heritage Site has been designated, the Wadden Sea, which spans coastal areas in the Netherlands, Denmark and Germany. The Dutch area of the reserve covers 255,000 ha[223]. The Wadden Sea Area is also the Netherlands' only Biosphere Reserve, with a documented area of 260,000 ha, including a core area of 120,000 ha (UNESCO, 2014).

11.2.2 Natura 2000

The terrestrial sites have been designated in four instalments, with marine sites dealt with separately (Ministerie van Economische Zaken, 2014b). In total 67 SPAs have been designated, of which three are marine sites. 130 SACs have been designated, of which four are marine sites and 10 SCIs still have conservation measures pending so are not yet full SACs, of which 3 are marine sites. The terrestrial area of SPAs is 102,346 ha, of SACs is 369,631 ha, and of the remaining SCIs is 15,858 ha[224]. All Dutch Natura 2000 sites are included in the National Ecological Network, and make up half of its area.

[221] *Mooi Nederland* (replacing the failed *Wet Natuur* proposal)
[222] http://www.government.nl/issues/nature-and-biodiversity/legislation-on-nature-conservation-in-the-netherlands
[223] http://www.waddensea-worldheritage.org/wadden-sea-world-heritage/dutch-wadden-sea
[224] Figures provided by Annemiek Adams of the Dutch Ministry of Economic Affairs. Database current as of 18 June 2014.

11.2.3 Nationally protected sites

The Netherlands has the following designations for Established Nature Areas[225]:

Protected Nature Monuments[226] are designated for the primary purpose of nature conservation and have most similarity with the IUCN protected area Category IV. Since the entry into force of the Nature Conservation Act 1998 this category has included State Nature Reserves[227] , which were essentially the same as Protected Nature Monuments, but on land owned by the state. Two-thirds of the country's 190 Protected Nature Monuments are now also designated under Natura 2000 (Broekmeyer et al, 2011).

National Parks[228] in the Netherlands align in principle and character reasonably closely with IUCN Category II although they do not have management mechanisms to match. Areas must be of at least 1,000 ha, with a characteristic landscape and unusual flora and fauna. Management is focused on conservation and development, outdoor recreation, education and research. National Park designations often cover an area which demonstrates a particular ecosystem type. This may reflect an aim to protect a representative sample of the major habitat (and landscape) types present in the Netherlands, although this is not explicitly stated. National Parks covered an area of 120,000 hectares, roughly 3% of Dutch territory, in 2005 (Ministry of Agriculture, Nature and Food Quality, 2005a). Since 2014 National Parks are the responsibility of provincial governments (Ministerie van Economische Zaken, 2014a).

There is also provision in law for other local designations. **National Landscapes** are designated to protect the combination of cultural and natural heritage in particular landscapes. The Netherlands Forestry Act provides some protection for the 10% of the Netherlands which is covered by woodland (Government of the Netherlands, 2014a). Protected Small-scale Habitats[229] can in principle be designated under the Flora and Fauna Act 1998 with the aim of achieving Favourable Conservation Status of specific plant and animal species at national level (as required under the Habitats Directive). These sites can be as small as an individual tree and must be outside other established protected areas. The legislative capacity to designate 'Protected Small-scale habitats' suggests a conceptual commitment to the development of a coherent protected area network, where protection given is appropriate and relative to the importance of the site (or feature) in the context of a wider network. However, current Ministry officials note that this designation is effectively a useless part of the Flora and Fauna Act, as none have been established, and the designation is not included in the proposed new nature legislation.

In addition to the designations for established protected areas, **Nature Development Areas**[230] can be designated to protect novel habitats and assemblages, embracing the government's policy of linking nature and society (Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, 2003).

[225] *bestaande natuurgebieden*
[226] *Beschermde Natuurmonumenten*
[227] *staatsnatuurmonumenten*
[228] *Nationale Parken*
[229] *beschermde leefomgeving*
[230] *natuurontwikkelingsgebienden*

The Dutch **National Ecological Network** incorporates existing protected areas, including 20 National Parks and all Natura 2000 sites, agricultural areas managed under agri-environment schemes and areas where new habitats are being created (Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, 2003). The network will also incorporate more than 6 million hectares of waters and wetlands (Government of the Netherlands, 2014c). It is claimed that this network is based upon systematic planning and the network is protected by a Spatial Planning Act. However, the extent to which these planning designations translate into on-the-ground positive impacts for biodiversity is as yet unclear. As this network includes a range of different protected areas as well as agricultural land, which is not strictly protected (but may be included in some form of agri-environment scheme), different levels of protection are afforded to different elements of the network. However, this generally reflects their previous/current use or designation, rather than their relative importance to the coherence of the network, or biodiversity in general. These areas may receive no extra protection on the basis of the National Ecological Network designation, and their status as a protected area is technically unclear.

11.2.4 Protected area coverage in the Netherlands

The UNEP-WCMC reports that 19.5% of the Netherland's terrestrial area is covered by some form of protected area; however this includes only protected areas with an area greater than 1,000 ha and excludes local or provincial designations (The World Bank, 2014).

Table 11-1: Biodiversity protected area number, land surface area, and IUCN category in the Netherlands

NB site designations are overlapping so this list adds up to more than the total protected area. The total terrestrial (land and freshwater) area of the Netherlands is 41,543 km^2.

Protected area type		IUCN category (indicative)	Number	Surface area (km^2)	Percentage of terrestrial area (%)
Internationally protected sites					
1a	Ramsar Sites (domestic)	-	43	8,231[231]	19.77
1b	Ramsar Sites (Caribbean territories)	-	10		
2	Natural World Heritage Sites	-	1	2,550	6.14
3	Biosphere Reserves	VI	1	2,600	6.26
Natura 2000 (terrestrial)[232]					
1	SPAs	IV	64	5,762	13.87
2	SACs and SCIs	IV	136	3,864	9.30
Nationally protected areas*					
1	Protected Nature Monuments	IV	190	Not available	Not available
2	National Parks	II	20	1,200	2.89

[231] For Ramsar sites, a sum of only those sites on European territory was not available, so it is recognised that this figure is inflated.

[232] Marine Natura 2000 sites are excluded from this table – marine sites tend to have much larger areas than terrestrial sites, so the inclusion of this data would significantly inflate area values.

Sources: Ramsar – (Wetlands International, 2014); WHS – (Wadden Sea World Heritage, 2014); Biosphere – (UNESCO, 2014); SPAs – Dutch Ministry of Economic Affairs statistics, personal communication; SACs and SCIs – (ETC/BD, 2014); PNMs – (Broekmeyer et al, 2011); NPs – (Ministry of Agriculture, Nature and Food Quality, 2005a). Note: * Excluding IUCN protected area categories V and VI.

11.3 Protected area objective setting in the Netherlands

11.3.1 Natura 2000

Management plans detailing site conservation objectives and conservation measures are obligatory for Natura 2000 sites in the Netherlands (European Commission, 2014). The national guidance recommends that management plans define 'core tasks', i.e. the most important contributions that a specific site makes or can make to the Natura 2000 network according to national aims. Plans are prepared in cooperation by several authorities at different levels, under the lead of a central or provincial government body, and adopted at the regional level (Ministry of Agriculture, Nature and Food Quality, 2006). A decision board is formed, and the management plans agreed by mutual consent among all government bodies involved in the site, taking into account opinions of experts, stakeholders and NGOs. These plans must be completed within three years[233] (Regiegroep Natura 2000, 2014a). However, one critique notes that this participative process has not been as successful as was hoped (Beunen et al, 2013).

The Dutch policy document outlining target setting for Natura 2000 sites defines eight guiding principles for the formulation of conservation objectives (Ministry of Agriculture, Nature and Food Quality, 2006):

1. Targets should be in harmony with existing national policy, in particular the national ecological network, wherever possible.
2. Targets should be practically and financially feasible.
3. Existing protected area quality and size should be maintained and, where necessary, improved.
4. Greater effort should be focused on those species and habitat types for which the Netherlands is relatively more important.
5. Less effort should be expended on species or habitat types where improvement cannot reasonably be expected.
6. Targets should anticipate natural dynamics and climate change; targets should be resilient.
7. Targets should guide site-based conservation and management efforts, whilst leaving scope for a local approach.
8. Targets should take account of existing budgets.

The guidance states that conservation objectives should guide conservation and management efforts in the sites, but also leave scope for a local approach; i.e. achieving a balance between 'guidance' and 'room to manoeuvre' is an important element of the Dutch philosophy regarding site-level management. Beyond the national guidance, local authorities are given 'room to manoeuvre' in the formulation of a management plan. As such, the pace of realisation of site objectives or the nature of conservation measures may

[233] as defined by the Nature Conservation Act 1998

be adjusted in line with developments in local understanding, or new information for example.

There is currently little documented integration of the ecosystem services concept into Natura 2000 target setting in the Netherlands.

The concept of 'strategic localisation' guides the development of Natura 2000 site management plans in the Netherlands, in pursuit of the aim of achieving Favourable Conservation Status, and in accordance with the principles listed above. A national decision is made regarding whether a site is set a maintenance target (current contribution to national targets is sufficient) or an improvement target (a greater contribution is or will be required), according to the principle of strategic localisation. Some sites may also be assigned a 'sense of urgency', which indicates a fast pace of objective realisation is required. Finally, in a minority of cases, 'credit formulation' may be applied, which means that a slight reduction in status or area may be permitted for one species or habitat type in the interest of improving the status of another, rarer or more nationally significant species or habitat (Ministry of Agriculture, Nature and Food Quality, 2006). For example, for a number of species of goose listed in the Birds Directive, it has been specified that the size of the foraging area may be reduced slightly in order to increase the area of high priority habitat types, e.g. wet alluvial forests. In effect, this means that improvement targets, and thus conservation effort, will be focused primarily on those sites where the maximum benefit (in terms of contribution to Natura 2000 targets at the national level) can be achieved with the minimum effort/cost (Ministry of Agriculture, Nature and Food Quality, 2006).

11.3.2 Nationally protected sites

In the early years of designation of **Protected Nature Monuments** the process of goal setting was not very transparent and poorly structured. The original legislation which allowed for the designation of these areas[234] does contain guidelines and targets for selecting and designating sites and allows for the formulation of management plans (Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, 2003). Goal setting for these sites is very broad, focusing on landscape quality, tranquillity and 'wildness' as well as more conventional biodiversity objectives. However, many sites are also designated as Natura 2000 sites and in these cases the more specific Natura 2000 conservation objectives focus on target species or habitats.

The management of **National Parks** in the Netherlands is designed to follow IUCN Management Category guidelines as closely as possible (Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, 2003). Management plans, which must be approved by the Ministry of Agriculture, Nature management and Fisheries, include specific management objectives. Guidelines for management are also formally embedded in the financial assistance documents issued by the Ministry to the bodies which govern National Parks. The main threats to National Parks must be recognised in management plans, which should then include actions to mitigate these threats (Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, 2003). There is extensive stakeholder participation in the management of National Parks; a consultative body of stakeholders,

[234] initially The Nature Protection Act 1967 and now the amended Nature Conservation Act 1998

facilitated by provincial authorities, is responsible for defining a vision for each National Park, which is developed into a ten-year management and development plan. They sit regularly to develop the plan and monitor implementation (Ministry of Agriculture, Nature and Food Quality, 2005a).

Although there is government recognition of the need to integrate the management of ecosystem services into nature policy in the Netherlands (Ministerie van Economische Zaken, 2014a), there is limited documented integration of this concept into national protected area planning and management.

11.4 Protection levels and approaches in the Netherlands

11.4.1 Natura 2000

Once a Natura 2000 site has been accepted by the Commission it is nationally designated by the Minister for Agriculture issuing a 'designation order'. Then it is the responsibility of the provincial authority to develop a management plan. The Dutch Nature Conservation Act 1998 transposes the Natura 2000 protection requirements defined in EU legislation (see section 1.5.2). Existing uses of Natura 2000 sites are generally included in management plans, so that licencing is not required for the continuation of these activities (Regiegroep Natura 2000, 2014a).

A working group in the Netherlands has recently been considering the best way to enforce Natura 2000 management plans and regulations. A 2010 conference concluded that it is important to develop an enforcement plan in parallel with the site management plan and to promote an early dialogue between management drafters and enforcers (Regiegroep Natura 2000, 2014b).

11.4.2 Nationally protected sites

In principle, no human interference is allowed in **Protected Nature Monuments**, under the Nature Conservation Act. However, permits can be issued if the natural features of the site are not at risk. It should also be noted that activities which were already taking place before designation occurred can often be continued as long as they are not intensified. As most of the sites are also Natura 2000 areas, additional protection levels apply (see above).

National Park designation is not embedded in Dutch legislation, but is rather covered by Ministerial orders, although policy has been formalised in several national documents (Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, 2003). Although the National Park designation may imply some planning restrictions, the status itself does not bring any specific protection. A Dutch government report likens it more to a "Michelin star rating for a beautiful and accessible nature area" (Ministry of Agriculture, Nature and Food Quality, 2005a). Many National Parks overlap with other protected area designations and the level of protection afforded to the area varies accordingly.

11.5 The monitoring of protected areas in the Netherlands

Since 2014 monitoring of protected areas has become the responsibility of provincial governments and efforts are being made to integrate monitoring regimes to make most effective use of available data and to most efficiently meet reporting requirements under the EU Nature Directives. These efforts are outlined in the nature white paper (Ministerie van Economische Zaken, 2014a). A manual has recently been prepared by central government and the provinces, which it is hoped will help to unify monitoring efforts to benefit Natura 2000 reporting requirements and other analysis (BIJ12, 2014). As this is a recent change however, the details of exactly how monitoring regimes will now function are still being formulated. It is hoped that as far as possible, existing monitoring programmes will be used to fulfil these requirements. For instance, the National Ecological Monitoring network is a partnership of government organisations which attempt to match monitoring practice to public need[235]; these data tend to focus on species trends.

The management plan for each Natura 2000 site will include a section on monitoring, which is guided by Habitats Directive obligations and a programme of requirements developed by the Ministry for Agriculture, Nature and Food Quality at area level (Remmelts, 2009). This document explains that area-based monitoring should both assess progress towards conservation objectives and evaluate conservation measures, in order to determine how conservation at the site is contributing to national objectives and to aid the development of future management plans. As such, it will accommodate for inevitable change only if this is recognised in site management plans. Exact monitoring regimes should be locally defined, but some basic requirements are outlined. Monitoring is specifically focused on species and habitat types listed in the annexes of the Habitats and Birds Directives, and on national and local conservation objectives. For listed species, population size and habitat quality should be assessed. For listed habitat types, the surface area of the habitat (in terms of a percentage of the site) should be estimated. A survey of vegetation types, abiotic conditions, typical species and other features of structure and function should be assessed (Remmelts, 2009).

Monitoring is also carried out in the National Ecological Network, which focuses generally on habitat types and trends. As part of the development of the network, the Dutch government has required that vegetation mapping of these areas will take place and be updated at least every 12 years (Regiegroep Natura 2000, 2014b). Where this area overlaps with Natura 2000 sites, monitoring will be more frequent to fulfil Habitats Directive requirements. National Parks are incorporated in this ecological network and so are included in this monitoring. The appropriate management authorities may perform further monitoring, but generally, as National Parks have no specific legal protection their monitoring reflects that of their overlapping designations.

Information from the Ministry for the Environment suggests that the provinces receive €2 million per year from the state government to fund monitoring activities.

[235] http://www.netwerkecologischemonitoring.nl/home

12 Protected areas in Spain

12.1 The role of protected areas in biodiversity conservation in Spain

The Spanish biodiversity strategy to 2017[236] recognises protected areas as a key instrument to prevent the loss of biodiversity and achieve a favourable conservation status of habitats and species in Spain, at the same time recognising that it is necessary to have a global vision that goes beyond these areas. Spain's achievement in designating more than 27% of the Spanish land area is highlighted, but also the ongoing deficiencies in management planning and financial commitment, and in particular the challenge of ensuring adequate management of the Natura 2000 network. The strategy lists 13 detailed actions in its objective 2.1 on protected areas, including the development and promotion of guidelines on management for the Natura 2000 network, National Parks, and internationally designated areas.

Spain was one of the European pioneers of protected areas, declaring two National Parks in 1918, and the most recent Spanish National Park was declared in 2013 on nearly 34,000 ha[237]. The Spanish protected area network has grown significantly in the last decades, due in particular to Natura 2000. However, much of this impressive area is inadequately protected, managed and funded. This was the finding of a survey of experts across Spain in 2013.[238] These deficits in protected areas, including Natura 2000, are the primary focus from the point of view of Spanish nature conservation NGOs, both because of their importance and because it is even more challenging to address implementation problems outside the network.[239]

The designation and management of protected areas takes place at the regional level in Spain (i.e. the autonomous communities). The national agency for natural heritage and biodiversity[240] is responsible for coordinating biodiversity conservation at national level, including the Committee for Protected Areas[241] which coordinates protected area strategy between the national government and the autonomous communities. The Spanish regions and local councils are currently undertaking an intensive process of developing management plans for Natura 2000 sites.

[236] *Plan Estratégico del Patrimonio Natural y de la Biodiversidad 2011-2017* (PEPNB) approved by Real Decreto 1274/2011, de 16 de septiembre, por el que se aprueba el Plan estratégico del patrimonio natural y de la biodiversidad 2011-2017, en aplicación de la Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad. Boletín Official del Estado Número 236 de 30 de septiembre 2011. http://www.cbd.int/doc/world/es/es-nbsap-v3-es.pdf

[237] Sierra de Guadarrama National Park in Madrid, Segovia and Ávila, http://www.magrama.gob.es/es/red-parques-nacionales/nuestros-parques/guadarrama/

[238] Personal communication, Marta Múgica, EUROPARC España

[239] Personal communication, Octavio Infante, BirdLife Spain

[240] '*Comision Estatal para el Patrimonio Natural y de la Biodiversidad*' (created by Ley 42/2007)

[241] '*Comité de Espacios Naturales Protegidos*'

12.2 Protected area designations and coverage in Spain

12.2.1 Internationally designated sites

Spain has declared the following protected areas on its European territory (including the Canary Islands) under international conventions:

- 74 Ramsar Wetlands of International Importance on freshwater and coastal wetlands
- 42 UNESCO Biosphere sites covering 9.7% of the land area (this is one of the highest shares amongst the parties to the convention)
- three natural World Heritage Sites for nature conservation (Doñana National Park[242], Garajonay National Park[243], Teide National Park[244]), and two dual natural and cultural World Heritage Sites (Ibiza, Biodiversity and Culture[245], and Pyrénées - Mont Perdu[246] together with France)
- a plant genetic biodiversity conservation site on Mallorca under the Council of Europe Plant Conservation Strategy

This analysis does not include Spain's marine protected areas, including OSPAR marine sites and Specially Protected Areas of Mediterranean Importance[247].

12.2.2 Natura 2000

Spain now has the most extensive Natura 2000 network of all EU Member States, occupying 27% of the Spanish land area, and including 1,449 SCIs/SACs and 598 SPAs. The declaration of SCIs as SACs is progressing, but is still less than halfway. SPAs were notified and/or expanded until recently in response to a European Commission infringement proceeding against Spain for failing to declare enough SPAs to adequately protect its bird populations[248].

The designation of Natura 2000 areas is defined in the 2007 nature and biodiversity law[249] in accordance with the obligations of the Habitats and Birds Directives. However, as most of the 17 Spanish autonomous communities have developed their own nature conservation laws rather than adopting the national wording, they have taken different approaches to designation. Some regions have created a specific new designation within their projected area legal framework (including Andalucía[250], Cantabria[251], Galicia[252], La Rioja[253], and the Basque Country[254]) (Blanco Arias, 2012). Others have created a category that is outside their

[242] 54,252 ha, http://whc.unesco.org/en/list/685
[243] 3,984 ha plus 4,160 ha of buffer zone, http://whc.unesco.org/en/list/380
[244] 18,990 ha, http://whc.unesco.org/en/list/1258
[245] 11,231 ha, some of which is marine, http://whc.unesco.org/en/list/417
[246] 30,639 ha, http://whc.unesco.org/en/list/773
[247] '*Zona Especialmente Protegida de Importancia para el Mediterraneo ZEPIM*'
[248] European Commission 24 June 2010 Environment: Commission welcomes Spanish compliance with bird protection rules; infringement procedure closed. IP/10/828.
http://ec.europa.eu/environment/legal/law/press_en.htm
[249] Ley 42/2007
[250] '*Zonas de Importancía Communitaria*' in Andalucía
[251] '*Zonas de la Red Ecológica Europea Natura 2000*' in Cantabria
[252] '*Zonas de Especial Protección de los Valores Naturales*' in Galicia
[253] '*Zonas Especiales de Conservación de Importancia Communitaria*' in La Rioja
[254] '*Zona o lugar incluido en la Red Europea Natura 2000*' in the Basque Country

projected area legal framework (including the Canary Islands, Castilla La-Mancha, Catalonia, and Valencia). Extremadura has opted for a mixed system that catalogues Natura 2000 sites in one of two categories, either as a statutory protected area type or not. Around 42% of the Natura 2000 network is covered by a second protected area designation (Europarc Espana, 2012a). Some of the network has so far only received the basic designation and protection through the European law.

12.2.3 Nationally protected areas

Protected area designations for nature and biodiversity are defined in the 2007 nature and biodiversity law and the 2007 National Parks law[255] as follows (IEPNB, 2013):

- **National Park**[256]: National Parks are large areas whose high ecological and cultural value, high naturalness and lack of modification through human activities, and representativeness of ecosystems make their preservation a high national priority, and where the uniqueness of flora, fauna, geology or geomorphology have ecological, aesthetic, cultural, educational and scientific value that justify preferential protection.
- **Natural Park***:* The category includes Natural Parks, Rural Parks, and Regional Parks designated by the autonomous communities. They are designated for similar objectives as the National Parks.
- **Nature Reserve**[257]: This designation is designed to protect ecosystems, plant and animal communities or other biological elements that are of high importance because of their rareness, fragility, ecological importance and/or uniqueness. They include areas designated for minimal intervention (known as '*integrada*'), and areas designated because they require management to maintain their nature value (known as '*dirigida*').
- **Natural Monument**[258]: Areas or natural features that contain particularly unique, rare, beautiful features that merit special protection for their scientific, cultural and/or landscape value. This can include single trees, geological features including type features, fossil or mineralogical deposits, and other special landscape features.

The following designations are not considered in this review, which does not cover landscape or marine designations:

- **Protected Landscape**[259]: Areas of landscape protected for their natural, aesthetic and cultural features, in accordance with the European Landscape Convention.
- **Protected Marine Area**[260]*:* Category established in 2007 to designate marine areas with similar characteristics as National Parks, but with more flexible designation criteria.

Other categories: As the autonomous communities have developed their own protected area legislation, there are currently more than 40 different protected area designations in Spain. Some of these are recognised to be equivalent to the six national categories, and

[255] Ley 5/2007
[256] '*Parque*'
[257] '*Reserva Natural*'
[258] '*Monumento Natural*'
[259] '*Paisaje Protegida*'
[260] '*Area Marina Protegida'* (according to Ley 42/2007)

these designations are grouped in the Spanish statistics into a core protected area network. A wide range of other designations are defined in the regional legislation, which have not been defined by national categories and which have generally not been matched to any of the IUCN protection categories.

12.2.4 Protected area coverage in Spain

The main categories of protected area for nature and biodiversity and their area in Spain are listed in the table below. According to the Europarc-Spain indicator, Spain now has 12.8% of its terrestrial area within one or more of the five main national categories of protected areas (as described above - National Park, Natural Park, Nature Reserve, Natural Monument, Protected Landscape). The Natura 2000 network occupies over 27% of the terrestrial area, of which around 88% is SAC/SCI. Around 8% of the terrestrial area is covered by other international designations.

The Spanish protected areas law[261] specifies that the network of National Parks must be representative of all the principal natural systems present in Spain, and lists 27 terrestrial systems (and 13 marine systems). Only one terrestrial vegetation system on the Canary Islands remains unrepresented (*Euphorbia* dominated coastal scrub and other thermo-macaronesian formations) (Europarc Espana, 2014).

It should be noted that though the Spanish nature and biodiversity law specifies that the legal protected area designations should be assigned to the IUCN protection categories, this has only been done for around a third of the protected areas (Europarc Espana, 2012a). This has the consequence that there are significant gaps in Spain's protected area information registered in international databases, including the Common Database of Protected Areas hosted by the European Environment Agency. It is also not possible to say exactly how much of the Spanish land area is protected according to the strict standards of the IUCN categories I to IV.

[261] Ley 5/2007

Table 12-1: Spain's biodiversity protected area number, land surface area, and IUCN category

NB site designations are overlapping so this list adds up to more than the total protected area. The table does not cover exclusively marine protected area categories but does include some marine area. The % coverage was calculated using a total terrestrial area of 499,542 km^2.

Protected area type	IUCN category (indicative)	Number (land only)	Surface area land (km^2)	Percentage of terrestrial area (%)
Internationally protected sites				
Ramsar Sites	-	74	2,759.62	0.6%
Biosphere Reserves	-	42	48,358.71	9.7%
Natural World Heritage Sites	-	5	1,190.96	0.2%
Plant genetic conservation[262]	IV	1	21.35	0.004%
Specially Protected Areas of Mediterranean Importance	-	9	498.68	0.1%
Natura 2000				
SACs	IV	1448	127,405.96	27%
SPAs	IV	598	103,802.30	
Nationally protected areas				
National Parks	II	14	62,652.78	12.5%
Natural/Rural/Regional Parks		175		
Nature Reserves	IV	230		
Natural Monuments	III	246		
Protected Landscapes*	V	56		
Other protected areas (autonomous communities)	undefined	836	not available	n/a
Other categories	undefined	1543	not available	n/a

Sources: (Europarc Espana, 2012a), (IEPNB, 2013). Note: * this is included as separate information on each designation is unavailable.

12.3 Protected area objective setting in Spain

12.3.1 Natura 2000

The biodiversity objectives of Natura 2000 areas must be defined either in the site management plan or in another administrative framework. The Spanish autonomous communities have chosen a range of different institutional approaches to the designation and definition of Natura 2000 conservation objectives. For example, the Basque country has issued a decree that defines conservation objectives for all riverine and estuarine Natura 2000 sites[263], in addition to the objectives defined in the individual site statements.

Only 16% of the Natura 2000 network is covered by comprehensive management plans, whilst another 17% of sites have plans under preparation (Europarc Espana, 2014). A few

[262] S'Albufera de Mallorca, http://www.xarxanatura.es/index.php?seccion=zona&id=33

[263] http://www.ingurumena.ejgv.euskadi.net/contenidos/informacion/zec/es_natura/adjuntos/documento_comun_rios_estuarios.pdf

autonomous communities have completed all their plans (including La Rioja and Galicia), whilst five[264] have initiated planning on less than 20% of their sites. The deficits are particularly great for sites dominated by agricultural, rocky and volcanic habitats.

The national Guidelines on Natura 2000 planning (2011)[265] define the minimum standard for management plans including the assessment of threats and pressures, the definition of conservation objectives, the description of conservation measures, and minimum standards for monitoring and evaluation. The NGO EUROPARC Spain, together with a foundation, has established quality criteria for drafting management plans, based on best practice, as well as objectively verifiable criteria for evaluating existing plans for their compatibility with Natura 2000 goals[266]. It runs thematic workshops and seminars and a website, aimed at regional and local administrations[267].

12.3.2 Nationally protected sites

Spanish law defines two categories of protected area management planning: the natural resources management plan (PORN)[268] and the management and use plan (PRUG)[269]. A National Park or Nature Reserve can only be designated once a natural resources management plan has been approved. This plan defines the site objectives and conservation measures. The law states that objectives and measures should go beyond the borders of the protected area, in order to set objectives for the ecological connectivity of the site, although this is not always done in practice (Europarc Espana, 2012a). Some protected areas are also required to develop a public access plan[270].

Europarc Spain report that at the end of 2013, 10 of the 15 of the National Parks and 126 of the 149 Natural Parks have a valid natural resources management plan in place; whilst 11 National Parks and 78 Natural Parks have a management and use plan (Europarc Espana, 2014).

Many of the management plans are currently being revised, as they were prepared for the first time more than a decade ago. Notably, all the protected areas that include some Natura 2000 area(s) must revise their management plans to include the Natura 2000 objectives and conservation measures. This often involves a substantive change in conservation objectives, as previously the objectives for Spanish protected areas were often formulated in very broad and vague terms. However, there is still a significant proportion of

[264] Extremadura, the Canary Islands, Asturias, Cantabria, Castilla y Leon and Aragon
[265] '*Directrices de conservación de la Red Natura 2000*', http://www.magrama.gob.es/es/biodiversidad/participacion-publica/directrices_conservacion_rn2000_tcm7-157113.pdf
[266] http://ec.europa.eu/environment/nature/natura2000/awards/application-2014/award-winners/networking-and-cross-border-cooperation/index_en.htm
[267] This project has been recognised by the European Commission in July 2014 with the Natura 2000 award for networking and cross-border cooperation
[268] 'plan de ordenación de los recursos naturales PORN'; the management planning defined by Catalonian and Canaries community laws are regarded as equivalent to PORN (Europarc Espana, 2012a)
[269] 'plan rector de uso y gestión PRUG'
[270] '*plan de uso público*'

the protected area network that has no management plan in place, and there is no up to date public information on the situation of management planning.

12.4 Protection levels and approaches in Spain

12.4.1 Natura 2000

The EU nature legislation is transposed into Spanish legislation in the 2007 Natural Heritage and Biodiversity law[271], as well as previous legislation. The autonomous communities have taken over this legal protection in their regional legislation. A study analysing the situation in the autonomous community of Galicia in 2010 found that much of this legal protection is on paper only, because there is still a significant lack of site management plans, management capacity and resources, and local recognition of the value of sites (Fuentes et al, 2011). Spain has reported that in the period 2007 to 2012, only 3% of conservation measures taken were contractual (i.e. a site management agreement with land owners or managers) and 27% were regulatory (e.g. restrictions on uses), whilst 70% of the measures taken were administrative (including direct management actions by the public authorities) (Europarc Espana, 2014). However, the situation is improving rapidly as site management plans are being developed.

The regional environmental authorities are in charge of enforcing site protection and management, through appointed experts. Some sites have their own manager or director but often only one or two experts manage all the sites in a province (European Commission, 2014). The civil guard for environmental affairs and forest rangers are also involved in enforcement.

12.4.2 Nationally protected sites

As the legislative and administrative conditions for protected areas are defined at the regional level in Spain, it is difficult to give a general overview of protection levels. The basic Spanish federal Law defines the following[272]:

- **National Park**: it is possible to restrict the use and extraction of natural resources, limit visitor access, and prohibit all activities incompatible with the protection of the values for which the area was designated. A management and use plan (PRUG) must be developed with specific use and management measures, and this overrides existing spatial planning decisions.
- **Nature Reserve**: the use and extraction of natural resources is restricted, unless the use is compatible with the protection of the values for which the site is designated. There is a general prohibition on the collection of biological and geological material, except for reasons of scientific investigation, conservation or education, subject to authorization.
- **Natural Monument**: General prohibition of use and extraction of natural resources, unless the use is compatible with the protection of the values for which the site is designated, and subject to authorization.

[271] *Ley de Patrimonio Natural y de la Biodiversidad*
[272] http://www.magrama.gob.es/es/red-parques-nacionales/la-red/legislacion/legislacion-basica/#para2

The Spanish government is currently debating a revision of the law governing **National Parks** in Spain. A citizen's petition has been launched by BirdLife Spain and other NGOs in support of a continued high level of biodiversity protection, and protesting against the possibility of opening up options for federal states to introduce exceptions to allow damaging activities[273].

12.5 The monitoring of protected areas in Spain

The Spanish law established a requirement for national monitoring of the National Parks[274], and in 2011 a monitoring plan was finalised, coordinated by a working group of the Scientific Committee for National Parks and experts from the autonomous communities. The monitoring covers ecological, socio-economic and governance indicators. In 2012, more than €970,000 were invested in monitoring in National Parks (89% for ecological aspects, 7% for socio-economic aspects and 6% for governance aspects) (Europarc Espana, 2012a).

The monitoring of other protected areas is regulated at the regional level in Spain. The NGO Europarc-Spain maintains a database of Spanish protected areas[275], and publishes regular reports on the status of protected areas in Spain (Europarc Espana, 2012a).

12.5.1 Site condition assessment

Natura 2000 management plans must define monitoring mechanisms for the measurable and clearly verifiable site conservation objectives, and a system of indicators for specific aspects, which must be data that can be reliably measured at an acceptable cost, allow comparison throughout a period of time, and evaluate the impact of the actions that have been carried out (European Commission, 2014). This system of indicators must be in line with the Spanish Natural Heritage and Biodiversity Inventory. Therefore, theoretically, once the Spanish Natura 2000 management planning process is complete, it will be possible to undertake a systematic site condition assessment across Spain. However, as so many plans remain undefined, this goal is still some way off.

There is no up to date information on monitoring costs for all of Spain's protected areas. According to EUROPARC Spain, significantly more efforts on monitoring and evaluation are needed[276]. Spain carried out a national inventory of the costs of the Natura 2000 network in 2006, through a detailed regional consultation and national expert panel analysis (Moreno et al, 2013). The study was not able to quantify the total monitoring and surveillance costs for Natura 2000 in Spain, but a sample of budgets of ten protected areas of different sizes and designations gave an enormous cost range from 0.03 €/ha/year to 91 €/ha/year for monitoring and surveillance.

[273] *Manifiesto ciudadano por la conservación*. http://iniciativaciudadanaparquesnacionales.wordpress.com/iniciativa-ciudadana/
[274] Ley 5/2007 article 5
[275] '*Observatorio de Áreas Parques Nacionales*', see http://www.redeuroparc.org/observatorioareasprotegidas.jsp
[276] Personal communication, Marta Múgica, EUROPARC España

Biodiversity data more generally are assembled at the national level in the Spanish national inventory of natural heritage and biodiversity[277], which brings together all inventories, catalogues, registers, lists and databases on biodiversity in Spain into one national database[278]. This information is used to publish an annual state of biodiversity report (IEPNB, 2013). The promotion of a national system to monitor the impacts of climate change on biodiversity in Spain is one of the goals of the Spanish biodiversity strategy to 2017[279].

12.5.2 Management effectiveness evaluation

The NGO EUROPARC-Spain has developed a quality control system and quality indicator for biodiversity conservation management in protected areas, and launched a capacity building project and annual award for best practices to encourage improvements in management (Europarc Espana, 2012a). The organisation also maintains a database of management actions registered by protected area managers. EUROPARC-Spain has also developed a quality control system and quality indicator[280] to reflect a high standard of management of public access in the larger protected areas (Europarc Espana, 2012a). A phased model of optimal management has been defined (Europarc Espana, 2012b).

[277] *Inventario Español del Patrimonio Natural y de la Biodiversidad*, see http://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/inventario-espanol-patrimonio-natural-biodiv/default.aspx

[278] *Banco de Datos de la Naturaleza*

[279] *Plan Estratégico del Patrimonio Natural y de la Biodiversidad 2011-2017* (PEPNB) approved by Real Decreto 1274/2011, de 16 de septiembre, por el que se aprueba el Plan estratégico del patrimonio natural y de la biodiversidad 2011-2017, en aplicación de la Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad. Boletín Official del Estado Número 236 de 30 de septiembre 2011. http://www.cbd.int/doc/world/es/es-nbsap-v3-es.pdf

[280] 'Sistema de Calidad Turística Española', implementing the European Charter of Sustainable Tourism developed by EUROPARC

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