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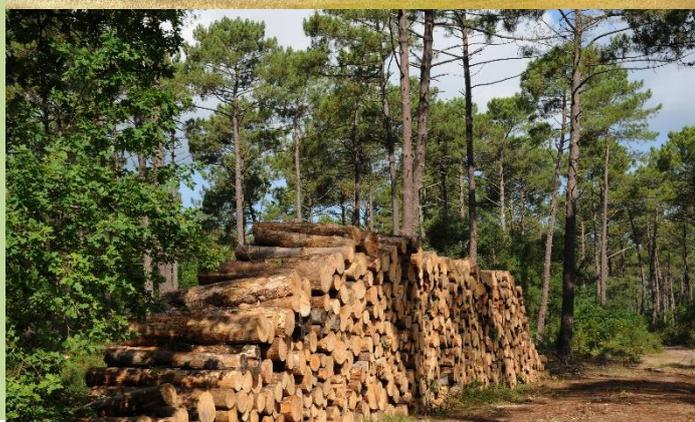
Natura 2000 and Jobs

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An executive summary of this study is available as a separate document.

1 Understanding the Employment Benefits of Natura 2000

The aim of the *Natura 2000 and Jobs: Scoping Study* is to summarise the state of existing knowledge on the level and type of jobs that are linked to the Natura 2000 network, to explore the methodologies used to assess the employment levels, and to recommend a way forward to improve the evidence base on the links between Natura 2000 and employment. It does not aim to do new primary research or derive new estimates.

Links between Natura 2000 and employment

There are currently almost 213 million people employed in the EU-28, which represents 64% of the active labour force. Just under 10% (20.973 million¹) are currently unemployed, with unemployment rates as low as 4% in some countries (Czech Republic: 3.9%; and Germany: 4.2%) and as high as 19.5% in Spain and 23.4% in Greece. Tackling unemployment and providing a new boost for jobs and skills remains a high priority for the European Commission and across Europe.

Employment is a key priority of the Juncker Commission, the Barroso presidency before that, and for governments and citizens across most Member States. The European Commission's 2016 annual work programme (AWP) and Jean-Claude Juncker's Political Guidelines' priority 1 is *A New Boost for Jobs, Growth and Investment*. The Europe 2020 strategies' priorities also include employment. This comprises smart (developing an economy based on knowledge and innovation), sustainable (promoting a more resource efficient, greener and more competitive economy) and inclusive growth (fostering a high-employment economy delivering social and territorial cohesion).

Key terminology for analysing the links

While the primary aim of the Natura 2000 network is to safeguard biodiversity, the EU's 28,000 protected areas are an important source of **direct, indirect and induced jobs**. It can do this directly – i.e. by jobs on site, whether in the management and restoration, or in sustainable production (e.g. crops, timber or fish), or in sectoral activities (e.g. health walks, recreation, scientific research). Natura 2000 can also lead to jobs “indirectly” – i.e. jobs supported offsite catalysed through Natura 2000 related activities (e.g. spending on hotels, restaurants and transport from tourists visiting the site) and along the product chain (e.g. fish, timber, crop transformation and distribution). Furthermore, the monies attracted to Natura 2000 management and related on-site activities (e.g. EU funding, sector and citizen expenditure) lead to increased knock-on spending that creates “induced employment”, or the “multiplier effect”.

¹ http://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistics

Figure 1.1 illustrates how different activities in and around Natura 2000 sites contribute to jobs. The management of sites themselves, the production of goods and services in agriculture, forestry and fisheries, and numerous other activities in tourism, recreation, research or health contribute to direct, indirect and induced jobs. Furthermore, resilient ecosystems provide a wide range of ecosystem services that are essential for the wider functioning of the economy, such as freshwater or protection against natural risks (e.g. coastal protection).

The Natura 2000 network of protected areas provides an important enabling environment in which a number of economic activities can develop. The relation and share between these varies across sectors and activities and will be discussed in the remainder of this report.

Figure 1.1: Types of jobs supported by Natura 2000 – direct, indirect and induced jobs

	Direct Jobs	Indirect Jobs	Induced Jobs	
Conservation Objectives				
Natura 2000 Management	E.g. Protected area managers, wardens	E.g. In construction, capital goods, monitoring and instrumentation	<p>I.e. jobs through induced spending through income as it flows through the economy (multiplier effect).</p> <p>The level depends on:</p> <ul style="list-style-type: none"> The savings rate of different income groups that receive the money and how fast money flows through the economy How open the economy is (the more open, the more money flows out, the lower the multiplier) <p>Methods: Use I-O models and/or multipliers</p>	
Restoration	Land management contractors; hydrologists			
Sustainable Production				
Fish	E.g. Fishers	Also jobs along the supply chain: packers, transformers (fish, furniture, food), distributors, retailers, shops		
Timber	Foresters			
Agricultural crops	Farmers on site and in vicinity (pollination)			
Integration into Sectors, Activities and Policies				
Tourism	E.g. Guides	Recreation and tourism infrastructure & services; hotels, transport, restaurants; Health centres and spas; Construction, capital goods Publishing, product innovation		
Recreation & Health	Sports trainers; wardens			
Climate Change	Land and marine are management, contractors			
Research & Innovation	Scientists & teachers			

Source: own representation

The jobs mentioned in Figure 1.1 are for illustrative purposes and can be observed in more than one sector or activity. Natura 2000 management and restoration jobs are mainly linked to the public sector; in other domains, jobs are linked primarily to the private sector, including self-employment.

One of the challenges of analysing the link between Natura 2000 and jobs is the different questions that can be asked. The focus could be on **jobs supported today**, on the **change of jobs** due to regulations as part of the Natura 2000 site management, on job losses avoided through the ecosystem services provided (e.g. flood protection) or on **additional jobs** generated through opportunities provided by the network of protected areas.

A typology of biodiversity-related jobs

The practical actions required to maintain and restore protected areas are likely to lead to and support a wide variety of jobs. Although no typology of jobs has been developed specifically in relation to Natura 2000 activities, Jurado et al. (2012) developed a typology for jobs associated with the delivery of wider biodiversity objectives (i.e. the targets of the EU Biodiversity Strategy to 2020, which includes under Target 1 the full implementation of the Birds and Habitats Directives). This typology of jobs shows the wide variety of direct and indirect jobs that may result from ecosystem management and restoration measures, which Jurado et al. (2012) divide into the following three categories:

- Category 1 jobs: are typically specialised jobs within organisations or departments with a biodiversity focus, such as government, environmental agencies, NGOs, consultancies, research organisations and zoological/botanical gardens. These organisations may undertake a wide range of activities and support a wide range of biodiversity focused jobs, as well as jobs in supporting activities such as administration, finance and human resources.
- Category 2 jobs: occupations which contribute to the conservation of biodiversity, but which do not have biodiversity as their focus or purpose. These are typically jobs in different sectors that for instance use natural resources and hence affect biodiversity, such as agriculture, fisheries, water and manufacturing. They include jobs with a focus on corporate environmental sustainability/ social responsibility, which may occur in a wide range of different sectors.
- Category 3 jobs: These jobs focus on the provision of goods and services derived from biodiversity and ecosystem services but are not directly involved in the management of biodiversity. They include some highly biodiversity focused and knowledge intensive jobs (e.g. bio-prospectors, R&D specialists and wildlife tourism guides) as well as much more generic jobs that nevertheless benefit from biodiversity in some way (e.g. mainstream tourism jobs in the vicinity of nature sites).

While this classification is useful for understanding the different job opportunities in the public and especially in the private sector, existing estimates of jobs linked to protected areas and Natura 2000 do not typically structure their findings according to this typology. This is mainly due to the method employed, which often focusses on direct and sometimes also on indirect and induced jobs.

Generally, analyses of the employment effects of protected areas are challenging due to limited data availability on how jobs are linked to protected sites in general or in site-specific analyses. The picture that emerges for the links between the Natura 2000 network and jobs is currently patchy across different sectors and economic activities. It will be the subject of further analysis in the remainder of this report.

Aims and structure of this study

The aim of this scoping study is to gather the available evidence on the links between Natura 2000 and employment in order to understand better how the network can contribute to the jobs priority. This comprises the policy synergies between nature and jobs, and how to assess the job implications of EU funding and policies to help understand EU-added value, coherence benefits and hence help with the better regulation agenda and associated assessments.

The aim of this work is to:

- a) **Scope out the state of current knowledge** on the employment benefits of Natura 2000;
- b) **Map out and explore the different methods** and tools used to calculate employment benefits; and
- c) **Present recommendations for a way forward** for such assessments in light of the insights from employment analysis to date.

Part A is a **scoping document** on the state of knowledge that covers the employment benefits in a number of important sectors, also beyond the management of sites, such as agriculture, forestry, and tourism and recreation. Part A follows the structure below.

Report structure: Part A

1. Understanding the Employment Benefits of Natura 2000
2. Jobs in Natura 2000 Management and Ecological Restoration
3. Agriculture and Rural Development
4. Forestry
5. Fisheries
6. Tourism and Cultural Heritage
7. Recreation
8. Health Sector
9. Natural Risk Management, Climate Change Adaptation and Mitigation
10. Urban and Regional Development and Regeneration
11. Research, Innovation and Education
12. The Role of LIFE+ Funding
13. The Role of Wider EU Funding
14. The Way Forward

Part B presents a **methodology summary** on approaches used to assess direct, indirect and induced employment linked to Natura 2000 and methodology recommendations to assess the current and future employment potential and hence help ensure that Natura 2000 and job insights are available for different policy processes in the coming years. Part B follows the structure below.

Report structure: Part B

15. Aims and Objectives
16. Assessments Based on Demand-based Approaches
 - Expenditure-based analyses
 - Employment factors and site-based analyses
 - Input-output-analysis

- General equilibrium models
- 17. Assessments Based on Supply-based Approaches
 - Deriving employment figures from a sector perspective
 - Suitability for estimating employment effects of Natura 2000
- 18. Lessons learned from applying methods and recommendations
 - Lessons learned in past analyses
 - Recommendations for a future analysis of Natura 2000 jobs

Part C present a series of **case studies** that illustrate the job creation potential of the network for specific cases linked to specific sectors. Cases have also been selected to explore and highlight suitable methods for calculating jobs, which can inform the methodological recommendations.

The nature of jobs that Natura 2000 supports directly and indirectly across Europe

Most biodiversity in Europe, outside marine and tundra areas, is associated with semi-natural habitats that have been created as a result of human activities. This is also the case within Natura 2000 sites and therefore the conservation of habitats and their associated species within them often relies on ongoing management activities rather than non-intervention approaches. This is particularly the case in agricultural habitats, such as grasslands, heathlands, moorlands, pastoral woodlands (Poláková, Tucker et al. 2011), many of which are included in Annex I of the Habitats Directive. Such habitats typically require low intensity grazing and/or mowing as undertaken in many low intensity traditional farming systems, often referred to as high nature value (HNV) farming (Baldock, Beaufoy et al. 1993, Oppermann, Beaufoy et al. 2012, Keenleyside, Beaufoy et al. 2014). Whilst some ancient and undisturbed forests require no intervention, many others require management, such as to increase their structural and species compositional diversity (e.g. in even-aged stands), to maintain veteran trees, and to open up areas (to mimic natural dynamic processes, such as fires, and allow regeneration) (Peterken 1993, Viilma 2004, Similä, Junninen et al. 2012, European Commission 2015, EEA 2016). To meet nature conservation objectives, many habitats also require management to alleviate threats, such as from alien invasive species (IAS), fires, disease, erosion (such as from high levels of recreation) and flooding and droughts (such as through improved hydrological management), which are being exacerbated by climate change.

Furthermore, many areas within Natura 2000 are ecologically degraded (EEA 2015) and therefore need to be restored to achieve the Birds and Habitats Directives objectives of achieving the favourable conservation status of habitats and species² (Milieu, IEEP et al. 2016). In some cases, the restoration of habitats can be achieved by alleviating pressures and putting appropriate management measures in place and then allowing the ecosystem to recover naturally with time (Perrow and Davy 2002, Tucker, Underwood et al. 2013). However, in some cases proactive intervention is required to overcome degradation that is irreversible through natural processes over reasonable periods. For example, nutrient enriched soils and sediments may need to be removed to restore eutrophicated grasslands, lakes and rivers. Trees or other vegetation may need to be planted to restore some habitats (such as following conversion to farmland) whilst others may need the removal of trees or IAS (such as following afforestation of heathlands and mires).

It is clear from the above discussion that whilst management and restoration of Natura 2000 sites requires a wide range of physical and practical interventions, many of which are achieved through the continuation of existing appropriate land use activities (such as HNV farming) or modifications of such activities. However, some practical management measures, and especially restoration activities, require specialists (e.g. for removal of invasive alien species, or river reprofiling) and this creates further jobs such as for ecologists, conservation managers, ecological consultants, engineers, hydrologists etc. Consequently, in Germany for

² Article 2 of the Habitats Directive and similar requirements under Article 2 of the Birds Directive

example, a large share of the land management in Natura 2000 sites is carried out by local land care cooperatives, most of which are partnerships between the local authority, farmer groups and nature conservation groups. A survey of 119 of the cooperatives in 2012 (Metzner 2013) found that 65% of the cooperatives employ one or more full-time members of staff.

The current state of knowledge on employment benefits of Natura 2000

From the above introductory discussion, it can be expected that in many cases Natura 2000 designation does not require a cessation or major change in land use activities and associated jobs. This is because many sites and their biodiversity importance are the result of activities such as extensive agricultural and forestry management practices that are part of HNV farming and forestry systems. Therefore, management objectives for Natura 200 sites are often to maintain such systems. However, HNV farming and forestry systems are vulnerable to abandonment due to their marginal economic viability (Keenleyside and Tucker 2010). As a result, Common Agricultural Policy (CAP) Rural Development Programme (RDP) payments such as through agri-environment measures are often used to support the required extensive management measures needed to maintain the Natura 2000 habitats and their species, and in so doing they provide economic support to the HNV farming and forestry business and thereby help to maintain their existing jobs.

Where new regulations on land uses occur in Natura 2000 sites, they may prevent changes, and have impacts on future job opportunities. In particular, regulations may prevent the intensification of HNV farming and forestry systems. This may also maintain some existing jobs as intensification tends to lead to reduced employment (e.g. as a result of farm consolidation and mechanisation). However, this will not always be the case, as some forms of intensive agriculture, such as irrigated fruit and vegetable growing, are labour intensive.

It can also be expected that management and restoration activities within Natura 2000 sites will require supporting jobs in the nature conservation sector (category 1) including specialists and their support staff, and in other sectors (category 2). This is because personnel are required such as to plan, consult and advise on nature conservation activities and then to oversee them and to monitor and report on their effects and biodiversity impacts.

Detailed information on the jobs that are supported through the management and restoration of Natura 2000 sites is lacking at an EU level and for most Member States. A number of examples of estimates of jobs directly associated with Natura 2000 are summarised in Table 2.1, but these do not appear to provide comprehensive estimates of category 1 and 2 jobs supporting the management and restoration of Natura 2000. In particular, the estimates for Ireland, Romania and Sweden are extremely low and suggest that only category 1 jobs are included. On the other hand, the figure for RSPB reserves in the UK is more comprehensive and includes category 1 and 2 jobs. However, RSPB reserves in the UK and the other NGO reserves in Scotland are also probably subject to more intensive conservation management than most Natura 2000 sites in the UK and elsewhere, so are probably not representative. It is therefore not possible to draw reliable conclusions on typical employment levels per area of Natura 2000, other than that most published figures are extreme underestimates. Table 2.1 presents examples of analyses of jobs in Natura 2000 management and restoration.

Table 2.1: Evidence of jobs directly required to manage and restore Natura 2000 sites

Some jobs listed below will overlap with sectoral jobs described elsewhere in this study, in particular in relation to agriculture and forestry. Indirect jobs (category 3) such as in the tourism sector are not included in the estimates below.

Reference	Region (object of study, e.g. national park)	Number of jobs (FTE)	Natura area concerned (terrestrial) (km ²)	FTE per 1,000 km ²	Insights on Method and/or Result
CGEDD and CGAAER (2015)	France Natura 2000	736 (236 in the administration + c. 500 coordinating and promoting action)	69,974	10.5	Considered an underestimate as does not include agricultural personnel.
Case study in Gantioler et al. (2010)	Ireland Natura 2000	136	9,227	14.7	Interview. Covers designation and management
Case study in Gantioler et al. (2010)	Sweden Natura 2000	250 working on management & 10-20 on research and monitoring	55,250	4.8	Interview relates to management of protected areas including Natura in 2009
Chrysogelos and Theodoropoulos (2012)	Greece	800 – 1,200	35,747	22.3 – 33.6	Interview
Case study in Gantioler et al. (2010)	Romania Natura 2000	163	53,781	3.0	Interview
Shiel et al. (2001)	UK – RSPB reserves including Natura 2000 sites	1,000	1,420	704.2	Includes jobs from direct employment, employee spending, goods and services for the reserves and grazing lets
McMurrnan et al. (2013)	UK – Scotland NGO owned nature reserves	736	2,080	353.8	Directly employed in management

Implementation of Natura 2000 in France

An official report on the implementation of Natura 2000 in France in 2015 provides information about the human resources dedicated to Natura 2000 in the French Administration.

A provisional evaluation of the personnel needed for Natura 2000 in France estimated that 655 FTE should be dedicated to Natura 2000 in 2013 in the regional and departmental administration devoted to environment and land use issues. In 2015, there were just 236 ETP dedicated to Natura 2000 in these administrations (DREAL – Direction Régional de L’Environnement, de l’Aménagement et du Logement, and DDT -Direction Départemental des Territoires). The report however acknowledges that these figures are underestimated, as other human resources dedicated to Natura 2000 in agricultural organisations have not been taken into account.

Furthermore, about 500 FTE (around 800 people) were dedicated to the implementation of the management plans on 1183 sites. These correspond to the so-called “animateurs Natura 2000” who coordinate and promote the actions needed for achieving the site conservation objectives.

Other resources are dedicated to Natura 2000 in different administrations although they have not been quantified in the report. For instance, the National Forest Office (ONF) has estimated that the management costs of forests in Natura 2000 have increased around 20% requiring also more human resources.

Source: CGEDD (Conseil Général de l’Environnement et du Développement Durable) and CGAAER (Conseil Général de l’Agriculture, l’Alimentation et les Espaces Ruraux) (2015). Analyse du dispositif Natura 2000 en France. Rapport CGEDD n° 009538-01, CGAAER n° 15029. Ministère de l’Écologie, du Développement Durable et de l’Énergie. Ministère de l’Agriculture, de l’Agroalimentaire et de la Forêt.

Despite the paucity of data, ICF GHK (2011) examined the employment effects of EU budgetary investments in the Natura 2000 network as a whole. The study drew on data from a survey of the costs of managing and restoring Natura 2000 sites in accordance with the aims of the Birds and Habitats Directives (Gantioler et al, 2010), which found an average annual salary of €28,000 for staff employed in the network across the EU. This was combined with a methodology developed by Rayment et al. (2009), which estimated that 50% of the costs of the Natura 2000 network comprise wages and salaries. Multipliers were then used to assess the employment impacts.

The ICF GHK study estimated that almost 30,000 FTE jobs are supported by each €1 billion of expenditure in the implementation and management of the network. Of these 17,900 (60%) are direct employment in the conservation of Natura 2000 sites, and include low skilled labour (e.g. for capital works) and higher skilled labour (e.g. research, surveys, consultations). A further 2,800 jobs (9%), are estimated to be indirectly created from the supply of goods and services related to the management of the Natura 2000 network. The remaining 9,300 are induced jobs and they conclude that there are likely to be some additional indirect jobs such as from tourism impacts.

The employment effects of achieving the objectives of the Natura 2000 network has been estimated by Jurado et al. (2012), by extrapolating the results of the ICF GHK (2011) study on

the basis of an estimate by Gantioler et al. (2010) of the annual costs of full implementation of the Natura 2000 network in the EU27, which amounts to at least €5.8 billion per year. According to this simple calculation, this would result in 104,000 direct FTE jobs in the conservation of Natura 2000 sites; and an additional 16,000 indirect FTE jobs among suppliers and contractors providing supporting goods and services.

Based on a division of the costs of implementing the network given in the Gantioler et al. (2010) report, Jurado et al. (2012) provide a breakdown of the jobs directly involved in the management and restoration of the Natura 2000 sites in the EU-27 (Table 2.2)

Table 2.2: Estimated breakdown of direct jobs in implementation and management of Natura 2000 in EU-27 (Jurado et al., 2012)

Activity	Estimated jobs (FTE)	Examples of jobs
One off management actions	6,000	Policy officers, environmental lawyers, surveyors, management planners, research scientists, GIS specialists, communications specialists
One off capital works (habitat restoration and visitor facilities)	18,900	Habitat restoration specialists, land management contractors, environmental and water engineers, builders, farmers, foresters, ecological advisors and consultants, IAS control specialists
Recurrent management planning actions	16,300	Management planners, communications specialists, administrators, policy officers, ecological advisors and consultants, GIS specialists, support services
Recurrent habitat management and monitoring actions	62,800	Site managers, wardens, site and species protection officers, monitoring specialists, visitor wardens and guides, teachers, farmers, foresters, ecological advisers and consultants
Total	104,000	

Management and conservation of habitats in the Serra da Estrela, Portugal

A LIFE Nature project was undertaken from 2002 to 2006 to restore and manage a number of grassland, forest and bog habitats in the Serra da Estrela, Portugal, as these had been degraded primarily by changes to agricultural and forestry practices. The main approach of the project was therefore to support and re-establish these traditional systems, primarily by enhancing the viability of livestock grazing and protecting habitats from damage. The project cost €1,245,000 and 62 persons were recruited to carry it out.

For details, see case study 1.

Job potential: what does the literature say on future job potential?

As with the current situation, no detailed information appears to be available on the expected trends in jobs resulting from the management and restoration of the Natura 2000 network.

However, as it is well documented that funding of the Natura 2000 network is inadequate (Kettunen, Baldock et al. 2011, Kettunen, Illes et al. 2016, Milieu, IEEP et al. 2016) and a significant proportion of the network is in an unfavourable conservation status ((EEA 2015). It might therefore be expected that jobs associated with the management and restoration of Natura 2000 would be expected to increase if increased investment is made to achieve the aims of the Nature Directives. In the longer-term, employment levels may then decline as one-off or intermittent restoration related actions are completed.

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The nature of jobs that Natura 2000 supports directly and indirectly across Europe

Agricultural activity in Natura 2000 results in a specific land management that benefits a number of European protected habitats and species. Without the Natura 2000 designation and the requirement to maintain management for these habitats and species, agricultural activity in many of the sites would be abandoned, whilst on some sites agricultural activities would be intensified and cease to benefit nature. The Natura 2000 conservation objectives and measures are designed to prevent damaging agricultural intensification such as increased stocking densities, fertiliser use and increased cutting frequencies, irrigation or drainage, whilst maintaining or reinstating beneficial agricultural management such as low intensity grazing and/or mowing.

A significant proportion of the Natura 2000 terrestrial network is targeted at the protection of habitats and species that depend on agricultural activities for their continued existence, including at least 58 habitat types, 62 birds and 200 other species (European Commission 2014). In the EU-27 (in 2011), agricultural land accounted for 19.9% of the total area designated as terrestrial SCI³ and 11.5% of terrestrial SPAs⁴, which form the Natura 2000 network⁵. The Natura 2000 network includes 10.6% of agricultural land in the EU⁶. The Natura 2000 network therefore contains a wide range of agricultural systems, ranging from very extensive large-scale seasonal grazing of beef cattle, sheep and/or goats, for example on mountain pastures or coastal grasslands, to wooded meadows, to cereal crops rotated with fallow, to intensive irrigated agriculture that maintains protected species in the irrigation channels. In these systems, agricultural activities that can benefit protected habitats and species include for example grazing, fencing, mowing and haymaking, maintenance of ditches, hedges, stonewalls, trees and orchards, and cutting of invasive plants and scrubs.

The agricultural sector's total labour input was estimated to be 9.566 million FTEs⁷ in 2015 in the EU-28⁸. Because many farmers and farm workers are only employed part-time in agriculture, this amounted to 22.2 million people regularly involved in labour in the agricultural sector in 2013⁹. Although these figures vary depending on the definitions and databases used, all show that the number of jobs in agriculture has been on a declining trend for most Member States. However, the total work units are estimated to have increased in a few countries, namely Slovenia, Lithuania, Hungary, Malta, Poland, UK and Greece (Eurostat, 2016).

Natura 2000 designation and governance will mostly result in the retention or reinstatement of previously existing agricultural jobs (e.g. farmers and farm workers). These jobs will be

³ Sites of Community Importance (SCI) under the EU Habitats Directive

⁴ Special Protection Areas (SPA) under the EU Birds Directive

⁵ Agri-environment indicator, Eurostat, 2016

⁶ Utilised agricultural area (UAA)

⁷ The standard unit used for farm labour is the Annual Work Unit (AWUs) which is equivalent to FTEs.

⁸ Eurostat, Economic Accounts for Agriculture, 2016

⁹ Latest available data on Eurostat in the Agriculture section

retained or reinstated in most cases because farmers are given additional funding to implement agricultural practices that benefit biodiversity (although this depends on the implementation choices made by the MS/region and the voluntary commitment by farmers). Being located in a Natura 2000 area may also result in priority access to EAFRD investment measures within rural development programmes, which in turn may help farmers to remain economically viable. In view of the downward trends of employment in the sector, job maintenance likely implies the avoidance of job losses, which is considered a benefit in this study. Natura 2000 designation may also create jobs arising from the related obligations e.g. in relation to the restoration/maintenance of landscape features on farms (GHK 2011). In many cases, the costs of (mostly non-productive) investments can be supported under the EAFRD. In addition, the Natura 2000 designation can provide opportunities for the development of agricultural businesses based on extensive management combined with added value products and other diversified activities. Many of these new jobs are indirectly related to agriculture as they are in food processing and marketing, tourism, recreation, and other related sectors. In turn, flourishing agricultural and food businesses associated with Natura 2000 will stimulate the rural economy more widely.

Obligations arising from a Natura 2000 designation might result in a negative economic impact on certain farming activities, or have an opportunity cost due to the avoided intensification of some types of agriculture. An ex-ante assessment of the impacts of Natura 2000 in Spain estimated a net loss of jobs in the agricultural sector due to the network, but the study did not estimate job creation opportunities due to new or added value agricultural businesses in Natura 2000. The study also did not include any estimate of potential job losses in agriculture due to future land abandonment, in the absence of Natura 2000 support to maintain specific agricultural land management (Moreno, Picazo et al. 2013).

Expected agricultural job losses and job creation due to Natura 2000 in Spain

An assessment of the expected impacts of the Spanish Natura 2000 network estimated that the full implementation of conservation measures on agricultural land in all Natura 2000 sites would result in the loss of over 15,000 FTE jobs in agriculture due to regulations, and the creation of over 3,500 jobs from payments to land owners and land purchases (Moreno, Picazo et al. 2013). The study does not estimate job creation from added value of agricultural products or other opportunities for agriculture in Natura 2000. This study was an ex-ante assessment because it was carried out before the implementation of management planning and conservation measures on most Spanish sites. It therefore made a series of assumptions of what agricultural activities would be regulated on Natura 2000 sites, including the adoption of integrated production¹⁰ or organic farming on all sites, reductions in fertiliser use, no irrigation and limited water extractions, no olives on sloping land at risk of erosion, delayed harvests or other regulations to protect breeding birds, lower livestock stocking densities and associated supplementary feeding needs. The estimated costs on Natura 2000 sites in each autonomous community of Spain were converted into FTEs using multipliers based on the total sector output and employment in Spain in 2000. The study notes, however, that it is very difficult to calculate opportunity costs for agriculture because most of the cost data come from the agricultural producers themselves, and so tends to overestimate potential costs.

¹⁰ Production that reduces the use of chemical pesticides and completely avoids the use of certain pesticides identified as hazardous to the environment and/or human health.

The current state of knowledge on employment benefits of farming in Natura 2000

The direct and indirect employment benefits in the agriculture sector from a Natura 2000 designation can be many and may take different forms. It is not straightforward to relate particular job benefits to the Natura 2000 designation rather than other protection statuses such as National Parks or Landscape Parks. Nonetheless, ad hoc evidence has been found in literature and lessons can be learnt from the methods used to perform this exercise as well as from the estimated employment benefits.

Only one study has to date attempted to estimate agricultural jobs associated with the Natura 2000 network across the EU. The report for DG ENV (BIO Intelligence Service 2011) estimated that Natura 2000 directly and indirectly supported some 1.3 million FTE jobs in the agricultural sector each year in the EU-27 during the period 2006-2008. This was 11% of the total 11.8 million FTE jobs the study estimated to be supported by Natura 2000 each year. However, the study methodology has a number of significant weaknesses, including the caveat that the study assumes that the employment ratio per ha is the same for agricultural activities outside Natura and within, and therefore does not distinguish the employment associated with agricultural activities that are benefiting biodiversity within the Natura 2000 network, as opposed to agricultural activities that are currently damaging the conservation status of Natura 2000 sites. Not all current agricultural activities in Natura 2000 sites are having a beneficial impact on habitats and species. Member States reports on the conservation status of their EU protected habitats and species in the 2007-2012 period identified agricultural activities as one of the major pressures causing deteriorations in conservation status (EEA 2015). These assessments apply to EU protected habitats and species in their total EU distribution both inside and outside Natura 2000.

Employment effects of Common Agricultural Policy funding in Natura 2000

Public subsidies for agriculture under the Common Agricultural Policy are a key factor influencing agricultural employment, but the academic literature on the employment impacts of CAP regulations and funding is contradictory. A recent review of the literature (Schuh, Gorny et al. 2016) concluded that the CAP supports the survival of small-scale farms which would otherwise be lost and contributes to sustain and develop rural economies, mainly through payments under rural development programmes. Direct payments under Pillar 1 also help to retain economically marginal farms, including many farms in Natura 2000, but on farms that are more productive, they have a negative impact on employment in the agricultural sector by driving increases in agricultural productivity per unit of labour without creating new jobs.

A body of literature has attempted to analyse the employment benefits of funding of agri-environment schemes. Agri-environment schemes are not exclusive to Natura 2000, but are likely to be taken up by and prioritized to farmers located on Natura 2000 sites, particularly the higher level ('deep green') schemes. These subsidies are therefore a key part of the benefits of the Natura 2000 designation for farmers. Scheme uptake by farmers in Natura 2000 is greatly benefited by the activities of cooperative networks between farmers, local authorities and/or NGOs. It is however not possible to derive the employment benefits specific to the Natura 2000 network from these studies, as many EU agricultural payment

agencies do not publish data on what proportion of agri-environment spending went to farms in Natura 2000 areas.

Agricultural jobs in Natura 2000 maintained by partnerships in Germany

In Germany, local land care cooperatives, most of which are partnerships between the local authority, farmer groups and nature conservation groups, carry out a large share of land management for nature conservation. Three quarters of the German land care cooperatives are engaged in Natura 2000 site management, and more than a third spend most of their time on Natura 2000. A survey of 119 of the 155 land care cooperatives in 2012 found that they work with around 10,000 farmers and 500 shepherds (Metzner 2013), which represents around 1% of farmers in Germany¹¹. Data on how much of the agricultural land within Natura 2000 in Germany is covered by these arrangements is not available.

In Scotland, a survey of the five largest environmental NGOs who own and/or manage land in Natura 2000 found that the environmental NGO RSPB rents some 4,950 ha of Natura 2000 land to 58 farmers/graziers and two others are responsible for some 17,362 ha of land under crofting tenure (McMorran, Glass et al. 2013). In total, the land the NGOs own and/or manage represents 1.5% of the terrestrial SAC network in Scotland.

Employment effects of added value agricultural activities related to Natura 2000

Farms in and around Natura 2000 sites can benefit and have benefited in many ways through the Natura 2000 protection status. The agricultural sector in Natura 2000 can directly gain increased income from the generation of a price premium using product labels, including:

- Origin labels with regionally branded processed or non-processed foods, e.g. honey, ham, cheese, fruits, wine, mushrooms. For instance, the Estonian label *Liivimaa Lihaveis* promotes meat from cattle grazing on boreal coastal meadows, *Riet Vell* in Spain sells organic rice produced in the Ebro delta and other products from Natura 2000 sites (European Commission 2014);
- Quality labels, either by supplying quality ingredients, e.g. milk, or producing foods, e.g. cheese, according to private quality labels or EU quality label specifications, which often require an extensive farm management or traditional practices which are likely to be found in Natura 2000 sites (e.g. PDO Pays d’Auge cider and Calvados from traditional apple orchards or PDO scheme for moor sheep meat (‘Diepholzer Moorschnucke’) in Germany are produced on Natura 200 sites (European Commission 2014);
- Other consumer product labels, e.g. animal welfare labels requiring extensive management; labels promoting the protection of birds or other wildlife; organic certification (which combines standards of food quality and environmental protection). By their nature, the practices required to obtain those labels may be in line within the conservation requirements of Natura 2000 sites, and therefore the incentive for farmers to convert their practices is likely to be higher on these sites.

¹¹ The German farmers association estimates that there were around 670,000 farmers in Germany in 2013/14. <http://www.die-deutschen-bauern.de/wissen>

The economic benefit to farms is greater if they are also directly involved in the food processing and/or direct marketing of produce.

Farms in and around Natura 2000 sites may have the option of diversifying activities, for example into agro-tourism, beekeeping, horse retirement, or wildlife protection activities. Farmers may choose to combine several activities and often the new ‘business model’ relies on a mix of economic factors and incentives. For instance, extensive farm management may be supported by public subsidies; it may boost agro-tourism potential in the area or on the farm while also generating direct increased income from the sales of niche products.

Higher gross economic margins from labelled agricultural products

The Protected Designation of Origin (PDO) labelling scheme is an EU programme that provides consumers with a guarantee of authentic regional origin and traditional production, whilst providing producers with legal protection. PDO labelled agricultural products must be produced, processed and prepared exclusively within the region of origin. A review of case studies (Areté 2013) found that production of raw materials for PDOs allowed farmers to achieve significant or substantial additional gross margins in half of the studied cases compared to unlabelled production. It also concluded that geographical identification labels including PDO are a key factor maintaining food production activities (at farming and/or processing stage) within the identified area, which implies job retention and creation. PDO labels are more likely to be associated with Natura 2000 sites than other agricultural areas, because they are generally tied to traditional low intensity agricultural systems, which are more frequent within Natura 2000. It is not however possible to quantify the number of PDO labelled products produced in Natura 2000 with current data.

Evidence identified for the employment impacts of these agricultural strategies is typically ad hoc case study information from single sites or regions, which cannot be aggregated or compared across the EU (see Table 3.1).

Table 3.1: Evidence on jobs supported in agriculture in Natura 2000 from case studies

Reference	Region	Nature and number of jobs	Method used	Source
Slow food movement	Italy	Groups within Natura 2000 support local food producers of high value foods	Direct reporting of project outcomes	(Schweitzer, Mutafoglu et al. 2016)
Tarnava Mare project funded by the Norwegian government (Fundatia ADEPT, Nathaniel Page)	Romania	200 small-scale dairy farmers have maintained their milk production on a Natura 2000 grassland site due to project investment	Direct reporting of project outcomes	(European Commission 2014)
Muñoz and Rueda (2014) Experiencias positivas en Red Natura 2000	Spain	From 1 to 14 direct jobs created or maintained per project (in over 30 Natura 2000 sites).	Direct reporting from a collection of projects	(Muñoz and Rueda 2014)

Reference	Region	Nature and number of jobs	Method used	Source
Belchite plain organic wheat production, Ebro Basin (agri-environment subsidy supported by NGO SEO/Birdlife)	Spain	165 farm businesses maintain low intensity cereal rotations in several Natura 2000 sites. Creation of two new food businesses.	Evaluation of agri-environment uptake in the region	(European Commission 2014)

Job potential: what does the literature say on future job potential?

The evidence base on agricultural jobs in Natura 2000 is fragmented. In Member States where site management and governance is still weak, Natura 2000 designation may be helping to maintain the status quo. This notably occurs through maintaining a low density of jobs in extensive agriculture, principally grazing, in the face of drivers of farm abandonment, whilst preventing agricultural intensification and land use change, if there is some basic system of site protection in place. The evidence submitted by Member States for the recent fitness check of the EU nature directives indicated that 30% of SPAs and 41% of SCIs had management plans in place at the end of 2012. It is not possible to say how many of these include agricultural activities, and it is possible that a larger percentage of sites are receiving funding for agricultural activities even though the plan has not been finalised (Milieu, IEEP et al. 2016). In Member States that have made more progress with establishing Natura 2000 site governance and funding for management, it is possible to find examples of revived and new agricultural businesses that are generating added income and therefore maintaining employment in Natura 2000 where it would otherwise be lost due to land abandonment, as well as maintaining existing extensive agricultural activities. One agricultural activity that is in increasing demand due to Natura 2000 management requirements, after decades of decline, is shepherding (Finck, Riecken et al. 2009, Pardini and Nori 2011).

Calculating more accurate agricultural employment estimates in Natura 2000 would require better-published data on agricultural activities in Natura 2000 areas, agricultural subsidies going to Natura 2000 and their relative impact on job creation, and appropriate counterfactuals, i.e. whether agricultural activities would have been abandoned or intensified in the absence of Natura 2000 designation.

Care should be taken in extrapolating findings from agriculture in Natura 2000 in one Member State or region to others. Member States have taken very different approaches to designating their Natura 2000 areas, and the agricultural area in SCIs ranges from 32.9% in Portugal to 2.1% in Luxemburg and in SPAs from 31.2% in Sweden to 0% in Slovenia in 2011¹². A few Member States publish national statistics on the number of farms active in Natura 2000, which could be used to derive more accurate employment estimates. For example, in Austria, 23,721 farms were active in Natura 2000 site management, and 7,855 farms were located inside Natura 2000 areas in 2013 (Schwaiger, Hofer et al. 2014).

¹² EEA, 2016. <http://www.eea.europa.eu/data-and-maps/data/natura-2000/>.

Because many Member States are still establishing their Natura 2000 conservation measures and management systems, many farmers on Natura 2000 sites do not have access to the appropriate advice and funding opportunities that would enable them to build sustainable agriculture businesses that both benefit nature and create sustainable income and jobs. There is therefore still a large unrealised potential for job creation associated with agriculture in Natura 2000. For example, large areas of grassland in Natura 2000 in Bulgaria are abandoned (Vassilev, Pedashenko et al. 2011), but these sites urgently require the re-establishment of suitable grazing systems so that these habitats are not lost.

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The nature of jobs that Natura 2000 supports directly and indirectly across Europe

Forests harbour a significant proportion of Europe's biodiversity. The most suitable areas for rare and threatened species and habitat types in the EU have been designated as part of Natura 2000 in order to ensure their long-term survival. As a result, some 375,000 km² of forests are now included in the Natura 2000 Network and overall around 50 per cent of the network is made up of forests. Almost 25 per cent of all EU forest area is included in Natura 2000¹³.

Forest in Natura 2000 must be managed for the conservation of habitats and species of EU interest. This may require active management to maintain or improve their conservation status or just the protection of the forest allowing their natural evolution with no-intervention. Sustainably managed forests in Natura 2000 are also used for the production of wood and non-wood products, recreation, hunting etc. while at the same time delivering public amenity and achieving other environmental objectives such as biodiversity, climate change resilience, protection of water and soil.

Natura 2000 may thus create direct and indirect jobs linked to the management of forests and forestry practices. The main types of activities and potential jobs linked to forest conservation include the following:

- Planning: technical staff for elaboration of forest management plans, action plans for conservation of forest habitats and species and species, inventories, etc.;
- Surveillance, monitoring, guarding: scientific personnel and guards for species protection, nesting monitoring, regulations, etc.;
- Restoration and active management of forest: workforce for silviculture and adaptation of forestry practices, thinning, invasive alien species removal, planting, etc.; and
- Recreation and visitor management: guides, information and communication staff, etc.

Other direct and indirect jobs may be also created in relation to the production and processing of wood and non-wood products, hunting and recreation in Natura 2000 forests.

A study on the relationship between biodiversity and employment (Nunes et al. 2011) estimated the employment in forestry in the EU at 2,988,000¹⁴. According to recent estimates by the European Commission (2013), forest-based industries provide nearly 3.5 million jobs across over 400,000 companies. In France alone, wood processing companies employed

¹³ Albeit with significant differences between countries and biogeographical regions. The area of forests under Natura 2000 varies from 6.4% in the United Kingdom to 53.1% in Bulgaria (EC, 2015).

¹⁴ EU employment figures were derived from OECD Input-Output tables and Eurostat for the year 2008. The number of jobs that are highly dependent on ecosystem services in the EU were estimated at 14.6 million or 7% of all jobs (Nunes et al., 2011).

300,000 people in 2012. France is the first European producer of oak, beech and poplar (Ministère de l'Environnement, 2012).

The current state of knowledge on employment benefits of Natura 2000

Estimates of jobs in natural protected areas and in Natura 2000 are available for several EU countries but in general these are not broken down into different economic sectors or land use activities. At EU level, a first attempt to estimate employment supported by Natura 2000 in different economic activities provides an estimate of **73,174 FTE jobs/year in Natura 2000 in forestry activities**¹⁵ (Bio Intelligence Service, 2011). The employment supported by the network was estimated in this study by correlating the employment data at MS level to the dominant activities performed in Natura 2000 sites, as reported in the Natura 2000 database. These estimates should be considered as an order of magnitude rather than precise estimations.

Methodology adopted to estimate the employment based on the economic activities performed in Natura 2000 sites (Bio Intelligence Service, 2011)

A sample of Natura 2000 sites in 16 MS was used in the study (around 36 million hectares, 48 per cent of the network). The methodology consists of three main steps, namely:

Step 1 – Calculation of the Natura 2000 area affected by economic activities at MS level.

The Natura 2000 area affected by human activities, as reported in the Natura 2000 database, was estimated for each MS. Economic activities were gathered according to their correspondence with some NACE categories, including A01. Agriculture, A02. Forestry, logging and related service activities etc.

Step 2 – Data collection and calculation of employment supported by Natura 2000 in MS.

Employment per hectare at MS level was calculated for each of the NACE categories, based on EUROSTAT data for the years 2006–2008 (in FTE). Land-use data were used to assess the area of land dedicated to each of the NACE categories. For each MS, employment related to activities undertaken in Natura 2000 sites was then estimated by applying the rate of employment per hectare and per NACE category to the Natura 2000 areas affected by the corresponding economic activity.

Step 3 – Calculation of direct and indirect employment supported by Natura 2000 at EU level.

Direct employment supported by Natura 2000 derives from the multiplication of MS employment rates with their Natura 2000 total area, per NACE category. The results were added up for all the categories to obtain a global estimate. A multiplier of 0.5 was then applied to direct employment to estimate the overall (direct + indirect) employment.

Employment supported by Natura 2000 was estimated based on incomplete and relatively poor quality data taken from the European Natura 2000 descriptive database. The scaling-up approach on a per Natura 2000 hectare basis does not take into account characteristics and specificities at site level that can have an impact on the activities undertaken in the site and on the workforce intensities.

¹⁵ The overall activities undertaken in Natura 2000 sites were estimated to have supported about 12 million FTE jobs each year during the period 2006-2008, i.e. about 6% of total employment in the EU. This includes about 3.2 million jobs in recreation (26% of the total), 1.3 million in agriculture (11%), 200,000 in fishing (2%), and 70,000 in the forestry sector (1%).

Natura 2000 supported value chains – Cork oak forests in Spain and Portugal

Cork oak forests are considerably important to the economy of Mediterranean countries and the derived products offer a large variety of applications. More precisely, cork products represent the sixth most valuable non-timber forest product (FAO, 2013) globally. Portugal and Spain are the leaders in the production and export of these products and several jobs are created through this growing industry (FAO, 2010). As many cork oak areas are part of the Natura 2000 network, this case study explores the creation of jobs associated with the cork industry in these areas. Through the analysis of the available site-specific information, the study estimates that 2,630 FTE are supported each year in the cork oak forests included in the Natura 2000 network.

For details, see case study 3.

Some EU countries have estimated the number of **green jobs**, which usually include jobs in natural protected areas, forest management and forestry, organic farming and other environmental sectors (waste, water, etc.). For instance **in Spain, green jobs linked to forest management were estimated at 32,400**, 6% of total green jobs estimated in the country, which amount to 530,947 jobs (FB and OSE 2010). According to this study, green jobs in the forest sector in Spain have increased from 22,980 in 1998 to 32,400 in 2009 (41%) and the potential for creating green jobs in Spain are good/excellent for forestation/reforestation, agro-forestry and sustainable forest planning.

A few studies assessed whether protected areas create jobs in the forest sector or on the contrary cause a decrease or loss of jobs in forestry, obtaining different results.

Decrease or increase in forest sector employment in protected areas?

In Sweden, a decrease in forest sector employment in and around protected areas in 15 mountain municipalities was detected in the years 1991-2001 (Lundmark et al., 2010). The number of people employed in the forest sector in the protected areas considered in the study decreased from 315 in 1991 to 155 in 2001. This same study however detected an increase in the tourism sector in these areas (from 197 people in 1991 to 237 in 2001).

On the other hand, an assessment of employment in Natura 2000 in Spain observed a positive net balance in employment in forestry, even considering the potential income and job losses due to regulations to forestry practices in Natura 2000 in some regions (MAGRAMA, 2013). The study provides a total estimate of about 13,000 new jobs created by the investments in the management of the whole Natura 2000 network in Spain, i.e. about one new job per 1000 ha on average. The study does not provide exact figures for direct employment in forestry but estimates a net balance of 70 new indirect jobs in forestry and logging and in the wood and cork industry because of the Natura 2000 management.

These contrasting findings should be interpreted taking into account the management regimes linked to forest management in protected areas in the different countries or regions. In Sweden, forests included in Nature reserves, National Parks and Natura 2000 areas have a very high conservation value and in many cases non-intervention is prescribed and forestry is not allowed in these sites. In contrast, large, extensive forest areas are included in Natura 2000 in Spain, where

sustainable forestry activities are allowed with only some regulations in the most intensive practices.

As for the financing needs of an effective Natura 2000 network, the management costs were estimated based on a questionnaire to Member State authorities (Gantioler et al. 2010). Total costs were broken down into broad land use types. The results indicated that the **management of forests in Natura 2000 represent 33 per cent of the total costs, i.e. 1,915 million €/year in the EU**. Information on staff numbers and wage costs involved in managing the network were also gathered. Wages comprise 50 per cent of the costs of the network and an average wage rate of 28,000 euro per FTE job was estimated.

EU funds provide opportunities to fund ongoing management of Natura 2000 forest areas mainly through the **EAFRD**. Although several studies highlight the limited use of this fund for forest conservation in Natura 2000 so far (Kettunen et al. 2011, N2K Group, 2016), several EU countries are implementing forest environment and climate measures, Natura 2000 forest payments and forest-investments for the conservation of forest biodiversity.

More specific conservation measures can be financed by the **LIFE** fund, which in general does not allow funding for ongoing management measures in Natura 2000 sites. Many LIFE Nature projects (over 55 projects between 2005 and 2014) have specifically addressed the conservation and restoration of forest habitats and species in Natura 2000 as a main target. These projects co-finance the personnel required for the implementation of conservation measures in the sites concerned. The information collected in a new database on LIFE Programme Indicator indicates that **LIFE-Nature projects specifically targeting the conservation of forests in Natura 2000 sites from 2005 to 2014 have created on average two new jobs (FTE) per site**.

National programmes to promote forest conservation and restoration are also available in some countries. In Ireland for instance, a Native Woodland Scheme provides funding to protect, enhance and expand native woodland and associated biodiversity through appropriate management and planting. In Flanders (Belgium), a programme of subsidies and incentives for forest owners supports the endorsement of ambitious regional targets for restoring favourable conservation status of all forest habitats (for further details see EC, 2015b).

Table 4.1: Evidence on jobs supported forestry

Reference	Region	Nature and number of jobs	Insights on method	Source
BIO Intelligence Service, 2011	EU	73,174 FTE jobs/year in forestry in the Natura 2000 network (EU-27)	Estimates based on land use data, activities reported in Natura 2000 database and MS data on employment in forestry	http://ec.europa.eu/environment/nature/natura2000/financing/docs/Estimating_economic_value.pdf

Reference	Region	Nature and number of jobs	Insights on method	Source
Nunes et al. 2011	EU	Employment in forestry in the EU: 2,988,000 jobs.	Estimates based on EU employment figures derived from OECD Input-Output tables and Eurostat for the year 2008.	http://ec.europa.eu/environment/enveco/biodiversity/pdf/Social%20Dimension%20of%20Biodiversity.pdf
FB and OSE, 2010	Spain	32,400 green jobs in forests in Spain in 2009.	Based on national statistics and consultation with forest companies (questionnaire)	http://empleaverde.es/sites/default/files/informe_empleo_verde.pdf
Moreno et al., 2013	Spain	70 new indirect jobs created in forestry and wood and cork industry as a result of the management of the Natura 2000 network.	Estimates based on calculations of direct and indirect costs and income foregone resulting from the Natura 2000 management, and input-output tables.	http://www.magrama.gob.es/es/biodiversidad/publicaciones/Valoracion_costes_RN_tcm7-309107.pdf

Job potential: what does the literature say on future job potential?

Overall, there is significant potential for job creation in the conservation sector during the next years with expected increase in protected areas surface and improvement of their management. In particular, the implementation of management plans and conservation measures in Natura 2000 is growing steadily in the last years. These areas will need staff to manage them, as in general there is a lack of adequate staffing.

In the field of forestry, there is potential to increase job prospects in afforestation, reforestation and sustainable forestry management. Future targeted investment in sustainable forestry could possibly generate 10 million new jobs in the world. Afforestation and reforestation are expected to offer the greatest scope for job creation, particularly where rural unemployment is high and vast tracts of degraded land are available (Herren et al., 2012).

Forest restoration usually requires sizeable amounts of manual labour, including cutting down unwanted trees, removing brush around the trees and pruning the new trees to maximize growth. Additional indirect jobs related to growing the seedlings in nurseries and transporting the trees to the forests could increase (Renner et al, 2008).

Labour intensity of forest restoration measures

LIFE+ Project Carpathia Restoration

A LIFE project aimed at restoring forest habitats inside a Natura 2000 site in the Carpathians in Romania (Muntii Fagaras) has employed about 90 local workers every season (spring and autumn) for planting saplings of native species in clear cut areas (on approx. 80 hectares). Replanting is

planned on around 400 ha of clear-felled areas. Plants are produced in nurseries created in the project for specific forest species, which also employ local workers. The project managers have estimated that 48 FTE jobs will be supported during the project duration (2012-2017) as reported in the LIFE Indicators database (see chapter 13).

Source: LIFE+ Project Carpathia Restoration website: <http://www.carpathia.org/en/life-project/> (accessed on 28/09/2016)

LIFE Green Desert

This LIFE project has developed an innovative planting technique to restore forests in unfavourable environmental conditions, such as dry mountain areas. A recent study has estimated the employment impact of using this technique to restore degraded areas in Spain. Although the study does not concern specifically Natura 2000 areas, it has estimated the number of FTE needed to reforest part of the land under the threat of abandonment and desertification in Spain under different scenarios, using the technology developed by the project. The tree density of the planted areas stands at 625 trees per hectare. Assuming that a person plants about 3 trees per hour or 5,280 trees per year, **about 67 FTEs are needed for planting 564 ha** (in 2020), i.e. about **12 FTE per 100 ha**. In addition, assuming that a line with an annual capacity of 120,000 boxes per year employs full time 15 people, about 45 FTEs are employed for the production of water boxes in 2020 (3 production lines in operation * 15 FTEs). As a result, the employment impact in 2020 totals 112 FTEs (45 FTEs for the production of the boxes and 67 FTEs for the planting of the saplings). In other scenarios, the reforestation areas range between 630 hectares and 3,150 hectares employing 165 person-years and 658 person-years respectively.

Source: LIFE past, present and future contribution to employment and economic growth. Final Report. Neemo LIFE Team (unpublished, under elaboration).

Contrary to what is happening in many other parts of the world, the area covered by forests and other wooded land in the EU-28 is slowly increasing. Over the past 25 years (1990 to 2015) the area of forest cover and other wooded land increased in total by 5.2 %, equivalent to an average increase of 0.2 % per annum.

Sustainable forestry management (SFM) is a promising area for future employment. Subsidies and incentives for sustainable forest management in Natura 2000 will support jobs linked to the implementation of more sustainable practices.

Sustainable forestry management and certification standards have been growing rapidly in the last few years and could become a source of employment for rural economies (Castañeda, 2010). Some studies have estimated the effects of certification schemes on jobs, indicating in general an increase in levels of employment and a continuation of this trend into the future (Renner et al, 2008). The market of certified forest products has reached a considerable size recently and is expected to increase very significantly in the next years (TEEB, 2010).

Certification schemes also require compliance with specific standards for employment. For example, the Forest Stewardship Council (FSC) and the Programme for Endorsement of Forest Certification (PEFC) require compliance with a number of standards on health and safety rules and equipment to protect workers, guaranteed workers' rights, training and education programmes, among others. These certification schemes contribute not only to the potential long-term increase in the number of green jobs, but also to their quality (UNEP, 2008).

Finally, forest conservation and restoration will deserve increasing attention in the context of climate change mitigation and adaptation policies. In this regard it is worth noting that forest habitats in Natura 2000 contain the highest carbon values of all habitats, ranging between € 318.3 and 610.1 billion in 2010 (ten Brink et al., 2010).

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The nature of jobs that Natura 2000 supports directly and indirectly across Europe

European fisheries directly employed just over 149,000 fishermen in 2013 (110,000 full-time equivalents (FTEs)), with significant geographical variations. Five EU MS fleets employed 77% of the total EU fishermen, with the Spanish fleet employing 22%, followed by the Italian (18%), Greek (17%), Portuguese (12%), and UK (8%) fleets (the same five MS fleets employed 80% of the EU total FTEs, with the Greek fleet surpassing the Italian fleet) (STEF, 2015).

Overall, employment in EU fishing is declining, with a negative impact on fisheries-dependent coastal communities (European Commission, 2016). The economic performance of the EU large-scale fleet is improving, while it continues to deteriorate for small-scale coastal fleets¹⁶. In the EU, 74% of active fishing vessels are small-scale (2013 figures), employing about half (73,900 people) of EU fishermen (STEF, 2015).

Although fisheries have relatively limited importance for the EU economy at large, the sector has a local cultural and historic importance. Meanwhile, many key fish stocks in the EU are still in a very poor state due to, primarily, overfishing. Small-scale fishing practices are often considered to have potentially less negative impact on marine resources than large-scale industrial fishing (Di Franco et al., 2014). However, the cumulative impact of small-scale fishing may have serious impacts on fish stocks (Munoz et al., 2013).

Although primarily a conservation tool, Marine Protected Areas (MPAs) are sometimes used to support fisheries. Evidence from around the world, including Europe, shows that areas closed from fishing can lead to larger and healthier populations of targeted marine species and subsequent 'spill-over' of young and adult fish into surrounding fishing grounds (see, e.g. Harmelin-Vivien et al., 2008; Lester et al., 2009; Fenberg et al. 2012; Sciberras et al., 2013; Guidetti et al. 2014; Costello and Ballantine, 2015; Garcia-Rubies et al., 2013). However, only a very small share of EU MPAs (including Natura 2000) is currently closed from fishing (<0.5% according to Fenberg et al., 2012). Instead, most marine Natura 2000 sites are multi-use areas and only partly regulate, if at all, different fishing activities (EEA, 2015). Furthermore, the Natura 2000 framework offers limited formal protection to commercially targeted species¹⁷.

Marine and coastal Natura 2000 sites may nevertheless provide indirect refuge for commercial species by protecting important habitats that these species depend on or regulating destructive activities within the site that are otherwise harmful to targeted species. If such sites lead to an improved state of targeted fish stocks, they may benefit fishery-related jobs.

¹⁶ STEF (2015) refers to "small-scale" fishing as vessels below 12m using non-towed gear. Critics call this unrealistic and request a classification that encompasses the significant variety of European below 12m fishing vessels, in terms of gears used, fishing patterns, capacity etc. (see e.g. García-Flórez et al., 2014).

¹⁷ Some fish species with commercial interest are protected under the EU Habitats Directive Annex II, for example, Atlantic salmon (only in fresh water), and Adriatic and Atlantic Sturgeon. Management of commercial fisheries is instead guided by the EU Common Fisheries Policy.

It is important to consider the time-scale here. In the long run, there is little doubt that an improved status of stocks thanks to regulated fishing will positively influence our ability to fish in the future compared to a business-as-usual with high fishing pressure. In the shorter term, limiting certain types of fishing or fishing for certain species will naturally have different impacts on different fishery-related jobs. For instance, by allowing controlled and conditional fishing within a Natura 2000 site, and/or if fish spill over from an area closed to fishing in to surrounding fishing grounds as described above¹⁸, some fishermen will benefit while others might need to relocate or adjust their operations. Any forgone fishing opportunity within the site, although often marginal¹⁹, might even be compensated over time by the improved stocks. According to Wells et al. (2016), coastal communities that often depend heavily on fishing accept MPAs and no-take areas specifically because they benefit fisheries. The authors link this phenomenon to the fact that many productive locations for fishing have habitats and species (such as coral reefs, temperate rocky habitats) for which closure to exploitation may have an immediate positive impact on size and abundance of target species. In pelagic (the open water body) and temperate waters, it is more difficult to demonstrate immediate benefits to fisheries. There are therefore fewer studies linking MPAs to improved commercial harvests, making it difficult to convince the commercial fishery sector of the need for MPAs, according to Wells et al. Perhaps partly a result of this, there is also controversy in the scientific literature about whether or not fishing regulations benefit commercial fishing (Caveen et al., 2015).

Fisheries regulations in marine Natura 2000 sites usually target particularly destructive types of fishing, such as industrial-scale fishing using bottom-contacting gear. Fishery-related jobs that benefit from marine Natura 2000 sites are therefore most likely to be of a small-scale/artisanal nature. Marine Natura 2000 sites could also result in indirect positive effects up and down the seafood supply chain, for instance industries producing fishing gear, fish processing and canning industries²⁰. These indirect effects can create jobs away from the site location, thereby benefitting the economy at the regional, national and even international scale.

The current state of knowledge on employment benefits of Natura 2000

Lack of data is still a major constraint when it comes to assessing the impact of marine Natura 2000 sites, including their employment effects (Russi et al., 2016). The establishment of marine Natura 2000 sites has been slow and many sites are still relatively new. Importantly, Member States are yet to establish and implement conservation measures, adopt management plans, and achieve efficient management for many sites, meaning that they might not yet have had noticeable effect on protected features or species. Further, the general lack of scientific data about marine environments often means that there is no baseline for comparison, making it difficult to assess the discrete role of site protection on fish stocks and to compare with areas without protection. The evidence of the effects of Natura 2000 sites on commercial fisheries can therefore be expected to increase with time.

¹⁸ Notably, a majority of spill-over is caught immediately around the borders of protected areas and may lead to a damaging concentration of fishing effort (Murawski et al., 2005; Goñi et al., 2008; Stelzenmüller et al., 2008).

¹⁹ Reef structures, for example, are rarely important fishing grounds as they risk damage to fishing gear.

²⁰ The FAO (2010) has estimated that, as a global average, for each fisherman employed, another three jobs are generated in related activities.

As discussed above, areas within European MPAs that are closed from fishing, whether Natura 2000 or not, have been shown to improve catches around their borders, thanks to an improved state of the targeted stock and spill-over (see, e.g. Goñi et al., 2008; Vandeperre et al., 2011; Garcia-Charton et al., 2013; Di Franco et al., 2014). In 2010, Goñi et al. claimed to be the first to empirically demonstrate spill-over effects of a no-take MPA with positive net contribution to local fishing catches.

Empirical analysis of spill-over of lobster from the Columbrete Islands, Spain

The Columbrete Islands are designated as a Specially Protected Area of Marine Importance under the Barcelona Convention since 2001 (World Database on Protected Areas (WDPA), 2016). In 2010, Goñi et al. showed that the harvested spillover of lobster (*Palinurus elephas*) around the Spanish Columbretes Islands no-take area offset the loss of yield of foregone fishing grounds within the site. The mean annual net benefit was 10% of the catch in weight (although not in number of lobsters). The study was based on scientific tag-recapture data gathered between 1997 and 2007. The authors also found that effort concentration along the site boundaries limited the spatial extent of spill-over.

Studies looking explicitly at job creation or employment impacts of marine Natura 2000 sites – and MPAs in general – are scarce.

The impact of Mediterranean MPAs on local economies

Roncin et al. (2008) have explored the impact of MPAs in the Atlantic and Mediterranean seas on local economies by conducting surveys with fishermen and divers (1,836 questionnaires completed) who are active users of 12 southern European MPAs (no-take zones made up on average 5% of the analysed MPAs and one of the MPAs was a Natura 2000 site).

The authors show that professional fishermen estimate the proportion of landings due to catches within the MPA to be between 45% and 58% in the Sinis, La Restinga and La Graciosa MPAs, and 20% in the Columbretes and Medes MPAs. Based on these survey answers, the authors apply standard ratios of added value to turnover provided by the French marine research institute Ifremer to arrive at corresponding added values of the respective fishing activities within the MPAs. Each MPA is estimated to generate incomes of €720,000 annually for the local commercial fishing industry and approximately 54 jobs in commercial fishing per MPA on average. The latter estimation is also based on the survey responses and applying a proxy for associated work force. However, the authors emphasise that the situation varies considerably between the different sites, and that their estimates are restrictive as they exclude both the non-market benefits that the MPA ecosystems provide to the local populations and any indirect and induced incomes and jobs.

The study also found that a majority of commercial fishermen in four of six analysed locations think that the MPA has a positive impact on their business.

For details, see case study 4.

Evidence of impacts of marine and coastal Natura 2000 on employment in the wider fishing sector is also limited. One study from Italy shows that almost 180,000 Italian companies (3%) depend on activities carried out in the sea, whereof more than 51,000 depend on MPAs

(Ministero dell’Ambiente e della Tutela del Territorio e del Mare and Unioncamere, 2014)²¹. Almost 10% of the MPA-dependent companies are active in the seafood supply chain, including activities associated with fishing, fish processing, preparation of dishes based on fish, fish wholesale and retail trade. Note that it is not clear to what extent the sites included in the study are designated under the Natura 2000 network.

Job potential: what does the literature say on future job potential?

The potential of Natura 2000 sites to create jobs in the fishery sector directly depends on how well the site is managed, to what extent fishing is regulated within the site, and the level of enforcement of imposed measures in order to prevent illegal fishing. In order to have a significant positive impact on fish stocks, and consequently on the fishing sector, the evidence shows that stricter regulations and zones with strong regulations for key habitats will need to be adopted inside Natura 2000 sites. For certain species, an improvement may be achieved by regulating use of different fishing methods rather than banning fishing altogether. In theory, the potential impact of marine and coastal Natura 2000 sites on commercially targeted species, and consequently on fishery-related employment, will develop with time, as management plans are adopted and conservation measures enforced.

One of the challenges currently facing EU fisheries, for example in the Mediterranean, is that artisanal fishermen are represented by increasingly older age groups (Matic-Skoko et al., 2011; Lloret and Font, 2013; ECORYS, 2013; Gonzalvo et al., 2015). In Belgium for example, finding an appropriate crew remains a challenge for many vessel owners, as young potential fishermen prefer to work for dredging companies or in the tourism industry. Similar trends have been identified in Germany, where employment in fisheries has become less attractive due to more suitable opportunities in other branches and the perception of the business as being uncertain. Further, the Slovenian fleet’s landings income decreased 21% between 2012 and 2013, while other income increased 33% during the same period. Therefore, Slovenian fishermen look for alternative opportunities to generate earnings in other industries, such as tourism (STEFEC, 2015).

It is possible that, in the longer term, fisheries in or supported by protected areas will create a different perception of the job as a fisherman and thereby help attract a new generation of fishermen working in harmony with nature conservation. One way to capitalise on this opportunity is through MPA-labelling initiatives (Di Franco et al., 2014). In fact, there is already a business case for these types of synergies in Europe, for example from Belle-Ile in France and Torre Guaceto in Italy. Companies differentiate their products by farming or harvesting fish and seafood in protected areas, allowing them to set a price premium to customers in return and generate higher profits (see Walle et al., 2015 and Di Franco et al., 2014). STEFC (2015) identifies implementation of certification schemes and the growing demand for certified products as one main driver and trend contributing to the improved economic performance of the EU fishing fleet overall.

²¹ This study is based on data from the Italian National Institute for Statistics (Istat).

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The nature of jobs that Natura 2000 supports directly and indirectly across Europe

The tourism sectors employ around 12 million people in Europe and one of five jobs in the services sector is linked to tourism²². For the EU-27, GHK (2007, p.34) estimate that around 1.59 million FTE are directly related to environment related tourism. Taking indirect and induced jobs into consideration, this figure amounts to 3.32 million jobs. Due to methodological challenges of defining environment related tourism, these figures should be interpreted cautiously.

Protected areas are popular tourist destinations and as such are linked to a range of employment opportunities. Tourism can be defined as *“the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes”* (UNWTO, 2014). In the context of ecosystem services, Natura 2000 sites can provide a space for cultural services, or *“non-material benefits such as recreation, aesthetic enjoyment or spiritual fulfilment, i.e. services linked to human perception and behaviour, cultural values, landscape and amenity values, tourism and recreation”* (TEEB, 2010). Appreciation for these cultural services means that natural or *pristine* environments are popular tourist attractions; and so protected areas and the tourism industry have the potential to be, and in many cases already are closely related.

Cultural and natural heritage are closely linked. The Natura 2000 network itself is the result of the *“interaction between people and places though time”*, e.g. in deliberately planted or managed or planted flora or extensive agricultural or fisheries practices (European Commission, 2014. p. 23).

UNESCO World Heritage Sites in Europe

There are more than 380 sites in Europe and over 300 in the EU with UNESCO World Heritage designation recognising their global significance. Many of these cultural and natural heritage sites coincide with the Natura 2000 network. They are major tourist attractions generating employment for local economies.

Doñana National Park, Spain

This nature reserve in Andalusia is both a Natura 2000 site (ES0000024) and was designated a World Natural Heritage Site by UNESCO in 1994. The park is valued for its unique biodiversity, marshes and dunes. In 2006, the site received more than 375,000 visitors.

Monasteries of Meteora, Greece

These 24 Eastern Orthodox Monasteries in Greece are designated as a UNESCO World Heritage, meeting five criteria. The site is located within the Natura 2000 site (GR1440003). The site welcomes more than 500,000 visitors each year.

²² http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_industries_-_employment

The relationship between tourism and nature conservation is complex, as successful or popular tourism destinations without appropriate management can place significant pressures on habitats (Bio Intelligence, 2011. p.58). Nevertheless, protected areas and tourism can co-exist, mutually reinforce each other, and provide significant opportunities for employment.

Figure 6.1: Impacts and socio-economic benefits of visitor spending linked to Natura 2000 sites (building on Bio Intelligence Service, 2011)



Tourism linked to Natura 2000 sites might be categorised in terms of its purpose (e.g. recreational, cultural, educational, spiritual etc.). The motivation for a tourism activity will also be a key determinant in the jobs (services) which they can support. Natura 2000 designation can influence economic activity in and around a site, which can result in the creation or the loss of jobs. In relation to tourism, this can take place in the following ways (Bio Intelligence, 2011):

- *Direct jobs*: those related to the management and conservation of the site itself, which might be supported by tourism (i.e. through entrance fees)
- *Indirect jobs*: those related to sectors that benefit from visitor spending, including tourism activities.
- *Supported by Natura 2000*: jobs that are linked to visitor spending and activities within a site, which can also include tourism.
- *Induced employment benefits*: employment generated by expenditure of employees in the tourism sector linked to a Natura 2000 site.

The nature of a Natura 2000 site will determine the tourism activities for which it is suited. Taking marine or coastal protected areas as an example, these can provide significant business opportunities, such as beach hotels, water sports, ferries and so on. The designation and management of marine Natura 2000 sites can make marine areas more attractive for tourists by improving the condition of marine ecosystems.

Cetecean Related Tourism in Scotland, United Kingdom

This study by Parson et al. (2003) examined the impact of whale conservation and associated tourism activities on the Scottish economy. The study carried out over one season in 2000, used survey interviews focusing on key stakeholder groups:

- Whale watching boat operators (30 surveys)
- Visitor centre managers (8 surveys)
- Whale-watchers (324 surveys)
- Tourist interviews (673 surveys)
- Local residents (189 surveys)

Survey data and extrapolation were used to estimate that 242,000 tourists were involved in cetacean related tourism in 2000. 59 FTE jobs and one part time job were created as a result of this activity.

Source: http://whaledolphintrust.co.uk/cust_images/research%20publications/Valueofwhale-watchinginWestScotland.pdf

The current state of knowledge on employment benefits of Natura 2000

The economic impact of tourism can be assessed by considering how expenditures related to tourism flow through different parts of the local economy, the sectors that can attract this visitor spending and the socio-economic benefits this brings. Due to the large number of sectors and services which can be considered as linked to tourism, as well as the different types of impact, determining the extent to which Natura 2000 sites support employment, or whether designation creates new jobs, is a complex exercise. A number of studies have been carried out which explore the impacts of protected area status on employment.

The most comprehensive EU wide study on this subject estimated that **Natura 2000 sites support on average 12 million FTE jobs each year in the period 2006 – 2008, including 3.1 million jobs in tourism**. In 2006, visitor expenditure was estimated to support between 4.5 and 8 million FTE jobs. Visitors who have affinity²³ with Natura 2000 supported from 800,000 to 2 million FTE (Bio Intelligence, 2011). **This represents about 12% to 23% of tourism related employment.**

In addition to EU wide studies, some studies focus on specific member states or their regions. For example, Castañeda (2010) examined green jobs linked to biodiversity conservation in Spain. She identifies the success of the “Parque Natural de Andalucía” protected area network in Andalusia, which supports 200 companies. In 2010, Europarc Spain anticipated an increase of 4,000 direct jobs to 10,000 in 2013, in protected areas.

²³ The affinity of a visitor with Natura 2000 refers to both the level of awareness and interest of a visitor in visiting sites with Natura 2000 designation. A visitor has affinity with a Natura 2000 site when he places value in Natura 2000 designation (Bio intelligence, 2011)

Evaluating the benefits of the Wales Coastal Path, United Kingdom

The Wales Coast Path (WCP) is over 1400km long and crosses two national parks (Pembrokeshire Coast National Park and Snowdonia National Park), as well as number of Natura 2000 sites. Following its official opening in 2012, the Welsh Government commissioned a study into its economic impacts in order to assess if it had met targets specified as part of its ERDF funding. Natural Resources Wales carried out the study, which involved telephone interviews with 1600 tourism related businesses, within a 2km corridor of the WCP path. The assessment demonstrated that 28.2 FTEs were created because of the WCP, and an additional 112.1 FTEs may have been created along the entire route of the path (Natural Resources Wales, 2013).

Some studies look in detail at specific protected areas, for example, the Natura 2000 site Salina Nature Park creates 90 local jobs in the tourism and health sectors while preserving the biodiversity of the area (Schweitzer et al., 2016). Other studies look at specific sectors or businesses associated with the tourism sector. In general, there are only few assessments of the impact on touristic and recreational activities of the designation of marine Natura 2000 sites, partly due to the recent designation of the majority of them.

Methods for assessing employment linked to Natura 2000 sites vary, in terms of both the scope and objectives of the study. Tourism focused studies tend to use data gathered from visitor spending surveys, and telephone questionnaires. In some cases, data on direct employment is readily available and in others, it must be estimated. A number of studies also extrapolate using a multiplier per hectare of protected area. This is often used to assess the creation of indirect jobs (Bio Intelligence, 2011). Table 6.1 presents some tourism and cultural heritage related analyses.

Table 6.1: Evidence on jobs supported in the sector

Reference	Region (object of study, e.g. national park)	The nature and number of jobs	Insights on method	Source
<i>EU Wide Assessment</i>				
Bio Intelligence Service (2011)	EU-27	Natura 2000 visitor spending directly supported 8 million FTE jobs in 2006, and indirectly 4 million FTE jobs. 6% of total employment in the EU-27	The study used a land use methodology, which assessed the types of activities taking place across the network. A scaling up method was used on a per hectare basis.	http://ec.europa.eu/environment/nature/natura2000/financing/docs/Estimating_economic_value.pdf

Reference	Region (object of study, e.g. national park)	The nature and number of jobs	Insights on method	Source
GHK (2007)		25-35% of tourism is environment tourism. Total of 3.32 million jobs across the EU27.	Use of input-output tables to estimate the economic consequences of environment related activities. Application of E3ME economic model.	http://ec.europa.eu/environment/enveco/industry_employment/pdf/ghk_study_wider_links_report.pdf
Ecotec (2002)		125,000 jobs supported in the EU through nature protection activities in 1999		http://ec.europa.eu/environment/enveco/eco_industry/pdf/ecotec_trade.pdf
<i>Member State Assessment</i>				
Rayment (1997)	Abernethy Forest, SPA, Scotland (<i>Cairngorms – UK0016412</i>)	11 FTE in reserve, 69 FTE from visitor expenditure, 87 FTE for local economy	Case study based	Rayment M (1997) Working with Nature in Britain. Case Studies of Nature Conservation, Employment and Local Economies. RSPB, Sandy
Cuff et al., 1997	Prespa National Park, Greece (Ethnikos Drymos Prespon, GR1340001)	50-60 people employed in eco-tourism related activities (supported by CADISPA Programme)	Case study based	http://ec.europa.eu/environment/enveco/innovation_technology/pdf/case_studies.pdf
ÖTV/ Freunde der Erde (1998)	Brodowin, Germany (Schorfheide-Chorin DE294801)	45 jobs (agro-tourism)	Case study based	http://ec.europa.eu/environment/enveco/innovation_technology/pdf/case_studies.pdf
Ecotec Research and Consulting Limited (1997)	Balearic Islands, Spain (1/3 Mallorca & ½ Menorca as PA)	Tourism Institute employs 500 professionals (+200 managers). Not all linked to protected areas	NA	http://ec.europa.eu/environment/enveco/innovation_technology/pdf/case_studies.pdf

Reference	Region (object of study, e.g. national park)	The nature and number of jobs	Insights on method	Source
European Commission (1996); Cuff & Rayment (1997)	National Park Vorpommersche Boddenlandschaft, Germany (DE1544302)	67 jobs in the park, 80% of the districts GDP is generated by tourism.	Case study based	http://ec.europa.eu/environment/enveco/innovation_technology/pdf/case_studies.pdf
Cuff & Rayment (1997)	Kite Country Centres, Wales (several relevant SPAs)	114 FTE jobs in local economy, 14 FTE in kite centres.	Case study based	http://ec.europa.eu/environment/enveco/innovation_technology/pdf/case_studies.pdf
Rayment & Dickie (2001)	UK Wide	350 FTE in RSPB Reserves	Reporting	https://www.rspb.org.uk/Images/conservationworks_tcm9-132933.pdf
Parsons et al. (2003)	West Scotland (a number of relevant SACs)	59 FTE and 1 part-time job created linked to cetacean-related employment (38% seasonal).	3 detailed case studies, focused interview surveys on stakeholder groups	http://whaledolphintrust.co.uk/cust_images/research%20publications/Valueofwhale-watchinginWestScotland.pdf
Huhtala (2007)	Pallas-Ounastunturi National Park, Finland (Tornionjoen-Muonionen vesistoalue FI1301912)	145 direct jobs and 18 indirect jobs supported by tourism in the Pallas-Ounastunturi National Park	Mixed methods. Visitor expenditure data based on standard visitor surveys (2003) and visitor expenditure diary (2004). Data analysed using US visitor survey/input-output model.	http://www.wsl.ch/dienstleistungen/publikationen/pdf/8192.pdf
Fernandez et al. (2008)	Spain, Natura 2000 sites	12,792 FTE, employment supported by tourism and recreation	NA	http://ec.europa.eu/environment/nature/natura2000/financing/docs/Estimating_economic_value.pdf
ten Brink et al. (2002)	Lille Vildmose Site, Denmark	0.02 FTE per hectare, 100 jobs if designated as Natura 2000.		http://www.ieep.eu/assets/71/naturaprceedings.pdf

Reference	Region (object of study, e.g. national park)	The nature and number of jobs	Insights on method	Source
Pabian & Jaroszewicz (2009)	Bialowieza, Poland, (PLC20004)	The national park employs 110 employees, one of the largest employers in the region. Three scientific institutes have staff of 30 scientists and 70 total employees.	Local case study	http://ec.europa.eu/environment/nature/natura2000/financing/docs/bialowiaza_case_study.pdf

Job potential: what does the literature say on future job potential?

A number of studies note the potential of job creation in the tourism sector linked to nature conservation. Indeed, the study by Bio Intelligence (2011) on tourism in Natura 2000 concludes, “there are potential economic benefits with the creation and extension of the Natura 2000 network” (p.115).

Key observations include:

- The need to highlight the benefits of designation to the tourism sector and tourists
- Improve data availability (including on Natura 2000 sites without any tourism activity)
- The development of standardised tools for assessing employment and wider socio-economic benefits from protected areas.
- Raise awareness, including for site managers, on the significance and methods to assess non-market values

The German Ministry for Nature Protection (BfN, 2010) argues that the management and planning processes associated with Natura 2000 designation should be better used as a vehicle for considering the potential local socio-economic benefits of the network. They argue for more public participation, and that the tourism sector was in many cases unaware of the potential benefit which designation has or could have for their business.

This is supported by a case study that looks at the Bialowieza Forest Natura 2000 site, which explains that local authorities and stakeholders were initially at odds with the Natura 2000 designation of the site, because they did not recognise the benefits designation could bring (Pabian & Jaroszewicz 2009).

Estimating benefits of Natura 2000 designation in Lille Vildmose, Denmark

This study looking at the Lille Vildmose, an active raised bog in Denmark, considered the impacts that Natura 2000 designation could have on employment on the local area. The study considered that designation would result in the phasing out of some industries including peat mining and farming, but these could be compensated with employment in new sectors. They concluded that designation could create 100 local jobs, particularly in tourism and the promotion of local agricultural products (ten Brink et al, 2002).

A shift towards management and restoration activities, rather than further designation of terrestrial sites in the future will bring new considerations for how these activities will affect tourism. In contrast, for marine protected areas, where designation is a new process, there are unanswered questions, and very little data in relation to the benefits of MPAs for employment, including for the tourism sector (Russi et al, 2016).

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The nature of jobs that Natura 2000 supports directly and indirectly across Europe

When Natura 2000 sites are used by local people or tourists for recreational activities this often involves expenditure within the economy. Hence, recreational services and infrastructure linked to Natura 2000 sites can support direct, indirect and induced employment opportunities.

Protected areas, such as those within the Natura 2000 network, are ideal locations for many recreational activities. Different attributes of the natural environment, such as topography, elevations, vegetation, climate, wildlife, water bodies etc. facilitate recreation, which might not be possible, or as desirable, in the built environment. Recreational activities include those both inside and outside one's normal environment, so are often but not always linked with tourism (see previous chapter).

Recreational activities linked to Natura 2000 sites are generally thought to be less disruptive to conservation areas than other activities (BfN 2010). Nevertheless, due to the diversity of sports and recreational activities, site activities and their potential for employment are often considered on a case-by-case basis, or categorised in terms on their dependence on the natural environment. This has the advantage that "the potential effect of the Habitats and Birds Directives on a specific sport or recreation activity will become apparent immediately" (BfN, 2010, p. 34).

Sports and recreation in protected areas can be classified using the following typology (BfN, 2010):

- Type 1 – activities which depend on outdoor infrastructure (e.g. golf, alpine skiing, sports gliding)
- Type 2 – activities depending on specific characteristics of the natural environment (rock climbing, canoeing, surfing, ski touring)
- Type 3 – activities not depending on any special features of the natural environment (cycling, cross-country skiing, hiking, swimming)

Added value of Natura 2000

The level of dependence of a recreational activity on the environment where it is practiced can also help to identify the added value of the Natura 2000 network. For some Type 2 activities, there is likely to be a high value added from Natura 2000 designation. This is because Natura 2000 designation may preserve the natural qualities of a site that make it particularly suited to that form of recreation. For regular practitioners of a given activity, this can increase the desirability of living in the immediate vicinity of a protected area in order that they can practice that activity without fear of disruption or land use change – thus providing potential for induced jobs in the local economy. This is evident in cases where the interests of nature conservation are aligned with those of a particular activity. Taking the example of surfers in Cornwall outlined below, nature conservation is fundamentally linked to the existence of a particular lifestyle and recreational activity. For bird watching or other

wildlife activities, the link is intrinsic. In such cases, Natura 2000 sites provide insurance for the continuation of that form of recreation and any linked jobs.

Surfing in West Cornwall, United Kingdom

Lands End and Cape Bank (UK0030375) is a marine protected area and Natura 2000 site in western Cornwall. Surfers in West Cornwall, for example using breaks at Sennen Cove located within the site, are a mixture of local residents and tourists. Across Cornwall it is estimated that surfing brings an annual turnover of GBP 64 million (MMO, 2016; MMO, 2013). The parish of Sennen has a population of less than 1000 people but has three surf schools with a number of employees. Across Cornwall, surfing supports 1,600 full time jobs. In 2013, surfing and environmental NGO Surfers Against Sewage (SAS) opposed commercial dredging and tin extraction plans for the Cornish coast, recognising the impact this could have on recreational opportunities as well as the wider economy (SAS, 2013).

Type 1 and Type 3 activities depend less on specific characteristics of the natural environment. Nevertheless, Natura 2000 designation may still help to support employment. In relation to any recreational activity, Natura 2000 designation may increase the desirability of practicing it at that site, e.g. due to its perceived pristine or wild qualities. Increasing the desirability of recreation at a site will in turn increase public willingness to pay; consequently, the viability of services and infrastructure for recreation may be heightened if it is located close to a Natura 2000 site.

For Type 1 recreation, where there is a high dependence on dedicated infrastructure to support that activity, Natura 2000 status might be at odds with the practice of that activity, for example where they involve disruption to habitats linked with a site. Some recreational activities, such as golf and alpine skiing, have significant demands for infrastructure.

Limni Golf, Cyprus

The Periochi Polis Natura 2000 site (CY4000001) is an important nesting ground for Loggerhead turtles, as well as a feeding ground for Green turtles. Since 2008, multi-million Euro plans have been in place to transform a former mine, including part of the Natura 2000 site into two golf courses, as well as a hotel and complex of private apartments. These plans received criticism from the public and local environmental NGOs, as they were seen to threaten the breeding grounds for the turtles (FoE Europe, 2014; FoE Cyprus 2016). In 2014, the European Commission sent Cyprus a formal notice for authorising the project without carrying out an impact assessment. The Commission threatened to take the case to the European Court of Justice in 2016 (Howarth, 2016; EC, 2015).

The current state of knowledge on employment benefits of Natura 2000

Studies which attempt to estimate the impact of Natura 2000 designation on employment linked to recreational activities are often the same as those that look at tourism, presumably to avoid double counting. For example, one estimate of EU wide employment supported by Natura 2000 suggests that there was an **annual average of 3.1 million jobs in recreation** (including hotels and restaurants) in the period 2006-2008 (Bio Intelligence, 2011). This study applies a multiplier by looking at land use across the Natura 2000 network. However, there are a number of reasons to consider tourism and recreation separately:

- Only considering recreation as part of tourism may mask some activities in the Natura 2000 carried out by local people
- Recreation opportunities in the Natura 2000 network and at specific sites may influence where people who practice a specific activity decide to live.
- Opportunities for recreation at a Natura 2000 site might generate infrastructure and service demands outside the protected area which facilitate engagement in that activity, i.e. training facilities in an urban/artificial environment (e.g. climbing walls) or for equipment (e.g. sports equipment manufacturers)

In general, few studies attempt to assess the employment or economic benefits of recreation as a whole. However, some studies consider specific activities such as hiking and cycling in detail. Although not always looking at the explicit links to protected areas, they can provide useful insights on the potential scale of benefits from these activities.

A detailed study of the cycling industry estimated that there were 23,000 people directly employed in the UK in the sales, distribution and maintenance of cycling infrastructure (LSE, 2013). This study was based on a literature review of national statistics and existing studies.

Tour de France, Natura 2000 and Jobs

For the 2015 Tour de France, the Ministry of Environment, Energy and the Sea in France promoted each stage of the tour by linking it to various natural parks and Natura 2000 sites throughout the country. For example, 'Etape 8 - Rennes / Mûr de Bretagne' took place close to the Natura 2000 site Forêt de Paimpont (Ministère de l'Environnement, 2015). Generally, the routes are designed to include the best of French (and other neighbouring countries') natural and cultural heritage. For each Tour de France, due to the large numbers of spectators who line the routes, an environmental impact assessment is commissioned by the organisers to assess the impact on Natura 2000 sites which are crossed (Biotope, 2012). A study of economic impacts was carried out when the opening stages of the Tour de France took place in the UK for the first time in 2014. A business survey was used to show 9.1% of sports and recreation businesses and 7.8% of bicycle retail and maintenance businesses reported that their employment had increased during the race (TDF, 2014).

Certain activities, including running, road and mountain biking allow individuals to cover large distances in a single session. Consequently, Natura 2000 sites can be actively incorporated into the routes that people choose to enjoy regularly. A number of Natura 2000 sites close to urban areas or even within cities mean that large numbers of people can use these sites for recreation transiently on a weekly or even daily basis. In these cases, employment benefits are not associated with the tourism sector, and often will not be easy to directly link to the site.

Marine protected areas attract particular forms of recreation, which can engage locals and tourists. For example, marine and coastal Natura 2000 sites can be used for recreational fishing, an activity carried out by 8 million people in Europe (Hyder et al., 2014). The designation and management of marine Natura 2000 sites can make marine areas more attractive for recreational users by improving the condition of marine ecosystems.

Increasing diving through MPA designation - Cabo de Palos, Spain

García-Charton et al. (2013) show how the number of dives in Cabo de Palos MPA in Spain (designated in 1995) has increased by 225% between 1998 and 2010, which has resulted in a local added value of €870,000 per year and an additional 20 local jobs.

In terms of funding, most of the major EU funding programmes can be linked to recreational activities to a greater or lesser degree. For example the EARDF and ERDF, could support recreational activities to support regional competitiveness or diversification of a rural economy. Likewise, EMFF could support a shift of fisheries activities to marine recreation.

EU funding for Natura based recreation - Wild fishing in Wales, United Kingdom

The Wild Fishing in Wales project had a budget of EUR 3 million of which EUR 1.36 million came from the ERDF funding. The aim of the project was to maximise the economic value of wild fishing in Wales and to enhance the ecological function of the sites where this recreational activity can take place. The project developed a range of employment opportunities, including direct employment for 30 angling guides and a dedicated project manager. Indirect employment was not assessed in the project, but opportunities were expected in angling clubs, private fisheries, as well as site maintenance (Brandl, 2011).

Job potential: what does the literature say on future job potential?

Evidence suggests that the popularity and diversity of recreational activities are increasing. The extent to which Natura 2000 sites can contribute to generating employment linked to these trends will have to be dependent on the nature of the activities and the carrying capacity of specific sites (i.e. in accordance with no deterioration of habitats) (Bio Intelligence, 2011; BfN, 2010).

A study by the German federal Agency for Nature Conservation argues, “The trend towards more extreme types of activities leads them into more challenging terrain. Opportunities for practicing indoors increase the number of participants (i.e. rock climbing) and increase skill levels. Consequently, levels of participation increase and lead these outdoors activities into ecologically more sensitive terrain”. This observation suggests that participation in recreational activities in protected areas, as well as more organised sports events, are increasing. This will generate further opportunities for employment, for example, in services providing equipment in remote or wild locations as well as the emergence of niche activities such as ski touring, however these opportunities will also need to be balanced with the pressures that they place on local habitats (BfN, 2010, p.32).

A recent study by WHO Europe (2016) estimated that 435,000 additional jobs could be created if 56 major cities had the same modal share of cycling as Copenhagen. Whilst this study focuses on urban cycling, it recognises that cycling as a mode of transport is closely linked to recreation and tourism activities, and there are opportunities for employment in both aspects.

Considering the typology of recreational activities challenges for nature conservation will be to continue to invest in infrastructure which supports recreation, realising the socio-economic

benefits which this can generate, but at the same time minimising the extent to which invests disrupt habitats and the environment.

Looking to the future, there is a growing understanding of the multiple benefits of integrating green infrastructure into cities, including providing public spaces for recreation. Access and proximity to green infrastructure, particularly the Natura 2000 network as part of an integrated network of green cities, can encourage or facilitate recreation (EC, 2013). Particularly when supported by policies which support active lifestyles in and around those spaces. Assuming there is a trend towards better integrating nature conservation into urban areas in the future, this will also provide further opportunities for recreation. Indeed, many cities such as Brussels and Berlin already contain Natura 2000 sites within their boundaries.

Recently, some cities have seen an increase in the use of public parks for organised mass participation recreation events, for example for jogging, yoga and other outdoor gym activities. These activities can be explained by a greater appreciation of the benefits of nature-based rather than infrastructure-based exercise, as well as due to the high cost of commercial spaces in large cities. Whilst some of these activities have been controversial with local authorities, due to the use of public spaces for (at times) commercial activities, they present opportunities for employment in the future. Further initiatives such as the “Urban Woods for people” project, which demonstrated how urban woodlands could attract recreational activities in a sustainable way, might be used to explore how recreational demands and healthy lifestyles can be linked with biodiversity objectives.

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The nature of jobs that Natura 2000 supports directly and indirectly across Europe

Whilst it is increasingly accepted that nature provides a range of health benefits there is very little evidence on the impacts that a better integration of biodiversity and public health objectives could have on the labour market. Currently, the health sector is a significant employer in Europe but this is coupled to a vast burden of disease and care which has far reaching socio-economic impacts including reducing labour productivity. In the EU, the health sector represents 10% of GDP, 15% of public expenditure and 8% of employment (Eurostat, 2015; ten Brink et al., 2016).

There are strong links between biodiversity and public health – nature conservation and engaging in nature can bring a range of physical and mental health benefits (WHO & CBD, 2015). This includes a range of health related ecosystem services, including regulating pollution (e.g. water purity and climate), provisioning (e.g. genetic material in medicines), and cultural (e.g. spaces for recreation and therapy) services (Kretsch, 2015; Myers et al. 2013).

Growing evidence suggests that nature conservation can have significant and cost effective health benefits, and consequently nature should better integrated into health objectives. Linked to this, there is growing pressure to change our public health policy objectives towards preventative care, defined by implementing healthy living and well-being before treatment and hospitalisation (ten Brink et al., 2016; Jax & Heink, 2016).

Examples exist which demonstrate explicit links between employment from health related products and services and protected areas. In many cases, these might have overlap with other sectors covered in this report, for example with recreation, agriculture or tourism. It should be noted that in some cases there is a blurring of health as an essential public service with health orientated commercial activities, particularly for wellness centres and spas. Evidence of employment opportunities exist within the services outlined in Table 8.1.

Table 8.1: Health employment opportunities linked to Natura 2000

Health services		Link with Natura 2000	Employment opportunities
Medicine	Traditional or alternative medicines	Genetic biodiversity forms the basis of medical research and biotechnology	Traditional or alternative applications
	Pharmaceuticals and conventional medicine		Research and development in the pharmaceuticals/biomedical industry
Greencare	Social Rehabilitation	Natura 2000 sites are used for recreation to support social interactions	Medical and social practitioners, and recreational guides
	Physical rehabilitation/exercise referral	Natura 2000 sites are used for physical recreation	Medical practitioners and recreational guides

	Education/employment	Natura 2000 sites use nature as a medium for education or integration of unemployed people	Medical and social practitioners, recreational guides, and sector professionals
Wellness	Thermal/mineral springs	Spas or springs are located within the Natura 2000 network	Services associated with the running of a spa
	Health foods and products	Natura 2000 sites provide a provisioning service	Production and marketing of products
Access to nature (e.g. for people with physical disabilities)		Infrastructure and services to support equal access to nature is implemented in the Natura 2000 network	Services associated with the maintenance or implementation of equal access infrastructure

Source: own representation building on Sempik et al. (2010)

Secovlje Salina Nature Park: Wellness and Natura 2000, Slovenia

Secovlje Salina Nature Park in Slovenia has a spa its grounds, which uses treatments derived from the park including saltpan mud and brine, to boost the immune system and improve overall health. Lepa Vida Thalasso Spa is an outdoor spa and opens only for the summer period due to regulations laid out by the park. In the summer, it employs 25 people, including 20 therapists. When the spa is not in operation, 3 jobs are still provided for its upkeep and management. In addition to the treatments that are available at the spa, including massage, mud wraps, salt scrubs and bathing, clients can also purchase products to take home with them (Schweitzer et al. 2016).

For details, see case study 6.

In the case of genetic resources in the pharmaceutical industry, the value added of nature conservation in the Birds and Habitats directive is intrinsic but difficult to quantify. For both traditional and more conventional pharmaceutical applications, the loss of genetic diversity is avoided in line with the precautionary principle (WHO & CBD, 2015). For the other products and services listed above, the link with the Natura 2000 network is less fundamental but might be important for marketing and viability. For example, wellness centres within a protected area might attract a higher premium, and customers might deem health products from a Natura 2000 sites more authentic. In some cases, there may be health related activities that are highly dependent on a specific characteristic of the natural environment, e.g. the presence of a thermal or mineral spring.

The current state of knowledge on employment benefits of Natura 2000

The extent to which the relationship between the natural environment and a given health product or service (as well as linked employment) is dependent on the Natura 2000 designation is difficult to quantify. No assessments of the health related employment benefits linked to Natura 2000 were identified in this scoping study. Although site-specific cases and

examination of specific products and services demonstrate that there are jobs linked to Natura 2000 within the health sector.

The European wellness industry is growing rapidly, important sectors are included below with their employment or revenues from 2014 (SRI International, 2014. p.24-26):

- Spa Industry: 32,190 spas, revenues USD 28.0 billion, employment 678,920
- Thermal/mineral springs: 5,035 springs, revenues EUR 20.4

Having said this, the number of establishments, revenue levels, and employment that are linked to Natura 2000 sites will be significantly less than these values. Only businesses located on or in close proximity to Natura 2000 sites could be said to draw an employment benefit from the designation of a given site. Lake Hévíz in Hungary provides an example of such a site and there are likely to be more across the Natura 2000 network.

Lake Heviz, Hungary

Covering 4.4 ha, Lake Hévíz in west Hungary is the second largest thermal lake in the world. Although not a Natura 2000 site, it is located in a protected area. The lake is promoted for its medicinal qualities linked to its sulphur content and sulphur bacteria living in the water. The Saint Andrew Rheumatism Hospital, located next to the lake cared for 780,000 patients in 2014, mainly for rheumatism and locomotor disease. The lake is also the site of a Hotel Spa Hévíz, a spa hotel located next to the lake, which provides similar treatments as in the hospital but for paying guests. The daily number of guests enjoying the lake in the high season varies between 2,900 and 3,500 (Schweitzer et al, 2016).

The links between protected areas and recreation have been covered in a previous section. However, evidence suggests that nature based exercise and recreation can promote a number of positive physical and mental health outcomes (Gascon et al. 2016). In this sense, physical activity in protected areas can serve multiple purposes, and might be organised or promoted by professionals in the health sector. The Natura 2000 network is already being used within the health sector as a resource for physical activity; some examples are given below (ten Brink et al. 2016).

- *Walkability in Pembrokeshire Coast National Park*: this project started in 2011 is a led by the Pembrokeshire Coast National Park (which covers a number of Natura 2000 sites) with the Welsh Government and the Hywel Dda Local Health Board. The project aims to promote walking in the Pembrokeshire Coast National Park to local individuals at risk of inactivity. Targeted groups include palliative care patients, mental health day patients and cardiac rehabilitation patients referred as part of the National Exercise Referral Scheme.
- *Moved by Nature Programme*: the project aimed at promoting physical activity in the Puijo nature conservation area (Natura 2000 site FI060001) to inactive men at risk of type 2 diabetes. Employees of Metsähallitus, Parks & Wildlife Finland led out the project, engaging a range of nature, health and education professionals.
- *Slí na Sláinte – Path to Health*: the Path to Health was established in 1996 by the Irish Heart Foundation to promote regular physical activity across the population. A number of national programs including the Health Service Executive (HSE), Irish Sport Council, Healthy Ireland and Get Ireland Walking support the project. The initiative maintains

walking infrastructure that integrates a number of Natura 2000 sites and provides information and training for walking groups.

A further area where nature based recreation might be linked to employment in the health sector is in social rehabilitation programmes. These might use various attributes of nature for their restorative, stress reducing qualities, as well as using nature as an educative medium (MIND, 2007). Forests and other natural spaces are increasingly used in educational and therapeutic interventions, all of which present opportunities for employment (NEF, 2013). However, it should be said that nature based interventions do not always take place in the Natura 2000 network. For instance, private gardens are commonly used for nature-based rehabilitation (ten Brink et al. 2016; Natural England, 2013).

Social Forest, Spain

The Social Forest project uses the woodland of the Collserola Park (Natura 2000: ES5110024) next to Barcelona as a space to provide forestry training services to young people at risk of social exclusion and unemployment. The project promotes the application of sustainable forest management and the use of forestry biomass as an energy resource. The aim is to use nature as an educative tool to rehabilitate and introduce young people, who would otherwise be marginalised, into a working environment.

Source: <http://socialforest.org/trabajos-forestales-barcelona/>

Very little information is available on the number of people employed in activities like these. This might reflect the fact that exercise referral and nature based rehabilitation, amongst other initiatives linked to protected areas are not widely practiced, and consequently are yet to be analysed in any detail.

In addition to the use of the Natura 2000 network for leveraging particular health benefits for individuals, employment may be found in ensuring that there is inclusive access to outdoor environments. Recognising the health benefits associated with recreation in protected areas there are clear motivations to promote equal access to the disabled and ambulatory patients.

Green Routes without Obstacles, Latvia

The Green Routes without Obstacles project aimed to improve access to three neighbouring protected areas at the borders of Latvia, Lithuania and Belarus. In Latvia, the initiative takes place in the Razna National Park (Natura 2000: LV0303400) and the Nature Conservation Agency of Latvia alongside a local NGO, Dagda Fraternity of the Disabled People “Nema” organise the project. Nema provide the expertise concerning environmental accessibility for people with reduced mobility.

Finally, there is also the underlying link between genetic biodiversity, conserved in part by the Natura 2000 network, and the medical research and pharmaceutical industry. More precisely, 25% of drugs sold in developed countries and 75% used in developing countries are made from natural compounds (European Commission, 2013). Protecting biodiversity through instruments like the Natura 2000 network allows for the medicinal properties of genetic material to be harnessed (Newman et al., 2008; Cox, 2009; Chivian and Bernstein, 2008). For instances, the Seafarm project in Kosterhavet National Park examines the medicinal properties of algae as part of its focus (see www.seafarm.se).

Job potential: what does the literature say on future job potential?

Nature and health are already closely linked and this provides a range of employment opportunities in health related services. Furthermore, there are obvious benefits for the economy in the working population in attaining a good level of public health. However, beyond specific case examples, there is little evidence or analysis of how that job potential is contingent on the Natura 2000 network.

Growing evidence on the multiple benefits of nature for physical and mental wellbeing may provoke both an increase in the implementation of nature related health activities and an increasing utilisation of the Natura 2000 network for these activities (ten Brink et al. 2016). This could include anything from green-care, nature based exercise referral, and nature based rehabilitation or education, as well as spas and wellness facilities. The derivation of medical products, both traditional and conventional, from genetic material and natural compounds will continue to support the Natura 2000 network through the role the network plays in preserving biodiversity. This all implies that the Natura 2000 network can directly contribute to the creation of jobs in the health sector.

Having said this, there remains a complex question on what impacts a shift towards nature supported preventative health care could have on the health sector overall. Integrating nature into public health is primarily driven by the positive impacts it could have on public health and wellbeing, and thus is not aiming to increase employment or dependency on the health care sector. Indeed, many nature-based health interventions are recognised as being beneficial because of their cost-effectiveness in contrast to hospitalisation or conventional interventions. A report by Natural England estimated that by providing equal access to green spaces to everyone, savings to the NHS would reach £2.1 billion per year. Moreover, 24% of people are expected to be more physically active when given access to green spaces (Wildlife Trust, 2015). Thus, the value of savings to public health care expenditure are viewed in respect of the stress which many Member State budgets are under rather than increasing public expenditure on health care professionals.

Any assessment of net impacts on employment from a better integration of nature and the Natura 2000 network into public health objectives might consider:

- The impacts on indirect jobs linked to medicine, green care and wellness with Natura 2000
- The impacts on employment in the conventional health care sector
- The impacts on the labour market as a whole in relation to public health, reduced burden of disease, and changes to labour productivity
- The impacts on public budgets linked to health care expenditure and how public funds are allocated

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9 Natural Risk Management, Climate Change Adaptation and Mitigation

The nature of jobs that Natura 2000 supports directly and indirectly across Europe

Natura 2000 areas can provide important provisioning and regulating ecosystem services by mitigating and buffering flood events, protecting coastal areas from storm surges, storing water during drought periods and providing shading and cooling in the urban and suburban built environment. Many of these services are important for climate resilience (e.g. during heatwaves, floods or other extreme weather events) and for adapting to climate change. These ecosystem services are relevant on land, but also in the marine environment, as e.g. marine protected areas can shield and stabilise coastal areas (Russi et al., 2016).

Realising the benefits of protected Natura 2000 areas for natural risk management and climate change adaptation requires crosscutting activities that are in the domain of different parties involved. The nature of these activities is varied, from physically protecting existing sites by appropriate action (e.g. visitor management to avoid damages to vegetation and land-cover) or by investing into the restoration of e.g. wetlands or floodplains to improve water retention. Cities and regions can also invest into green infrastructure for the urban environment, especially related to address urban heat islands that affect public health (ten Brink et al., 2016). Consequently, employment opportunities arise in several areas through investing and maintaining into the Natura 2000 network.

Combining Green Infrastructure and Natura 2000 sites: Vitoria-Gasteiz, Spain

Both floods and heatwaves affect Vitoria-Gasteiz in the Basque Country. Due to the existing urban heat island effect, the city centre is up to 5 degrees warmer than low-density areas. The duration of heatwaves is expected to increase in future. As part of wider urban development efforts, the city has continuously developed a green belt around the city, connecting peri-urban areas, integrating Natura 2000 sites (Salburua Wetlands, Ramsar site; Zadorra River). This development started in the early 1990ies and has supported employment in green infrastructure and restoration over decades. However, data on the share for Natura 2000 related investments and their employment benefits is not readily available, a common challenge when analysing practical cases where Natura 2000 related activities are embedded in wider investments into nature (for further details, see ten Brink et al. (2016)).

Employment opportunities link to a range of skills required, including inter alia for landscaping and landscape engineering (e.g. related to restoring wetlands), wider green (and blue) infrastructure (e.g. connecting protected areas through vegetated corridors or restoring dunes and other coastal habitats to stabilise coastlines) or remote sensing and mapping (e.g. to assess urban heat islands and identify vulnerable populations). Risk management and adaptation measures can also contribute to avoiding job losses in the future, for example in climate-prone sectors such as tourism or agriculture.

The current state of knowledge on employment benefits of Natura 2000

Investments into climate change adaptation and risk mitigation can take the form of physical actions but also aim for capacity building. One challenge of analysing the employment effects is that climate change might imply job losses in a number of climate prone sectors such as agriculture, forestry or tourism, depending on the regional impacts of climate change. Thus, adaptation activities and their employment effect need to be jointly analysed with the adverse effects of climate change.

It will not be possible to separate the employment impact of adapting to climate risks through mainstreaming in different sectors (e.g. adapting practices in forestry, including in protected areas) from the overall development in the sector. When adaptation activities are specifically undertaken to mitigate climate change impacts (e.g. water retention at landscape scale or through groundwater recharging to address drought risk), it could be possible to record such activities and the associated employment impacts. However, in practice, corresponding figures are not available.

Analysing climate adaptation investments to mitigate job losses across the EU

Understanding the employment effects of climate adaptation activities requires information on how different sectors could be affected and how adaptation activities can help address these impacts. Triple E (2014) present a study that derives the implications of climate change for a wide range sectors across EU Member States, including e.g. the built environment, water management, agriculture, forestry, tourism, energy, and transport. The modelling approach estimates a loss of 240,000 jobs between 2011 and 2020, and of 410,000 jobs up to the year 2050, an estimated 0.2% of the working population in the EU.

In a second step, the study contrasts this baseline scenario with two scenarios of moderate and ambitious climate change adaptation measures, with 0.5% and 1% of GDP in 2050 spent on adaptation activities respectively. In the moderate scenario, adaptation activities could save up to 136,000 jobs and create an additional 500,000 jobs by 2050. For the ambitious scenario, these figures are more than twice as high.

It should be noted that this study takes into account the EU economy as a whole and marked differences across the EU-MS can be expected, e.g. due to structural differences such as the economic relevance of certain sectors (e.g. agriculture or forestry) for employment. This study does not look explicitly at the role of protected areas for climate adaptation activities, including the Natura 2000 network. However, a number of the adaptation measures underlying the scenarios are relevant to protected areas, including Natura 2000 sites, such as water retention, enhanced floodplain management, protection of coastal zones or the protection of forests.

Ecosystem-based approaches to climate change adaptation offer opportunities for promoting biodiversity while addressing climate risks and adaptation needs. Several EU Member States have acknowledged the role of nature for climate change adaptation, as documented for example in national strategies or at EU level, e.g. within rural development programmes or Partnership Agreement for EFSI funding. The link to economic development and job protection and job growth is often implicit, but at times expressed more explicitly.

Linking climate change adaptation, biodiversity and jobs in priorities of EU Member States

Climate change adaptation strategies in EU Member States increasingly acknowledge the role of nature for addressing extreme weather events and climate risks. In some cases, the strategies go a step further and explicitly draw the link to jobs.

For example, in **Portugal**, the National Climate Change Adaptation Strategy (Instituto da Conservação da Natureza e Florestas, 2013) recognises the importance of biodiversity, including Natura 2000 sites, to address climate risks, including their role for reducing the impacts of climate change on the economy and on employment.

In **Spain**, the Third National Plan for Climate Change Adaptation (MAGRAMA 2014) refers to integrating adaptation concerns into a wide range of sectoral policies, including biodiversity policy, to address the impacts on the sector and wider impacts to the economy such as the protection of coastal zones.

A large potential also exists for capturing and storing carbon in terrestrial and in marine ecosystems. Related restoration and management activities (e.g. in forests, peatlands and grasslands) are linked to both temporary and permanent jobs for monitoring and maintenance. The job potential arises both from a qualitative improvement of Natura 2000 site (i.e. enhancing the ecosystem services delivered) and quantitatively from a designation of further sites, especially in the marine environment.

Carbon storage in seagrass meadows, Andalusia, Spain

Posidonia oceanica is a seagrass species endemic to the Mediterranean Sea and a priority habitat type for conservation under the Habitats Directive (Dir 92/43/CEE) (Díaz-Almela and Duarte, 2008). This species of seagrass buries around 2 Tg carbon/year and is the best marine carbon sink of the Mediterranean (Luisetti et al. 2013). The Spanish region of Andalusia holds in its waters about 6,700 ha of seagrass meadows, 90% of which are included in 12 Natura 2000 sites.

These meadows provide several benefits such as carbon storage, improvements of fish stocks and to fisheries, protection of the coasts and of the marine ecosystems. In spite of their importance, such meadows are diminishing in all the Mediterranean due to several reasons. In Spain, the rate of decline is about 5% per year. Marine protected areas, when properly implemented, can positively impact *P. oceanica* meadows protection and growth (Marbà et al. 2002).

A recent study estimated that the carbon stock of the area amount to around 24.7 M tons CO₂. In addition, the per year sequestration capacity is 31,500 CO₂ tons. The Natura 2000 areas are managed by the Andalusian Environment Council and by the Spanish Ministry of Agriculture, Food and Environment.

Job potential: what does the literature say on future job potential?

Ecosystem-based approaches to climate change adaptation in urban and rural contexts are one element in the toolbox of decision-takers. Many of the specific actions that help address climate change risks rely on technical, scientific and organisational skills that exist within Member States within the sectors affected such as agriculture, forestry or urban development.

Figures on the future job potential of climate change adaptation through nature protection, including Natura 2000 sites across the EU are not readily available. However, as for example indicated in the study from Triple E (2014), taking insufficient adaptation action to address climate risks will lead to job losses in vulnerable sectors. As the severity of climate risks is expected to grow over time, the need for adaptation activities is likely to grow over time, too. On one hand, Natura 2000 sites are exposed to these climate risks and can be affected negatively. On the other hand, a well-maintained network of protected areas can also contribute to mitigating climate risks, along with employment opportunities.

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Natura 2000 is present across rural and urban areas in Europe's regions, and already plays a role in supporting the development of local economies and jobs. The development of regional economies drives economic activity and employment across different sectors. While the purpose of the Natura 2000 network is to protect biodiversity, it also considers the economic, social and cultural needs of the different regions (Gavilán-Iglesias, 2013). The Natura 2000 network explicitly sees a role for traditional human activity in conserving biodiversity and promotes a range of economic activities in protected areas (Alphandéry & Fortier, 2001; EU Biodiversity Action Plan, 2010; Ostermann, 1998). This section considers how regions might use local Natura 2000 sites as part of their socio-economic development as a whole.

Employment linked to Natura 2000 and regional development

In Europe's regions, natural heritage including Natura 2000 sites contributes to economic development and employment (European Commission, 2013). Many of the sector specific employment opportunities that exist linked to the Natura 2000 network have been explored in previous chapters. Each region, owing to its culture, geography and economic history, will have its own economic strengths. Beyond sector specific activities and individual cases of employment, a region can use its natural heritage to benefit employment in the region as a whole.

Many regions demonstrate this through active policies of branding, whereby they market the products and services that are in some way characteristic to their region in order to simultaneously promote local economic activity and increase their value for export. Appreciation of regional cultural and natural heritage is important within this process, both from the perspective of making use of local natural resources but also in a symbolic sense, as local landscapes and natural heritage are often closely tied to local economic traditions.

West Cork Region, Ireland

The coastal region of West Cork in the south-west of Ireland is regarded as a successful attempt at regional branding. The area is approximately 3,400km² and is characteristically rural, with 74% of the total land area used for agriculture, compared to 63% nationally (West Cork Development Partnership, 2007). While not an administrative region in its own right, it has an established identity of its own. To protect its natural heritage, Natura 2000 sites cover many different areas, including the Roaringwater Bay and Islands SAC, Courtmacsherry SPA, Clonakilty Bay SPA and the Bandon River SAC. Areas in the region have benefitted from LIFE-funded projects, such as one that ran from 1997 to 1999 on the management of SPAs in Ireland (LIFE96 NAT/IRL/003240).

A branding strategy that began in the early 1990s has further cemented the area as its own developmental region. The West Cork regional brand is a product of the West Cork LEADER Programme that is jointly funded between the EU European Regional Development Fund and the Irish government and that began in 1994. The brand revolves around three core sectors: food, craft and tourism, and the natural and unspoilt landscape of the area takes prominence in the approach to branding. The fuchsia flower that is eminent in the region is used as the logo, along with the slogans "West Cork - A place apart" and "A taste of West Cork" depending on the product or service in question. This collective marketing initiative is a good example of a region collectively adding

value to its products and services in an effort to increase rural incomes and support job creation (West Cork Development Partnership, 2012).

Languedoc – Terroir Direct and the Cévennes Natural Park, France

Terroir Direct is an example of a short food supply chain (SFSC) which was established in the Languedoc Region of France. The aim of the SFSC is to link urban and rural populations and support small-scale producers from the Cévennes, a mountainous rural area in the region.

Using the slogan “Mangez Bon et Local” (eat well and local), consumers can choose from 400 products on its website. 80% of the food is from the local Cévennes and neighbouring areas such as Aveyron or Carmargue. Most of the products are organic; the remainder are described as ‘fermier’ (artisanal farming). Most producers are family farms with fewer than 5 employees. In order to join the scheme, they must demonstrate a link to the territory.

During the financial crises in 2008, the scheme faced an uncertain future and was forced to reduce costs. However, since then Terroir Direct has increased its size to include 60 regular suppliers and is described as being in its adult phase, finally achieving profitability.

The project had ambitions to provide employment opportunities to young unemployed people from the region, for this they received funding from regional authorities, EU LEADER funding to support marketing, and from the Natural Park of Cévennes (Natura 2000 FR911033) (JRC, 2013. pp. 91-98).

Natura 2000 sites, aimed at conserving biodiversity, encourage various actors and sectors to collaborate within environmental projects, among which the preservation of agricultural landscapes takes a central role. Such joint approaches to environmental protection work in the direction of overcoming fragmentation in rural areas promoting social inclusion, and employment across Europe’s regions (European Commission, 2013). Agriculture is particularly important in the context of regional development linked to the Natura 2000 network, as farmland accounts for 40% of the total area included in Natura 2000 (see chapter on agriculture) (EC, 2014).

Local products, including but not limited to those from agriculture, which can be linked to an area’s natural and cultural heritage, can raise the profile of a region – providing opportunities for export, thus strengthening the local economy. West Cork represents an example of this trend, whilst and Terroir Direct demonstrates how marketing products linked to the regions natural heritage to local consumers is another way to support employment. A resurgence of rural products and services is reflected in the EU wide labels indicating Protected Denomination of Origin (PDO) and Protected Geographical Indication (PGI) (de Roest and Menghi, 2000).

As well as building on existing economic traditions, some regions have successfully found opportunities in Natura 2000 designation within wider objectives to revitalise local economies, and develop novel economic opportunities. This is a particularly relevant issue for areas of economic and industrial decline. Recognising Europe’s economic history, many regions that were previously supported by heavy industry already suffer from or are at risk from elevated levels of regional unemployment. Investment in nature conservation and

habitat restoration at former industrial sites is not uncommon in Europe, and has played a central role in generating employment for some areas.

Emscher Landscape Park, Germany

The Emscher Landscape Park (ELP) is one of Europe's largest ecosystem restoration projects. The project is comprised of a river revitalisation programme and over 400 green infrastructure projects. The results of these infrastructural works have been to support biodiversity in the region, create jobs, and support the regional economy. Generating employment in the region was a key objective of the project, particularly in light of the de-industrialisation and decline of the coal and steel sectors, which had previously defined the region. Investments of EUR 4.5 billion led to the creation of 25,847 direct, indirect and induced jobs in the state of Nord Rhine Westphalia in the period 1991-2007. A total of 48,884 direct, indirect and induced jobs were created across Germany for the same period. By 2020, it is anticipated that the ELP project will have created 55,892 and 101,687 jobs in the region of NRW and across all of Germany respectively (RWI, 2013). Input-output models and macro-economic modelling applied in a study of employment benefits linked to the ELP carried out in 2013, provides insights for assessing benefits of ecosystem restoration. Although it is not a Natura 2000 site, the ELP can help to support argumentation and analysis of future assessments of the value of ecosystem restoration as part of a strategy for regional development.

For details, see case study 5.

Employment linked to Natura 2000 and urban development

Urban areas, particularly large cities, are likely to interact with the Natura 2000 network differently. The economies of large cities make them comparable in size to the economies of regions, or in a few cases whole countries. However, the density of cities and the types of economic activity they engage with generally result in a different interaction with their natural heritage. Indeed, the scarcity of nature and biodiversity and Natura 2000 sites might change the way in which cities can use protected areas for job creation.

Numerous cities in the EU include Natura 2000 sites, with Berlin as the city with the largest number of Natura 2000 sites (15 sites) and Copenhagen has the largest area. Although it is hard to assess the monetary benefits that are generated by the integration of natural sites within urban areas, it is clear that there are economic benefits for cities (Sundeth, Raeymaekers, 2006). Several initiatives exist with the aim of promoting the move towards healthier and more sustainable urban environments. For instance, the European Commission Green Capital Award rewards the efforts of cities in pursuing such shift. But the real reward is the benefits which cities gain from making investments in greening as part of a wider strategy of sustainable development. The award is one channel which markets these benefits, and can stimulate cities to become role models for each other by engaging in friendly competition (EC, 2016).

Nantes – Green Capital 2013, France

Thanks to its several green credentials, Nantes won the Green Capital Award in 2013. The city presents many green spaces, with 60% of its surface covered by agricultural or green areas (EC, 2015). In particular, Nantes hosts the first natural site in an urban environment as part of the Natura 2000 network. The site, la Petite Amazonie, is located in proximity to the city centre and represents

a natural site of ecological interest (Dubois, 2015). Green Capital was seen as an initiative to further develop the efforts of the city towards a better environmental performance (EC, 2016). However, the award stimulated the creation of several activities and jobs linked to the environmental excellence of the city. For example, Nates Metropole launched several mobility plans in 2004 in relation to the urban travel and climate plan of the city. In 2014, more than 360 plans were signed, covering 104,000 employees (EC, 2014b).

In general, there are several social benefits associated with the integration of natural sites in urban environments. The presence of these natural sites within the cities perimeters provides an opportunity for developing education centers on nature and wildlife, again contributing to employment. Moreover, nature can build a stronger interaction among urban communities through neighbourhood schemes and volunteer work as well as encourage management plans for Natura 2000 sites in the socioeconomic and cultural context of the city (Sundeth, Raeymaekers, 2006).

Nature management in urban areas differs considerably from rural areas as the former is subject to the impact of more people, stronger development pressures and a weaker perception of nature. Nevertheless, urban areas are constantly changing environments, therefore opportunities are continuously arising to integrate biodiversity conservation into development plans. This contributes to increasing the biodiversity value of the city in question and consequently makes it a more attractive place to live. This translates into a greater need for organization of green spaces, which tends to lack in urban areas, and stimulates the creation of business and services as well as the introduction of human resources which can effectively address the needs of the city (Sundeth, Raeymaekers, 2006).

Vikki Natura Reserve, Finland

The Vikki Natural Reserve is located in the heart of the city of Helsinki, therefore making it ideal for nature education. However, its central location creates a range of threats to the conservation of the park due to potential human interaction. A project financed by LIFE-Nature was implemented with the aim of making human enjoyment of the site compatible with its conservation value through the introduction of habitat restoration works and educational schemes for locals. Apart from the evident biodiversity conservation improvements, the project attracted a large number of visitors and the site was provided with a nature guide (Sundeth, Raeymaekers, 2006).

Future job potential

It is difficult to gauge the extent to which integrating Natura 2000 as part of development strategies can bring net employment benefits for a given region. Furthermore, relating those employment benefits to Natura 2000 designation would be complex due to the number of variables that could be considered for a region or city. No assessments of the contribution of Natura 2000 to employment were identified for a whole region or city.

Having said this, evidence suggests that both regions and cities are likely to continue to use local Natura 2000 assets as a tool for their development. Many cities, for instance, are implementing Natura 2000 into their urban development strategies as part of comprehensive

agendas of greening and sustainable development (ten Brink et al, 2016). Formalising the role of Natura 2000 within strategies, is the first step towards realising potential employment benefits.

Barcelona Green Infrastructure and Biodiversity Plan 2020, Spain

Launched in 2013, Barcelona's "Green Infrastructure and Biodiversity Plan 2020" plans to address urban challenges associated to the city. The aim is to move towards a greener and healthier city, dealing with issues of climate change adaptation, demographic change, health and well-being. The integration of green spaces in the city is key to the achievement of the set goal and preserving the natural heritage is one of its main benefits. In particular, plans have been implemented to increase the share of green spaces through the creation of a network of six green corridors, stimulating engagement in outdoor activities (Schweitzer et al., 2016). Moreover, action is taken to protect nature in specific areas, for example the Parc de Collserola, which is part of the Natura 2000 network (Ayuntamiento de Barcelona, 2016). The plan foresees the reconnection of the park to the green corridors already crossing the city (Schweitzer et al., 2016). Actions of this kind are likely to stimulate growth in employment in green infrastructure related services.

In relation to regional products and services, the need to diversify but at the same time develop specialisms is unlikely to change significantly in the future. Thus, it can be expected that products and services identified for their "regional" qualities are likely to remain important, indicating the potential for further job creation. Similarly, consumer preferences for "green" tourism and recreation experiences have been shown to be a resilient factor in spite of economic crises (Sánchez-Zamora et al., 2014).

In relation to agricultural products, growth in organic agriculture, which saw growth rates of 6% organic utilised agricultural area (UAA) per year between 2002 and 2011 (European Commission, 2013). In 2015, the total organic area made up 6.2% of total EU-28 UAA, and this figure anticipated to increase based on farms already under conversion (Eurostat, 2016).

The use of geographic indication (GI) schemes, is regarded by many as a success story in promoting regional development in Europe, now over 3,000 products have Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) or Traditional Speciality Guaranteed (TSG). A study by DG Agri showed that GI products have a price premium over corresponding standard products (European Commission 2013). A study by the Joint Research Centre examines the recent resurgence of re-localising of agricultural production, particularly through short food supply chains (SFSC) (JRC, 2013). Based on a series of cases, they note that the primary objective of such programmes is to support social values including employment, and the second objective is environmental values (see case on Cévennes). Evidence suggests that local farming schemes and short chains have a multiplier effect on local economies, maintaining employment particularly in rural areas (JRC, 2013).

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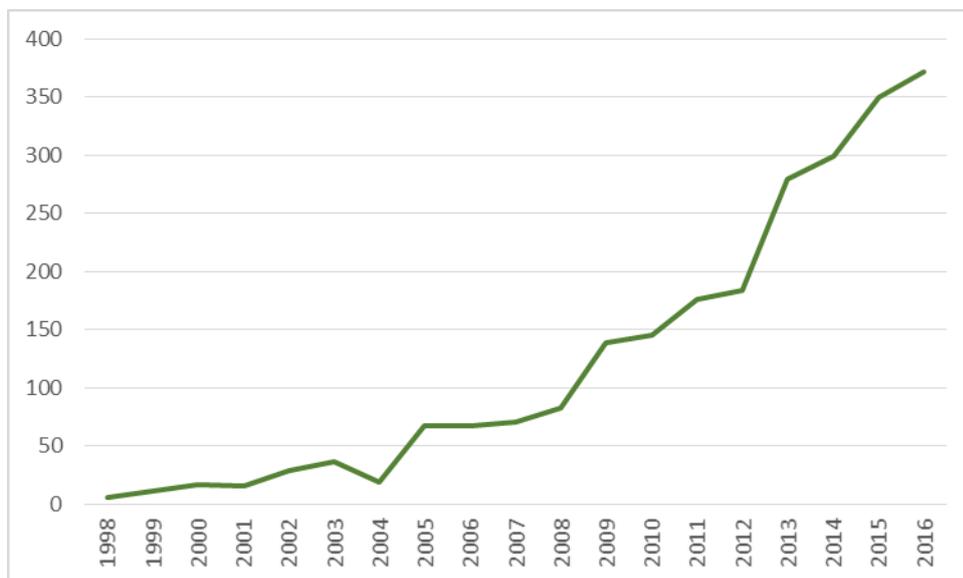
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The nature of jobs that Natura 2000 supports directly and indirectly across Europe

The areas included in the Natura 2000 network can make an invaluable contribution to research, innovation and education both on site and off site and support both the creation of new jobs and enrich existing ones. There has been no comprehensive research to date to assess the scale of current and potential future employment benefits. However, a few studies offer some first indications of the benefits of Natura. This chapter presents a state of current knowledge.

The protection of species and ecosystems can provide valuable input to **research** through monitoring, sampling and analysis activities aiming at developing an understanding of ecosystem functions, ecosystems and species. For this reason, the Natura 2000 network provides interesting material and opportunities to enrich existing jobs, and can potentially contribute to the creation of new jobs in the future. For example, a search within the ScienceDirect data base (which includes articles from over 3,800 scientific peer-reviewed journals and more than 35,000 book titles) shows a sharp increase in the number of published articles and book chapters that include the words “Natura 2000” from 17 in 2000 to 145 in 2010 and 372 in 2016 (see Figure 11.1).

Figure 11.1: Number of articles in the ScienceDirect database including the words “Natura 2000”



Source: own elaboration

The implementation of the Bird and Habitat Directives have stimulated a significant increase in research activities of relevance to their implementation, including the designation, management and monitoring of Natura 2000 sites (Milieu, IEEP et al. 2016)²⁴. Even though

²⁴ The Birds Directive’s article 10 and the Habitat Directive’s article 18 encourage Member States to promote research activities to support the objectives of the two Directives. In addition, Article 22c of the Habitats

there is no direct provision for Natura 2000 in the EU research programmes²⁵, they provide important funding opportunities for research in and about Natura 2000 areas. Furthermore, the EU LIFE programme, the EU's funding instrument for the environment and climate action, contributes to financing research and education activities in Natura 2000 areas (see Chapter 13 for more information on Life and Chapter 14 for more details on research activities linked to Natura 2000 areas).

The Natura 2000 network can also provide opportunities for **innovation**, including both offsite jobs (i.e. laboratory work and product innovation and subsequent markets for products) and onsite field research, for example bioprospecting (the search for and development of new sources of products from nature, including genetic and biochemical resources) and biomimicry (an approach to innovation based on the emulation of nature's patterns and strategies), see Russi et al. (2016). This results in the creation of new jobs related to on-site research and offsite activities down the innovation chain enabled by Natura 2000 research.

Finally, Natura 2000 areas support **educational** activities both on site (through e.g. "forest schools", information centres, school visits) and off site (through educational activities related to biodiversity and ecosystems). This can generate jobs (e.g. linked to on-site facilities) and enrich the existing jobs of teachers and educators by providing interesting material and ideas.

ICF GHK et al. (Jurado, Rayment et al. 2012) provide some examples of works related to survey, monitoring, research and advice activities associated with Natura 2000, i.e. Ecological surveyor; Biodiversity research scientist, Ecological advisor, Ecological consultant. According to the same authors, highly skilled jobs in education associated with Natura 2000 include ecological education specialist, lecturer on biodiversity and environmental policy or communications officer in nature and biodiversity.

The current state of knowledge on employment benefits of Natura 2000

It is currently not possible to establish how much EU funding is devoted to research connected to the Natura 2000 areas (Kettunen, Baldock et al. 2011), and there is no comprehensive information available on what Member States have done to promote research and support education projects there. The research potential related to Natura 2000 areas can be assessed using for example information on jobs of on-site scientist doing field work, number of papers written, funds granted to research dealing with the Natura 2000 network, number of jobs related to prospecting, number of patents obtained thanks to work in a Natura 2000 areas, investment in innovation processes dealing with Natura 2000, number of jobs related to specific innovations, onsite jobs in education facilities in protected areas and number of forest schools in Natura 2000 areas.

In most Member States, information on educational activities associated with Natura 2000 is only available at site level or at the level of the local region, as pointed out by a review of the evidence of socio-economic impacts of protected areas in Austria (Milaković, Schöbinger et

Directive requires Member States to promote education and general information on the need to protect wild flora and fauna and to conserve their habitats.

²⁵ The current EU research programme is Horizon 2020 (2014-2020). It replaced the past multi-annual Framework Programmes (the last one was the 7th Framework programme, in place between 2007 and 2013).

al. 2015). However, there are some examples of the range of initiatives being undertaken by Member States to support education associated with Natura 2000 (Milieu, IEEP et al. 2016):

- Austria has financed many initiatives to inform visitors to protected areas and educational activities with schools about Natura 2000 sites;
- Bulgaria has developed a national information and communication strategy for the Natura 2000 network for 2014 to 2023;
- Ireland has supported various biodiversity awareness initiatives, including a range of events and a TV series. The National Parks and Wildlife Service education centres provide educational programmes for schools and information on Natura 2000 sites for locals and visitors;
- The Malta government has created an education campaign to raise awareness about the importance and current state of Malta's biodiversity, including awareness-raising activities through the press, site information, a TV series and educational tours in protected areas.

There are some estimates of the jobs related to biodiversity conservation, but with no indication on what part of them is linked to the Natura 2000 network. For example, in France it has been calculated that biodiversity conservation is generating 30,400 jobs in information and education and 5,400 jobs related to research and knowledge (Jurado, Rayment et al. 2012).

In addition, interviews at the country level carried out for a study published in 2010 (Gantioler, Rayment et al. 2010) show that in Greece each Natura 2000 site Management Body employs on average 20 scientific staff and up to 10 administrative and technical staff. In addition, there are around 60 nature information centres in Natura 2000 sites, which employ 120 people and up to 300 jobs could be created in the future linked to Natura 2000 sites. The authors also found that in Sweden there are at least 10-20 jobs at the national level linked to research and monitoring activities in Natura 2000 areas.

The Białowieża Forest (Poland), which was designated in 2004 as a Natura 2000 site provides another example of jobs generated by Natura 2000 areas. The national park creates 110 jobs and is one of the largest employers in the Białowieża community (the Białowieża village has a population of approximately 2,500 people). Part of the jobs are related to three scientific institutes in the Białowieża village, which run conferences and summer camps and employ approximately 70 employees, including technical and administration staff and 30 scientists. In addition, there are four education centres in the area, employing 9 people (Pabian and Jaroszewicz 2009).

Other estimates focus on the jobs generated by Natura 2000 but with not much information on the amount of jobs specifically related to education and research activities (e.g. (Gantioler, Rayment et al. 2010)). For example (Jurado, Rayment et al. 2012) calculate the total jobs in the implementation and management of Natura 2000 network as 104,000 full time equivalent jobs. 16,300 of these are linked to recurrent management planning actions and 62,800 to recurrent habitat management and monitoring actions. These two categories of actions include jobs required to carry out research and education activities (e.g. communication specialists, ecological advisors and consultants, monitoring specialists and guides).

Job potential: what does the literature say on future job potential?

The richness, diversity and uniqueness of biodiversity (ecosystems, species and genes) in Natura 2000 sites is still a largely untapped source of knowledge with benefits for research, innovation and education. Nature, with over a billion years of “experimentation” via evolution, is a living laboratory and living library of life. However, there is very limited research on the future job potential related to Natura 2000 areas and this evidence gap needs to be addressed.

One study that looked at future potential is the estimate by ECORYS (2014) of the potential of the blue biotechnology²⁶ industry in Europe. The authors estimate the annual turnover of the sector at between €302 and 754 million and the employment created at between 11,500 and 40,000 jobs (most of which are high-end jobs). According to the authors, the sector could generate up to 10,000 additional jobs in 5 years if supporting policies are put in place. The potential growth and employment generation related to the blue biotechnology sector are dependent on the availability and state of marine genetic biodiversity.

Given the potential of Natura 2000 for research, innovation and education, it would be important to research more into the job creation and job enrichment potential and what mechanisms can enable this. The potential is linked to what efforts are made to build on the knowledge inherent in the biodiversity – i.e. it is a choice of schools and universities as to how important it will be for education and research, and for private and public funding institutions to support research linked to Natura 2000 areas.

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²⁶ The OECD defines biotechnology as “the application of science and technology to living organisms, as well as parts, products and models thereof, to alter living and non-living materials for the production of knowledge, goods and services” (OECD, 2013).

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Introduction - How does LIFE relate to Natura 2000 and employment?

LIFE is the EU's financial instrument supporting environmental, nature conservation and climate action projects throughout the EU.

LIFE Nature projects aim to support the development, implementation and management of the Natura 2000 network in particular by applying, developing, testing and demonstrating approaches, best practices and solutions. They are usually focussed on concrete conservation measures aimed at maintaining or improving the conservation status of species and habitats for which sites are designated. Projects for improving the management and/or for restoring sites of the Natura 2000 network are therefore the first priority for LIFE Nature funding.

LIFE Nature projects in general cannot finance on-going routine management activities²⁷ in Natura 2000 sites but can support more specific conservation measures, including preparatory actions, elaboration of management plans and studies applied to conservation, concrete on-site conservation actions (e.g. active management and restoration of habitats), land purchase, information and awareness raising activities etc.).

The eligible costs include the salaries and associated costs of the personnel required for the implementation of the projects, including through external assistance, which can be funded under certain conditions. These personnel may include specialised staff and workers, administrative and managerial personnel.

The project budget in the approved projects is presented in financial forms, which provide information about all direct personnel costs, including the type of contract, the time dedicated to the project, the professional category/role in the project, the daily rate charged for each member of personnel and the number of person-days needed to carry out the project.

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

LIFE Nature has co-financed 1,528 projects from 1992 to 2014, contributing approximately 1.5 billion € to nature conservation in the EU (LIFE Programme website). During the period 2014-2020, around 2.6 billion € are allocated to the sub-programme for environment. At least 81% of the total budget shall be allocated to projects supported by way of action grants or, where appropriate, financial instruments. The first LIFE Multiannual Work Programme covering the period 2014-2017 foresees a budget of 610,068,900 € for the priority area Nature and Biodiversity (European Commission, 2014).

In the programming period 2014-2020, the LIFE Regulation puts more emphasis in measuring and monitoring the actual impact of the LIFE programme. Each project shall report on a set

²⁷ For example, any site surveillance, periodic mowing or long-term monitoring actions, which were ongoing already before the start of the project, is generally ineligible.

of key indicators corresponding to the sector or priority area on which the project focuses, as well as on further mandatory key indicators concerning the project's societal and economic outcomes, as jobs creation. It should be possible to evaluate the impact of individual LIFE projects, as well as the LIFE programme as a whole.

For projects carried out from 2007 to 2014, the LIFE unit has promoted the collection of a number of values and descriptors related to qualitative and quantitative output and outcome indicators on project level in a pilot LIFE Key Project Indicator database prepared with the collaboration of DG Environment's thematic units and the European Environment Agency in Copenhagen. The database is currently being integrated into the LIFE IT-Tool environment. The **LIFE Key Project Indicators database** includes information regarding socio-economic indicators, such as the jobs created by the projects. The project managers are requested to provide information about the number of project related jobs expressed in full-time equivalents (FTE):

- a) 'at the beginning of the project', i.e. the year before the project starts;
- b) 'at the end of the project', i.e. throughout the total project period; and
- c) 'after the project end', i.e. five years after the end of the project.

Currently, the database includes information that has been validated for 281 LIFE+ and LIFE Nature and Biodiversity projects (including 2 integrated projects) which target Natura 2000 sites resulting from the Calls for proposals from 2007 to 2014.

The table below presents the jobs estimates per country (in FTE) based on the information obtained from this database for all validated LIFE Nature and Biodiversity projects. However, a few projects were omitted, as they provided jobs numbers that seem unrealistic or wrong (e.g. over 1000 jobs in some projects in Italy, Portugal and Sweden).

A total of **2,904 FTE jobs were supported by 281 LIFE Nature and Biodiversity projects** targeting Natura 2000 sites. This represents about **10 jobs per project** during the project's duration. About half of these jobs are maintained 5 years after the end of the projects, according to the information reported by the project managers. **3,5 jobs are created or supported per 1 million € invested.**

Considering the number of jobs reported at the beginning (i.e. the year before the project starts) and at the end of the projects (647 and 2,904 jobs respectively), LIFE projects represent an important boost to job creation in Natura 2000.

However, these estimates do not take into account indirect jobs created by the project activities or the jobs that are generated through the replication of LIFE project results. The overall impact of LIFE on employment is therefore under-estimated.

Bearing in mind that many LIFE projects are carried out in remote rural areas or economically disadvantaged areas, where additional jobs are important to local livelihoods, the impact of LIFE projects on employment in these regions can be quite significant.

Table 12.1: Jobs in LIFE Nature and Biodiversity projects (2007 to 2014)

Own calculation based on information from the LIFE Indicators database (validated projects). Number of jobs at the end of the project and 5 years beyond are estimated numbers by the project managers.

Country	Nr. of projects	Total cost	Jobs (FTE) 1 year before the project	Jobs (FTE) during the project*	Jobs (FTE) 5 years after the project	Jobs per project*	Jobs per 1 million € invested*
Austria	3	29,059,041	12	25	18	8,3	0.9
Belgium	8	43,727,064	8.7	15.7	7.1	2.0	0.4
Bulgaria	6	13,203,388	3	102.5	63.5	17.1	7.8
Croatia	1	4,592,898	0	10	5	10.0	2.2
Cyprus	1	1,183,922	25.2	25	0	25,0	21.1
Czech Republic	1	607,879	0	6.9	0	6,9	11.4
Denmark	10	40,813,503	143.8	177.35	242.7	17.7	4.3
Estonia	6	11,098,627	0	22.9	10	3.8	2.1
Finland	3	33,603,905	15	25	0	8.3	0.7
France	9	38,837,391	51.3	71.5	2.2	7.9	1.8
Germany	14	11,098,627	5.1	16.4	1.2	1.2	1.5
Greece	2	3,005,349	20	46,2	6,4	23.1	15.4
Hungary	6	16,786,075	55	68.7	30	11.4	4.1
Ireland	6	18,904,487	6,5	31	11	5.2	1.6
Italia	52	125,915,181	45.4	621	243.2	11.9	4.9
Latvia	10	16,454,956	6	126.1	105.3	12.6	7.7
Letonia	5	5,581,382	0	70.8	37.6	14.2	12.7
Luxembourg	1	2,529,816	0,3	0	0	0	0
Malta	4	7,617,528	2	35.8	12.1	9	4.7
Netherlands	5	30,186,439	0	4	4	0.8	0.1
Poland	28	83,495,774	36	167.6	38.4	6.0	2.0
Portugal	14	33,492,003	45.4	180.4	60.4	12.9	5.4
Romania	2	7,101,316	11	58.7	2.9	29.4	8.3
Slovenia	9	27,587,589	83.9	190.7	105	21.2	6.9
Slovakia	10	28,853,292	2	120.1	20	12	4.2
Spain	43	93,249,933	32.5	483.3	390.7	11.2	5.2
Sweden	8	46,525,277	0	50	26	6.3	1.1
United Kingdom	14	58,165,046	37	151.4	16.9	10.8	2.6
Total	281	833,277,688	647	2,904	1,459.4	10.3	3.5

*Annual average FTE

A recent study has estimated the impact of LIFE on employment on a large sample of 1464 projects, considering both Environment and Nature projects. The findings show that during the projects' lifetime the average project supported 21 person-years, while every million Euro of EC contribution created the equivalent of 17 person-years. These figures only reflect direct job creation estimated from the personnel costs (Neemo, unpublished). The impact of the projects in the sample on employment during their implementation phase equals to approximately 5.2 person-years per a year of project. The impact on employment during the post-implementation phase has also been estimated. On average, one project might produce

3 FTEs per year during its post-implementation phase. In consequence, every million € of EU funding might generate about 2.5 FTEs per year even after the end of the EU funding.

A study carried out in 1997 estimated that 313 direct jobs (FTE) were funded in the 63 LIFE-Nature projects approved in 1996 in the EU-15 countries during the project period (European Commission, 1997). These estimates were based on the detailed information provided in the financial forms of the projects for permanent and temporary staff assigned to each project.

The employment created under external assistance was also estimated considering that salaries represent between 60 and 80% of the total external assistance costs, excluding overheads. The study also provided information about the types of jobs and activities covered by the personnel funded by LIFE.

Although the study is quite old, the methodology used was very accurate and could still be applied to LIFE projects funded nowadays or in the last 20 years, as the financial forms provided with the project budget are almost the same since the second phase of the LIFE Programme (LIFE II: 1996-1999). This information can properly reflect the number and types of direct jobs created or supported by the implementation of the projects, as the final execution should respect all the financial terms approved for each project, with a maximum variation of 10% allowed in each of the budget categories (personnel, external assistance, travel, durable goods, etc.).

Jobs created by LIFE-Nature projects approved in 1996

In 1996, 63 Life projects were funded with an average duration of approximately 3 years. These projects provided funding for 473 to 523 FTE jobs over the projects duration. These FTE jobs include both personnel directly employed by the projects (313 jobs) and employment resulting from external assistance (estimated at about 160 to 210 jobs). Some employees are part-time; others do not work throughout the project duration. It was therefore estimated that these 500 FTE jobs involved more than 1,300 people.

The costs of the personnel employed for the implementation of the projects (i.e. the 313 direct jobs) represented about 21% of total project costs.

Personnel categories. The personnel funded by the projects mainly concern staff with university studies, which represents 45% of total FTE direct jobs funded. This category notably includes scientists in charge of environmental studies, elaboration of management plans, implementation and monitoring of the actions and project management. 22% of all funded jobs correspond to workers, which are in charge of manual labour such as fencing, hydraulic works, construction of infrastructures, habitat management, etc. Non-academic staff represents 15% of FTEs financed by the projects. This category includes technicians or technical agents, accountants, administrative staff, etc. "Other category" includes guards, herders, animators, etc., which represent 13% of the total number of FTE jobs financed by the projects. Finally, secretarial staff represents 5% of the number of FTEs funded.

Distribution of staff costs by type of activity

Overall, 57% of the total staff costs correspond to general staff engaged in administrative functions, coordination, scientific monitoring, elaboration of management plans and preparatory work. The staff involved in recurring habitat management represents 24% of the total staff costs. The personnel employed in surveillance activities, as guards and shepherds, represents 12% of total

staff costs. Finally, 7% of the personnel costs correspond to outreach staff, which includes nature guides, animators and public relations staff.

Allocation of costs under external assistance

Hydraulic engineering, landscaping, land clearing, afforestation or mowing represent 54% of total spending in external assistance. The remaining expenditure in external assistance (46%) is allocated to the elaboration of management plans and scientific monitoring of the projects.

Source: European Commission (1997)

Direct, Indirect and Long-term Jobs

LIFE projects create direct jobs in project management, technical implementation, often also through outsourcing as external assistance, preparatory activities (baseline studies, detailed planning), monitoring, etc. In the after-LIFE phase of the project, some of these jobs continue onwards and even offer long-term employment. In this case, the costs are taken over by the government or other stakeholders.

LIFE-Nature projects include activities that are quite labour intensive. On-site active management and in particular restoration activities require significant manual labour, e.g. for planting, pruning, removing invasive species, fencing, etc., as often these tasks must be carried out manually or with light machinery. Inventories, surveillance and monitoring activities are also labour intensive, requiring specialised staff to carry out specific surveys, monitoring and protection of sensitive habitats and species, etc.

As an example of LIFE-Nature projects aimed at the restoration of natural habitats which support a significant number of jobs, a project aimed at restoring Atlantic heaths and inland dunes in Denmark (LIFE09 NAT/DK/000370 supported as much as 115 FTE jobs during the project (110 FTE were maintained 5 years after the end of project). Projects that involve management planning and working with stakeholders to improve the conservation of important areas for protected species can also require significant human resources. For instance, a project aimed at establishing the Natura 200 network in the marine environment in Portugal LIFE09 NAT/PT/000038) supported 77 FTE jobs, according to the LIFE Indicators Database.

The role of LIFE funding for research

A global assessment on the number of jobs related to research and education financed through Life projects is not available yet. There is only anecdotal evidence available, as the one related to the conservation project LIFE-Priolo, financed by the LIFE programme in the protected area Pico da Vara (Azores, Portugal) between 2003 and 2008. The project created an average of 21.6 full time jobs per year (including a technical team, a group of interns and a local fieldwork team). In addition, it supported another 44 full time jobs thanks to expenditures of around €300,000 per year and expenses of workers and volunteers of the project of around €50,000 per year ((Cruz A. 2011)).

Another example of the activities that can be financed by Life+ projects is provided the Activa Red Natura 2000 project (2012-2017, Spain)²⁸. Sociedad Española de Ornitología, the main bird conservation organisation in Spain, and BirdLife International, coordinate the project. Its objectives are to raise awareness about the objectives of the Natura 2000 network in Spain, and show examples of Spanish Natura 2000 sites and their rich biodiversity through short videos and podcasts, which are broadcasted on national television and radio, and disseminated via social media. Activa Red Natura 2000 also produces targeted informative and educational material aimed at specific sectors, and set up a free telephone line that people can call to ask questions.

LIFE-Nature projects can also promote a number of economic activities during and after their completion. Indirect jobs can be created from economic activities indirectly promoted by Life projects such as catering, accommodation, making fences, etc. These jobs are generally different from those directly created by LIFE projects. They also relate to activities financed by other projects or by other funds (e.g. agri-environmental measures), which are derived from the implementation of LIFE projects. These indirect jobs arising from LIFE projects, however, are very difficult to quantify.

Table 12.2: Evidence on jobs supported in the sector

Reference	Region	Nature and number of jobs	Insights Method	on	Source
Own calculation	EU-28	3000 FTE jobs supported by 283 LIFE-Nature and Biodiversity projects targeting Natura 2000 sites (2007-2014)	Own calculation based on the number of jobs reported for each project in the Life Indicators database		European Commission. LIFE Indicators database. The database is not publically available yet. Access to relevant data was allowed for this study.
European Commission (1997)	EU-15	313 FTE direct jobs	Based on personnel costs from project budget		http://ec.europa.eu/environment/life/publications/lifepublications/generalpublications/documents/natureemploi_fr.pdf

Where have LIFE+ projects supported jobs in other sectors?

Both LIFE Nature and LIFE Environment projects support actions in many different sectors, including sustainable agriculture, sustainable forestry, fisheries, tourism and cultural heritage, recreation, health sector, natural risk management, urban development and regeneration, research, Innovation and education, climate change adaptation and climate change mitigation. In particular, climate change has received a particular boost with the creation of the new sub-programme LIFE Climate Action.

²⁸

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4342.

Information about the projects acting on these sectors is available on the LIFE Programme website²⁹, which provides detailed information about all the projects funded, and a series of publications on the contributions of LIFE projects to different sectors and themes³⁰.

A recent publication by the European Commission (2013, LIFE creating green jobs and skills) contains a selection of LIFE projects that have helped create jobs and develop green skills, arranged by sector and theme. Job numbers are provided for some of the projects presented but none of them are linked to Natura 2000.

What areas could become more important and why?

There seem to be increased opportunities for the creation of green jobs through LIFE Nature, as well as LIFE Environment and LIFE Climate Action projects, which will continue beyond the duration of the LIFE projects and as such have a positive impact on the job market.

The LIFE 'Climate Action' sub-programme provides new opportunities to finance actions in Natura 2000 related to climate change mitigation and adaptation, climate governance and information. Some projects recently funded under this sub-programme have their actions focused on Natura 2000 sites.

For instance, a project funded under the Climate Change Adaptation strand in Spain aims to mitigate the negative effects of climate change on key ecosystem services in three representative Mediterranean Protected Areas which are also Natura 2000 sites. The project will create 69 jobs according to the information reported in the LIFE Key Project Indicators database.

A project funded under the Climate Change Mitigation strand aims to quantify the carbon deposits and the sequestration rates of marsh and seagrass meadow habitats included in Natura 2000 sites in Andalusia Spain. The Project will support the creation of 23 FTE Jobs along its duration.

Another project funded under the Climate Change Mitigation strand aimed at promoting a sustainable management of peatlands in Latvia will support the development of a management plan for a Natura 2000 site (Lauga Mire) among other actions. The project is expected to create about five FTE jobs.

Under the new LIFE Programme (2014-2020), LIFE project funding also will be provided through innovative financial instruments. The LIFE Environment sub-programme contributes to one such instrument, the pilot Natural Capital Financing (NCF) financial instrument, which falls under the Nature and Biodiversity project area and will help finance biodiversity projects, amongst other things.

²⁹ Information on all LIFE projects can be obtained from the LIFE projects database available at: <http://ec.europa.eu/environment/life/project/Projects/index.cfm>

³⁰ See LIFE Focus publications available at: <http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/index.htm>

Insights of relevance to method choice and application to assess jobs

This job creation will be monitored closely as part of the new indicator framework of the LIFE Programme (2014-2020). Each project will have to report on the outputs and impact of the project taking into account the LIFE project performance indicators.

Since 2015, LIFE-Nature projects are requested to report on a number of outcome and performance indicators, which include jobs created (in FTE) at the end of the projects and 5 years after the project. The Commission has also compiled in a LIFE Indicators database the information on employment from projects funded between 2007 and 2014, based on estimates provided by the project managers. This information can be used to assess the jobs created or supported by the Life projects.

Moreover, LIFE projects are approved based on applications that include very detailed information on all the project costs, including on direct personnel costs, i.e. the salaries, the category, position and role of all personnel required to implement the project, their time dedicated to the project activities, etc. The projects also produce final reports with detailed information on actual expenditure incurred, including on personnel. This could also be a very useful information source to assess the direct jobs created by the implementation of LIFE projects. Part of the personnel working in the project may also be sub-contracted under external assistance. These jobs could be estimated taking into account the description of the activities to be carried out through external assistance included in the projects.

However, the information included in the projects approved and in the implementation reports is not publically available and the Commission should provide the relevant data possibly with the agreement of the project beneficiaries.

There are thousands of documents from inception to final reports. However, these reports are mostly flat word documents with few structured data that can be used for analytic purposes. It takes a huge effort to extract economic or other pertinent variables from this documentation in order to conduct a quantitative study. Thus, the need for reliable indicators on LIFE projects is one a crucial aspect that needs to be developed.

The new LIFE Regulation, approved in 2013, gives an increased importance to the socio-economic impact of the projects. With the aim of reporting on the success of the LIFE Programme in relation to the performance indicators established in Article 3 of the LIFE Regulation, the multiannual work-programme for 2014-2017 defines a comprehensive set of outcome indicators on which all LIFE projects must report, including some of social and economic character. In this respect, the recently elaborated LIFE indicator database will undoubtedly constitute a valuable tool. This database already contains indicator data from hundreds of projects. Inputs are up to the present made on a voluntary basis, but the idea is to progressively establish the database as a basic tool for systematic assessment.

References

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http://ec.europa.eu/environment/life/toolkit/pmtools/life2014_2020/monitoring.htm

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European Structural & Investment Funds (ESIF)

Five EU funds under shared management, i.e. ERDF, ESF and the Cohesion Fund, EAFRD and EMFF (previously EFF) – collectively called European Structural and Investment Funds – now integrate biodiversity and Natura 2000 support goals into their funding objectives. In 2014-2020, funding must be in line with one or more of the 11 EU Thematic Objectives, and Natura 2000 funding can support any or all of these. The funds can also support community-led development strategies, which provide bottom-up funding opportunities for local regions or sites. None of the funds, however, includes obligatory earmarking of funds for Natura 2000. Member States were required to produce Prioritized Action Frameworks (PAFs) for the 2014-2020 programming period that identify how Natura 2000 costs will be covered by which EU funds and/or other funding sources.

No current or precise estimate is available of how much EU funding is currently being spent on Natura 2000, but the most recent assessments suggest that it meets at most 20% of the estimated costs of managing the network (Kettunen, Illes et al. 2017). The lack of transparency in tracking biodiversity related expenditure under the EU budget makes it difficult to determine the proportion that actually goes towards supporting the implementation of the Natura 2000 network (Kettunen, Baldock et al. 2011). This means that it is even more difficult to assess the impact of EU funding on job creation and retention in Natura 2000.

European Regional Development Fund (ERDF)

How does the fund relate to Natura 2000?

The ERDF can support the Natura 2000 network directly and it can also be used to finance activities that promote sustainable regional development and regeneration that are linked indirectly to the Natura 2000 network. In particular, the ERDF supports investment for climate change adaptation, including those that concern ecosystem-based approaches; investment in cultural and natural heritage; and biodiversity and soil protection and restoration through the Natura 2000 network (Kettunen, Torkler et al. 2014). The ERDF also includes specific provisions for European Territorial Cooperation (ETC) funding, previously known as INTERREG. This funds projects with the ERDF objectives that incorporate cross-border or transnational cooperation.

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

In the 2007–2013 programming period, of 46 ERDF operational programmes in 10 Member States, only 63% had a specific budget for biodiversity, despite 86% including it as an objective (Milieu, IEEP et al. 2016). Many regions chose not to offer the option of funding that had biodiversity as the primary objective³¹, which meant that under those programmes, it was

³¹ Member States could choose not to include Budget Code 51 in their operational programmes

generally difficult to fund project in Natura 2000, though those projects that did obtain funding generally had economic objectives including job creation. The level of allocations was also consistently low, as 12 Member States allocated less than 0.2% of resources to biodiversity, and six of these OPs allocated minimal or zero funding (European Court of Auditors 2014). On the other hand, six allocated more than 1%. In the 2014-2020 programming period, analysis of a sample of OPs indicates that allocations are still insufficient to cover the needs identified in the national PAFs, with funding addressing mainly management planning and monitoring (N2K Group 2016).

Job creation is an ERDF project indicator, but it is not used in environment OPs in most countries since job creation is not a primary aim of intervention. An expert evaluation points out concerns with the comparability of the figures reported and how far they can be meaningfully aggregated across programmes (ISMERI Europa 2013). The definition of the indicator and calculation methods are inadequately described in many guidance documents, and even where the guidance is satisfactory, it is not implemented in practice and the methods used differ across regions.

Opportunities for using EU funds to establish and run management bodies or to monitor and manage Natura 2000 sites (including by establishing sufficient staff capacity) appear relatively limited, and these areas, which are most directly associated with Natura 2000 job creation, exhibit the most significant funding gaps (Kettunen, Baldock et al. 2011). However, some Member States have used ERDF funding to develop Natura 2000 management plans. Management planning is an important prerequisite for generating the management agreements, access to funding schemes, and other initiatives that can create added jobs on and around Natura 2000 sites (Bouwma, van Apeldoorn et al. 2010).

Examples of ERDF funded projects that created jobs in Natura 2000

ERDF funding was used for the ecological reconstruction of the wetlands in Comana Nature Park and Natura 2000 area in Romania in the 2007–2013 funding period (Kettunen, Green et al. 2014). The dam construction employed 20 people temporarily and further jobs are expected in the future through ecological research organised through partnerships with local universities³². The area has experienced an increasing number of visitors, allowing new tourist amenities to be developed.

Two ERDF-funded Communities and Nature project initiatives in Natura 2000 sites in Wales created new high-quality recreational assets that generated additional tourism spending that supports 110 FTE jobs (JBA Consulting 2012). The funding of the Newport Wetlands Centre in a Welsh Natura 2000 site has created 13 new jobs (FTE) directly (6 full time and a further 15 part time) (JBA Consulting 2012). It has also generated a volunteer workforce numbering between 40 and 50 volunteers at any one time, to manage the reserve habitats, provide guided walks and deliver educational talks to school and community groups.

³² <http://nwrn.eu/case-study/restoration-comana-wetlands-romania>

Examples for use of ERDF funding to create Natura 2000 management plans (Kettunen, Illes et al. 2017)

- Romania (via Environment OP) supported elaboration of management plans for 382 newly designated Natura 2000 sites
- Hungary (via South Eastern Europe Transitional Cooperation Programme): BE-Natur, Transnational Joint Strategy for the better management and improvement of Natura 2000 network, and the definition of Joint Transnational Action Plans for the conservation of species and habitats, focussing in particular on wetlands³³.
- Slovakia (via OP Environment): Elaboration of management plans on SPAs, SCIs
- Czech Republic (via OP Environment): Drafting of management plans for all designated Natura 2000 sites (about 800 sites), following the detailed survey of all target features in particular sites.
- Spain (Murcia 2007-2013 OP): Elaboration of studies and management plans for 4 Natura 2000 sites in Murcia³⁴

European Social Fund (ESF)

How does the fund relate to Natura 2000?

The ESF provides opportunities to fund Natura 2000 through projects that support broader social and economic cohesion, with possible indirect links to Natura 2000 management. Funding opportunities include enhancing the competitiveness of SMEs dealing with Natura 2000 and enhancing Natura 2000 related institutional capacity and efficient public administration. The ESF priorities include the promotion of sustainable and quality employment and labour mobility, and investment in education, training and vocational skills training.

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

No information is available on the amount of ESF funding that has gone to Natura 2000 in the previous programming period. Job creation is a primary objective of ESF funding and therefore projects generally record how many jobs were created, but as no environmental or biodiversity criteria are required, it is not possible to quantify what impact social fund spending has had on direct or indirect job creation related to Natura 2000 or biodiversity more widely.

³³ http://www.southeast-europe.net/en/projects/approved_projects/?id=139

³⁴ <http://www.murcianatural.carm.es/web/guest/visor-contenidos-dinamicos?artId=321513>

Moved by Nature, Finland

The Moved by Nature (2013-2015) programme was funded by the European Union Social Fund (75%) and public and private organisations. The project created intervention programmes for target groups (youth at risk of social exclusion, long-term unemployed, new immigrants, obese people) to encourage more physical exercise in natural areas. Site managers of the Natura 2000 areas were actively engaged in project planning. The project involved 2.83 FTE places for two years in the lead organisation and a large number of other part time involvement in the nature conservation, school and health sectors³⁵.

Cohesion Fund (CF)

How does the fund relate to Natura 2000?

The Cohesion Fund can be used by recipient Member States to support the Natura 2000 network and for green infrastructure projects for biodiversity protection and the provision of ecosystem services (Kettunen, Torkler et al. 2014). Only countries that have a GNI of less than 90% of the EU average are eligible for cohesion funding. In the 2014-2020 period, that includes Bulgaria, the Czech Republic, Croatia, Cyprus, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. As the programming and structure of the Cohesion Fund and ERDF are quite similar, eligible Member States often prepare joint Operational Programmes for both funds.

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

The joint contribution of the ERDF and Cohesion Fund to biodiversity-related expenditure was estimated to amount to 3.6% (or €7,476 million) of overall expenditure by these funds in the 2007 to 2013 period (Kettunen, Illes et al. 2014). This includes expenditure that did not benefit Natura 2000, so the proportion going to Natura 2000 is unknown.

A report (BirdLife International 2012) used DG REGIO data from Operational Programmes, Eurostat data and the ICF GHK estimate (GHK 2011), to estimate that the job impact of the ERDF, ESF and Cohesion Fund represented approximately 16,800 full time equivalent jobs supported per €1 billion of Cohesion Policy in 2007-2013.

Examples of Cohesion funded projects that created jobs in Natura 2000 sites

An example of Cohesion Funds being used within Natura 2000 network can be found in Latvia. The project is called “Development of an Anthropogenic Load Reduction and Informative Infrastructure in the Territories of Natura 2000”³⁶, and it concerned 38 Natura 2000 sites located across 51 Latvian regions. €3,823,600 in cohesion funding was made available to the project in the 2007-2013 period, which covered all the costs. It involved building new trail routes, developing resting areas, viewing platforms, and parking facilities, putting up signage and providing information on Natura 2000 activities in Latvia.

³⁵ Personal communication, Liisa Kajala, Metsähallitus Finland, 30 September 2016

³⁶ European Commission, 2011, Managing tourism in special areas of conservation.

http://ec.europa.eu/regional_policy/en/projects/latvia/managing-tourism-in-special-areas-of-conservation

European Agricultural Fund for Rural Development (EAFRD)

How does the fund relate to Natura 2000?

EAFRD is the key EU funding source for the terrestrial Natura 2000 network, due to the high proportion of EU protected habitats and species that depend on agricultural management or are associated with managed forests. It provides several opportunities for direct funding of habitat management and restoration actions as well as various supplementary measures such as farm advice, food business support for branded local products, and diversification options (Kettunen, Green et al. 2014). Opportunities and uptake depend on Member State programming choices. However, crucially, Member States are obliged to allocate 30% of their EAFRD budget to the environment and climate including the agri-environment measure, and this is the main source of terrestrial Natura 2000 funding in most Member States (Milieu, IEEP et al. 2016).

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

It is not possible to quantify the EAFRD funding that benefited Natura 2000 in the 2007-2013 EAFRD programming period due to the lack of detailed budget breakdowns and targets (Kettunen, Illes et al. 2017). A review of Natura 2000 funding in a subset of RDPs for the 2014-2020 period found that RDPs have improved their integration of Natura 2000 funding needs compared to previous programmes (N2K Group 2016). However, the RDPs do not cover fully the needs identified in the PAFs. The use of conservation-related measures in forest areas is weak, and where used it is often not linked to the conservation of EU protected habitats or species. It is not possible to quantify the EAFRD funding going to the Natura 2000 network across the EU, as many EU agricultural payment agencies do not publish data on what proportion of spending went to farms in Natura 2000 areas.

EAFRD can be successful in creating new jobs, particularly through diversification of farm incomes, although funding has not always been properly targeted at job creation or been cost effective (European Court of Auditors 2013). EAFRD measures that can most directly benefit Natura 2000 are agri-environment, non-productive investment, Natura 2000 compensation, and natural heritage. Natura 2000 sites can also benefit from funding for the production of quality food products such as through labelling schemes, organic farming, LEADER projects, farm advice, and other RDP funding measures. The Areas of Natural Constraints payments help maintain the viability of farming in Natura 2000 areas but do not impose any requirements to benefit habitats or species.

A body of research focuses on the job creation and/or retention impact of agri-environment funding. A study (GHK 2011) used the results of one England study (Mills, Courtney et al. 2010) to estimate that investing €1 billion in agri-environment schemes in the Natura 2000 network across the EU in the 2007–2013 programming period would create 6,600 FTE jobs and sustain existing employment of 36,200 FTE. Using this estimate, a subsequent report (Jurado, Rayment et al. 2012) calculated that an annual increase of €5.4 billion in agri-environment expenditure could create an additional 11,250 FTEs directly and 30,000 FTEs in total in the EU. Where the research refers to higher-level agri-environment schemes that compensate farmers for more demanding and targeted habitat and species management actions, the

results can be extrapolated to Natura 2000 sites, as these schemes are likely to be targeted to and taken up by farmers in Natura 2000. For example, in Germany, around 40,000 farmers (one in seven farmers) are signed up to higher-level agri-environment schemes, which are predominantly focused on Natura 2000 areas³⁷.

It is important to note that the Natura 2000 compensation measure and most agri-environment schemes compensate farmers for income foregone for not undertaking certain management activities (e.g. for reducing pesticide and/or fertiliser applications, not cutting grass before a certain date or above a certain frequency, or for leaving land fallow). This spending is not creating an additional labour demand and may be reducing labour demands. Overall, the net effects of agri-environment spending on employment tend to be limited, which is to be expected, as the schemes are only able to compensate farmers for additional costs of the required activities and the income foregone due to regulations. The schemes do not therefore provide the farmer with additional income that he or she can invest in job creation. Furthermore, some schemes tend to underfund the costs of some farmers, who choose to allocate additional unpaid labour to the scheme for diverse reasons.

Studies on the impacts of agri-environment funding on job creation / retention in the UK

- A study on the English higher-tier agri-environment scheme (Mills, Courtney et al. 2010) estimated that the loss of the €95 million scheme would lead to a loss of 20% of agricultural employment, which represents 36.2 FTE per €1m of investment. This study is analysed in detail in the case study in Part B.
- A Scottish study of 2002 (Scottish Agricultural College 2002) found little evidence from the farm accounts survey that the agri-environment scheme created new jobs, but concluded based on an interview sample that it helped reduce the speed of fall-off of employment in rural areas of Scotland.
- A survey of the labour impacts of the Welsh agri-environment scheme on sheep and beef farmers in 2003-04 (Agra CEAS Consulting 2005) found that it resulted in greater labour requirements according to 92% of respondents, an average of 66 extra person-days labour a year across the interview sample (ranging from 41 for arable farmers to 92 days for sheep farmers), equivalent to 0.25 FTE (range 0.16 to 0.35 FTE)³⁸. Most of the extra work generated was carried out by contractors (49%), with the farmer accounting for 33% and other immediate family members for 9%. A separate survey of the contractors found an overall rate of employment creation of 0.2 FTEs per contractor involved in the scheme (Agra CEAS Consulting 2006).

European Maritime & Fisheries Fund (EMFF)

How does the fund relate to Natura 2000?

The EMFF can contribute to Natura 2000 conservation objectives through support for the management, restoration and monitoring of coastal and marine Natura 2000 sites³⁹, studies, drawing-up, monitoring and updating of protection and management plans for fishery-related

³⁷ Personal communication, Jürgen Metzner, DVL, 27 September 2016

³⁸ 66 days divided by 260 days for a full working year according to <http://www.accountingtools.com/questions-and-answers/how-to-calculate-ftes.html>

³⁹ EMFF Regulation Article 40(e)

activities in and around Natura 2000 sites, and aquaculture compatible with biodiversity conservation in Natura 2000. EMFF funding can also support the permanent cessation of fishing activities and/or measures to limit the impact of fishing on the marine environment and protected species. In addition, EMFF funding for other marine protected areas can contribute to the ecological connectivity of the Natura 2000 network, and broader support for sustainable fisheries and/or viability of fishing communities can contribute to marine Natura 2000 goals (Kettunen, Torkler et al. 2014). In the previous programming period, the EFF included similar objectives.

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

Uptake of the opportunities for Natura 2000 funding in the EFF in 2007-2013 was very modest (Kettunen, Baldock et al. 2011), probably linked to delays and barriers to the designation of marine Natura 2000 sites. It is relevant to note that some of the actions supported by the EFF had negative impacts on marine biodiversity including EU protected habitats and species. For example, financing was available for modernisation of fishing infrastructure and vessels, entry of young fishers into the industry, and aquaculture facilities and marketing that have maintained fishing effort at unsustainable levels, with associated habitat damage and pollution (Milieu, IEEP et al. 2016) There is some indication of an increase in overall biodiversity spending through the EMFF in the 2014-2020 funding period through the sustainable development funding stream, but the extent and the impact on Natura 2000 funding is not clear (Kettunen, Illes et al. 2017). There is no evidence available to estimate the impact of EFF / EMFF funding on job creation in and around Natura 2000 sites.

Research and innovation: Horizon 2020

How does the fund relate to Natura 2000?

EU Horizon 2020 research funding could be relevant to Natura 2000 through a wide range of measures. The 2016-17 Horizon 2020 Working Programme stresses the role of nature-based solutions for territorial resilience. Current thematic calls under two Societal Challenges (Societal Challenge 2: Food Security, Sustainable Agriculture, Marine and Maritime research and the Bio-economy; and Societal Challenge 5: Climate Action, Environment, Resource Efficiency and Raw Materials) are relevant. The EU funded Non-Nuclear Direct Actions of the Joint Research Centre can also indirectly help Natura 2000 management. The previous Framework Programmes for EU research also offered various opportunities for Natura 2000.

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

It is not currently possible to establish how much EU funding is devoted to research connected to the Natura 2000 network, as research projects are not required to report on their impact on the Natura 2000 network, and no programme wide assessment of biodiversity impacts has been carried out. Analysis by DG Research and Innovation estimated that biodiversity-related expenditures amounted to €269 million in 2014 and €278 million in 2015, comprising just less than 3% of the Horizon 2020 budget (Kettunen, Illes et al. 2017), but this covers a range of expenditures that are not connected to Natura 2000.

Strong evidence indicating that EU funding has contributed to considerable advances in the biodiversity knowledge base in the EU came out of the fitness check of the EU nature directives, but it is not clear whether FP funding played much of a role, as the immediate Natura 2000 needs tend to be for basic biodiversity data collection, which is not funded by EU research projects (Milieu, IEEP et al. 2016). However, some EU research projects, including FP and COST projects, have supported Natura 2000 monitoring and data collection.

An evaluation of the 7th Framework Programme estimated that it is creating 130,000 research jobs per year over a period of ten years and 160,000 additional jobs per year over a period of 25 years⁴⁰. A recent UK study found that more than €970 million⁴¹ in EU research funding in 2014-5 supported 8,864 direct jobs in the university sector, and more than 10,190 FTEs in industries outside the university sector, primarily business activities (more than 2,604 FTEs); wholesale and retail trade (more than 2,048 FTEs); and manufacturing (over FTEs)⁴².

Examples of EU funded research supporting improvement of the biodiversity knowledge base (Kettunen, Illes et al. 2017)

FP 6 EuMon⁴³ project on EU-wide monitoring methods and systems of surveillance for species and habitats of Community interest, which focused on four major aspects important for biodiversity monitoring: the involvement of volunteers, coverage and characteristics of monitoring schemes, monitoring methods, and the setting of monitoring and conservation priorities.

FP 7 European Biodiversity Observation Network⁴⁴ project (EBONE) which set out to improve methods and standards for habitat monitoring, including Habitats Directive Annex I habitats.

FP7 EU Biodiversity Observation Network (EU BON) is also developing tools and data standards, data-sharing specifications and strategies for accommodating large data volumes in order to facilitate access and integration of available biodiversity data in the EU. The EU BON data hub will facilitate use of the database of existing biodiversity monitoring schemes across Europe developed under EUMON⁴⁵.

COST EMBOS⁴⁶, development and implementation of a pan-European Marine Biodiversity Observatory System.

Natural Capital Financing Facility (European Investment Bank)

How does the fund relate to Natura 2000?

The Natural Capital Financing Facility (NCF) is administered through the European Investment Bank. The financial instrument brings together EIB financing and European

⁴⁰ http://europa.eu/rapid/press-release_IP-16-145_en.htm

⁴¹ £836 million

⁴² <http://www.universitiesuk.ac.uk/news/Pages/economic-impact-on-the-UK-of-eu-research-funding-to-universities.aspx>

⁴³ <http://eumon.ckff.si/summary.php>

⁴⁴ <http://www.wageningenur.nl/en/Expertise-Services/Research-Institutes/alterra/Projects/EBONE-2.htm>

⁴⁵ http://www.eubon.eu/show/project_2731/

⁴⁶ http://www.cost.eu/COST_Actions/essem/ES1003

Commission funding from the LIFE Programme. The NCFE can use a range of different financing options, including debt and equity financing, and direct and intermediated funding⁴⁷. Its primary purpose is to demonstrate that natural capital projects, which enhance biodiversity and provide climate change adaptation benefits, are also capable of generating revenues or saving costs. Public and private bodies, such as public authorities, land owners, businesses and NGOs can be recipients of NCFE financing. Financial institutions can in turn work as intermediaries or investors⁴⁸.

The NCFE can be used to finance projects related to Payments for Ecosystem Services, Green Infrastructure, Innovative pro-biodiversity and adaptation investments, and Biodiversity offsets. Projects that involve Natura 2000 sites are eligible for funding from each of these streams except biodiversity offsets.

What is the current/recent expenditure on Natura 2000 and what evidence is there on jobs?

Finance can be provided either directly or indirectly through financial intermediaries. A typical project receives between € 5 million and € 15 million for up to 10 years, and with the possibility of a five-year extension, and can cover up to 75% of the total project costs. The NCFE can also invest in equity funds and match other contributions up to a maximum share of 33%. These projects may or may not be on Natura 2000 sites. The 2014 to 2017 period is its pilot phase and in this period, €125 million being made available for investments in 9-12 projects. As yet, very little is known about how this budget is being used, and as information has not been released on the progress of the pilot projects, the number of jobs that they support cannot be estimated.

As well as funding for the natural capital projects, the NCFE has a Support Facility of € 10 million for financing capacity-building measures. This is used for paying specialist support to develop the technical and financial capacity of potential NCFE projects. This support is only provided to projects that are likely to meet the NCFE criteria. This is one way in which the NCFE can support job creation.

Synthesis and Outlook on the Role of Wider EU Funding

ERDF, ESF and CF seem to have a considerable further potential for financing activities that link the management of Natura 2000 with employment creation. While the scope of these funds is limited in terms of creating direct employment on the sites (i.e. they cannot be used to fund ongoing management or monitoring costs) they could be strategically used to target one-off investments that help to increase site related employment in a long term, such as development of visitor infrastructure linked to business opportunities for tourism and outdoor recreation. Furthermore, emphasising nature-based solutions to a range of environmental and socio-economic issues can help to direct ERDF, ESF and CF investment to Natura 2000 sites, creating temporary project related employment. For example, with the knowledge on the public health benefits of nature increasing ESF could be used to fund a

⁴⁷ European Investment Bank, <http://www.eib.org/products/blending/ncff/index.htm>

⁴⁸ European Commission, no date, Natural Capital Financing Facility.

http://ec.europa.eu/environment/life/funding/financial_instruments/documents/ncff_leaflet.pdf

range of different public health and social cohesion related initiatives linked to the existing infrastructure provided by Natura 2000 sites.

EAFRD funding is foreseen to continue to play a crucial role for Natura 2000 management and restoration, but it is very difficult to quantify the impact on employment. An unquantifiable part of the funding is compensating farmers for not carrying out certain productive actions and activities on Natura 2000 sites, which is unlikely to result in an increase in employment and may be contributing to a decrease in labour demand. On the other hand, EAFRD funding is crucial to maintaining agricultural activities on many sites where in the absence of funding, agricultural activity would be abandoned. Further future employment benefits are more likely to result from investments in agricultural businesses and product marketing, which may increase if EAFRD moves more towards funding start-up grants, loans and risk insurance.

The EMFF has an expanded scope of funding, compared to the previous EFF, which provides more opportunities to fund projects for managing the impacts of fisheries to the wider environment, and support the management of marine protected areas either if it relates to fisheries management (as part of supporting the CFP objectives) or supporting non-fisheries related management (as part of supporting the IMP objectives)⁴⁹. It therefore has the potential to play a much greater role in the creation and maintenance of sustainable jobs in marine Natura 2000 areas, both in terms of direct site management activities and also by creating marine Natura 2000 related business opportunities via economic diversification of fisheries communities.

Even with concrete projects still in the pipeline, the financing provided by NCFE is foreseen to play an integral role in linking biodiversity - including Natura 2000 sites and other protected areas - to financing approached explicitly aimed at providing return on investment. Employment creation linked to conservation actions and sustainable management is likely to be one key element in this regard.

In general, PAF could offer a strategic tool to identify opportunities where the management of Natura 2000 could be linked to the wider national socio-economic objectives, including with a view of employment creation in longer term.

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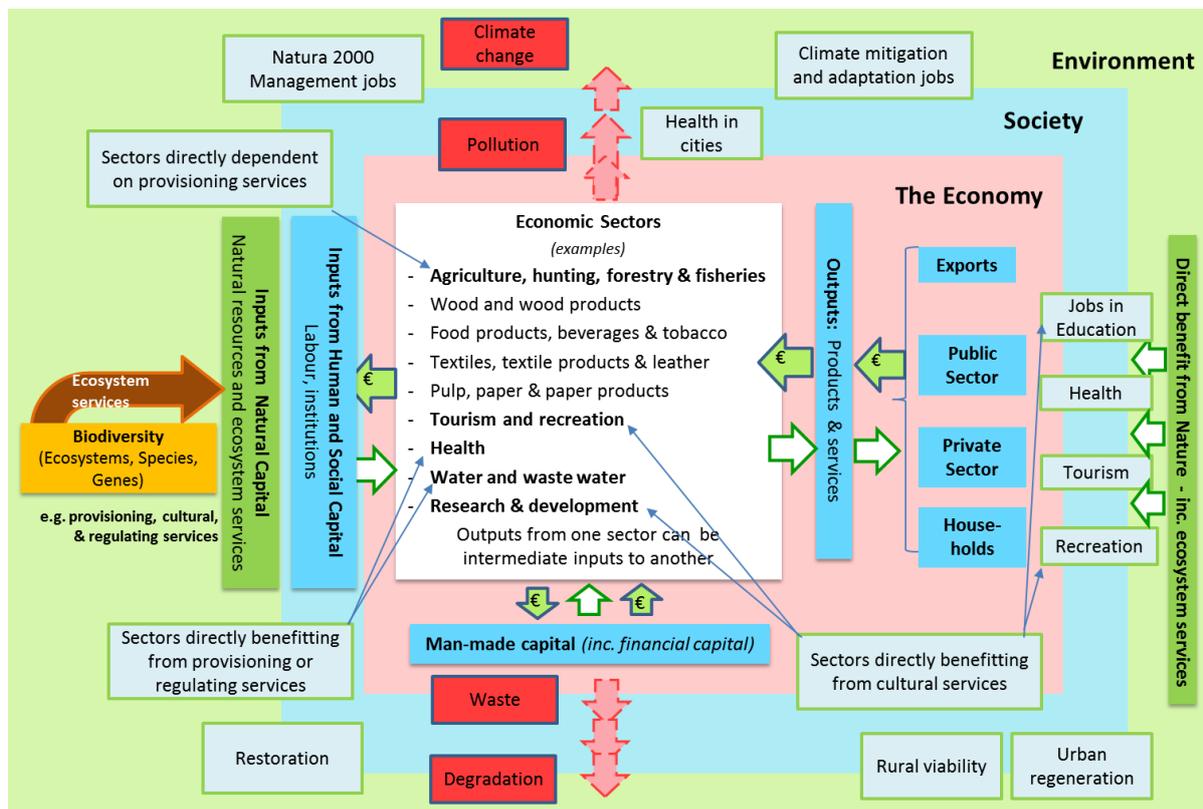
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What is the state of knowledge as regards job contributions of Natura 2000?

The Natura 2000 network, while set up for conservation of nature objectives, provides or supports a range of jobs directly and indirectly –linked to expenditure on conservation objectives, to sustainable production and to on-site activities making use of the qualities of the landscape and biodiversity assets (e.g. tourism, recreation). The evidence base on the level of direct and indirect jobs underlines the multiple added values of the Natura 2000 network. However, more analysis is needed for a fuller understanding of the multiple pathways in which Natura 2000 can support jobs directly and indirectly. Figure 14.1 presents a schematic for where the direct and indirect jobs fit in the economic-social-environmental context and key points stemming from the literature review of this scoping study are presented thereafter.

Figure 14.1: Links between sectors, the economy and the environment



There are important synergies between biodiversity and employment

- **The aim of the Natura 2000 network**, established under the Birds and Habitats Directive and covering 18% of terrestrial areas and 5% of marine areas, **is to safeguard biodiversity**, whilst taking into account other economic and social considerations. However, the conservation and restoration measures that take place and their

impacts are **an important direct and indirect source of employment** and contributes to smart, sustainable and inclusive growth.

- In addition to **on-site management and restoration jobs for conservation purposes**, there are jobs from **sustainable provisioning of crops, timber and fish**, as well as in a range of **sectors that make use of the natural capital – tourism, recreation, health, and education** – as well as support for off-site employment through both **product chains and spending**.
- At the most fundamental level, without a sufficient robust natural system, supported by the Natura 2000 network, **there is a risk that losses of ecosystem services protected by the network can undermine not only a range of sectors, but also the basis of the functioning economy itself**. The timing and relative sensitivity of jobs in different sectors to loss of natural capital is, however, difficult to assess, so this employment analysis has focused on direct, indirect and induced jobs, on-site and off-site, including in the supply chain. Consequently, research underestimates the contribution of protected areas to employment.
- **The number of jobs related to Natura 2000 depends on what questions are being asked** and whether the answers sought focus on direct jobs on site, indirect jobs, and/or induced jobs. It is also important to distinguish between jobs related to the ecosystem within the Natura 2000 sites, jobs affected outside of the sites due to the biodiversity, and those linked to activities making use of the natural capital without having conservation objectives in mind. Furthermore, it can be useful to distinguish between incremental jobs from Natura 2000 designation and management activities and wider jobs supported by the protected ecosystems.

The Natura 2000 network supports a wide range of jobs directly and indirectly, through conservation measures, sustainable production and other activities on site. However, the current state of knowledge needs to be improved.

Jobs for nature conservation

- Current expenditure on conservation measures in the **Natura 2000 network support around 52,000 jobs** directly and indirectly. The € 5.8 billion needed for the full implementation of the Natura 2000 network, has been **estimated to support 104,000 direct jobs** in protected area management and conservation activities and **174,000 jobs in the EU if indirect jobs are also included**.

Jobs in sustainable production

- **Fisheries:** there are 149,000 fishermen and women in the EU, representing 110,000 full time equivalent (FTE) jobs. There is yet no information on how many jobs are directly or indirectly dependent on Natura 2000 network and associated protection measures.
- **Agriculture:** It has been estimated that 1.3 million of the 9.6 million farming jobs in the EU are linked directly or indirectly to Natura 2000. This was, however, a first estimate, which did not distinguish between jobs that are contributing towards Natura 2000 conservation objectives and those that are not, and additional analysis is needed. There is no estimate of the amount of agricultural activity that would be needed to maintain and improve conservation status in Natura 2000, but that is being abandoned or already lost, and the associated loss of jobs.

- **Forestry:** of the 3.5 million jobs in the sector, a first estimate suggests that 73,000 jobs are supported by Natura 2000. Again, this is a first estimate and additional assessment is needed.

Jobs enabled and supported by Natura 2000

- **Tourism:** 12 million people are employed in tourism in Europe. Of these, 3.1 million have links to protected areas and 9.8 million to 2 million explicitly with Natura 2000.
- **Health:** There are 8.8 million jobs in the health sector. Currently, there are only case examples of jobs in Natura sites focusing on preventative health measures and care, but no systematic assessment or aggregate. There is significant additional potential to developing Natura 2000 sites as health hubs.
- **Climate change mitigation and adaptation:** Natura 2000 sites offer major benefits in carbon storage, sequestration as well as adaptation to climate change, through for example, urban cooling. There is, however, no measure of the scale of employment linked to this policy objective. Some of the jobs will be found in protected area management and hence conservation jobs can be seen as offering wider public benefits.
- **Research and innovation:** The number of scientific publications on Natura 2000 and ecosystem services has been rising quickly. Furthermore, there are increasing applications of bio-mimicry and bioprospecting supporting innovation and growth. There is yet little data on how many jobs are supported in this area, and to what extent they benefit directly from the biodiversity in the Natura 2000 network. This is, however, expected to be a growth area.

Jobs via EU funding: The EU added value via the MFF

- Investment in the implementation and management of Natura 2000 network can create a range of immediate direct employment opportunities and support indirect long-term employment. The former is a direct consequence of conservation expenditure consisting of jobs related to the on- and off-site management activities. The latter builds on the employment and business opportunities sustained by investment in well-functioning, biodiverse and aesthetically pleasing and/or productive and biodiverse ecosystems (e.g. tourism, sustainable agriculture, fisheries and forestry).
- **LIFE: 2,904 FTE jobs were supported by a sample of 281 LIFE Nature and Biodiversity projects** targeting Natura 2000 sites. This represents about **10 jobs per project** (annual average FTE) during the projects duration. Around half of these jobs are maintained 5 years after the project end, according to the information reported by the project managers.
- **Wider MFF:** Five EU funds under shared management, i.e. ERDF, ESF and the Cohesion Fund, EAFRD and EMFF (previously EFF) – collectively called European Structural and Investment Funds – now integrate biodiversity and Natura 2000 support goals into their funding objectives. In principle, funding to support the implementation and management of Natura 2000 sites can be synergistic with or actively contribute to a range of sectoral EU objectives linked to employment. However, there have been no assessments on the impacts of EU funding on the creation of different types of job (direct, indirect, and induced) linked to the existence and management of Natura 2000 sites.

Lessons from past applications of methods and how to interpret the results

- **Type of jobs:** Some jobs are for the maintenance of the network and related to **conservation expenditure**; others are **self-sustainable and the jobs that benefit from the network** rather than are necessary for the network.
- **Confusion can arise when talking about the number of jobs as different sources talk of different things.** It is therefore important to be clear whether the focus is on direct and indirect jobs, on on-site and off-site, one off and recurring jobs, jobs and FTEs, jobs fully supported by Natura or simply benefiting, and the timescale of assessment.
- The state of Natura 2000 sites varies significantly across the EU and **one cannot simply scale up using average jobs per area or jobs per site bases as a method.** Expenditure analysis linked to assessment of what share of expenditure related to wages, combined with wage rates is a better means of calculation. This approach can be used for assessing local employment benefits and is less suitable for national or EU-wide assessments.
- **Input-output models** can help with assessing the multiplier effect and hence induced employment values. However, input-output models also have their limits, for example in capturing crowding out effects in other sectors of the economy. In principle, many of the above concern could be addressed within **general equilibrium models** that capture the feedback loops in an economy. However, data availability and practical challenges, for example of delineating employment supported by Natura 2000 sites, by other protected sites and by natural spaces generally, do not currently allow for the use of general equilibrium models for assessing the employment benefits of the Natura 2000 network overall. There is potential to apply these models in areas such as tourism, however the models would need to be adapted and further data gathering would be necessary.
- **Interpreting results:** There is a need to avoid double counting. For example, jobs associated with the management and restoration of protected areas are often the same as those that could be considered for climate mitigation adaptation.
- In addition, some jobs are “**change of jobs**” (e.g. due to regulations as part of the management) others “**additional jobs**” (due to opportunities provided by the protection status).

As regards how to interpret the results, there are often very concrete and precise numbers at particular sites that can be taken as robust and accurate. There is however not yet any systematic collection of data on employment levels associated with Natura 2000. The level of knowledge of both direct and indirect jobs linked to Natura 2000 is still patchy at the EU and Member States level, although there are a range of experimental assessments that have been carried out to date to scope the scale of employment (Ecotec 2002a, Bio Intelligence Services 2011, GHK 2007, GHK 2011). These give orders of magnitude results as presented above. There are also no Eurostat labour statistics linked to the Natura 2000 network, nor robust EU-wide data or in-depth assessments. Various gaps remain with regard to both direct and indirect jobs for most sectors and activities.

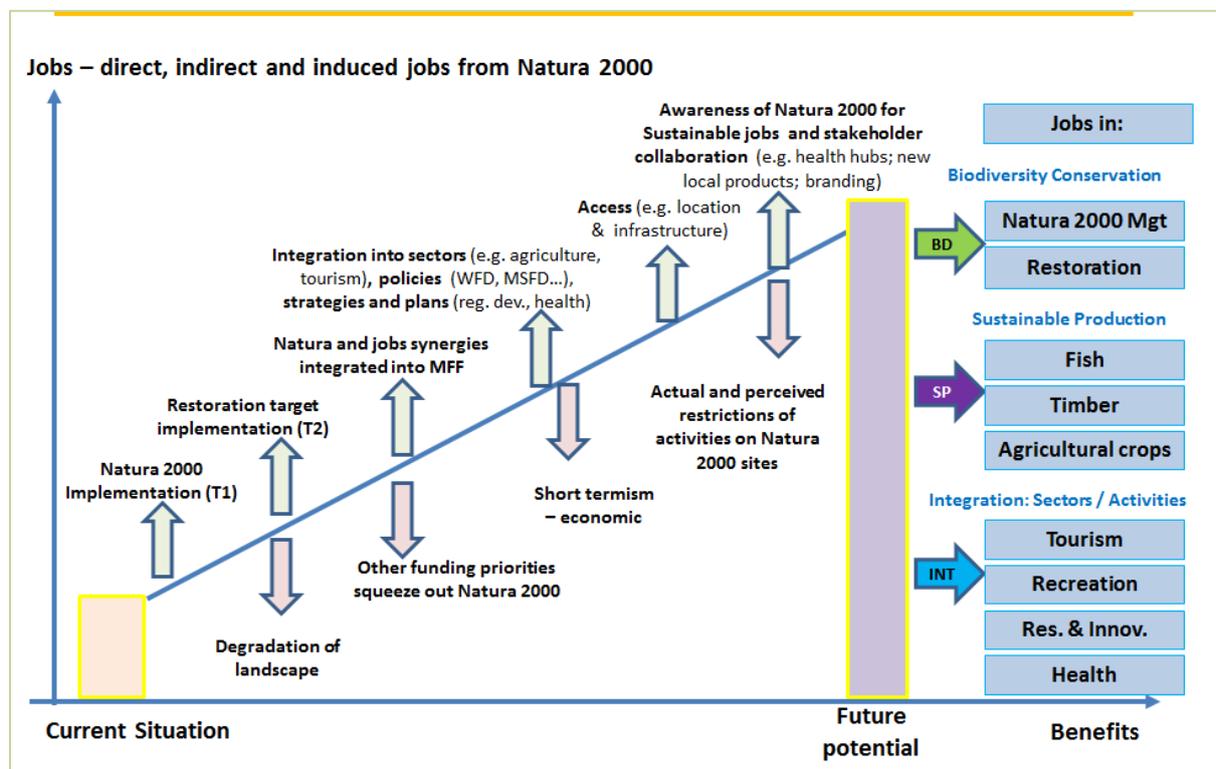
Given the high priority of employment benefits within the current political context at the EU level and many national and local levels, it is clearly important to explore how additional jobs

can be catalysed through the Natura 2000 network, without compromising the prime objectives (i.e. aiming of synergies). Furthermore, it is important to assess the current and future potential levels of Natura 2000 for livelihoods in Europe.

How can the synergies be realised? The way forward

A first step forward is to have a better understanding on the range of ways in which the Natura 2000 network already does and can in the future support employment directly and indirectly – and what jobs are linked to biodiversity conservation objectives itself, which to sustainable production and which are linked to wider sector activities, integration and policy integration (see Figure 14.3)

Figure 14.3: Drivers and barriers to potential



For this, the role of different drivers and barriers to employment need to be better understood and integrated into policy reflections (e.g. ex post valuation, ex ante assessments as well as REFITS) and into EU funding decisions. The MFF has the potential to be an important catalyst for job creation in the EU. Key drivers include:

- **Implementation** of the biodiversity targets and commitments and ensuring due prioritisation and financing
- **Systematic integration** of nature synergies in other sectors, policies and plans – e.g. by biodiversity proofing and use of other existing tools (SEA, EIA)
- **Improving access and awareness** of the type of activities, benefits and jobs that are possible – e.g. underlining the preventative health care benefits and low cost treatment linked to physical and mental health problems and making use of the nature’s “health hubs”.

It is also important to address the barriers to jobs, including:

- Avoiding the degradation of the landscape
- Avoiding that other funding priorities displace legitimate interests in supporting Natura 2000
- Short termism and
- Debunking some of the myths around regulation of activities on Natura sites

What are the assessment needs for the future to support the evidence base to inform decision-making?

The EU's commitment to **Better Regulation** implies understanding the **EU added value**, supporting **policy coherence** and **improving cost effectiveness of implementation**. It also commits to a series of regular **ex post evaluations**, **REFITS** and **impact assessments** – each requiring the employment aspects to be covered. Therefore, we need:

- **Regular assessment of EU funding contributions** – e.g. EU added-value as regards employment, as noted above.
- **Requirements for projects** supported by EU funds to identify jobs on site and off and use EU funding advantage to obtain the evidence base needed for an operational science-policy interface.
- Regular **integration** of the Natura 2000 job issues into **policy evaluations** (e.g. ex post assessments, major reviews and impact assessments).
- **Sector assessments** could similarly be useful – i.e. to help understand the real potential for employment in health related activities and what can facilitate this (e.g. infrastructure for the mobility constrained; or guides support activities).
- **Investment in data** upon which the above assessments can be built.
- Over time, move **towards natural capital accounting** and **links of jobs satellite accounts** so that a more robust assessment of jobs levels can be made. This will require linked spatial, ecological, social and economic data.

In summary, this scoping assessment underlines that the **Natura 2000 network offers a wide range of direct and indirect jobs** – while a number are linked explicitly to conservation objectives, an even larger number related to on-site and off-site activities enabled by the existence of the Natura 2000 sites.

It will be **important to assess in more detail these links** and ensure that they are **integrated into policymaking, evaluations, project and programme selection and implementation on the ground**.

There remains a need to improve the state of knowledge on the current and potential future jobs from conservation objectives and the various biodiversity targets (notably restoration). The LIFE projects employment analysis offers a useful source of information to build for future assessments.

Particular attention in the short term can usefully be focused on **assessing jobs linked to EU funds as well as improving the indicators and mechanisms to track job creation**.

While the above focus more on employment from government funding, there is also a need to assess the potential Natura 2000 related employment benefits from sectors and identify where these lead to private sector employment benefits. Here promising sectors would be **agriculture, tourism, recreation, fisheries and forestry** – care will be needed as regards assumptions for “allocating” jobs to Natura 2000. In addition, it would be important to understand more on the potential job benefits in the **health sector**, i.e. from increasing the use of the Natura 2000 network as health hubs, as this is a key area of potential.

In summary, this scoping assessment has explored what evidence is available on jobs and which methods are used (see Part B for greater depth on methods and Part C on specific cases), there is a need for considerable more investment in the evidence base of the many pathways in which the Natura 2000 network supports jobs directly and indirectly. Such an analysis will help in supporting the ambitions for better regulation, improve coherence of policies, increase the efficiency and cost-effectiveness of EU spending and hence improve the overall EU added value. It will also help inform decision makers and the wider public that conservation of nature can go hand in hand with social and economy objectives via job creation.

The aim of this report *Methods for Assessing Job Impacts to Inform Policy Debates* – which is Part B of the scoping study *Natura 2000 and Jobs* – is to explore what methods have been used to date to assess job impacts from Natura 2000, and to recommend what type of tools and analysis will be useful to help supply an evidence base into policy deliberations.

Background

Before presenting and discussing options for analysing the employment impacts of protected areas and the Natura 2000 network, a number of methodological caveats should be noted. Recalling these will help assessing when a specific method of analysis is suitable or not.

When looking at the links between a protected area status and employment, several questions could arise in principle:

- What kind of jobs (and how many) are generally supported by designating a protected area and what kind of jobs (and how many) are supported by measures to meet conservation objectives?
- What kind of jobs (and how many) can be generated from activities on site or linked to the site that are not directly to do with conservation objectives?
- For both of the above - what kind of jobs and how many jobs are generated additionally? (i.e. incremental benefits relative to jobs supported by the ecosystem pre designation and management)
- What kind of jobs (and how many) are negatively affected by designation and management measures?
- What is the net effect on jobs of designating and managing a protected area?

The methods used to date tend to focus on some but not all of the above questions and the results need to be seen in the context of what they aim to do and what remains to be done to get the whole picture. This report explores what methods have been used in the past for the above questions and what lessons can be drawn for future analysis.

Structure of the report

The methods used in the past can be structured into two strands of work. On one hand, a **demand-based approach** looks at different goods and services demanded, to which protected areas contribute by ecosystem services. Another way of approaching the above questions is to look at the different sectors of the economy and analyse official statistical sources and other aggregate data to derive conclusions on employment linked to protected areas. This **supply-based approach** could be used in combination with demand-based methods to understand the role of the Natura 2000 network for employment.

In light of the above, this report is structured as follows:

- Assessments Based on Demand-side Approaches (Chapter 2), which covers:
 - Expenditure-based analyses (2.1)
 - Employment factors and site-based analyses (2.2)
 - Input-output-analysis (2.3)
 - General equilibrium models (2.4)

- Assessments based on Supply-based Approaches (Chapter 3), which covers:
 - Deriving employment figures from a sector perspective (3.1)
 - Suitability for estimating employment effects of Natura 2000 (3.2)

- Lessons learned from applying methods and recommendations (Chapter 4), which includes:
 - Lessons learned in past analyses (4.1)
 - Recommendations for a future analysis of Natura 2000 jobs (4.2)

Expenditure-based analyses

Basics of the approach – Expenditure-based analyses use primary data, for example from visitor surveys in protected areas or accounting data of businesses in agriculture and forestry, and/or secondary data sources to derive estimates for the economic contribution in a certain region, including estimates of jobs supported. Expenditure-based analyses have been mostly used for assessing the employment impacts of tourism and could in principle be applied in other sectors such as recreation, protected areas management and restoration of sites.

For example, in tourism assessments, the approach uses data on expenditure, disaggregated across different categories such as accommodation, transport, retail etc. to estimate aggregate expenditure based on nature tourism. To arrive at accurate estimates, it is important to use representative survey data that covers e.g. seasonality of visitors during days of the week and throughout the year. It is also important to identify the visitor group for which the protected area is the main motivation of visiting the region. From the estimated expenditure, it is possible to derive an estimate of the economic value added and its share translated into direct income (and corresponding job equivalents) (Mayer et al., 2010).

Deriving expenditure-based job estimates in German National Parks

Researchers have studied the regional economic impacts of nature tourism in Germany, especially with regard to national parks and other types of protected areas. Job et al. (2003) first conducted a pilot study in the Berchtesgaden National Park in Bavaria and then developed a methodology for assessing the regional economic benefits of protected areas (Job et al., 2006). This methodology was then applied to 15 of the 16 German National Parks.

The findings suggest that the German national parks support an estimated 85,000 jobs through visitor expenditure. Continuous and careful monitoring of visitors to the area and their spending patterns allows the contribution to the local economy through the generation of direct and indirect income to be derived. The method relies on a combination of representative visitor data collected in the area, their spending patterns on different goods and services in the area such as accommodation or transport, and the use of secondary information from statistical sources, such as the average income in the region of interest.

For details, see case study 8.

Indirect and induced employment can be estimated from the direct employment supported. This step typically relies on a multiplier developed in earlier studies, as for example in the case study on Mediterranean marine protected areas (see case study 4) or estimates such multipliers by collecting further empirical data on spending patterns. The example below on the job benefits of stewardship schemes in England is one rare example where data was collected at farm level to substantiate the direct and the indirect job effects.

Estimating job benefits of Environmental Stewardship Schemes in England, UK

Agri-environment schemes in England created an estimated 665 new FTE jobs between 2005 and 2009 (Mills, Courtney et al. 2010). This breaks down into 530 direct FTE jobs, 75 indirect FTE jobs and about 60 induced FTE jobs. The higher-tier agri-environment programme (Environmental Stewardship), which is largely targeted at Natura 2000, created an estimated 200 new FTE jobs between 2005 and 2009 for a total spending of £90.3 million. As the higher tier scheme covered 415,000 ha in 2009, this is equivalent to about 0.000482 FTE jobs per ha.

The method used in this study (Mills, Courtney et al. 2010) included an extensive survey combining face-to-face and telephone interviews to 'Environmental Stewardship' beneficiaries and other rural economic actors throughout England. The study applies a step-by-step model to estimate direct, indirect and induced effects of the scheme on employment, and as a result, the number of FTE jobs supported for every £ million initial scheme injection.

The analysis differentiates between entry-level and higher-level agri-environment funding. The higher-level agri-environment contracts in England are partly targeted at protected areas and overlap largely with the Natura 2000 network. Assuming that half of the higher level agreements were on land in the Natura 2000 network, it can be concluded that higher-tier agri-environment spending maintained 100 FTE jobs in the Natura 2000 network in England between 2005 and 2009.

For details, see case study 2.

Suitability of the approach – An expenditure-based analysis can help understand how a protected area can contribute to the local economy. The approach relies on a number of assumptions, e.g. on the share of expenditure that translates into direct salaries and on using multipliers based on previous work. The results will give an idea of economic importance of the protected area status, if survey data carefully identifies separates out the role of Natura 2000, for example identifying nature tourists for whom the site was an important or main reason to come to the area.

The method is useful for monitoring the contribution of a site to the local economy over time. However, it does not provide a reliable framework for estimating the economic impacts of increased expenditure in the future.

The approach is generally not suitable for scaling up findings to a larger level (to the regional, national or EU level), as the results differ e.g. due to varying spillover effect sizes. However, with a sufficiently large number of site-based analyses, it could be possible to better substantiate employment factors, though the caveat of using this approach at local level and not for forecasting purposes remains.

Employment factors and site-based analyses

Basics of the approach – The employment factor approach is a relatively straightforward approach to link economic activities to employment. Based on earlier analyses, for example over several sites or from earlier modelling work, employment factors could be derived and used in other contexts.

What is an employment factor? An employment factor can link jobs to a physical unit (e.g. jobs created per ha or ecosystem restored, jobs created per ton of product sourced etc.) or a monetary unit (e.g. jobs per million Euro expenditure on protected area management).

Example for employment factor: FTE per land-use approach

BIO Intelligence Service (2011) estimated the amount of land within Natura 2000 under agricultural management by extracting the area recorded as affected by agricultural activities in the standard data forms of each Natura 2000 site in the year 2009. The study then estimated, for each Member State, an average employment in FTE jobs per hectare for agricultural activity, for example 0.0413 FTE/ha in Germany, and 0.0264 FTE/ha in France. The rate of employment per ha was then applied to the Natura 2000 areas affected by agriculture. A multiplier of 0.5 was applied to the direct employment figure to estimate the overall (direct and indirect) employment supported by the network.

The study makes the following assumptions and records the following caveats:

- The study assumes that the standard data forms record all agricultural activities on Natura 2000 sites, including beneficial activities for habitats and species management. The study does not discuss the possibility of bias towards recording of activities with a negative impact on habitats and species.
- The Natura 2000 standard data forms are very incomplete, and in 2009, many of them did not record the proportion of the site affected by activities. The study provides no information on the completeness of the dataset used.
- The study assumes that the employment ratio per ha is the same for agricultural activities outside Natura and within, whereas there are some significant differences between the types of agriculture carried out within Natura compared to outside.

Due to the series of assumptions behind the analysis, the findings need to be interpreted cautiously. For example, it is possible that agricultural practices are more labour-intensive within protected areas, which could lead to an underestimate of jobs supported.

Employment factors can be applied in several sectors and have been presented in this work. Examples are the case study on cork oak forests in Spain in physical units (direct and indirect jobs per ha of cork oak forest) or the analysis of LIFE projects in the period 2004 – 2007 (full-time equivalents per million Euro expenditure) (see Part C).

With a given employment factor, one can quickly derive estimates of the employment implications of a specific activity. The approach could cover several sectors analysed in this scoping study such as Natura 2000 management and restoration, agriculture or forestry.

Employment factors used in job analyses at EU level

Employment factors can also be generated in an abstract form as shown in GHK (2011). Assuming that wage costs comprise 50% of the cost of operating Natura 2000 network and that the average wage is at €28,000 per year, GHK (2011, p.11) estimate that for each €1 billion of expenditure in the implementation and management of the network, almost 18,000 FTE jobs are directly supported and 30,000 FTEs supported per year if indirect and induced jobs are included.

GHK (2011) also applied this to the estimates of the costs of Natura 2000 needed to meet the conservation and management objectives under the nature directives (€5.8 billion/year). This would lead to 104,000 direct jobs, 69,000 indirect and induced jobs and hence overall 174,000 jobs. Current levels of expenditure – estimated (arguably conservatively) at about €1.74 billion/year - would imply 52,000 direct and indirect jobs supported by Natura 2000 expenditure.

For details, see case study 10.

Suitability of the approach - A number of caveats apply to using employment factors when assessing the job potential of protected areas. A major limitation of this approach is that it will most likely not capture the fact that local circumstances differ markedly. Activities that at first sight seem to be defined in terms of scope and activities can have very different employment implications.

For example, BenDor et al. (2014) discuss site-based evidence on the job creation potential of restoration projects. Past analyses suggest wide-ranging estimates from 7.1 jobs per million US dollar expenditure in tidal marsh restoration up to 39.7 jobs per million US dollar expenditure in the restoration of forest, land and watersheds. The estimates vary across geographic scale (local, regional or national perspective) and across different types of restoration projects.

However, due to highly variable local contexts, job estimates for similar activities can be very different, too. For example, BenDor et al. (2014, p. 16) present past estimates on the job creation potential of wetland restoration, which range between 6.8 and 29 jobs per million US dollar expenditure. The geographic scale is of relevance here, as employment factors tend to be larger when looking from a national perspective due to higher shares of indirect and induced effects captured than when limiting the view to a local perspective.

Input-Output-Analysis

Basics of the approach – The above methods do not take the structure of the economy in account, which is at the heart of input-output-analysis. This method is based on input-output (I-O) tables, which describe how different sectors of the economy demand of goods and services and which goods and services are needed in turn to produce these. Input-output-tables are typically available at country level and give a snapshot in time of the structure of the economy.

An I-O table can be used to estimate the effect of additional expenditure e.g. by consumers or the government on production and economic value added in different sectors of the

economy. As well as this direct effect, input-output-models can also capture the indirect effects, as the sectors facing higher demand for their goods and services will in turn increase their demand for inputs from other sectors. This process goes through several repetitions. Furthermore, I-O models can capture the induced economic effects through additional income created and spent in the economy and the associated goods and services demanded.

Estimating Regional Economic Benefits of the Hohe Tauern National Park, Austria

Bodenhöfer et al. (2009) applied an input-output model, combining primary data on expenditure of the national park and secondary statistical sources to estimate the regional economic benefits of the Hohe Tauern National Park in the Austrian Alps. The national park generated around 21.8 million Euro of economic value added in 2007 through expenditure on operations, through investment into the national park infrastructure and through expenditure of national park tourists in the region. This is equivalent to around 450 jobs, of which around 390 are generated domestically. Tourism is an important contributor, with 76% of the employment supported. Around 4.5% of economic value added and 5.6% of employment in the region is due to the Hohe Tauern National Park.

For details, see case study 9.

Models based on input-output tables also have the advantage that they can distinguish effects domestically and abroad and can model the government sector, including revenue generation. They are applicable for a range of sector analyses, including in urban, rural and regional development and regeneration. One example presented in this work is the case study on restoration activities in the Emscher Landscape Park in Germany (see Part C).

Suitability of the approach – Two strands of arguments are relevant to applying I-O models to assessing the links between protected areas and employment. The first arguments refer to limitations of I-O approaches in general. The approach relies on a number of assumptions such as a fixed proportion of inputs to produce one unit of output (i.e. a “linear” production technology, independent of the price of labour and other input factors) and that there exist no constraints on resources (e.g. assuming that labour is available in desired quantity and quality).

The second set of arguments refers to the challenges of defining adequately a “nature sector” and of separating its employment effect from the overall contribution of the sector. Protected areas and more specifically Natura 2000 sites are part of larger sectoral activities such as eco-tourism and currently available I-O models do not have the granularity to capture the role of the network as such.

General Equilibrium Models

Basics of the approach – General equilibrium models are a further development of the concept of input-output analysis. As I-O models, they depict different sectors of the economy (production in sectors, consumption, government), but model the economic decisions of agents, including allowing for flexible prices and wages (Dwyer, 2015). General equilibrium models allow for the substitution of different input factors and consider feedbacks between

sectors of the economy. A set of mathematical questions describes the economic relations, covering technological and behavioural aspects.

General equilibrium models can be used to analyse the impacts of economic stimuli such as an increase of consumption expenditure of households or the government, or higher economic activities in certain sectors such as agriculture, forestry or tourism. The advantage of this approach is that it can account for feedbacks. For example, increased activity in one sector (e.g. tourism) could lead to negative impacts in other sectors (e.g. in agriculture) when labour is scarce and redirected towards the expanding sectors. The methods presented above cannot account for such effects.

Suitability of the approach – This approach is in use in many areas for evaluating policies and is in principle suitable, as it allows for a more realistic picture of the production and consumption of goods and services in an economy. However, it has not so far been applied to an analysis of protected areas or the Natura 2000 network. The main reason is again the challenge of adequately defining a “protected area sector” in the economy and modelling the interactions with other sectors.

Deriving employment figures from a sector perspective

The above demand-based approaches estimate economic activity based on expenditure and economic value added in the economy in order to derive the associated employment. In contrast, supply-based approaches rely on statistical sources about volume of sales or employment in sectors. Such figures can, for example, be drawn from official statistical surveys (or special analyses thereof), from data provided by private sector organisations (e.g. in eco-tourism or organic farming), from NGOs or from dedicated surveys to estimate the number of jobs that are supported by protected areas. This approach is also applicable for analysing jobs in the administration and management of Natura 2000 sites.

While it is possible to combine several data sources across sectors and economic activities, using a systematic framework is useful. The OECD/Eurostat Environment Industry (EI) Classification, the Classification of Environmental Protection Activities (CEPA) and the Classification of Resource Management Activities (CReMA) provide such frameworks that link to existing official statistics in EU Member States and on EU level.

Blazejczak and Edler (2015) have for example based employment estimates in environmental services supply in Germany based on the OECD/Eurostat Environment Industry (EI) Classification (OECD/Eurostat 1999). Several sectors and activities discussed in this work are included in this framework, such as sustainable agriculture, fisheries, natural risk management or eco-tourism. While job estimates can use such a statistical framework, economic activities that are environmentally beneficial or driven by environmental considerations cannot be easily separated from general economic activities. Labour input in transport could for example be used for services in eco-tourism but equally also for general transport regardless of environmental objectives. In such cases, it is possible to apply imputed shares, which estimate the share of service that is environmentally motivated.

Suitability for estimating employment effects of Natura 2000

The general caveats to using supply-based methods also apply for estimating the employment effects of Natura 2000. Activities linked to Natura 2000 may not be a main activity (e.g. in agriculture and forestry) of the businesses involved. This is also the primary reason why this approach has not been adopted in a comprehensive Natura 2000 jobs assessment.

Blazejczak and Edler (2015, 15ff.) recommend combining supply-based approaches (especially for environmental services provided) with demand-based approaches (especially for environmental goods provided), while relying as much as possible on official statistical sources. Such official data sources have an underlying unified sampling and quality control across EU Member States, but may need to be complemented with other surveys e.g. from business associations.

Lessons learned in past analyses

Applicability of methods

Past analyses of the role of protected areas and Natura 2000 sites have typically suffered from limited data availability at different levels (site level, local, regional, national and EU). To overcome this data challenge, previous work has often combined available data with a series of assumptions, sometimes explicitly stated and sometimes implicitly embedded in the method applied (e.g. on the availability of labour demanded in desired quantity and quality).

Among the more frequently applied methods are employment-factors, often in combination with site-based analyses. While the idea of using an average or a “typical” number appears intuitive, such approaches do not capture the potentially very wide range of employment benefits from similar economic activities on the ground in different Member States. For example, the employment generation potential of restoration activities varies greatly across the localities of the work, also within a country. Taking an average number (e.g. full-time equivalent jobs per ha of a certain landscape restored) and extrapolating on a national or EU-wide level would not produce a reliable number.

Expenditure-based approaches and input-output modelling are more appropriate, especially when the focus of the analysis is a local or regional one. When interpreting the findings, however, caution is advisable, for example as regards some implicit assumptions of the approach used, such as the availability of the labour force or inputs in the region in terms of quantity and/or quality. Further important assumptions are that prices for inputs and outputs are fixed and that there exist no capacity constraints. One important caveat of these approaches is that negative feedbacks (e.g. diverting employment from one sector to another sector through changes of wages) are not accounted for. Thus, especially from an aggregate, national or EU perspective, reliable numbers on employment benefits of activities in and around Natura 2000 sites cannot be derived.

General equilibrium models have the potential to better capture the direct, indirect and induced employment impacts of protected areas. They have not been used so far, mainly due to methodological challenges of separating economic activities within protected areas from those outside.

Challenges of deriving findings on jobs supported and jobs generated through Natura 2000

Distinguishing between jobs generated additionally, jobs supported generally (including avoiding job losses) and jobs affected negatively is a challenging task. While case examples illustrate the mechanisms at work, deriving aggregate numbers for example for a country of for the EU will not be possible due to several analytical challenges:

- Natura 2000 sites cannot be disentangled from other protected areas, other nature areas and wider green infrastructure.

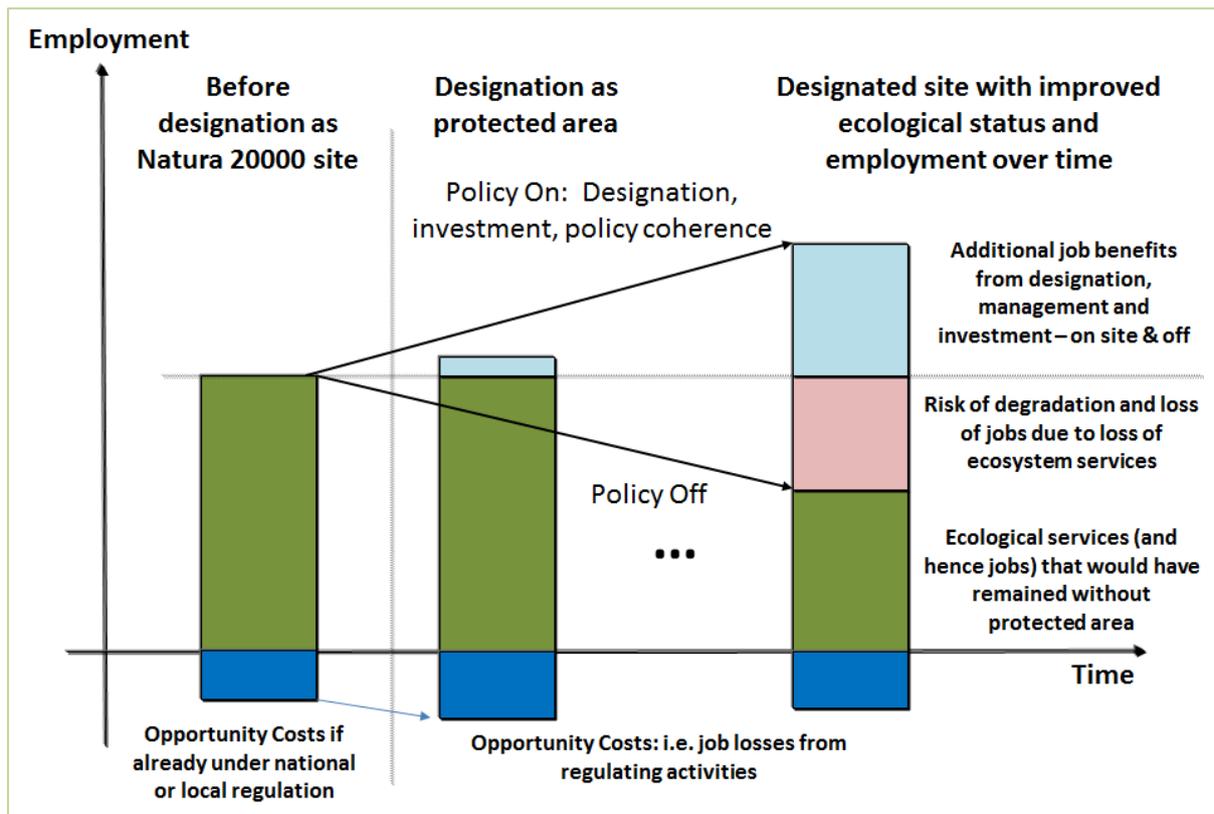
- Qualitative differences exist across comparable ecosystems due to different management regimes (e.g. protected forest areas are used in a more or less extensive way across countries in Europe).
- Economic activities linked to protected areas are typically part of wider economic activities (e.g. transport or accommodation services around protected area provided to tourists visiting sites, but also to other customers).
- This is reflected for example in classifications of economic sectors, where no “nature sector” exists. For example, the OECD/Eurostat Environment Industry (EI) Classification (OECD/Eurostat, 1999) defines a number of sectors (e.g. sustainable forestry or ecotourism), but does not refer to protected areas and their role in providing goods and services.

Interpreting results and methods

As well as understanding the applicability of a certain method, it is also important to interpret the findings appropriately. In employment analysis, it is useful to distinguish between existing jobs that are supported, new jobs that are created, jobs that are lost, as well as jobs that remain but are changed (i.e. “change of jobs” due to regulations as part of the management). Furthermore, it is also important to distinguish between the jobs provided by the ecosystem and those that are incremental “additional jobs” due to opportunities provided by the protection status. Past analyses have rarely looked into these aspects.

In this context, the timescale is important as the protection status safeguards or augments the jobs that the ecosystem provides – see Figure 18.1. There is limited research available on how the improved ecological status, after designating a site and appropriate management and/or restoration activities, have reduced the risk of ecosystem degradation (and associated job losses) and triggered new or additional activities in this enabling environment.

Figure 18.1: Natura 2000 related jobs: developments over time



Source: own representation

It is also important to assess the trade-offs (e.g. reduced forestry related employment and increased tourism – i.e. take into account the lower blocks in the figure), looking not just at immediate gains and losses, but integrating a longer timescale and taking into account avoided job losses from degradation of services and potential employment benefits from use of savings (e.g. where associated with savings from health care).

Another example of trade-offs is that of Natura 2000 sites being used as health hubs and preventative measures to meet health objectives. Where access to and use of Nature 2000 sites leads to health benefits that displaces the need for cures and treatment that cost money, there can be some associated job losses over time if the scale of preventative benefits is significant. This could lead one to conclude that Natura 2000, while it can create some jobs benefits from local guides, may end up losing jobs overall. However, this conclusion would be premature, and a solid employment analysis would need to look at the labour gains from the expenditure of the monies saved. If this were to flow to labour intensive activities, then it is likely that there are overall net job gains. As the answer depends on where the savings go, it would be useful to look at different hypotheses to create sensitivity analyses of the results. This is a typical approach to ensure a robust answer. In practice, where an I-O is used, one can choose different options – e.g. use average expenditure (i.e. average labour intensity) and then two likely alternative uses of monies and then calculate the range of jobs gains from savings.

There is also often a need to avoiding double counting. For example, jobs associated with the management and restoration of protected areas are often the same as those that could be considered for climate mitigation adaptation.

It is sometimes difficult to “allocate” jobs to Natura 2000 or to other issues. For these it is important to note explicitly assumptions and provide ranges.

Recommendations for a future analysis of Natura 2000 jobs

From a **methods perspective**, several options exist to advance the current work on Natura 2000 and employment. These refer to applying existing methods more widely to broaden the knowledge base, to refine existing methods and to experiment with new approaches.

The evidence base of employment-factors and site-based approaches is still limited and extrapolating from a relatively small sample of employment analyses will currently lead to order-of-magnitude estimates. Further site-based work is advisable to assess whether such an approach is applicable or whether the high variability of actual employment effects would be a potential reason for not applying such methods for EU-wide estimates.

Input-output models and especially general equilibrium models would offer opportunities to adapt the existing modelling framework to distinguish activities linked to protected areas from those outside. However, this would require significant work on adapting the modelling framework. Pilot projects, for example distinguishing eco-tourism from general tourism activities, could help understand whether such an adaptation would bring additional insights.

Furthermore, the combination of supply- and demand-side approaches could lead to estimates that make use of several data sources and modelling approaches. This report has summarised existing work using those approaches, however, no study exists that follows such an approach for analysing the role of Natura 2000 for jobs.

Finally, most analyses do not take the temporal dynamics of Natura 2000 site designation and the role of the ecological status for economic activities into account. This is partially due to the limitations of the method (e.g. employment factors) or due to the scope of the existing research. Bringing together the ecological status and the economic activities supported would be a major modelling challenge but also a promising avenue for the development of methods.

As regards where to target future analysis to **inform decision-making, there are several areas where additional analysis would be beneficial.**

The EU’s commitment to Better Regulation implies understanding the EU added value, supporting policy coherence and improving cost effectiveness of implementation. It also commits to a series of regular ex post evaluations, REFITS and impact assessments – each requiring the employment aspects to be covered. Therefore, we need:

- **Regular assessment of EU funding contributions** – e.g. EU added value as regards employment, as noted above.

- **Requirements for projects** supported by EU funds to identify jobs on site and off and use EU funding advantage to obtain the evidence base needed for an operational science-policy interface (see case study on LIFE funding).
- Regular **integration** of the Natura 2000-jobs issues into **policy evaluations** (e.g. ex post assessments, major reviews and impact assessments).
- **Sector assessments** could similarly be useful – i.e. to help understand the real potential for employment in health related activities and what can facilitate this (e.g. infrastructure for the mobility constrained; or guides support activities).
- **Investment in data** upon which the above assessments can be built.
- Over time, move **towards natural capital accounting** and **links of jobs satellite accounts** so that a more robust assessment of jobs levels can be made. This will require linked spatial, ecological, social and economic data.

It will be **important to assess in more detail these links** and ensure that they are **integrated into policymaking, evaluations, project and programme selection and implementation on the ground.**

There remains a need to improve the state of knowledge on the current and potential future jobs from conservation objectives and the various biodiversity targets (notably restoration). The LIFE projects employment case study (see Part C) offers a useful source of information to build on for future assessments.

Particular attention in the short term can usefully be focused on **assessing jobs linked to EU funds as well as improving the indicators and mechanisms to track job creation.**

While the above focus more on employment from government funding, there is also a need to assess the potential Natura 2000 related employment benefits from sectors and identify where these lead to private sector employment benefits. Here promising sectors would be **agriculture, tourism, recreation, fisheries and forestry** – care will be needed as regards assumptions for “allocating” jobs to Natura 2000. In addition, it would be important to understand more about the potential job benefits in the **health sector**, i.e. from increasing the use of the Natura 2000 network as health hubs, as this is a key area of potential.

Having this additional evidence base will support evidence based decision making and help support the integration of protected areas into EU policies and programmes as well as into local economies and local development. This will improve the **coherence and added value of EU policies, efficiency and effectiveness of EU funding programmes**, as well as facilitate job creation across the EU while progressing with meeting objective of nature conservation.

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Part C: Case Studies

Part C presents ten case studies that illustrate the job creation potential of Natura 2000 or other protected areas. Some of the cases serve as examples to show the application of different methods to arrive to estimates of jobs supported.

Case	Name	Country	Description
1	Management of Natura 2000 habitats in Serra da Estrela	Portugal	Site-based analysis of job effects of LIFE project on restoring priority habitats
2	Socio-economic benefits of Environmental Stewardship Schemes in England	United Kingdom	Estimating direct, indirect and induced job effects of stewardship programmes based on farm-level surveys
3	Cork oak forests and cork production in Natura 2000	Spain and Portugal	Analysis of direct and indirect jobs generated in production and processing of cork and employment factors based on this analysis
4	Job creation in Southern European Marine Protected Areas	France, Spain, Italy	Job supported through marine protected areas in commercial/recreational fishing and scuba diving
5	Employment Effects of Large-Scale Restoration – Emscher Landscape Park	Germany	Employment analysis of river restoration project based on input-output modelling
6	Secovlje Salina Natura Park and Lepa Vida Spa	Slovenia	Site-based analysis of employment generated through health and wellness activities supported by Natura 2000
7	EU LIFE Programme: Creating Jobs in Natura 2000	EU-wide	Analysis of employment effects of LIFE Nature projects in 2007 – 2014
8	Regional economic contributions of national Parks Through Tourism	Germany	Expenditure-based analysis of tourism-supported jobs in German national parks, with example from Müritz National Park
9	Regional Economic Benefits of Hohe Tauern National Park	Austria	Employment effects of national park management and tourism analysed with an input-output model
10	Expenditure-based EU-wide approaches to calculating jobs linked to Natura 2000	EU-wide	Examining the developments from the Ecotec (2002) study to the GHK (2011) and Jurado et al. (2012) studies

Management and conservation of priority habitats in Natura 2000 sites in the Serra da Estrela, Portugal

Graham Tucker, IEEP

Summary

A LIFE Nature project was undertaken from 2002 to 2006 to restore and manage a number of grassland, forest and bog habitats in the Serra da Estrela, Portugal, as these had been degraded primarily by changes to agricultural and forestry practices. The main approach of the project was therefore to support and re-establish these traditional systems, primarily by enhancing the viability of livestock grazing and protecting habitats from damage. The project cost €1,245,000 and 62 persons were recruited to carry it out.

1. Background and Context

The Serra da Estrela are the highest range of mountains in Portugal, reaching 1,991 m, and have a rich diversity of habitats and species as a result of their geology, topography, climate and human history. The Natura 2000 site holds eight habitat types listed in Annex I of the habitats directive, including the largest area of species-rich *Nardus* grasslands in Portugal, which are found above 1,700 m. On the lower slopes are remnant patches of Mediterranean *Taxus baccata* (9580) forest, *Quercus ilex* and *Quercus rotundifolia* (9340), Galicio-Portuguese oak woods with *Quercus robur* and *Quercus pyrenaica* (9230), alluvial forests (91E0), *Salix alba* and *Populus alba* gallery forests (92A0) lowland hay meadows (6510) and active raised bogs (7110).

These important habitats have been reduced and degraded as result of the abandonment and/or changes in traditional agriculture as well as from intense fires, tourism pressures, cutting and removal of riparian vegetation and hydrological changes. A LIFE Nature Project was therefore set up to address these pressures and restore and conserve the habitats through the re-establishment of sustainable land use practices. This involved selection removal of shrubs and trees to reduce encroachment on the grasslands and to reopen traditional livestock (“canadas”) to improve access to pastures, re-establishment of controlled grazing (including through improved fencing), measures to re-wet some grassland areas and bogs, planting of vegetation (including oak glades to provide shelter for livestock when established), forest management (e.g. thinning and fire break creation), restricting tourist vehicle access to sensitive areas and awareness raising. The project was coordinated by the forestry producers association (Associação de Produtores Florestais do Paúl) that represented approximately 1,100 forest owners, and had a total budget of €1,245,000.

Despite some setbacks (e.g. from fires and continued high levels of grazing in some areas), the project was considered to be successful, as amongst others things, it doubled the area of *Nardus* grasslands, and improved the condition of these and other targeted habitats.

2. What Level of Employment Is Supported by the Site?

Current jobs

As the important habitats within the site require ongoing management, to avoid encroachment from shrubs and reduce fire risks, the principal conservation approach that was taken was to support and re-establish traditional agri-sylvicultural systems and practices. In particular, it improved access and opportunities for traditional grazing, and this together with capacity building and awareness raising activities, resulted in an increase in sheep numbers of 33% and the active involvement of shepherds in the LIFE project activities. Ongoing participation is also anticipated with shepherds, such as the management of electric fences installed by the project.

The main jobs created through the management and restoration of the Natura 2000 habitats under this project therefore related to agriculture and forestry, including farmers, shepherds and foresters. According to the project summary on the LIFE database, 62 persons were recruited for different paid activities during the project. However, no further details are provided in the summary or in the project's layman's report.

Future jobs

No estimate of future jobs is provided in the LIFE project reports. However, it is indicated that the results and experience from the project helped inform new agri-environmental measures for the area, which were approved in 2005. It is therefore assumed that the lasting legacy of the project and follow-on CAP RDP funded agri-environment scheme will maintain some jobs associated with the longer-term conservation management of habitats in the Natura 2000 site.

3. Methods

Methods used for assessing current jobs

No details of the methods used to calculate the jobs created by the project are provided in the available documents. However, it is assumed that the number of recruited personnel was directly measurable from the project expenditure records.

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Estimating the incidental socio-economic benefits of Environmental Stewardship Schemes in England

Anne Maréchal and Evelyn Underwood, IEEP

Summary

Agri-environment schemes in England created an estimated 665 new FTE jobs between 2005 and 2009 (Mills, Courtney et al. 2010). This breaks down into 530 direct FTE jobs, 75 indirect FTE jobs and about 60 induced FTE jobs. The higher-tier agri-environment programme, which is largely targeted at Natura 2000, created an estimated 200 new FTE jobs between 2005 and 2009 for a total spend of £90.3 million. As the higher tier scheme covered 415,000 ha in 2009, this is equivalent to about 0.000482 FTE jobs per ha. The method used in this study (Mills, Courtney et al. 2010) included an extensive survey combining face-to-face and telephone interviews to 'Environmental Stewardship' (ES) beneficiaries and other rural economic actors throughout England. The study applies a step-by-step model to estimate direct, indirect and induced effects of the ES scheme on employment, and as a result, the number of FTE jobs supported for every £ million initial scheme injection. The analysis differentiates between entry-level and higher-level agri-environment funding. The higher-level agri-environment contracts in England are partly targeted at protected areas and overlap largely with the Natura 2000 network. Assuming that half of the HLS agreements were on land in the Natura 2000 network, it can be concluded that higher-tier agri-environment spending maintained 100 FTE jobs in the Natura 2000 network in England between 2005 and 2009.

1. Background and Context

Environmental Stewardship (ES) schemes formed a major part of the Rural Development Programme for England in the period 2005-2013. ES schemes are agri-environment schemes addressed to land managers (mainly farmers) and part-funded by the EU. Defra and Natural England commissioned a study to assess the incidental socio-economic benefits of the ES schemes in England between 2005 and 2009 in order to identify their impact on the wider local economy. The study (Mills, Courtney et al. 2010) estimates the impact of agri-environment expenditure on income and on employment, differentiating between direct, indirect and induced benefits. The work estimates the employment creation effects in full-time job equivalents (FTEs), and the employment multiplier (the proportion of indirect and induced jobs relative to direct jobs) of ES schemes. The impact of the socio-economic benefits was analysed according to different scales and variables: at national level, at regional level, by farm type, by agricultural landscape level, by size of the agri-environment contract and by scheme option, notably the Entry Level Stewardship – ELS and the Higher Level Stewardship – HLS. The HLS agreements in England are partly targeted at protected areas and overlap largely with the Natura 2000 network. Of a sample of 2% of HLS agreements active in 2012, 49% went to Natura 2000 sites over the period 2009-2011⁵⁰ (Mountford, Cooke et al. 2013).

⁵⁰ Of 174 HLS agreements 2009-2011, 29 included SPA land and 57 included SAC land. The 174 HLS agreements are a sample of 1.8% the total 9900 HLS agreements in 2012.

However, it was not possible to calculate what proportion of HLS funding went to Natura 2000 between 2005 and 2009. The LM3 model used in the study captures the effects of three rounds of spending, with the initial injection of money linked to the ES scheme and induced effects on the local economy. The model is based on specific assumptions and raises a number of general issues that need to be borne in mind when interpreting the figures, especially when trying to compare the results with those of other studies/models.

2. What level of employment is supported by agri-environment schemes?

Local employment effects of Environmental Stewardship schemes in England (UK)

The study provides ‘employment multiplier’ estimates, which reflect the proportion of indirect and induced jobs relative to the number of direct jobs created. It also provides estimates of jobs that are created for every £ million of initial ES scheme injection. The study ran 48 LM3 models using different parameters, e.g. levels of commitments by beneficiaries, by landscape types where the beneficiaries are located, by type of farms, by regions in England or by size of the ES scheme receipt. In this case study, we only report the aggregated results.

At the national level and for all scheme levels, the study calculates an employment multiplier of 1.25, in other words, **for 100 direct jobs created, 25 indirect and induced jobs** are also created as a result from further ‘rounds of spending’ of the ES scheme money within the local economy (see Methods). The study also finds that **1.32 FTE jobs** (direct, indirect and induced) are created **for every £ million spent** on ES schemes. In England overall, ES schemes created around **665 new FTE jobs** in the local economies **throughout England between 2005 and 2009**, with ‘local’ meaning the area accessible in a 40 mins drive from a given beneficiary. This breaks down into **530 direct FTE jobs, 75 indirect FTE jobs and about 60 induced FTE jobs**. The majority of those jobs were therefore created through direct effects of ES scheme spending, i.e. direct employment arising from the increased workload generated by ES scheme commitments. Direct jobs may benefit contractors, suppliers, advisors or farm workers, including farm holders (or other ES scheme beneficiaries) themselves.

HLS schemes generated the highest employment multiplier of 2.14, and the highest FTE jobs created per £m scheme injection of 2.21, reflecting the more demanding nature of these schemes and the greater requirement for the use of contractors and supplies.

Based on the findings of the survey sample, the authors suggest, “farms [enrolled in ES schemes in England] were able to absorb much of the additional workload generated by the scheme without recruiting additional staff. This implies that farm staff on these holdings was largely underemployed. Thus, it appears that ES is more important for job *retention* rather than job *creation*. In some areas where farm underemployment is widespread, ES appears to have been important in retaining family members and farm employees on the farm.”

The table below provides a comparison of ES employment multipliers and effects on FTE jobs of the ES scheme as a whole and broken down figures for the High Level Scheme (HLS – higher tier) and for the Entry Level Scheme (ELS – lower tier).

Source	Initial injection (£m)	Area	Employment effects (FTEs)					Multiplier	FTE jobs supported/£m initial injection
			Direct	Indirect	Induced	Total			
ES all schemes (40 mins drive)	504.8	England	530.2	74.6	60.5	665.3	1.25	1.32	
HLS (40 mins drive)	90.3	England	93.3	88.4	18.2	199.9	2.14	2.21	
ELS (40 mins drive)	347.0	England	413.9	21.5	43.5	478.9	1.16	1.38	

Source: (Mills, Courtney et al. 2010)

Key aspects of the method affecting comparability:

- The study looks at direct, indirect and induced jobs, while most studies do not include induced effects of expenditure on jobs.
- The boundary demarcation of the 'local economy' used was the area within a 40 mins drive. This has an impact on the magnitude of the total local expenditure on supplies (used to estimate indirect jobs, see Methods).

The total expenditure figure used accounts for additionality effects, i.e. deadweight effects are estimated and deducted from the money input. It also estimates the proportion retained by beneficiaries to compensate for income foregone.

3. Methods

Methods used for assessing current jobs

The method is based on the LM3 model, developed by the New Economics Foundation based on a more complex model by Keynes.

Researchers first carried out a literature review of studies on the economic impacts of agri-environment schemes, some of which also employed the LM3 model. This provided evidence for the social and human capital benefits of such schemes and an understanding of the potential issues associated with the LM3 model.

Data required for the LM3 model were collected through some 360 face-to-face and telephone interviews, combining closed and open questions. The sample was selected to ensure a representative coverage of scheme types, agricultural landscape types and scheme

agreement values. Further interviews were conducted with 85 local businesses to better identify the income and employment impacts of the ES schemes on businesses covering agricultural contractors, suppliers of goods and advisors.

The LM3 model estimates the effects of three rounds of spending (in this case, the public expenditure under the ES scheme), as follows:

- 1) the direct effects accruing to the whole economy as a result of the scheme area payments to beneficiaries and support to investment works;
- 2) the indirect effects of the spending by direct beneficiaries in the local economy, e.g. contractors, materials for works, and subsequently, of the spending by such 'secondary' beneficiaries, e.g. contractors and suppliers; and,
- 3) the induced effects, i.e. the expenditure of wages and profits by ES scheme beneficiaries and contractors.

The LM3 model calculates the income and employment effects of the spending; for this case study, we focus on the employment effect model only. The researchers used a combination of survey data, outputs of the income effect models, and coefficients found in the literature. It is noted that most of the survey data was used to derive the income effects, with some questions specifically targeted at employment. The employment effect model estimates the number of jobs created as a result of direct, indirect and induced spending (see above).

Direct jobs are estimated based on the mean additional FTE jobs arising from the ES scheme commitments as reported by beneficiaries (farmers and land managers) in the survey. This takes account of any displacement effects on jobs, i.e. whether the additional employees taken on as a direct result of the scheme were previously employed within the local economy, which is also captured using the survey. The mean FTE is then multiplied by the total number of beneficiaries in England.

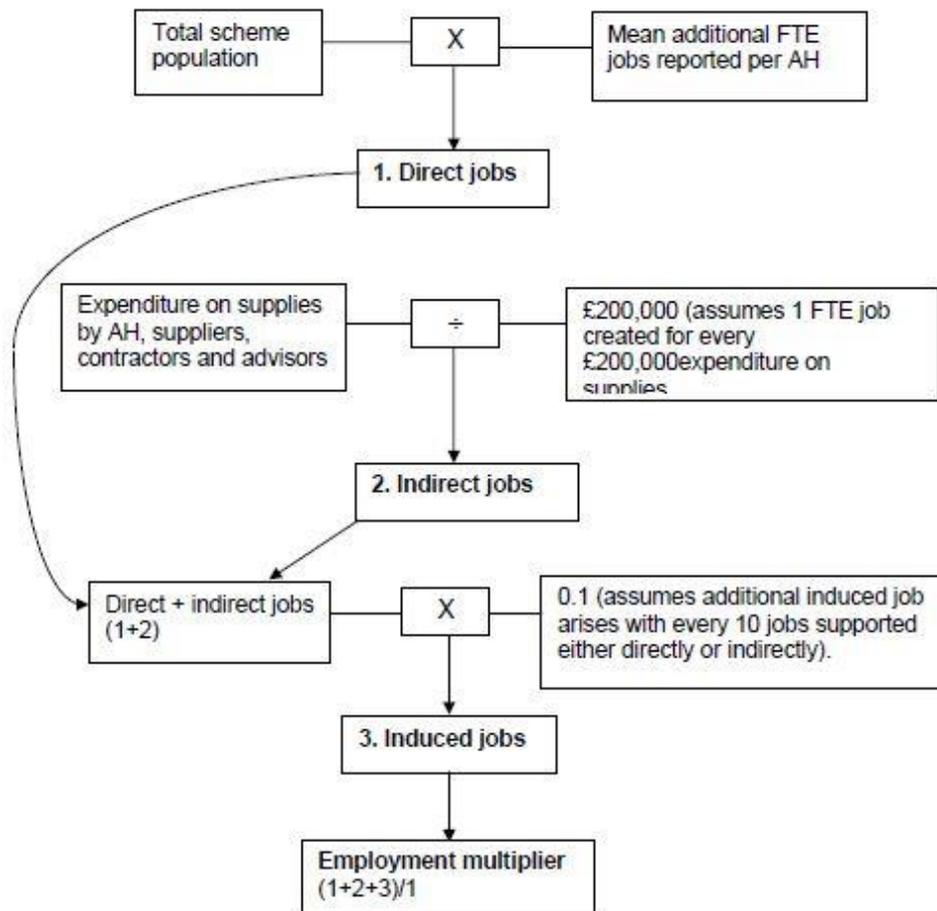
Based on a coefficient used by previous research for indirect jobs (Mills, Winter et al. 2000), it was assumed that 1 FTE job is created for every £200,000 expenditure on supplies by beneficiaries. Expenditure on supplies is estimated through interviews and includes the direct spending by beneficiaries of a proportion of the ES scheme envelope as well as second and third rounds of spending by contractors, suppliers and advisors.

For induced jobs, a coefficient of 0.1 was assumed based on the literature, i.e. 1 induced job is created for every 10 direct or indirect jobs. The coefficient is applied to the sum of direct and indirect jobs estimated in previous steps. Ultimately, an 'employment multiplier' is calculated as follows:

$$\text{Employment Multiplier} = (\text{Direct Jobs} + \text{Indirect Jobs} + \text{Induced Jobs}) / \text{Direct Jobs}$$

Figure 1 below shows the steps to calculate the total number of FTEs and the employment multiplier:

Figure 1: steps to calculate the total number of FTEs and the employment multiplier



Source: (Mills, Courtney et al. 2010). Note: AH = Agreement Holders, i.e. ES beneficiaries

Recommendations or insights for assessment in the future

The employment multiplier method is a relatively simple model that seeks to capture the overall impacts on jobs of an initial input or investment, such as expenditure from public policies, taking into account various rounds of spending of the same money into the economy. The model thus could be more accurate than other methods confined to direct and indirect impacts and can be applied in a range of contexts.

However, one of its main limits for extrapolation is that it requires the availability (or further estimation) of coefficients to derive indirect and induced jobs. The direct jobs estimate also relied on the survey of a statistically representative sample, which in this study translated into an extensive data collection exercise (360 interviews). The LM3 model is acknowledged less comprehensive than e.g. input-output models or general equilibrium models in that it does not capture how all the various actors and sectors interact and the full circular flow of income around the economy. It is however less reliant on complex secondary data and therefore less costly and simpler to implement.

Issues of relating agri-environment spending to the Natura 2000 network

Several limitations make it difficult to estimate the proportion of agri-environment spending that is going to Natura 2000 compared to outside the network, and therefore to estimate the job creation effect associated with that spending. Although the higher-level stewardship scheme is highly targeted to the English protected area network (SSSIs), it also funds the conservation of priority species and habitats, heritage features and other national priorities outside protected areas. In addition, although the English protected area network encompasses Natura 2000, it also includes a number of other sites. It should be noted that some Natura 2000 sites would be receiving entry-level environmental stewardship funding rather than HLS funding, and/or other forms of rural development funding. It is not however possible to quantify the total amount of rural development funding going to Natura 2000 in England without carrying out an explicitly spatial analysis.

Reference

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Cork Oak forests and cork production in Natura 2000 (Portugal and Spain)

Concha Olmeda, ATECMA

Summary

Cork oak forests are considerably important to the economy of Mediterranean countries and the derived products offer a large variety of applications. More precisely, cork products represent the sixth most valuable non-timber forest product (FAO, 2013) globally. Portugal and Spain are the leaders in the production and export of these products and several jobs are created through this growing industry (FAO, 2010). As many cork oak areas are part of the Natura 2000 network, this case study explores the creation of jobs associated with the cork industry in these areas. Through the analysis of the available site-specific information, the study estimates that 2,630 FTE are generated each year in the cork oak forests included in the Natura 2000 network.

1. Background and Context

The cork oak is a tree species periodically harvested throughout the tree's life for its bark. The first cork harvest is conducted when the tree is approximately 30 years old. Thereafter, harvests are practised at 9–15-year intervals, which is sufficient time for the trees to grow a new layer of cork about 3 cm thick. Cork is obtained by means of manual extraction of the cork oak bark.

Cork oak forests are of crucial importance to the economy and ecology of several Mediterranean countries, covering a worldwide area of over 2 million hectares. Cork oak forests cover almost 1.5 million ha in Europe and 700 000 ha in North Africa. Portugal has 34 % of the world's area and Spain is the second largest country in terms of cork oak forest cover, with 27 % of the total world's area.

Table 1: Cork Oak forest area in the world (APCOR, 2016)

Country	Area (hectares)*	Percentage
Portugal	736.775	34
Spain	574.248	27
Morocco	383.120	18
Algeria	230.000	11
Tunisia	85.771	4
France	65.228	3
Italy	64.800	3
Total	2.139.942	100

* Source: Portugal: IFN, 2013; Spain: MARM, 2007; Italy: FAO, 2005; France: IM Liège, 2005; Morocco: HCEF Maroc, 2011; Algeria: EFI, 2009; Tunisia: Ben Jamaa, 2011.

Cork oak forests have a high conservation, social and economic value. Cork oak forests provide a wide range of environmental services, including biodiversity conservation, soil conservation, fire prevention, resilience to climate change and desertification, carbon fixation, water table

recharge and run-off control.

The **importance of the cork oak for biodiversity and nature conservation** is recognised by the EU legislation by classifying two cork oak habitat types as habitats of Community Importance: 6310, Sclerophyllous grazed forests (*dehesas* or *montados*, habitat code 6310) and *Quercus suber* forests (habitat code 9330).

The *dehesas* or *montados* are a characteristic landscape of the Iberian peninsula in which crops, pasture land and arborescent matorral are shaded by a fairly closed to very open canopy of native evergreen oaks (*Quercus suber*, *Q. ilex*, *Q. rotundifolia*, *Q. coccifera*). It is an important habitat for raptors including the threatened Spanish Imperial Eagle (*Aquila adalberti*), the Common crane (*Grus grus*), large insects and their predators and for the endangered Iberian lynx (*Lynx pardinus*). The *montados* are usually regarded as sustainable ways to maintain productive lands in ecologically sensitive Mediterranean regions, subject to unfavourable climatic conditions (hot dry summers, wet winters) and poor soils.

Quercus suber forests are present in the West-Mediterranean region and harbour a rich biodiversity, providing suitable habitat for many protected species, such as the Cinereous vulture (*Aegypius monachus*), the wildcat (*Felis sylvestris*) and many others.

Owing to their high natural value, **a high percentage of these cork oak habitats are included in Natura 2000 areas**. In Portugal, the cork oak is the tree species with the greatest coverage by area in the Portuguese Natura 2000 network, with 114,502 ha. The share of cork oak forests within Natura 2000 is 16%. In Spain, as much as 47% of cork oak forests (9330) and 24% of *dehesas* (6310, which comprise open forests of *Quercus rotundifolia* and/or *Q. suber*) are included in Natura 2000.

Table 2: Cork oak areas within Natura 2000 in Portugal and Spain

Cork oak areas	Total Area (ha)	Area in Natura 2000 (ha)	% in Natura 2000
Portugal			
Cork oak forest (according to dominant tree species)	715,870	114,502	16 %
Spain			
<i>Quercus suber</i> forests (9330)	301,000 ¹	141,406 ²	47 %
<i>Dehesas</i> of <i>Quercus rotundifolia</i> and <i>Q. suber</i> (6310)	2,117,000 ¹	511,453 ²	24 %

Source: Portugal: National Forest Inventory 2010. Spain: ¹ SECF 2013; ² VV.AA. 2009

Cork products have a large variety of applications, making it the sixth most valuable global non-timber forest product (FAO, 2013). The main target sector of cork products is the wine industry which accounts for 72 % of what is produced, followed by the construction sector with 28 % - including floors, insulation and coverings, blocks, plates, sheets, strips and other cork products such as home and office decoration.

The world cork production is around 201,000 tons per year (2010). Portugal is the leader in production with 49.6% (100,000 tons) as well as in exports with a share of 62.7 %, followed

by Spain with 30.5% of production (61,504 tons) and 16 % in exports (Table 2). Most of the cork production is used to making bottle stoppers, the remainder used in the furnishing sector. The bulk of cork production is in privately owned areas.

Table 3: Cork production in the world (APCOR, 2016)

Country	Average annual production (ton)*	Percentage
Portugal	100,000	49.6%
Spain	61,504	30.5%
Morocco	11,686	5.8%
Algeria	9,915 4	4.9%
Tunisia	6,962	3.5%
Italy	6,161	3.1%
France	5,200	2.6%
Total	201,428	100%

Source: FAO, 2010. Global Forest Resources Assessment 2010. Country reports.

According to data from IPROCOR, the Institute of cork, wood and vegetal charcoal of Extremadura and the European Cork Confederation (*Confédération Européenne du Liège*), forestry and cork extraction activity represent about 2 million working days a year in the world's cork oak forests (i.e. around 9,000 FTE per year). The cork products industry and commerce in Europe represents between 90,000 and 100,000 jobs and an overall invoicing (exterior and interior market) of €1.7 billion a year (Retecork, 2013).

The number of companies in the Portuguese cork industry increased by around 12 per cent from 2011 to 2014 and presently the cork sector in Portugal totals nearly 670 companies hiring together 8,295 workers at national level. The main production activities are the preparation, manufacturing - production of cork stoppers, agglomeration and granulation. Around 40 million cork stoppers are produced per day in Portugal.

Spain produced 61,000 tons of cork in 2010, which represented an economic value of €43.8 million. It must be taken into account that these figures are only related to the cork harvesting, but do not take into account the added value generated in the production of bottle stoppers or materials for other uses in the construction and furnishing industry. Around 300 cork industries are present in Spain, which provide around 3,700 jobs (AITIM, undated).

2. What level of employment is supported by cork oak forests?

The entire productive chain of cork is found in the rural environment. It involves three main agents: the owners of the cork oak forests, the people who work in the forests and extract the bark, and the manufacturers of the final products, mainly cork stoppers. The extraction and use of cork has enabled sustainable forest management to be developed and creates wealth in many rural areas.

Typically, cork oak woodlands are managed to optimise cork production, with four main operations: (i) periodic weed control (every 5-10 years, more frequently in younger cork oak

stands, until the first cork harvesting) to avoid shrub encroachment, and to facilitate other operations, such as pruning and cork harvesting; (ii) formative pruning of young trees to obtain straight and long stems and branches, and sanitary pruning of mature trees to eliminate dead and/or infected branches; (iii) thinning, to eliminate trees that are old, dead, diseased, produce bad quality cork, or that compromise the growth of other, more productive ones; and (iv) periodic cork harvesting (usually every 9-10 years).

As above-mentioned, many cork oak areas are included in the Natura 2000 network and are sustainably managed for cork extraction. The Forest Stewardship Council (FSC) has certified many of these areas for their sustainable forest management.

Forest management certification in Natura 2000 ensures that sustainable forestry practices fully take into account the preservation of all the natural features that motivate the sites designation. Natura 2000 management helps and supports forest managers to identify and properly manage the high conservation value areas and to carry out the monitoring of ecologic features in their forests. In turn, the cork produced in certified areas can achieve a higher price or at least have better access to markets.

Regional administrations in Spain often provide subsidies and incentives to maintain forests in good condition in Natura 2000 areas, which supports jobs related to forestry activities. Some public administrations (e.g. the regional government of Andalusia, in Spain) have also provided subsidies and incentives to promote FSC certification among private forest managers, giving priority to Natura 2000 areas.

The public reports of certification by the Forest Stewardship Council provide useful information on the management of cork oak forests included in Natura 2000, including the number of people employed in forestry activities and cork production. Some relevant cases are presented below.

Table 4: Cork production and jobs in Natura 2000 areas in Spain and Portugal

Location, Natura 2000 site, certification code	Surface	Cork production/year	Number of workers	Source
Andalusia, Spain Los Alcornocales (ES0000049) FM/COC-002776	6,090 ha	522,946 kg	Total: 52 workers in the forest area. 39 men, 2 women. 11 forestry workers (including subcontractors)	FSC Annual audit public report 2016
Valencia, Spain Sierra de Espadán (ES5222001) and Sierra Calderona (ES5232002) FM/COC-015619	1,075 ha	259,136 Kg	Total: 12 workers; 11 men and 1 woman (hired for 3 months).	FSC Assessment public report 2012
Andalusia, Spain Los Alcornocales (ES0000049) FM/COC-021969	5,458 ha	720,740 kg	Total: 51 workers. Full time local workers: 4 men, 7 women. Part time local workers: 40 men.	FSC Assessment public report 2015

Location, Natura 2000 site, certification code	Surface	Cork production/ year	Number of workers	Source
Catalonia, Spain Les Gavarres (ES5120010) FM/COC-006182	1,607 ha	90,000 kg	Total: 20 workers. Full time local workers: 3 men. Part time local workers: 11 men, 6 women.	FSC Assessment public report 2011
Extremadura, Spain Sierra de San Pedro, (ES0000070) FM/COC-006535	8,529 ha	853,242 kg	Total: 18 workers. Full time local workers: 12 men, 6 women.	FSC Assessment public report 2012
Alentejo, Portugal Cabeção (PTCON029) FM/COC-002594	8,602 ha	1,038,525 kg (+ timber: 3,828 m ³ , in 2014)	Total: 67 workers. 46 men, 21 women + Other contractors (variable, depending on the operations)	FSC Assessment public report 2015
Alentejo, Portugal Cabeção (PTCON029) FM/COC-835564	4,462 ha	447,225 kg (+ pine cones: 280,588 kg), in 2015	Total: 8 workers, 5 men and 3 women (2012) All forestry work is performed by local subcontractors (2015)	FSC Annual audit report 2012, FSC Reassessment public report 2015
TOTAL	35,823 ha		228 workers	

Source: Reports of FSC certification, available at: <http://info.fsc.org/certificate.php>

On average, cork production in these areas amounts to 110 kg per hectare per year. The price of the cork bark harvested is around €1 /kg.

The number of workers reported in these sites indicate that around **6.4 workers are employed per 1000 ha per year in cork extraction and forestry activities**. However it is not always possible to know whether they are hired throughout the year or only temporarily during the time required to carry out the cork harvesting (i.e. usually three months) or the forestry activities needed to maintain the forest in good condition and to prepare the extractive activity (e.g. bush clearing, pruning, etc.).

In addition to jobs dedicated to cork harvesting and forestry activities in cork oak forests, a number of jobs are supported in the cork industry. Most of the cork production is used for making bottle stoppers and a number of small industries work in the production and sale of stoppers, which require labour and personnel for manufacture and marketing.

In order to estimate the jobs created in the productive chain related to cork oak forests in a Natura 2000 area, a particular case study from Spain is presented in the box below.

Cork production in a Natura 2000 site in Spain

A family business (Oret Subericultura) owns and exploits cork oak forests with a total surface of 1075 ha, which are included in two Natura 2000 areas (Sierra de Espadán and Sierra Calderona) in the Valencia Region (Spain). These are quite dense forests with over 600 cork oak trees per hectare, which allow an annual extraction of 191,846 kg of cork

(according to the management plan). Some financial support is available from the regional administration to carry out the forestry activities needed to maintain these forests in good condition.

The company provides temporary work for cork extraction and forestry activities (clearing, pruning, etc.), employing some 12 to 20 local workers for around three months every year, depending on the years and on the subsidies available for forestry activities. This represents around 3 to 5 FTE per year employed in the forest.

3. Methods

It would be possible to estimate jobs in cork oak forests in Natura 2000 based on the information available from the sites mentioned in Table 4 and on the area of these forests included in Natura 2000, as referred to in Table 2.

Taking into account the number of workers reported in some sites included in Natura 2000 (Table 4) and on a more detailed analysis of one of these cases (Oret Subericultura), we can estimate the following figures:

- 1000 ha of cork oak forest maintain 4 FTE jobs in the forest.
- Cork manufacturing requires around 15 FTE per 500.000 kg of cork.
- Cork oak forests produce, on average, 110 kg of cork per ha.

Considering that around 25% of the cork oak forests are included in Natura 2000 (based on the figures provided in Table 2 for Portugal and Spain), we can provide the following estimates for cork oak forests in Natura 2000 (Table 5).

Table 5: Jobs and cork production in Natura 2000 (based on own estimates)

Cork oak forests in Natura 2000	Annual cork production	Workers in the forest	Workers in cork manufacturing	Total direct jobs
360,263 ha	39,628,930 kg	1,441 FTE/year	1,189 FTE/year	2,630 FTE/year

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Job creation in Southern European Marine Protected Areas

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Summary

Marine Protected Areas (MPAs) can contribute to creating new and supporting existing jobs that benefit local economies. A study by Roncin et al. (2008) estimates the number of jobs related to commercial/recreational fishing and scuba diving in 12 Southern European MPAs. According to their results, each MPA generates on average about 43 full time-equivalent jobs for professional fishermen per year. In addition, each MPA generates on average 13 jobs per year for companies providing products and services to scuba divers and 2 jobs related to products and services used by recreational fishers. These results show how the designation of MPAs has positive economic impacts and benefits local economies.

The study underestimates the jobs created by MPAs, as it does not take into account a) jobs related to resident recreational users; b) indirect job creation along the entire value chains of services and products related to fishing and recreational activities; 3) the positive impact of MPAs on employment due to the improved state of fishery stocks near many MPAs, which is due to the protection measures in place inside the MPAs.

1. Background and Context

EMPAFISH (<http://www.um.es/empafish>) was an EU funded research project (6th Framework Programme) carried out between 2005 and 2008. It aimed at analysing the role of European Marine Protected Areas (MPAs) in fisheries management and conservation. In the context of EMPAFISH, a study by Roncin et al. (2008) explored the impact of Southern European MPAs on local economies in twelve Southern European MPAs. The MPAs used as case studies were different in size, ranging between 800km² (Bonifacio) and 4km² (Monte da Guia), and only 5% of their total surface was an integral reserve (no-take zone). Nine MPAs were in the Mediterranean sea (three in France, four in Spain and two in Italy) and three in the Atlantic sea (two in the Canary Islands and one in the Azore Islands). Only one of the case study MPAs was a Natura 2000 site (Monte de Guia, Portugal). The analysed MPAs were all located in highly touristic areas (on average around 7,000 scuba divers and 2,000 recreational fishers visit each of these MPAs per year).

2. What level of employment is supported by the site?

The study estimated the jobs and income created by commercial fishing and recreational activities (recreational fishing and scuba diving) inside the analysed MPAs. It came to the conclusion that there were on average **54.2 full time job equivalents** per year per MPA for professional fishermen, 13 jobs for companies providing products and services for scuba divers and 2.1 related to services and products for recreational fishers (see Table 1).

Table 1: Jobs and income related to professional fishing and recreational activities in 12 Southern European MPAs

MPA	Professional fishing ^a		Recreational fishing ^b		Scuba-diving ^b	
	Added value ^c	Jobs ^d	Added value ^c	Jobs ^d	Added value ^c	Jobs ^d
Banyuls					973	22.9
Bonifacio					948	22.3
Cabo de Palos					868	20.4
Columbretes	1573	50.4			211	5.0
Côte Bleue			52	1.8	632	14.9
La Graciosa	482	50.0	35	1.1		
La Restinga	306	31.4	55	1.7	616	14.5
Medes	48	4.2			1099	25.9
Monte da Guia			211	5.0	241	5.7
Sinis	1140	133.9			16	0.4
Tabarca					16	0.4
Tuscany					446	10.5
Mean	710	54.0	88	2.1	551	13.0
Standard deviation	563	43.4	71	1.7	374	8.8

Data source: EMPAFISH field survey 2005–2006.

^aAdded value and jobs due to fishing within MPA.

^bAdded value and jobs related to expenditures of non-resident recreational users of MPA.

^cUnit: 1000 €.

^dYearly full-time equivalents.

The study did not aim to assess the impact of the MPA designation on the creation of jobs, i.e. how employment would have looked in the analysed locations if they were not protected areas. However, a question was included in the questionnaire about the so-called “designation effect”, i.e. the increased attractiveness of a place due to the MPA designation, and the relative economic impact. Most surveyed scuba-diving operators affirmed that the designation of MPAs had a positive impact on their activities by attracting divers. This is confirmed by the opinion of scuba-diving operators, the majority of which declared that the MPA designation had a positive impact on their business. This can be explained by the fact that scuba divers tend to think that the designation of MPAs has a direct impact on the quality of ecosystems, resulting in the protection of underwater scenery and spectacular or emblematic species.

As regards commercial fishermen, in three of the six locations surveyed, more than 75% of them declared that the MPA designation had a positive impact on their business, and in another one more than 60% of the surveyed fishermen said the same. This is probably due to the increased fish abundance and size in the areas near the MPAs, which may in part have compensated the reduced fishing opportunities due to the restrictions imposed inside them.

3. Methods

Methods used for assessing current jobs

The authors carried out a socio-economic survey (1,836 questionnaires completed) between 2005 and 2006 to explore the kind of users, the activities they carry out inside the MPAs and their attitudes towards them. The survey was directed to MPA users (fishers and scuba divers) and persons with an activity inside the MPA. This approach led to an underestimation of the job creation. In fact, the jobs created by the so-called spill over effect (i.e. the increased and

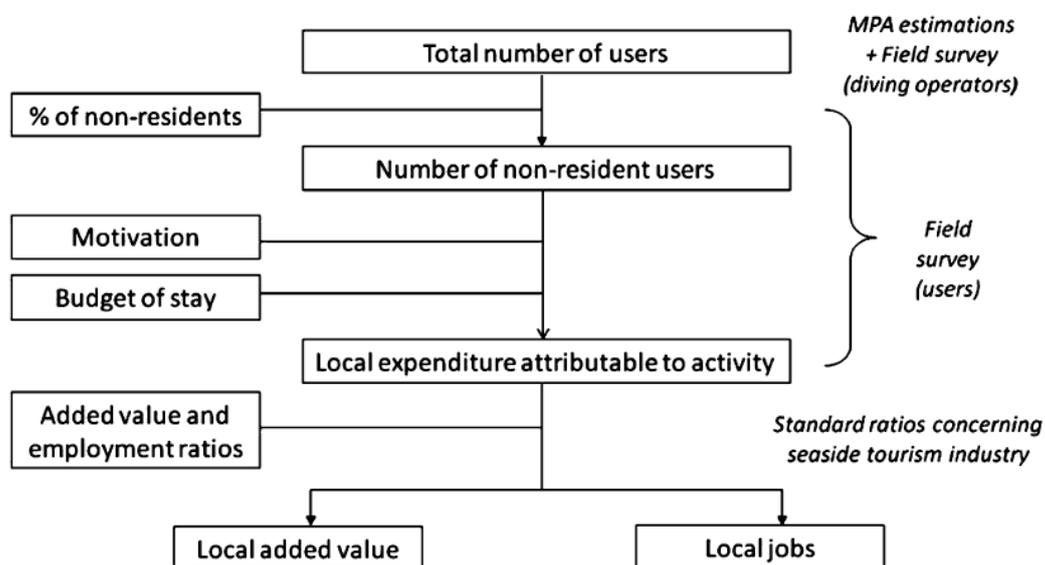
improved state of commercial fish stocks near MPAs due the environmental protection measures inside it) were not taken into account, mainly due to lack of data and information on this issue. Also, indirect job creation was not considered (i.e. jobs related to goods and services provided to the fishing and tourist operators and those up- and down-stream in the related economic value chains, such as for example fish canning industries and travel agencies).

The jobs due to commercial fishing activities were estimated using information on the number of commercial fishing boats obtained from MPA authorities and calculating the share of the jobs created due to activities carried out inside the MPA, based on fishermen’s answers to the survey.

The authors also analysed the jobs related to recreational activities (i.e. scuba diving and recreational fishing), based on those created by local business like hotels, restaurants, diving or charter-fishing operators due to expenditures of non- resident recreational users of the MPA. In order to do so, they multiplied the total number of recreational users (obtained from the MPA authorities and diving operators) by a ratio of non-resident users/total population derived from the field survey. Recreational users were considered non-resident if the distance between the MPA and their permanent home was more than 50 km. This leads to an underestimation of the jobs related to the provision of services and products to recreational fishers. In fact, whereas most divers are non-residents in most case studies (88% on average), in some MPAs, the majority of recreational fishers are resident.

After that, the authors estimated the amount of non-resident users who were mainly attracted to the area to fish or dive (the related information about the main motivation of the trip was obtained from the survey). The corresponding job creation was calculated on the basis of standard ratios from statistical data on the French seaside tourism industry (Kalaydjian, 2006), according to which 1 million hours spent by tourists visiting the seaside generate on average 9.89 jobs (full-time equivalent units) locally. Figure 1 shows the methodology adopted to assess job creation related to recreational uses of the MPAs.

Figure 1: Method to estimate the economic impact of recreational users



Recommendations or insights of use for calculating jobs for assessment in the future

The methodology used in this article is solid and coherent, and could be replicated to analyse the job creation effect in other MPAs. Future analysis should try to assess jobs created due to the spill-over effect and those related to the expenses of resident recreational users. In addition, indirect job creations should be calculated, using information on the value chain of products and services related to professional fishing and recreational activities. Finally, the jobs related to other uses of MPAs may be calculated, e.g. those related to touristic uses other than scuba diving and fishing.

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Employment Effects of Large-Scale Ecosystem Restoration – Emscher Landscape Park, Germany

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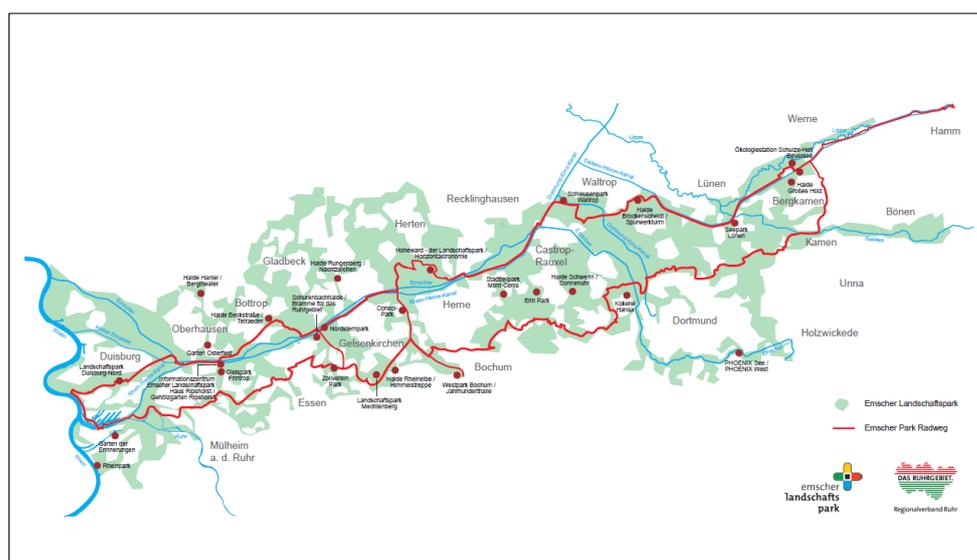
Summary

The Emscher Landscape Park (ELP) in Germany is one of Europe’s largest ecosystem restoration projects. The project is comprised of a river revitalisation programme and over 400 green infrastructure projects. The results of these infrastructural works have been to support biodiversity in the region, create jobs, and support the regional economy. Generating employment in the region was a key objective of the project, particularly in light of the de-industrialisation and decline of the coal and steel sectors, which had previously defined the region. Investments of EUR 4.5 billion led to the creation of 25,847 direct, indirect and induced jobs in the state of Nord Rhine Westphalia in the period 1991-2007. A total of 48,884 direct, indirect and induced jobs were created across Germany for the same period. By 2020, it is anticipated that the ELP project will have created 55,892 and 101,687 jobs in the region of NRW and across all of Germany respectively (RWI, 2013). Input-output models and macro-economic modelling applied in a study of employment benefits linked to the ELP carried out in 2013, provides insights for assessing benefits of ecosystem restoration.

1. Background and context

The Emscher Landscape Park (ELP) provides an example of how investment in ecosystem restoration can both increase the ecological value of an entire region and trigger local economic development.

Figure 1: Map of the Emscher Landscape Park (Regionalverband Ruhr)

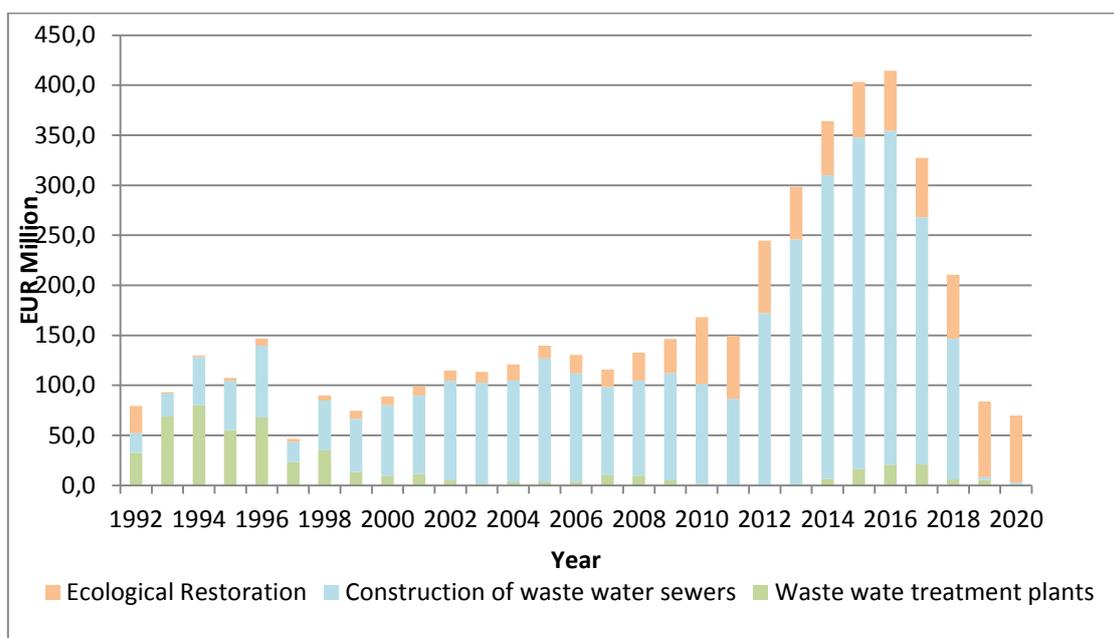


Between the 19th and 20th century, the Ruhr region was central to Germany’s coal and steel industries, as well as subsidiary sectors. Industries fell into decline following the 1950s, and

Germany's Wirtschaftswunder. Several brownfield sites suffered from severe contamination (for example from heavy metals), and the Emscher River itself had been used for a number of decades as an open sewer for human and industrial waste (WWF, 2012). Before redevelopment, at multiple sites, industrial wasteland and mine dumps existed alongside residential areas (Regionalverband Ruhr, 2013).

Following investments of EUR 4.5 billion, the redevelopment and renaturing of the Emscher river system and its surrounding brownfield sites constitutes one of Europe's largest environmental re-engineering projects (RWI, 2013). The International Building Exhibition (Internationale Bauausstellung or IBA Emscher Park) was started in 1989, and ran for 10 years; this was the starting point for the renaturalisation of the Ruhr region. The ELP itself covers 80km and an area of 300 km², crossing 17 towns and cities. Multi-stakeholder engagement and multi-level governance are emblematic to the Emscher project, as over 450 projects have been implemented by 20 local authorities, two districts, three regional governments, the state of North Rhine-Westphalia, the Regionalverband Ruhr (Ruhr Regional Association), the water companies Emschergenossenschaft and the Lippeverband (Regionaverband Ruhr, 2013).

Figure 2: Construction expenditure in the ELP project 1992 – 2020 (RWI, 2013. p. 131)



From a nature conservation perspective, as well as the revitalisation of the river itself, the project focused on re-establishing connectivity between green spaces, notably through the development of seven green corridors. The park is a UNESCO World Heritage Site and includes a number of Natura 2000 sites, as well as accommodating 1500 plant species (50 on the IUCN Red List) (European Commission, 2013). An emphasis in the area's redevelopment has been placed on the biodiversity advantages of brownfield sites (WWF, 2012).

A detailed study into the regional economic impacts of the Emscher redevelopment programme including employment impacts was carried out by the Rhineland-Westphalian Institute for Economic Research (RWI, 2013).

2. What Level of Employment Is Supported by the Site?

Current jobs

A key objective within the Emscher redevelopment programme was to create and secure jobs. Including indirect employment, it is estimated that between 1991 and 2020 the Emscher development programme will generate EUR 11.9 billion for the economy and 109,787 person years, with an average of 3,700 FTE created each year. Of these jobs, around 58% are located in North Rhine-Westphalia itself. In the period 1991-2007, 25,847 direct, indirect and induced jobs were created in North Rhine Westphalia linked to the ELP. A total of 48,884 direct, indirect and induced jobs were created across Germany for the same period.

Job creation is identified in at least 23 sectors in the period of 1991 – 2007. Sectors with notably high levels of employment benefits are stonework, machinery operators, civil engineers, wholesale services, and company related services (RWI, 2013. p.48). Some benefits across sectors are detailed below:

Urban and regional development – the polycentric nature of the Emscher Landscape Park benefits up to 18 million people in the region (including the Ruhr District and the whole state of North Rhine Westphalia) (WWF, 2012). An estimated 1,400 jobs have been or will be created each year directly engaged in the redevelopment of the Emscher Park (RWI, 2013).

Tourism – The ELP is now a popular tourist attraction, particularly following its award of UNESCO status. A number of outdoor and indoor facilities, as well as wider infrastructure have been established to support tourism, a number of which provide employment opportunities. A good example is the ELP Information Centre (Regionalverband Ruhr, 2013).

Recreation – A number of recreation opportunities exist in the ELP that were not previously possible, a number of which support direct and indirect employment. Anglers benefit improved spawning grounds at a restored oxbow lake. Cyclists can cycle through the park using the Emscher Park Cycle Trail. RevierRad was established in 1997 to provide cycle tourism infrastructure to the whole Ruhr region (RevierRad, 2015).

Climate change adaptation – plans to revitalise the Emscher River have aimed to take into account possible changes to the regions climate, and the impact this could have on the 865 km² river catchment. Cooling green spaces and resilience in the river system were included in the ELP development plan to avoid drying out brooks in the summer, as well as increasing the retention capacity of water bodies to avoid flooding during heavy rainfall events. One example has been the construction of Lake Phönix in Dortmund (supported by funding within the Urban Water project), which will be able to absorb up to 240,000 cubic meter of floodwater from the river Emscher. The Dynaklim Group, which was established to create a regional climate change adaptation strategy, includes more than 50 partners, including water boards, municipalities, universities, and regional/civil society groups (Climate-ADAPT, 2015).

Research, Innovation and Education – the park accommodates infrastructure and associations engaged in research and education activities. This includes the Voßgätters Mühle nature conservation centre and the Young Nature Conservation Society. A “Nature School” was set up in 1995 for the City of Essen to promote nature conservation. In 2012, they had 45,000 visitors. An obstacle free park gives educational opportunities to disabled people at Gruga Park (European Commission, 2013. p.9).

Future jobs

For the period 2012 – 2020 the RWI study includes an ex ante analysis of the economic effects of the ELP, including employment. This is in recognition that the Emscher redevelopment plan is committed to EUR 2.4 billion of further investments for that period, as well as EUR 0.2 billion in operation expenses. **By 2020, it is anticipated that the ELP project will have created 55,892 and 101,687 jobs in the region of NRW and across the whole of Germany respectively (RWI, 2013. pp. 139,140).**

Table 1: Forecasted Regional employment effects of investments in the Emscher redevelopment programme for the period 2008-2020 (RWI, 2013. p.139-140)

Year	Direct employment benefit (excluding induced jobs) for all Germany	Total employment benefit (including induced jobs) for all Germany	Total employment benefit (including induced jobs) for NRW only	Direct employment in the Emschergenossenschaft (water company)
2008	1208	2403	1367	270
2009	1285	2526	1437	270
2010	1477	2914	1658	270
2011	1255	2914	1658	270
2012	1961	3569	2031	270
2013	2300	4755	2705	270
2014	2735	5808	3305	270
2015	2951	6605	3759	270
2016	2978	6902	3927	270
2017	2324	6156	3503	270
2018	1514	4438	2525	270
2019	640	2434	1385	270
2020	544	1380	785	270
Total (2008-2020)	23172	52803	30045	3,510

3. Methods

Methods used for assessing current jobs

The RWI (2013) study provides a comprehensive assessment of the economic impacts of the Emscher redevelopment project using **input-output analysis as well as a dynamic macro-economic model** (RWI-Konjunkturmodell). Input-output models analyse the effect of investing in restoration, particularly in the construction sector, as well as upstream sectors. The RWI-Konjunkturmodell is used to trace the impacts of investments on the economy as a whole. The outputs of the study are based on two work units:

The first unit examined economic impacts linked to construction activities, including contractors and subcontractors linked to investments; it also considered labour income associated with this work as well as resulting tax incomes. An ex-post analysis of the fiscal effects of the project is carried out for the period 1991–2001, this is followed by an ex-ante assessment of fiscal effects of the project for the period 2012–2020. The RWI study assumed

that jobs created would be replaced by unemployment if the development programme did not exist, so also calculated benefits in terms of the opportunity costs of employment and unemployment. In terms of employment benefits, this first work unit is of most interest in the context of this study.

The second unit examines the impact on the real estate market, and analyses the extent to which the improvements in the quality of the environment and of access to green space has had on housing prices locally.

Recommendations or insights of use for calculating jobs for assessment in the future

The case of the ELP and the related study by RIW (2013) provides insights on how large-scale ecosystem restoration can generate significant employment benefits. Input-output models and macro-economic modelling are used to provide both ex post and ex ante assessment of these benefits. This case study is not explicitly focused on the Natura 2000 sites linked to the ELP; indeed much of the ELP does not have conservation status. Future analysis might examine how successful ecosystem restoration in the ELP could lead to Natura 2000 designation, and might examine the employment benefits that designation could have on the region. Furthermore, other sites carrying out ecosystem restoration programmes could apply similar methods to the RWI study. In the ELP itself, future assessment might consider the extent to which jobs created are secured in the post construction phase.

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Sečovlje Salina Natura Park and Lepa Vida Spa, Slovenia

Maeve Howe, IEEP

Summary

Sečovlje Nature Park in southwestern Slovenia is part of the Natura 2000 network. A number of years ago, the Lepa Vida Spa was established in the area that uses products from the Sečovlje saltpans in its treatments. It is a health-promotion setting and the focus is on wellness. The spa is an entirely commercial entity and has not received any EU funding or public funding of any other kind. However, Lepa Vida must obey strict restrictions on its facilities and the treatments it offers due to its setting in the nature park.

1. Background and Context

Salt production in the area of the Sečovlje Salina Nature Park dates back 700 years and this activity has led to the creation of a unique habitat that attracts plants and animals that favour salty conditions (Slovenian Tourist Board, 2016a). The park is quite small, at 750ha, and currently receives around 50,000 visitors per year, from 8,000 in 2002. Most visitors to the park only spend one day there, although no systematic evaluations have been made to date (Sovinc, 2016).

In recent years, new applications have been commercialised for the salt from Sečovlje. Thalassotherapy treatments, which use seawater and sea products, are offered in the spa. Products made from salt derived from the local saltpans are used in the treatments. These include a variety of infused bath salts, soap containing sea mud, brine that is a by-product of salt evaporation, and salt peeling kits (Soline, 2016a). As well as being stocked for sale in the nature park itself, the products are sold by retailers throughout Slovenia in cities like Ljubljana, Maribor and Koper (Soline, 2016b).

2. What Level of Employment Is Supported by the Site?

Current jobs

Because the treatments are carried out outdoors, Lepa Vida Spa is only operational during the summer months and it is weather-dependent. Most of the employment at the spa is therefore seasonal. In the summer season, 20 therapists and 2 full-time servers are employed. As regards year-round jobs, there are 1.5 full-time jobs in management/admin and 1.5 full-time jobs in cleaning and maintenance. In addition to providing treatments, salt-based products are also sold at the spa for clients to take home. Average spending by a guest in the spa is €50 per day (Sovinc, 2016).

Only some light snacks and drinks are sold at the spa and there are no hotels in the nature reserve itself. Accommodation and food services are catered to outside of the park, generating employment there that is spurred on by the people that come to visit Lepa Vida

spa. The biggest tourism resort in Slovenia is located just 1.5km away from the park so there is ample accommodation available locally.

Future jobs

In speaking to Sečovlje Salina Natura Park contacts, we discussed the plans of Lepa Vida Spa, concerning future job creation. To some extent, the outdoor setting of the spa limits its operation to the summer period. We asked if finding staff for just the summer period was difficult and also if there are any plans to expand the premises in the future so as to provide treatments in an indoor setting. The respondents said that it is not particularly difficult to recruit therapists even though the spa is only open for the summer period, although they mentioned that it would be easier if they could offer full time and permanent jobs.

Under current management, there are no plans to develop indoor treatment facilities at the spa, as it is felt that this would detract from the main objective of biodiversity conservation. Conservation regulations dictate that there can be no accommodation in the spa complex itself, that it closes overnight, that the spa is only operational in the summer. In addition to this, guest numbers are limited and there is no motorised access to the spa. Regulations are considered as an advantage rather than a disadvantage because they mean that the spa can be promoted as truly natural.

3. Methods

Methods used for assessing current jobs

Employment levels were obtained via personal correspondence with staff in Sečovlje Salina Nature Park. They were able to tell us about the number of direct jobs that have been created in the spa, and about employment patterns, as well as give us some indication of estimates for the number of indirect jobs that are supported. These estimates had not been formalised or published, but rather they were based on extrapolations from calculations on Triglav National Park. These deemed that there are in the range of seven jobs created outside the park for each permanent job.

Recommendations or insights of use for calculating jobs for assessment in the future

As no actual study or assessment had been taken on the number of indirect or induced jobs that are associated with Sečovlje Salina Nature Park or Lepa Vida spa itself, estimating the number of indirect or induced jobs associated with the park and spa was difficult. Estimations provided by Sečovlje Salina Nature Park contacts were based on Triglav National Park, which is the only national park in Slovenia. This poses some problems and the degree to which the two are comparable entities is questionable. In terms of size alone, Triglav National Park is a considerably larger than Sečovlje Salina Nature Park, with an area of 838 km² (Slovenian Tourist Board, 2016b) in comparison to 6.5 km², of which only 0.98 km² is dry land (Slovenian Tourist Board, 2016a). Extrapolating from one to the other to determine indirect/induced jobs would not lead to reliable estimates.

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The EU LIFE Programme: Creating Jobs in Natura 2000

Concha Olmeda, ATECMA

Summary

LIFE provides over €610 million for the priority area Nature and Biodiversity in the period 2014-2017 (first LIFE Multiannual Work Programme). As LIFE co-finances 60% of the project costs in Natura 2000 projects, €1000 million will be invested in Natura 2000 over this period. From its inception in 1992 until 2013, LIFE-Nature has co-financed around 1,500 projects, contributing more than €1.5 billion.

Key outcome indicators for LIFE projects are reported from 2015, including jobs. This allows a regular assessment of jobs supported by LIFE that can help in mid-term and ex post evaluations of the societal impacts of the LIFE Programme. 281 LIFE projects focused on Natura 2000 (approved from 2007 to 2014) have supported 2890 annual FTE jobs related to the project implementation, i.e. on average around 10 direct jobs per project, and 3,5 jobs per €million invested.

Based on these figures, it can be estimated that LIFE can support around 3,500 direct jobs (annual FTE) related to Natura 2000 and biodiversity conservation in its first Multiannual Work Programme (2014-2017). This could represent 5,900 FTE jobs including indirect jobs (using a multiplier of 1.7).

LIFE projects report about personnel costs linked to the actions implemented, which could allow estimating the direct jobs supported under different project activities. External assistance can also provide personnel for the implementation of the project actions and needs to be taken into account when calculating project related jobs.

Indirect jobs are however difficult to assess as this information is not available from LIFE projects reporting and is not included in the outcome indicators.

1. Background and Context

LIFE is the financial instrument supporting environmental, nature conservation and climate action projects throughout the European Union. One of its priority areas, LIFE-Nature and Biodiversity specifically aims to support the further development, implementation and management of the Natura 2000 network and to contribute to the development and implementation of the EU Biodiversity Strategy.

Other LIFE strands, i.e. LIFE Environment and LIFE Climate action, can also co-finance relevant actions in Natura 2000, e.g. activities related to water management, marine pollution or coastal management for climate change adaptation, just to mention a few examples. However, these other LIFE projects are not considered in this case study.

From its inception in 1992 until 2014, LIFE-Nature has co-financed 1,528 projects, contributing more than €1.5 billion over 26 years (considering that LIFE projects approved in 2014 will last until 2018).

LIFE-Nature can co-finance any **type of actions** required for the implementation and management of the Natura 2000 network, and in particular for the conservation and restoration of habitats types and species that motivate the designation of the sites included in the network. The project actions may include: surveys, studies and planning for the implementation of the actions required in the sites, fieldwork and on-site conservation and restoration measures, monitoring and surveillance activities, education, awareness raising and dissemination of information.

The eligible costs financed in the LIFE-Nature projects are included in the following **categories of expenditure**: personnel, travel, external assistance, durable goods (infrastructure and equipment), land purchase, consumable, other costs and overheads). Personnel costs are reported in the LIFE projects based on the number of working hours dedicated to the different project activities.

LIFE-Nature projects can include many different types of actions, which makes it difficult to identify categories of projects. However, some **types of projects** can be distinguished according to their main objectives, as projects aimed at:

- Restoration and maintenance of habitats in favourable conservation status, which may concern all habitat types: coastal, forest, wetlands, grasslands, etc.;
- Conservation of species and their habitats (marine, terrestrial, birds, etc.)
- Identification, designation and establishment of Natura 2000, especially in the marine environment; and
- Integration of Natura 2000 management into land uses and economic activities present in the network, including fostering the use of other EU funds in the sites (this type corresponds especially to the so-called “integrated projects”, a new type of projects to be funded in the new LIFE period 2014-2020).

In the current programming period (2014-2020), LIFE projects need to report on their outcomes and will be regularly monitored and evaluated based on the outcome indicators defined both at project and at programme level. Each project will have to report on a set of **key indicators** corresponding to the sector or priority area on which the project focuses, as well as on further mandatory key indicators concerning the project's societal and economic outcomes.

Among the latter, the projects shall report on the number of **project related jobs**, expressed in full-time equivalents (FTE). Where possible, the calculation of the actual **annual FTE** used for the project should rely on working time registration. Otherwise, the FTE can be estimated based on the project manager's experience⁵¹.

⁵¹ According to the General Guidance for the LIFE projects outcome indicators, available at: http://ec.europa.eu/environment/life/toolkit/pmttools/life2014_2020/documents/160215_LIFEproject_level_outcome_indicators.pdf

A first data set regarding the relevant indicators and related descriptors are collected in the application phase. It will reflect the applicant's real data, estimates and/or forecasts at project level regarding the situation at the outset of the project, at the end of the project and 5 years beyond the project's end.

The data collected through the **LIFE indicators will be public** once validated at the end of the project, will allow for structured and meaningful reporting on the project and programme outcomes and provide a wealth of data to researchers and other stakeholders.

2. What level of employment is supported by the LIFE Fund?

Information on direct jobs supported by LIFE projects currently available

As regards the number of direct jobs supported by the projects approved from 2007 to 2014, a **pilot LIFE Key Project Indicator** database prepared by the Commission with the collaboration of the projects' managers provides information regarding socio-economic indicators, such as the jobs created by the projects, expressed in full-time equivalents (FTE).

The following numbers have been obtained from this database for 281 LIFE-Nature and Biodiversity projects acting on Natura 2000 sites, which were approved from 2007 to 2014 (for further details see Annex 1 of this case study).

Table 1: Employment in LIFE projects (2007-2014)

Nr of projects	Jobs (FTE) 1 year before the project	Jobs (FTE) during the project*	Jobs (FTE) 5 years after the project*	Jobs per project*	Jobs per million € invested*
281	647	2904	1459	10,3	3,5

*annual average FTE

These figures correspond to **direct jobs** created or supported in relation to the project activities, and should be based on actual data (e.g. working time registration) or on estimates by project's managers.

The information on jobs included in this pilot database indicates the number of FTE corresponding to men and women and to different professional categories or qualifications (e.g. worker, technician, engineer, etc.). However, it is not possible to know the exact role or the activities carried out by the personnel from this database.

Moreover, it is not possible to know exactly how these figures have been calculated/estimated, although it is assumed that these jobs numbers mostly include the personnel directly engaged in the project activities but not always the personnel that can be involved in the activities carried out through external assistance. The interpretation of the data is therefore limited and conditioned by these uncertainties.

Often, external assistance (sub-contractors) also provides personnel to carry out some project actions (e.g. restoration works, scientific assistance, expert work, surveillance and monitoring). The jobs created by the external assistance provided in LIFE projects should be

estimated, based on the type of actions sub-contracted and on the information provided in the project about the activities undertaken under this category of expenditure. For instance, surveillance and monitoring activities, and fieldwork in general may be quite labour intensive and the corresponding personnel costs could represent a high percentage of the total costs included in this kind of external assistance. A study on the jobs supported by LIFE projects (European Commission, 1997), based on the costs indicated in the projects approved in 1996, estimated that between 60% and 80% of the total external assistance costs corresponded to salaries, thus to costs of personnel also working in the project.

For every LIFE Project, **detailed information on direct personnel costs**, including the working time (e.g. person- days, weeks, months) allocated per action is available in the **project application file**, which is included in the grant agreement. This information is also provided in the **final reports** that are submitted to the Commission at the end of the project, which provide the exact figures of actual costs incurred per category of expenditure. The time that the personnel dedicate to the different project activities must be registered in time sheets and on this basis, the personnel costs are then reported to the Commission. This data could be very useful to know the actual personnel costs and the activities carried out by the personnel hired in the project and thus estimate the number of jobs supported by LIFE projects.

This information is available at the Commission (LIFE Unit) and some items, including project description, Layman's report, final report and After Life conservation plan can be available on the LIFE website⁵². It would be therefore possible to carry out research to obtain information on personnel costs from the reports produced by the LIFE projects, from which job numbers could be derived. However, this would require considerable work time to search for relevant information and calculate direct jobs created in each project.

An example of the data that can be obtained from the projects' final reports is presented below, on a sample of 6 projects:

Table 2: Examples for cost information in LIFE projects

Costs/ Project number	Total Costs	Personnel	External Assistance	60% of External Assistance
LIFE09NAT/HU/384	3,607,547	614,946	1,097,122	658,273
LIFE08NAT/DK/465	2,416,235	155,887	527,291	316,374
LIFE10NAT/CY/717	1,159,597	788,600	70,139	42,083
LIFE10NAT/IT/239	2,885,902	1,749,321	523,106	313,864
LIFE09NAT/LV/239	761,881	354,865	173,702	104,221
LIFE10/NAT/BG/146	571,516	213,379	176,047	105,628
TOTAL	11,402,678	3,876,998	2,567,407	1,540,444
% of total costs		34%		13,5 %

⁵² See some relevant LIFE projects publications at:

<http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.getProjects&publications&themeID=83>

It is also possible to extract the personnel costs allocated to every project action. An example of the information obtained from the final report of one of the projects included in the above table is presented in Table 3 below:

Table 3: Final Report Project LIFE10/NAT/BG/146 - Summary of costs per action

Action No	Short name of action	1. Personnel	2. Travel and subsistence	3. External assistance	4.a Infrastructure	4.b Equipment	4.c Prototype	5. Purchase or lease of land	6. Consumables	7. Other costs	TOTAL
A.1	Threats & risks	0,00	0,00	2 965,54	0,00	0,00	0,00	0,00	0,00	0,00	2 965,54
A.2	Tech Doc Premis.	0,00	0,00	11 692,21	0,00	0,00	0,00	0,00	0,00	0,00	11 692,21
A.3	Tech Doc Equip	240,00	0,00	409,04	0,00	0,00	0,00	0,00	0,00	0,00	649,04
A.4	Rest Prog&Plans	0,00	0,00	3 061,05	0,00	0,00	0,00	0,00	0,00	0,00	3 061,05
C.1.1	Renov shed	0,00	0,00	1 472,54	68 993,51	0,00	0,00	0,00	0,00	714,39	71 180,44
C.1.2	Refr. Chambers	0,00	11,85	46,02	0,00	25 294,00	0,00	0,00	0,00	0,00	25 351,86
C.1.3	Lab equipment	0,00	16,68	0,00	0,00	19 537,32	0,00	0,00	4 618,77	0,00	24 172,77
C.1.4	Greenhouse	0,00	0,00	0,00	14 391,20	0,00	0,00	0,00	224,97	0,00	14 616,17
C.1.5	Office equip	0,00	0,00	0,00	0,00	4 214,87	0,00	0,00	0,00	173,84	4 388,72
C.1.6	Orchard	3 958,22	169,02	0,00	1 791,59	1 819,82	0,00	0,00	384,32	0,00	8 122,97
C.1.7	Manag arrang	3 000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	3 000,00
C.2.1	Select sources	10 179,02	1 994,59	0,00	0,00	1 737,22	0,00	0,00	116,57	0,00	14 027,40
C.2.2	Collection	8 019,93	2 714,52	7 833,32	0,00	0,00	0,00	0,00	18,90	0,00	18 586,66
C.3	Prod seedlings	25 577,12	848,43	178,95	0,00	0,00	0,00	0,00	4 669,95	0,00	31 274,46
C.4	Pilot restor.	0,00	1 283,14	132 121,43	0,00	0,00	0,00	0,00	496,32	92,03	133 992,92
D.1	Workshops	1 979,97	127,82	0,00	0,00	0,00	0,00	0,00	0,00	4 349,90	6 457,69
D.2	Guidelines	797,63	0,00	0,00	0,00	0,00	0,00	0,00	0,00	401,88	1 199,51
D.3	Film	0,00	0,00	7 464,97	0,00	0,00	0,00	0,00	0,00	0,00	7 464,97
D.4	Press conf & med	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	167,33	167,33
D.5	Web page	0,00	0,00	1 687,29	0,00	0,00	0,00	0,00	0,00	0,00	1 687,29
D.6	Leaflet	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	300,64	300,64
D.7	Notice boards	0,00	0,00	0,00	1 389,07	0,00	0,00	0,00	0,00	25,77	1 414,84
D.8	Layman's report	0,00	0,00	570,61	0,00	0,00	0,00	0,00	0,00	0,00	570,61
E.1	Project management	159 627,35	2 591,83	0,00	0,00	0,00	0,00	0,00	0,00	0,00	162 219,18
E.2	Monitoring	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
E.3	Networking	0,00	750,48	0,00	0,00	0,00	0,00	0,00	0,00	0,00	750,48
E.4	Audit	0,00	0,00	6 544,63	0,00	0,00	0,00	0,00	0,00	0,00	6 544,63
E.5	After Life plan	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Overhead											15 657,52
	TOTAL	213 379,24	10 508,36	176 047,60	86 565,37	52 603,23	0,00	0,00	10 529,80	6 225,78	571 516,90
	% of TOTAL COSTS	37,3	1,8	30,8	15,1	9,2	0	0	1,84	1,09	100

This information is only related to direct personnel costs of direct jobs supported by LIFE projects. There seems not to be any quantification of indirect jobs or jobs induced by LIFE projects. Although it is often mentioned in the final reports that the projects had a beneficial effect in terms of economic activities and job creation in the areas where they operated, they do not provide any estimate of job numbers in this regard.

As regards future jobs, the LIFE indicators will provide estimates of the number of jobs maintained 5 years after the project end. These jobs will be probably linked to the continuation of the project actions. All the LIFE projects must produce an After Life conservation plan, which describes the actions that will be continued and the means and resources that will be used for this purpose.

3. Methods

Methods used for assessing current jobs

The main information source currently available for assessing jobs created or supported by the LIFE projects is the Pilot LIFE Key Indicators database, which allows a quantification of total number of direct jobs supported by 281 projects (for which the information has been validated). As this information refers to different periods (i.e. at the outset, during the project and 5 years after the project end), it also allows the estimation of how much of the employment created is maintained in a medium-term. A query in the database should allow adding up the data reported for each project and obtain the total number of jobs supported by LIFE over a period, as well as the number of jobs per country, per hectare, per €million invested etc.

The same type of assessment will be possible in the future using the information that will be collected for the key indicators on which the LIFE projects shall report in the period 2014-2020. This can be useful to measure the contribution of LIFE to jobs and growth in the mid-term and final evaluations of the LIFE programme.

However, the information will be limited to the number of project related jobs, i.e. direct jobs, and mostly linked to the personnel engaged to carry out the project actions. There is even some uncertainty about whether the personnel included in external assistance will be accounted or not, and additional assessment tools would be needed to ensure that those contributions to jobs will not be overlooked. This could look at the average share of contribution to remuneration and then weight this with labour costs across member States to derive an estimate of jobs from external assistance.

For **indirect jobs**, it would be useful to assess where the LIFE investments go – e.g. as in Table 3 but averaged across all projects, and then apply labour shares and labour costs in these categories to derive knock on expenditure. Indirect jobs in Natura 2000 have also been estimated using multipliers (e.g. 1.7). The study on the economic benefits of environmental policy estimated that, if properly resourced and managed, the Natura 2000 network could directly support 122,000 full time equivalent (FTE) jobs. Including indirect and induced effects, the estimated total is 207,000 FTE jobs (Rayment et al. 2009). A multiplier of 1.7 was used in that study, which could be applied in the LIFE case.

Some estimates

Jobs per €1 million in Life-Nature and biodiversity projects: 3,5 FTE direct jobs

Total investment in Natura 2000 in the period 2014-2017: €1,000 million

Total direct jobs supported by LIFE in Natura 2000 (2014-2017): 3,500 FTE

Total direct + indirect jobs supported by LIFE in Natura 2000 (2014-2017): 5,950 FTE

Other possible methods for assessing jobs created/supported by LIFE projects would require a detailed analysis of information included in the application files (e.g. on personnel required, working time, salaries, etc.) and reported by the projects on their implementation and final expenditure incurred. This will require time-consuming research and analysis. However, this

type of analysis, which was carried out in the past for 63 LIFE-Nature projects approved in 1996 (EC, 1997), could provide a detailed and accurate assessment of the direct jobs supported in the projects, with possible indication of the roles, activities covered, professional categories, etc.

References

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LIFE Monitoring Indicators:

http://ec.europa.eu/environment/life/toolkit/pmtools/life2014_2020/monitoring.htm

Rayment, M., Pirgmaier, E., De Ceuster, G., Hinterberger, F., Kuik, O., Leveson-Gower, H., Polzin, C. and Varma, A. (2009). The economic benefits of environmental policy. Report for the European Commission, November 2009.

Annex 1: Jobs Supported by LIFE Projects

Country	Nr. of Projects	Total cost	Jobs (FTE) 1 year before the project	Jobs (FTE) during the project*	Jobs (FTE) 5 years after the project	Jobs per project*	Jobs per €1 million invested*
Austria	3	29,059,041	12	25	18	8,3	0.9
Belgium	8	43,727,064	8.7	15.7	7.1	2.0	0.4
Bulgaria	6	13,203,388	3	102.5	63.5	17.1	7.8
Croatia	1	4,592,898	0	10	5	10.0	2.2
Cyprus	1	1,183,922	25.2	25	0	25,0	21.1
Czech Republic	1	607,879	0	6.9	0	6,9	11.4
Denmark	10	40,813,503	143.8	177.35	242.7	17.7	4.3
Estonia	6	11,098,627	0	22.9	10	3.8	2.1
Finland	3	33,603,905	15	25	0	8.3	0.7
France	9	38,837,391	51.3	71.5	2.2	7.9	1.8
Germany	14	11,098,627	5.1	16.4	1.2	1.2	1.5
Greece	2	3,005,349	20	46,2	6,4	23.1	15.4
Hungary	6	16,786,075	55	68.7	30	11.4	4.1
Ireland	6	18,904,487	6,5	31	11	5.2	1.6
Italia	52	125,915,181	45.4	621	243.2	11.9	4.9
Latvia	10	16,454,956	6	126.1	105.3	12.6	7.7
Letonia	5	5,581,382	0	70.8	37.6	14.2	12.7
Luxembourg	1	2,529,816	0,3	0	0	0	0
Malta	4	7,617,528	2	35.8	12.1	9	4.7
Netherlands	5	30,186,439	0	4	4	0.8	0.1
Poland	28	83,495,774	36	167.6	38.4	6.0	2.0
Portugal	14	33,492,003	45.4	180.4	60.4	12.9	5.4
Romania	2	7,101,316	11	58.7	2.9	29.4	8.3
Slovenia	9	27,587,589	83.9	190.7	105	21.2	6.9
Slovakia	10	28,853,292	2	120.1	20	12	4.2
Spain	43	93,249,933	32.5	483.3	390.7	11.2	5.2
Sweden	8	46,525,277	0	50	26	6.3	1.1
United Kingdom	14	58,165,046	37	151.4	16.9	10.8	2.6
Total	281	833,277,688	647	2904	1459,4	10.3	3.5

Analysing the Regional Economic Contributions of Protected Areas in Germany – The Case of German National Parks

Konar Mutafoglu, IEEP

Summary

German National Parks generate an estimated 85,000 jobs through visitor expenditure. Continuous and careful monitoring of visitors to the area and their spending patterns allows the contribution to the local economy through the generation of direct and indirect income to be derived. The method presented in this case uses an expenditure-based approach to estimate the employment benefits. It relies on a combination of representative visitor data collected in the area, their spending patterns on different goods and services in the area such as accommodation or transport, and the use of secondary information from statistical sources, such as the average income in the region of interest. This is a promising approach for other countries to adopt.

1. Background and Context

Researchers have studied the regional economic impacts of nature tourism in Germany, especially with regard to national parks and other types of protected areas. Job et al. (2003) first conducted a pilot study in the Berchtesgaden National Park in Bavaria and then developed a manual on the methodology for assessing the regional economic benefits of protected areas (Job et al., 2006). This methodology was then applied to 15 of the 16 German National Parks. It is designed to help national park administrators and other site managers monitor the benefits of the protected areas over time with a limited input of financial and staff resources.

At its core, the approach builds on visitor expenditure in a specific protected area, estimates the income generated in the area through this expenditure and then converts the generated income into full-time job equivalents (FTEs). While the approach is straightforward in principle, it relies on a number of assumptions and requires carefully collected data on visits and visitors in protected areas.

2. What level of employment is supported by these sites?

Job Creation Benefits of National Parks in Germany

National Parks in Germany vary considerably in terms of size, park characteristics and visitors, including their expenditures. Consequently, a wide variation exists between the regional economic benefits, including job generation. Across all 15 National Parks assessed, with a total area of around 10,200 km², gross expenditure by visitors amounts to an estimated 2.78 billion EUR. This expenditure generates around 1 billion EUR of direct income and around 450 million EUR of indirect income. Together, this translates into an estimated 85,400 jobs generated through national park tourism (Job et al. 2016, 24f.), equivalent to 8.3 FTE per km² and 30.7 FTE per 1 million EUR gross expenditure.

Table 1: Employment effect of German National Parks (own calculations based on Job et al., 2016)

National Park	Area [km ²]	Visitor days [1000 Persons]	Expenditure per person and day [€]	Gross expenditure [Million €]	Employment equivalent [Persons]	Employment equivalent per km ² [Persons]	Employment equivalent per 1 million € gross expenditure [Persons]
Bayerischer Wald	242	760	37	28	904	3.7	32.5
Berchtesgaden	208	1,581	59	94	2,103	10.1	22.4
Eifel	108	450	19	9	251	2.3	28.9
Hainich	75	290	17	5	168	2.2	33.6
Harz	247	1,746	43	74	2,312	9.3	31.1
Jasmund	31	679	70	48	1,583	51.6	33.3
Kellerwald-Edersee	57	200	19	4	111	1.9	28.5
Müritz	322	375	54	20	768	2.4	38.0
Niedersächsisches Wattenmeer	3,450	20,650	50	1,040	34,525	10.0	33.2
Sächsische Schweiz	94	1,712	34	59	1,878	20.1	32.0
Schleswig-Holsteinisches Wattenmeer	4,415	18,635	57	1,066	30,401	6.9	28.5
Schwarzwald	101	1,041	43	45	825	8.2	18.4
Unteres Odertal	103	206	9	2	61	0.6	31.3
Vorpommersche Boddenlandschaft	786	4,766	61	290	9,582	12.2	33.0
All National Parks	10,239	53,091	52	2,783	85,472	8.3	30.7

For the subgroup of visitors for which the characteristic of visiting a National Park was the primary motivation of their visit (i.e. when applying stricter definition of tourism to national parks), the estimated expenditure is in the range of €486 million, equivalent to 14,900 jobs.

The above figure comprises direct and indirect jobs equivalents, and does not account for induced jobs. Visitor expenditure on goods and services purchased generates and supports a range of jobs e.g. in accommodation facilities, lodging, local transport, medical and recreational facilities, guides and other services for tourists.

3. Methods

Methods used for assessing current jobs

This expenditure-based approach requires data on the numbers of visitors, separated for day visitors and visitors that stay overnight in or around the protected area. Collecting data separately for these groups is important as spending patterns differ, especially as overnight visitors will for example use accommodation facilities. The share of day visitors varies considerably across the National Parks. It is relatively low for the marine and coastal parks, with an average share of 16.3% and higher for the parks located inland (often in forest and mountain regions), with an average share of 48.8% (Job et al. 2016, p. 10). On average, day visitors spend 14.70 EUR/day, while overnight visitors spend on average 62.60 EUR/day (Job et al. 2016, p. 22).

For both groups, total expenditure is derived by multiplying the number of visitors by average expenditure. All data on visitors and their spending patterns, including average expenditure, need to be based on a representative survey conducted at different points of interest in the protected area. The expenditure is derived for different categories of spending (e.g. expenses for local transport, shopping, accommodation, dining etc.). After deducting value added tax, net expenditure is available for the different spending categories.

In a second step, multiplying the expenditure in the different categories of spending (see above) by the share of the expenditure yields the share that generates direct income. The latter is based on prior information e.g. from official statistical sources or sectoral statistics (see example for Müritznational Park below). Income generated through expenditure (i.e. what share expenditure relates to wages and profits) varies greatly across different activities and the corresponding shares need to reflect the national and regional context. Job et al. (2005, p. 37) report that this share can range between 20% in fast food facilities and up to 60% in medical rehabilitation and treatment facilities.

After deriving the direct income generated (i.e. money allocated to employment), the approach accounts for indirect income generated in the region via the demand for goods and services that are linked to the touristic activities in the protected area as well as investments e.g. to maintain the quality of visitor facilities. Examples are goods and services purchased by accommodation facilities (e.g. food, insurance, repairs of buildings).

Indirect income generated (i.e. the amount of monies supporting jobs indirectly from provision of goods and services) could be derived in principle by analysing the economic activities of the firms involved, i.e. looking into the accounts of individual firms as part of a representative survey. However, in practice, this could be a complex procedure. Job et al. (2005, p.39) recommend therefore resorting to empirical values based on for example sector

statistics. For the German context, the authors suggest accounting for an additional 30% of indirect income generated for each unit of direct income.

Adding direct and indirect income generated in the study area yields the total income generated. By dividing total income by the average income in the region where the protected area is located, Job et al. (2006) arrive to a figure for full-time job equivalents (FTE). These FTE should not be interpreted as actual jobs created through the protected area. They give an indication on the economic contribution of the protected site.

Illustrative example – Job Effects of Müritz National Park (based on Job et al., 2005)

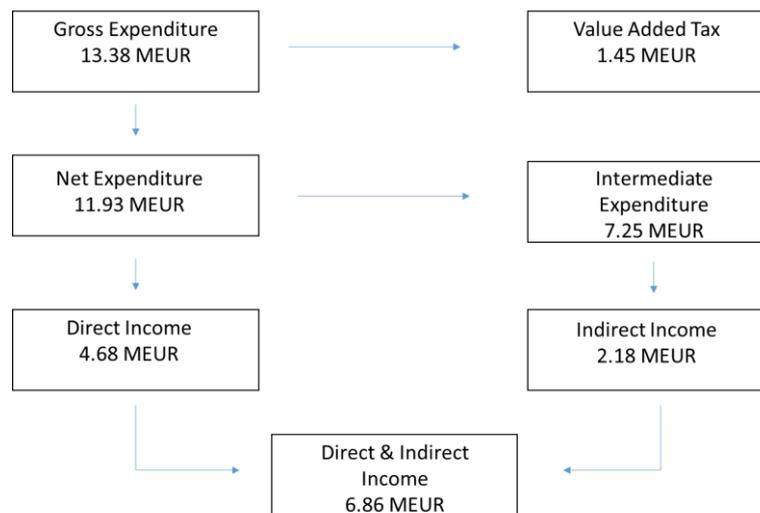
Müritz National Park, located in Northeast Germany, covers an area of around 322 km² in a mostly agricultural region with relatively low-population density. Job et al. (2005) have conducted a detailed visitor survey and provide an estimate of employment supported in the area through national park tourism. Based on survey data of around 13,500 visitors to the area, Job et al. (2005) conclude that 43.7% of the visitors can be regarded as national park visitors in a narrow definition, for which the protected area status was a very important or an important reason for their visit to the area. The remaining 56.3% of the visitors are classified as national park tourists in a wider sense.

The survey asked questions about spending patterns in different categories such as accommodation, subsistence, retail and local services (e.g. transport, visitor centres etc.). National park tourists in a narrow sense spend on average around €34 per person and day. This value differs across day and overnight visitors, with values ranging between 7 and €54 per person.

From the survey data, Job et al. (2005) conclude that visitors to Müritz National Park spend around €13.38 million per year in the area. Accounting for around €1.45 million of Value Added Tax (VAT), as estimated from the spending categories and associated VAT rates, this is equivalent to €11.93 million of net expenditure (Figure 1). Around 36.6% of the expenditure of day visitors and around 39.5% of the expenditure of overnight guests translate into direct income.

Job et al. (2005) derive these values from the spending patterns of the visitors, in combination with analysing secondary data sources at national and regional level about cost structures and economic value added in different sectors of the economy, including the sectors relevant to the expenditure of the tourists. Overall, direct income generated amounts to €4.68 million, while around €7.25 million flow into intermediate expenditures to produce the goods and services demanded by tourists. These expenditures have knock-on effects in other sectors and Job et al. (2005), based on previous experience, assume that 30% or €2.17 Million result in indirect income.

Figure 1: Expenditure and income generated in Müritz National Park in €1,000 (based on Job et al. (2005), p. 70)



Thus, direct and indirect income generated are at €6.86 million in the area. This value can be differentiated between national park tourists in a narrow sense and wider sense (Table 2).

Table 2: Expenditures, income generated and employment equivalents (based on Job et al., 2005)

	NP tourists - narrow sense	NP tourists - wide sense	All tourists	Unit
Number of visitors	167,000	223,000	390,000	Persons
Average expenditure per day	33.8	34.7	34.3	€
Gross expenditure	5,647.3	7,737.0	13,384.3	€1,000
Direct income generated	1,918.6	2,765.3	4,683.9	€1,000
Indirect income generated	931.2	1,243.7	2,174.9	€1,000
Direct and indirect income generated	2,849.8	4,009.0	6,858.8	€1,000
Employment equivalents	261	367	628	Persons

To arrive to an estimate of the employment equivalents supported by national park spending, the authors divide the sum of direct and income generated by per capita income in the area in 2004, which was at €10,918 per capita. The estimated 628 income equivalents give an indication of the relevance of the role of the national park for generating employment. Job et al. (2005) stress that the figure should not be interpreted as actual jobs created by the national park and not be used for example for forecasts of future developments.

Recommendations or insights for assessment in the future

This expenditure-based approach has the merit that it can in principle be applied with limited resources if visitor data is carefully collected. With this in mind, Job et al. (2006) propose this technique for use in continuous site and visitor monitoring activities in National Parks. It is also suitable for other categories of protected areas such as Biosphere Reserves or sites under other (national) protection/conservation status.

The method is suitable for an analysis in local and regional contexts and the estimate for income generated in the area can be helpful to assess the economic relevance of a national park in the area. However, as can be seen from the wide range of estimates for employment equivalents per km² or per €million spent (see Table 1), this method is not suitable for scaling up from average to a national or European level.

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Applying Input-Output Analysis to Estimate Regional Economic Benefits of the Hohe Tauern National Park, Austria

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Summary

The Hohe Tauern National Park in the Austrian Alps generated around €21.8 million of economic value in 2007 through expenditure on operations, through investment into the national park infrastructure and through expenditure of national park tourists in the region. This is equivalent to around 450 jobs, of which around 390 are generated domestically. Tourism is an important contributor, with 76% of the employment supported. Around 4.5% of economic value added and 5.6% of employment in the region is due to the Hohe Tauern National Park. These findings are based on applying an input-output model, combining primary data on expenditure of the national park and secondary statistical sources.

1. Background and Context

Covering an area of 1,856 km², the Hohe Tauern National Park in Austria is the largest national park in the Alps. It was officially founded in 1981 and expanded to its current extent in subsequent decades. Among the key touristic attractions is Austria's highest mountain (Großglockner, 3,798 m). Three quarters of the area are defined as a "core zone", without economic activities. The remaining quarter of the protected area is designated for traditional land use practices (e.g. extensive alpine pastures) and is open for touristic activities.

Like many protected areas, the Hohe Tauern National Park contributes to the local and regional economy, notably as an attraction for visitors and through expenditures related to managing the protected area, including investments. Based on an input-output model approach, Bodenhöfer et al. (2009) analysed the regional economic benefits of the national park, including employment effects. These are based on economic contributions of the national park (current expenditure and investments) and through expenditure of tourists to the region.

2. Key Findings

Bodenhöfer et al. (2009) analyse data on the expenditure of the Hohe Tauern National Park management for the year 2007 on operations (i.e. expenditure on staff, materials and other incidental expenditure) and on investments (e.g. into the infrastructure for visitors) as well as data from official tourism statistics on the expenditure of tourists who visit the national park.

The operating expenditure of the national park was €3.46 million in 2007 and contributed to €4.53 million of economic value added, of which 3.84 million accrued domestically in Austria. Over the last 16 years, the national park invested around an average of €443,000 per year, leading to an economic value added of around €524,000 per year, of which €404,000 per year

was invested domestically. Together, these expenditures support 107 full-time equivalent jobs, 94 of which domestically (Bodenhöfer et al., 2009, p. 87ff.).

An even larger contribution to the regional economy occurs via expenditures of tourists who visit the national park. Around 46,000 visitors spent around €14 million per year in the area, 75% of which going into accommodation and subsistence. This expenditure resulted in €16.7 million of economic value added, with €14.5 million generated domestically in Austria. This contribution supports around 345 full-time equivalent jobs, 293 of which within the country (Bodenhöfer et al., 2009, p. 100ff.).

Bodenhöfer et al. (2009, p. 6-7) estimate that around 4.5% of economic value added and 5.6% of employment in the region is due to the Hohe Tauern National Park. These figures are conservative, lower-bound estimates, as they are based on the direct effects of expenditure, not accounting for indirect and induced effects (see below). The national park is also an important source of tax revenue, amounting to around €6.1 million per year, 4.4 million of which is through tourism expenditure.

3. Methods

Methods used for assessing current employment

This analysis of the economic contribution of the Hohe Tauern National Park is based on an input-output-model that depicts in detail the structure of the Austrian economy. An input-output (I-O) table describes the inputs needed from different sectors to produce one unit of output in a particular sector, valued at current prices. The assessment uses the national input-output table for the year 2005 provided by Statistik Austria (2009).

The authors use detailed accounting data (on operations and investment) of the Hohe Tauern National Park and allocate the expenditure to different sectors that are depicted in the input-output table, following an international classification of economic sectors and its implementation for Austria (ÖNACE 2003). Expenditure on operations is allocated to 17 different sectors (e.g. public administration (primarily personnel costs) (ÖNACE Sector 75), publishing and printing (22) or transport (60)). With a share of 37.4%, personnel costs are the largest current expenditure block of the national park administration. Expenditure on investments falls into three categories (with a large share going into construction work (45)).

Table 1: Expenditure data used in input-output model (Bodenhöfer et al. (2009))

	ÖNACE Sector	€
National Park - Current expenditure		
Public administration	75	1,293,245
Other business activities	74	1,030,408
Publishing and printing	22	314,953
Construction	45	209,130
Agriculture and hunting	01	202,986
Post and telecommunications	64	103,047
Wholesale trade	51	74,765

	ÖNACE Sector	€
Real estate	70	57,659
Transport	60	46,284
Other sectors		129,708
Total		3,462,185
National park - Investment		
Construction	45	269,835
Other business activities	74	93,854
Furniture	36	79,408
Total		443,097
Tourism expenditure		
Hotels and restaurants	55	10,608,734
Retail	52	1,680,230
Recreation, culture, sports	92	915,247
Transport	60	819,624
Total		14,023,835
Total expenditure		17.929.117

For analysing the economic role of tourism, Bodenhöfer et al. (2009) resort to official tourism statistics and combine the data with information from other secondary sources. Based on visitor surveys conducted by Lehar et al. (2004), it can be concluded that around 15% of the overnight visitors (around 30,500 visitors) are national park tourists in a narrow sense. They would not have visited the region had the national park not been existent. Based on an earlier tourism survey, Bodenhöfer et al. (2009) assume that on average each overnight guest spent around €97.30 per day and stayed 4.6 days. Around 53% of this expenditure is directed towards accommodation.

Around 15,600 further visitors came to the area for a day trip, spending on average €46 per day. Together with the overnight visitors, this amounts total tourism expenditure of around €14 million per year, roughly balanced between winter and summer season. The authors allocate this expenditure to 4 sectors (e.g. hotels and restaurants (ÖNACE Sector 55) and retail (52)).

Bodenhöfer et al. (2009) use the disaggregated data on expenditure of the Hohe Tauern National Park and its visitors and run an input-output model to estimate the impacts on economic value added (Table 2). For each unit of output in the sectors depicted by the model (e.g. for the value of construction work undertaken by the national park), the model provides information on the inputs from other sectors needed to produce the final product or service demanded. These are the direct effects of the expenditures.

However, to provide these goods and services demanded, these sectors in turn need inputs from other sectors. This process goes over several rounds and leads to indirect effects of the initial expenditure across the sectors of the economy. Furthermore, income generated through the direct and indirect effects across the sectors is spent by households and leads to further induced effects both domestically and abroad.

Table 2: Economic value added through national park and tourism expenditure

	National Park - Operations	National Park - Investment	Tourism	National Park & Tourism
Total expenditure [€ Million]	3.46	0.44	14.02	17.93
Economic value added [€ Million]				
Direct	1.19	0.21	8.51	9.91
Indirect	2.17	0.23	5.50	7.90
Induced	1.17	0.08	2.72	3.97
Total	4.53	0.52	16.73	21.78
Total domestic	3.84	0.40	14.51	18.75

Next to the economic value added, the I-O-model also provides information on direct, indirect and induced employment generated, based on the labour intensity of one unit of economic value added in the sectors of the economy (Table 3). The labour intensity of the production of goods and services can be inferred from the input-output-table.

Table 3: Estimates for employment generated (Bodenhöfer et al., 2009)

Employment [FTE]	National Park - Operations	National Park - Investment	Tourism	National Park & Tourism
Direct	38	4	178	220
Indirect	49	4	142	195
Induced	11	1	24	36
Total	98	9	345	452
Total domestic	87	7	293	387

Recommendations or insights of use for calculating jobs for assessment in the future

Using an I-O-model to assess the economic contributions of the Hohe Tauern National Park facilitates the assessment of economic value added, income generated and employment created. The picture is more complete than e.g. in expenditure-based approaches that rely on coefficients (though also more resource intensive). Additional insights are available in the form of the domestic versus foreign economic contribution of the National Park and on the tax revenue generated.

The caveats for using an input-output approach for analysing economic and employment effects also apply in the case of the Hohe Tauern National Park. This analysis does not capture the impact of demand on prices (e.g. of material inputs or labour) and is based on a static approach that does not model the temporal dynamic of the processes. The approach assumes that different inputs are always brought together in the same ratio, i.e. a linear production technology, which does not capture to which extent one input (e.g. labour) could be partially substituted by another input (e.g. capital goods), for example when the price of labour changes.

One important contribution of this approach is that it can bring additional insights into the expenditure patterns for managing protected areas as shown by the breakdown of the data provided by the Hohe Tauern National Park administration. Repeating the analysis for a series of protected areas could improve the evidence base to help “ground-truth” and calibrate the coefficients in expenditure-based approaches and hence improve the robustness of scaling up approaches to derive national and European level estimates for expenditure flows and supported jobs.

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Expenditure-based approaches to calculating jobs linked to Natura 2000 – From the Ecotec (2002) study to the GHK (2011) and Jurado et al. (2012) studies

Patrick Ten Brink and Konar Mutafoglu, IEEP

Summary

It is possible to derive a top-down estimate for the number of jobs directly linked to the Natura 2000 network via the expenditure on conservation and restoration on the network. This can be done by taking yearly expenditure values, identifying what share of this flows to wages and divide that by the average wage costs to derive an estimate for the number of direct jobs supported, expressed in full time equivalents (FTEs) to ensure comparability with other labour statistics.

The expenditure also leads to indirect and induced expenditure as the monies (from non-income related expenditure, and incomes spent) create additional jobs as they flow around the local economy. This can be assessed using a “multiplier” from literature, based on research understanding the economic flows in the economy.

GHK (2011) used this approach to estimate that for each €1 billion of expenditure in the implementation and management of the network, almost 18,000 FTE jobs are directly supported and 30,000 FTEs supported per year if indirect and induced jobs are included.

They also applied this to the estimates of the costs of Natura 2000 needed to meet the conservation and management objectives under the nature directives (€5.8 billion/year). This would lead to 104,000 direct jobs, 69,000 indirect and induced jobs and hence overall 174,000 jobs. Current levels of expenditure – estimated (arguably conservatively) at about €1.74 billion/year - would imply 52,000 direct and indirect jobs supported by Natura 2000 expenditure.

1. Background and Context

Assessments on the level of eco-employment in the EU have been the focus of studies over the past 20 years (e.g. see Ecotec 2002 – see box), subsequently GHK (2011) and Jurado et al. (2012). The aim of this body of work has been to understand the direct and indirect employment benefits for environmental expenditure and hence ensure an evidence base in discussions on the role of protected areas in local and regional development, viability and socio-economic considerations.

The Ecotec 2002 study used an expenditure and “engineering analysis” approach to derive employment levels supported by capital and operating expenditure on nature conservation. Here public expenditure on nature conservation was derived from public documents (this was wider than Natura 2000) and combined with an assessment of how this was split between operating and capital expenditure and how the latter in turn led to expenditure on capital goods, construction and services, i.e. key sector inputs.

These were combined with employment per turnover values to derive labour costs and hence employment levels. Here the average CAPEX/OPEX split estimate used a ratio of 41/59. Nature protection expenditure in Europe was assessed at 7bn for EU15 in 1999. This led to an estimate of 99,800 FTEs jobs, of which 66,700 were linked to operational expenditure (i.e. regular expenditure)

and 33,100 FTEs linked to capital expenditure (i.e. on one-off construction, restoration activities) (Table 1).

Table 1: Expenditure and employment in Nature Protection: EU-15 (ECOTEC 2002)

			Capital expenditure and supporting goods, sectors, services			
	Total expenditure	Services (OPEX)*	Capital expenditure (CAPEX)	Capital goods	Construction	Services
	MEUR	MEUR	MEUR			
Expenditure (MEUR)	7,250	4,310	2,940	1,270	1,470	210
Employment (FTE)	99,800	66,700	33,100	14,200	16,800	2,100
Cost (KEUR)/FTE	73	65	89			

These numbers related to public expenditure. The 2002 study authors noted that there was insufficient data on private sector and citizen expenditure to allow extrapolation. In that sense, the results can be seen as an underestimate. However, the public expenditure related to all nature conservation expenditure and not only on Natura 2000 - so the estimate would be an overestimate of employment in Natura 2000. The above was also only for EU-15.

Given the development of the Natura 2000 network, and new survey work on expenditure on Natura 2000 (as documented under Gantioler et al, 2010), the question on employment has refocused on the Natura 2000 network. Hence, the GHK (2011) estimates are explored in more detail below.

2. What level of employment is supported by the network?

Estimating job creation through levels and focus of expenditure – GHK (2011) examined the employment effects at the EU level of investing in the Natura 2000 network, as part of a study to examine the employment effects of greening the EU budget. The work drew on data from a survey of the costs of investing in Natura 2000 sites (Gantioler et al, 2010), which found an average annual salary of €28,000 for staff employed in the network across the EU, and methodology developed by Rayment *et al.* (2009). This work estimated that 50% of the costs of the Natura 2000 network comprise wages and salaries. Multipliers were then used to assess the employment impacts resulting from indirect effects (through expenditures on goods and services) and induced effects (through re-spending of wages).

Overall, the study estimated that each €1 billion of expenditure in the Natura 2000 network supports almost 30,000 jobs.

It also distinguished the nature of the jobs – splitting between direct jobs from the Natura 2000 management and restoration – the indirect jobs (e.g. from supply of goods and services linked to Natura 2000 management) - and the induced jobs (e.g. as the wages and other expenditure lead to knock on expenditure and hence knock on jobs as the monies spend and flow around the (local) economy. Table 2 below gives the split for 1bn EUR expenditure – with around 30,000 jobs per billion EUR, i.e. 30 direct and indirect (gross) jobs per million EUR spend.

Were 5.8bn to be spent (i.e. the amount estimated to be needed per year to meet the objectives), then this would lead to 104,000 direct jobs and overall 174,000 direct and indirect FTE's per year. Current expenditure is, however, not at the level of need, and **the estimate is that currently of the order of 52,000 FTE jobs are supported by expenditure**. This does not include jobs from sustainable production on Natura 2000 sites or jobs linked to other activities such as tourism and recreation.

Table 2: Annual EU employment (FTE) impact of investing €1 bn in Natura 2000

Effect	Assumptions and clarifications	Addition / loss of jobs (FTE)
Direct effect	Half of the investment is spent on wages. These jobs can include low skilled labour (e.g. for capital works) and higher skilled labour (e.g. research, surveys, consultations)	17,900
Indirect (supply)	Jobs created from the supply of goods and services related to the management of the Natura 2000 network, purchased with the other half of the investment, excluding land purchase.	2,800
Indirect (demand)	There is likely to be a slight increase in EU employment from impacts on tourism, encouraging additional expenditure from international (non-EU) tourists, attracting a share of any real growth in tourism spending by EU citizens and by reducing leakage associated with tourism expenditure by EU citizens outside the EU.	Slightly positive
Induced effect	Jobs created from the consumption activity generated by spending of the wages received by those directly and indirectly employed.	9,300
Total jobs	Gross figure - for 1bnEUR expenditure	29,900
Total jobs: if Expenditure at need	If 5.8 billion EUR expenditure	174,000
Total jobs: at "current expenditure" levels	Assumed at 1.74 billion EUR (30% of needed expenditure)	52,000

Source: Jurado et al. (2012), GHK (2011)

The employment effects of achieving the aims of the Natura 2000 network have been estimated based on jobs created per unit of expenditure on nature conservation combined with an estimate of the annual costs of full implementation of the Natura network in the EU27 of least €5.8 billion per year. On this basis, the full implementation of the Natura 2000 network would be expected to support 104,000 direct FTE jobs in the conservation of Natura

2000 sites, and a further 16,000 indirect FTE jobs among suppliers and contractors providing supporting goods and services. The wider 53,000 induced jobs are unlikely to be jobs in conservation and restoration so cannot be called jobs in conservation activities, despite being driven by associated expenditure.

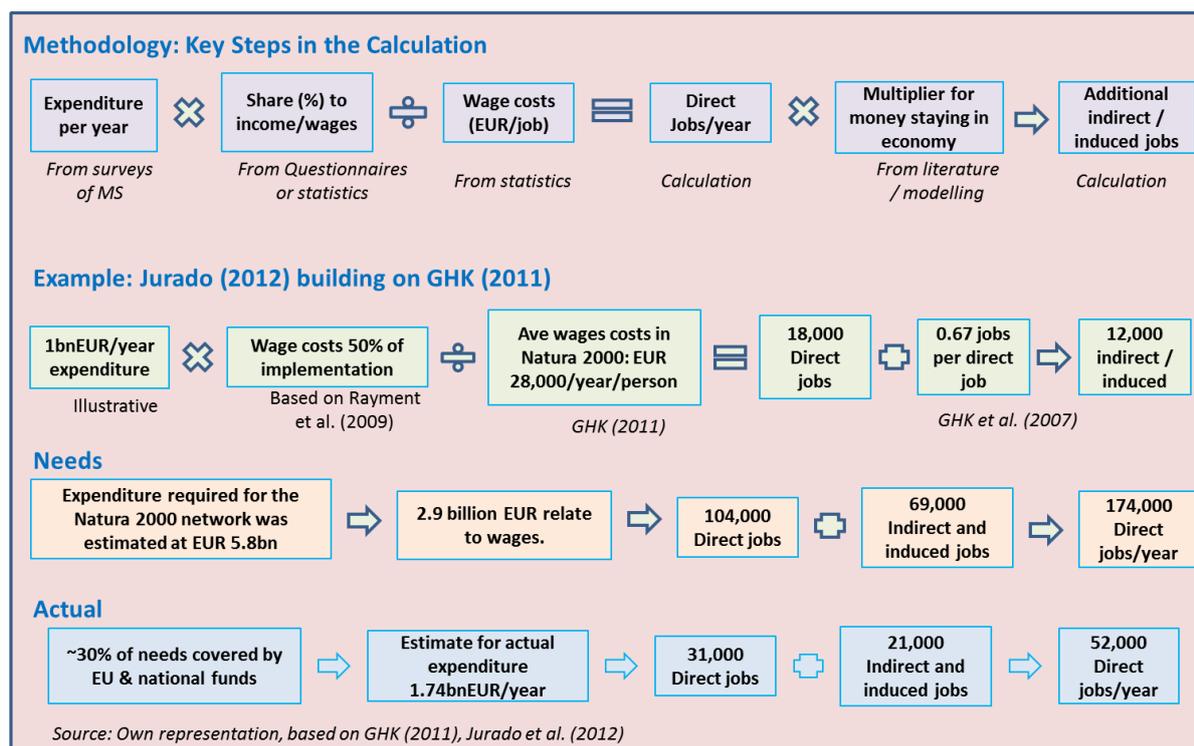
3. Methods

Methods used for assessing current jobs

The key steps and assumptions in the methods are summarised below and illustrated in Figure 1:

- **Expenditure required for the Natura 2000 network** was estimated at EUR 5.8bn – based on questionnaires to Member States (Gantioler et al. 2011).
- **Wage costs account** for around 50% of the costs of implementation (Rayment et al. 2009). This implies that 2.9 billion EUR relate to wages.
- **Natura 2000 wage costs** are on average EUR 28,000/year/person (based on a survey reported in Gantioler et al., 2011). This leads to the estimate of 104,000 jobs directly involved in nature conservation and restoration activities in Natura 2000 sites.
- **Indirect and induced effects were estimated to lead to an additional 0.67 jobs per direct job** (GHK et al., 2007). This in turn leads to an additional 69,000 jobs and a total of 174,000 direct & indirect jobs.
- Of the additional 69,000 indirect jobs, 53,000 can be seen as induced jobs as money flows around the economy.
- As the 5.8bnEUR is the costs of meeting the requirements of the network, Jurado et al. (2012), to avoid overstating employment figures, used the argument that public funding for Natura is less, and applied a 30% factor to derive the 1.74 bn EUR expenditure and the **52,000 FTE per year estimate**.

Figure 1: Method applied in employment analysis



It should be noted that the 5.8bn EUR/year value was, however a mix of actual expenditure, planned expenditure, needed expenditure and “incremental” expenditure (as UK focused on additional costs of Natura 2000; most Member State looked at cost of Natura 2000). **The 1.7bn EUR and 52,000 jobs are quite possibly an underestimate.**

Recommendations or insights for assessment in the future

Given the importance of understanding the level of jobs supported by the Natura 2000 network and the contribution to local socio-economic viability, more analysis is needed.

- Need a **new expenditure based analysis**: related to (a) **overall expenditure now**; (b) needs for **meeting conservation objectives**; and (c) **EU expenditure to assess EU added value** (i.e. jobs from EU funds) and (d) ideally, differentiate expenditure for Natura 2000 specific measures and those measures for protected area management that would have happened without Natura 2000 designation (i.e. incremental costs of Natura and incremental job supported).
- **Distinguish between public, private and household expenditure** as this can help clarify roles, responsibilities and sources of funding.
- **Review and update the assumptions** – e.g. explore in more depth where the money flows – e.g. CAPEX/OPEX and associated “engineering analysis” to get better basis. This can build on and extrapolate from other studies and/or input-output models.
- Carry out (or make greater use of) **bottom up case-by-case analysis** to help **fine tune assumptions** and **calibrate** the approach.
- Fine tune with **wage rates** for different Member States and regions as this can vary (e.g. higher employment benefits in poorer rural regions given lower labour costs).

- **Explore more what type of jobs are supported**- e.g. skilled/unskilled, for which age groups and level of SME employment.
- More analysis is needed of the **multiplier effect**, as this is dependent on the openness of the economy and the level of trade and links with other regions and countries. This can usefully distinguish between rural and peri-urban/urban sites as well as the location.
- **Cross check with other approaches** – e.g. **I-O models** and other **employment models**.
- **See in wider context** of the number of **jobs supported by sustainable production on site** and **jobs from activities linked to the site such as recreation, tourism, health activities and bioprospecting**.

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