

CLIMATE CHANGE

Ecosystem services approach for adaptation and mitigation



14-15th May 2014,
Norwich, East Anglia, UK
Summary Report

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LIFE Platform Meeting: Climate change- Ecosystem Services approach for adaptation and mitigation

1. Introduction

Europe is already facing unavoidable impacts of climate change and these impacts will affect the full EU territory, with regional differences. The EU response has been to decide that climate action objectives will represent at least 20% of EU spending in the period 2014-2020¹.

The LIFE programme 2014-2020 will be able to make a significant contribution to climate action through annual dedicated calls for project action grants and other strands.

Although 'climate change' was hardly on the conservation agenda in the 1990s many early LIFE projects across Europe, such as those restoring mires, have done much to show that habitat restoration programmes can address present-day concerns. With the new LIFE regulation there is now an increasing focus on the contribution that LIFE projects can make to efforts to reduce the impact of climate change through mitigation and adaptation.

The primary aim of the LIFE Platform Meeting was to bring together past and present projects from across Europe to share their experiences on addressing issues linked to aspects of climate change. An important secondary aim of the meeting was to look at opportunities in the current LIFE multi-annual work programme for 2014-2017 to identify opportunities for attracting funding to mitigation and adaptation projects which focus on nature and biodiversity.

The UK was chosen as a venue for the meeting as it could offer a range of projects where climate change has been a driver for developing actions. The host region, East Anglia, was most suitable as Breckland is the driest part of the UK, North Norfolk is one of the most natural and dynamic coastlines in the UK and the Broads is one of the most important wetlands in the UK.



The workshop was hosted by the project, 'Futurescapes'², run by the Royal Society for the Protection of Birds (RSPB) which is championing a new approach to landscape-scale conservation initiatives of sufficient scope to include climate change adaptation plans. The meeting was also supported by the PAF project for England, the 'Improvement Plan for England's Natura 2000 Sites'³, which is addressing the potential impacts of climate change across a national Natura 2000 network. Field visits were organised by RSPB and the Broads Authority.

The platform meeting combined project presentations with field visits and discussions to exchange experience. It was able to give the European Commission a sample of the potential of LIFE projects to support EU-wide and national strategies for climate change mitigation and adaptation. The meeting itself feeds into a wider review of LIFE and climate change which has identified over 300 projects which in some way contribute to EU strategies for mitigation and adaptation.

¹ Total budget 2014-2020: €960 billion, of which climate-related potentially €192 billion or more over seven years or around €27.5 billion p.a.

² <http://www.rspb.org.uk/futurescapes/>

³ <http://www.naturalengland.org.uk/ourwork/conservation/designations/sac/ipens2000.aspx>

2. Background to platform meeting

The meeting was timely as it spanned the period between the final round of LIFE+ projects (2007-2013) and the launch of the new LIFE programme (2014-2020). The crucial change is that the LIFE regulation is now a programme for the Environment and Climate Action. The LIFE programme itself is responding to the developing EU strategies and related action plans on adaptation to climate change.

The EU strategy on adaptation to climate change

The overall aim of the EU Adaptation Strategy⁴ is to contribute to a more climate-resilient Europe. This can be achieved by enhancing the preparedness and capacity to respond to the impacts of climate change at local, regional, national and EU levels, by developing a coherent approach and by improving coordination.

The EU adaptation strategy, in line with UN Framework Convention on Climate Change, supports the development of national adaptation strategies⁵. The EU will also support the strengthening of links between these adaptation strategies and national risk management plans (e.g. for drought, flood or coast erosion). The EU adaptation strategy points out that substantial funding will be available over the 2014-2020 for climate mitigation and adaptation and also confirms that financial support will be provided through the climate action sub-programme of the LIFE regulation.

The EU adaptation strategy⁶ contains an action to 'provide LIFE funding to support capacity building and step up adaptation action in Europe' and gives example areas, *inter alia*, cross-border management of floods, trans-boundary coastal management, adaptation in the urban environment, mainstreaming adaptation into natural resources management and sustainable management of water.

Other actions within the adaptation strategy are to bridge the knowledge gap (e.g. through the Horizon 2020 research and innovation programme) and to support Climate-ADAPT⁷ as the 'one-stop shop' for adaptation information in Europe. Within the Climate-ADAPT website information is provided by EU sectoral policies, including biodiversity⁸, coastal areas⁹ and agriculture and forestry¹⁰. A link is provided to the 'Guidelines on Climate Change and Natura 2000'¹¹ published by DG Environment.

Much of the adaptation strategy is aimed at 'climate-proofing' EU action in key sectors such as marine and coastal areas, agriculture and forestry and biodiversity. LIFE projects can provide important case studies for these, and other, guidance documents.

⁴ See links at http://ec.europa.eu/clima/policies/adaptation/what/index_en.htm

⁵ For example, the UK climate adaptation programme is set out at <https://www.gov.uk/government/policies/adapting-to-climate-change> To date (2013) 16 EU Member States have developed national adaptation plans with others in preparation (EEA 2013)

⁶ Communication "An EU Strategy on adaptation to climate change" COM(2013)216 final

⁷ Climate-Adapt <http://climate-adapt.eea.europa.eu/>

⁸ <http://climate-adapt.eea.europa.eu/web/guest/biodiversity>

⁹ <http://climate-adapt.eea.europa.eu/web/guest/coastal-areas>

¹⁰ <http://climate-adapt.eea.europa.eu/web/guest/agriculture-and-forestry>

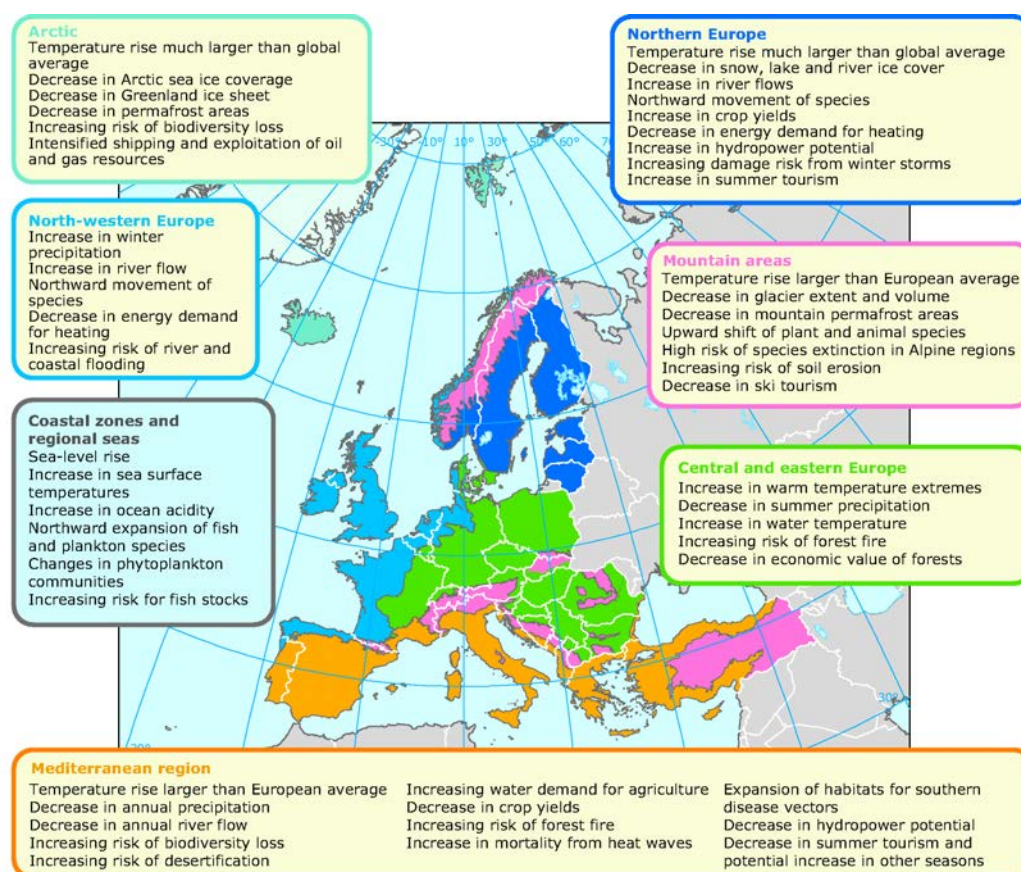
¹¹ <http://ec.europa.eu/environment/nature/climatechange/pdf/Guidance%20document.pdf>

EEA Report: Adaptation in Europe

The direction of the EU adaptation strategy is echoed in the publication 'Adaptation in Europe' published in 2013 by the European Environment Agency¹². The report defines adaptation as "actions responding to current and future climate change impacts and vulnerabilities (as well as the climate variability that occurs in the absence of climate change) within the context of ongoing and expected societal change. It means not only protecting against negative impacts, but building resilience and also taking advantage of any benefits from these changes".

It is useful that variability in weather patterns (storms, floods, droughts etc) can also be included under the umbrella of 'adaptation' but important also to understand that the climate has always fluctuated and species respond to changing conditions. What is of particular concern, however, at the global level¹³ is that the rate of current climate change may be too fast for many species to respond.

The EEA report stresses that adaptation and mitigation (i.e. the reduction of greenhouse gas emissions) are complementary actions with both being EU priority areas. In terms of LIFE Nature projects the largest contribution towards mitigation work has been through mire, wetland and soil restoration and conservation projects.



Key observed and projected climate change and impacts for the main regions in Europe © EEA 2013

¹² <http://www.eea.europa.eu/publications/adaptation-in-europe>

¹³ See for example the IPCC report Climate Change 2014: Impacts, Adaptation and Vulnerability <https://www.ipcc.ch/report/ar5/wg2/>

The EEA report stresses the need for coherent approaches, flexible approaches and participatory approaches. LIFE projects can match these requirements by seeking synergies between different policy sectors, by developing regional and local responses, promoting 'adaptive management' and ecosystem based approaches and by engaging with a wide range of stakeholders.

The EU approach to ecosystems based-approaches to climate change

Addressing the effects of climate change through adaptation and mitigation is central to ensuring continued ecosystem functioning, human health and socio-economic security. It is impossible to solve biodiversity loss without addressing climate change and it is equally impossible to solve climate change without addressing biodiversity and ecosystem services. Ecosystem-based approaches have emerged as a key instrument to confront these concerns across sectors of business and society, offering multiple benefits in a potentially cost-effective manner. The EU Biodiversity Strategy up to 2020¹⁴ states that "*ecosystem-based approaches to climate change mitigation and adaptation can offer cost-effective alternatives to technological solutions, while delivering multiple benefits beyond biodiversity conservation*".

The EU Adaptation Strategy supports ecosystem-based approaches which provide multiple benefits, such as reduced flood risk, less soil erosion, improved water and air quality and reduced heat-island effects. Priorities in multi-annual work programmes will be given to adaptation flagship projects that address key cross-sectoral, trans-regional and/or cross-border issues. Projects with demonstration and transferability potential will be encouraged, as will green infrastructure and ecosystem-based approaches to adaptation, and projects aiming to promote innovative adaptation technologies.

Ecosystems based approaches are ready for use and easily accessible. LIFE projects can offer a means of demonstrating the value of existing approaches and can help drive creativity to discover new solutions. Further information can be found in the report 'Assessment of the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe'¹⁵.

The LIFE Programme for the Environment and Climate Action

The new LIFE programme introduces two sub-programmes; environment and climate action. The LIFE programme is still a relatively small fund and it will continue to have a focus on capacity building and acting as a catalyst by disseminating solutions and best practices and by promoting innovative technologies. The LIFE programme is complementary to other EU funding programmes and the new category of 'Integrated Projects' encourages the preparation of projects using funding from several EU sources and national sources.

The new programme also encourages a closer partnership with the EU research programme 'Horizon 2020' and this could be valuable to climate change projects which would benefit from closer links to scientific monitoring. LIFE projects can often provide ideal open-air laboratories to measure the effects of management actions.

The priority focus for nature conservation in the LIFE Nature programme is on the implementation and management of the Natura 2000 network, in particular in relation to the national and regional

¹⁴See <http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm> for information on EU biodiversity work

¹⁵ http://ec.europa.eu/environment/nature/climatechange/pdf/EbA_EBM_CC_FinalReport.pdf

Prioritised Action Frameworks (PAFs), on the development and dissemination of best practices in relation to the nature directives, and the wider challenges identified by the EU Biodiversity Strategy to 2020.

The regulation foresees integrated projects being used as a coordinated funding mechanism for the Natura 2000 network, given their potential to lever funds and to attract other EU funds to support nature conservation. This is a task given to the EU supported 'PAF projects', most of which attended the platform meeting.

A key paragraph in the regulation¹⁶ is *"With a view to optimising the use of LIFE programme resources, synergies between actions under the sub-programme for Environment, in particular to protect biodiversity, and climate change mitigation and adaptation measures under the sub-programme for Climate Action should be fostered"*.

This implies that projects which target the protection of biodiversity may come from either of the two sub-programmes within the LIFE regulation, though LIFE Climate action projects should have climate as their main focus. Thus, applicants should determine whether their proposal is geared, from its initial conception and design, towards climate change or towards nature conservation, and apply for the relevant strand of the LIFE Programme. Within the sub-programme for climate action are priority areas for i) mitigation, ii) adaptation and iii) governance and information and within the specific objectives for climate change adaptation are references to the use of ecosystem-based approaches.

Further elaboration of the priorities for LIFE funding is given in the multiannual work programme for 2014-2017. Priorities given in this programme relevant to nature conservation projects include (the list is not exhaustive):

- Planning and establishment of natural water retention measures
- Promoting flood and drought risk management including extreme event prevention
- Addressing problems of land use or in-river use in River Basin Management Plans
- Re-naturalising river, lake, estuary and coastal morphology and/or re-creating associated habitats including flood- and marsh plains
- Sustainability of economic activities related to the marine environment
- Synergies between integrated coastal management and maritime spatial planning
- Achieving better soil management
- Sustainable forest management
- Improving conservation status of habitat types in Natura 2000 sites or species of Community Interest
- Implementation of actions foreseen in Prioritised Action Frameworks
- Addressing the marine component of the implementation of nature directives under the Marine Strategy Framework Directive
- Delivering actions from EU-level species or habitat action plans
- Targeting invasive alien species
- Maintaining or enhancing ecosystems by establishing green and blue infrastructure and restoring degraded ecosystems
- Targeting species with 'endangered' status (or worse) on European Red Lists
- Demonstrations of innovative use of funding
- Testing and implementing green infrastructure actions

¹⁶ Paragraph 17 of the preamble to the LIFE regulation

- Information, communication and awareness raising projects (e.g. on Natura 2000, EU Biodiversity Strategy, Invasive Alien Species, Green Infrastructure)

The LIFE programme continues to support a wide range of thematic areas. There is, however, more focus on the relevance of projects to EU policy such as a clear indication that the Commission would expect to see proposals for integrated projects addressing Natura 2000 to be supported by national or regional PAFs.

3. Platform Meeting Themes

The platform meeting shared project experience on developing responses to the predicted impacts of climate change across European Member States. Given the breadth of the subject area it was only possible to focus on a few themes, linked to biodiversity, and to climate change adaptation.

The selected themes were:

- Coastal change: the need to adapt to rising sea levels and extreme events whilst conserving coastal habitats and species
- Rivers and floodplains: the value of riparian woodland management and river restoration in reducing flood risk whilst improving wildlife value and the need to reconnect rivers and floodplains
- Upland and lowland bogs, fens and mires: their ecosystem values for carbon sequestration, water management and wildlife
- Agricultural land: changing agricultural patterns and the importance of sustained management for species

Coastal Change

Information on the challenges facing European coasts is given on the Commission's pages for integrated coastal management¹⁷ and the European Climate-ADAPT platform¹⁸. Additional information can be found in the EC staff working document 'Climate change adaptation: coastal and marine issues' which accompanies the EU adaptation strategy¹⁹. The value of the ecosystem services that natural coastlines provide in terms of protecting coastal communities is recognised.

Against a background of rising ocean temperatures, sea-level rise and projections of increasingly severe storm surges and erosion events there is a need to assess how coastal habitats and species in the Natura 2000 network can adapt to these changing conditions. The pioneering UK LIFE project 'Living with the Sea' addressed the challenges of protecting European sites on dynamic coasts.

Along the North Norfolk coast there is a delicate balance between freshwater SPA sites and marine SAC sites. The project opened a debate on how Natura 2000 can adapt to a changing coast by working with natural processes whilst also attempting to ensure no net loss of European habitats and species. The work had a direct influence on the preparation of Shoreline Management Plans in England which set out coastal management policy in the short, medium and long-term. 'Managed realignment' is a term now used to describe the process of working with the sea rather than against it.

The National Trust (UK's largest conservation charity) has adopted a 'shifting shores' approach to managing its properties and examples of storm damage and responses can be found on their website²⁰.

¹⁷ http://ec.europa.eu/environment/iczm/state_coast.htm

¹⁸ <http://climate-adapt.eea.europa.eu/web/guest/coastal-areas>

¹⁹ http://ec.europa.eu/clima/policies/adaptation/what/docs/swd_2013_133_en.pdf

²⁰ <http://www.nationaltrust.org.uk/article-1355823320656/>

The meeting visited the North Norfolk Coast to see the LIFE project 'Titchwell Marsh Coastal Change Project'²¹ where a 1.5m€ managed realignment scheme was completed to protect SPA freshwater reedbeds from tidal incursion.

Rivers and floodplains

Flooding is a major social and economic issue across Europe and few countries have not suffered from devastating floods in recent years. Increasing risks of flooding are not solely due to changing patterns of climate but also from the ways in which river catchments are managed from the uplands, through the floodplains to the tidal rivers. There can also be resistance from local communities to restoring natural river functions and making better use of the natural floodplain for water storage during periods of flooding.

The RESTORE project²² has raised awareness of the importance of river restoration in Europe and has provided tools and case studies on its website. The overall aim of the project was to encourage the restoration of European rivers towards a more natural state to deliver increased ecological quality, flood risk reduction and social and economic benefits.

Adaptation to climate change for river systems can be supported by actions such as promoting natural water retention measures²³, by reconnecting the links between the rivers and their floodplains and by reducing water temperatures by increasing shading.

River restoration is an approach which can help meet Water Framework Directive targets and develop green and blue infrastructure in urban and rural areas. There is a need, however, for more projects to be identified as case studies in climate change mitigation and for good practices to be more widely adopted. The RESTORE project has raised awareness across EU Member States opening up opportunities for follow-on projects to put large scale river restoration into practice.

Upland and lowland bogs, fens and mires

All peatland restoration projects help towards climate change mitigation by helping to stop the release of carbon through oxidisation of bare peat and by re-establishing peat forming processes on degraded sites. In many cases one-off restoration actions are enough to restart the development of peat forming vegetation in active bogs.

The LIFE programme has supported several hundred peatland projects across Europe and will continue to do as the value of the work for carbon sequestration and ecosystems services in reducing flash flooding is now widely recognised. Increasing too, peatland restoration projects are able to attract national and EU funding through their role in carbon sequestration. There is already a good degree of networking between peatland restoration projects and increasingly there will be interest in sharing results in terms of ecosystem services. In this context, the opportunity in the new LIFE programme to match scientific input (through e.g. Horizon 2020) with (experimental) restoration work could help to broaden our understanding of the function of peatlands. The

²¹ Project LIFE07NAT/UK/000938 Tackling Climate change-related threats to an important SPA in Eastern England

²² <http://www.restorerivers.eu/>

²³ <http://ec.europa.eu/environment/water/adaptation/ecosystemstorage.htm> Natural water retention measures are measures that aim to safeguard and enhance the water storage potential of landscape, soil, and aquifers, by restoring ecosystems, natural features and characteristics of water courses and using natural processes.

contribution of projects towards carbon capture has been outlined in the LIFE-Focus publication on soils.²⁴

Agricultural land

With much of the Natura 2000 network across Europe managed privately for agriculture and forestry there has been a focus on LIFE projects completing demonstration projects to show how land management can become nature-friendly. General projects with the farming community have looked at ways in which farmland birds can be conserved within the agricultural landscape, and more specific projects have looked at birds with special requirements.

Partly driven by predictions of the future climate one project in the UK is re-introducing the Great Bustard to large open grassland sites in the south west of England²⁵. Such a project would only be sustainable in the long-term if indeed the climate stays favourable or even improves for this species.

One species in the UK which is predicted to benefit from increasing summer temperatures is the Stone Curlew²⁶. The bird chooses to nest on dry, stony, open ground and such conditions can be found in the Breckland of East Anglia and similar habitat in southern Britain. The meeting included a visit to a farm in North Norfolk where fallow plots were being created through agri-environment payments to attract nesting stone curlew.

With each review of the Common Agricultural Policy there should be opportunities to introduce support for farming practices which accommodate climate change adaptation. Sometimes it will be important to prepare the habitat conditions before species move so that the range does not become contracted.

²⁴ http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/soil_protection.pdf

²⁵ http://greatbustard.org/life_project/

²⁶ More information at <http://www.rspb.org.uk/ourwork/projects/details/342233-EU-LIFE+-Project-Securing-the-future-of-the-stone-curlew-in-the-UK>

4. 14th May 2014- Morning Session

Key note presentations were given by Aidan Lonergan, RSPB Programme Manager for the LIFE 'Futurescapes' project and Sue Rees, Senior Environmental Specialist, Coastal Habitats, Natural England. Five projects presented their experience on landscape planning, ecosystem services and coastal management. Rob Lucking, RSPB Area Manager Lincolnshire, North Norfolk and the Brecks introduced the field excursion to Titchwell Marsh and Muckleton Farm.

Aidan Lonergan	Climate change and the adaptation response needed from conservationists
<p>A major change in delivering action for conservation is required to meet the challenges of climate change. The sector is faced with a public which is disengaged. And there can also be inter-organisational rivalries which hinder progress. Yet, organisations in the UK did come together in 2013 to publish the State of Nature report (http://www.rspb.org.uk/Images/stateofnature_tcm9-345839.pdf) which showed that much more has to be done together to tackle the threats. There is recognition across governments, government agencies and NGOs that a collaborative approach is vital. In the UK the report 'Making Space for Nature' acknowledged that Natura 2000 sites and other protected areas will continue to be the core of nature protection but that there was a need for more sites and for sites to be bigger, better and more joined. Government is supporting such ideas through Nature Improvement Areas and RSPB's response is through the Futurescapes programme on 83 landscapes. There are other examples of 'landscape scale conservation' from organisations such as The Wildlife Trusts 'Living Landscapes' programme. Climate change adaptation is central to these projects and is evident in other initiatives such as the Ecosystems Markets Task Force (http://www.defra.gov.uk/ecosystem-markets/). Landscape scale conservation is looking at innovative partnerships and innovative solutions such as the example of the creation of habitats at Wallasea Island in the Thames Estuary using spoil from London's Crossrail Project. Aidan listed eight steps to adaptation:</p> <ol style="list-style-type: none"> 1. List objectives of work area 2. Find out how climate is expected to change 3. Assess affect on objectives <ul style="list-style-type: none"> - Direct impacts - Indirect impacts 4. Prioritise threats and opportunities 5. Explore range of strategies and actions 6. Agree actions and revise work programmes 7. Monitor, review adaptive management cycle 8. Communications to key audiences 	
Project	LIFE10INF/UK/000189 Futurescapes
Link to presentation	https://drive.google.com/file/d/0B02grvgQWDIQUWg0cXE5eUxnMHM/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4028
Project website	www.rspb.org.uk/futurescapes Making Space for Nature http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf

Linda Maria Martinello	Landscape planning, ecological networks and participatory processes
<p>The project aims to develop the ecological network in the Province of Trentino. Although 30% of the territory is protected there is a lack of consensus over management leading to inadequate funding and poor protection of nature. There is a need to change the mindset to one where protected areas are seen as a tool for local sustainable development. The concept of ecological networks is based on homogenous areas, which can form the main links in the network and be recognised in planning documents. Ecological networks can help to address threats such as fragmentation, abandonment, intensive land use, invasive alien species and the impacts of climate change (particularly noted as a threat to bird species). The project has a strong focus on the participatory process and what it calls 'responsible subsidiarity'. There is a strong socio-economic strand to the work with links to agriculture, tourism, jobs and integrated management at the provincial and regional level. Although not addressing climate change adaptation directly the engagement processes established by the project allow discussions on adaptation to be included in the delivery of the project.</p>	
Project	LIFE11NAT/IT/000187 TEN
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQdGtKNXAwTmljTVk/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4291
Project website	www.lifeten.tn.it

Martin Forsius	Modelling and assessment of climate change impacts on key ecosystem services in Finland: experiences from the VACCIA – project.
<p>The VACCIA-project assessed the impacts of climate change in ecosystem services and livelihoods, produced environmental change scenarios and developed modelling, GIS and database solutions to assess the changes and adaptation options. It generated information for updating the Finnish national climate change adaptation strategy, for regional planning and decision making and as a contribution to EU-level science and policy work. The project focused on three ecosystems (coastal, lakes and catchments and urban) and four sectors (forest, agriculture, fish production and nature-based tourism). An example of evidence is presented for the Gulf of Bothnia. Long-term measurements (1939-2007) of water turbidity show a decrease in visibility depth from about 7 m to 3.5 m. This indicates increasing eutrophication and projections indicate that climate change will increase suspended sediment and N loads. Climate warming has resulted in a measured earlier spring migration and later autumn migration of water birds. On average autumn migration occurs 0.37 days/year later (11 days in 30 years). Climate change will have both positive and negative effects on key ecosystem services in Finnish conditions. Some provisioning services may benefit but there would be negative impacts on endangered species, water quality and winter tourism. It is important to recognize that there would need to be adaptation measures even for potentially benefitting services. Adaptation measures are mainly relevant at the local/regional scale and this requires high-resolution data. National long term ecological research network LTER-sites provide excellent platform for detailed studies on climate change impact and adaptation.</p>	
Project	LIFE07ENV/FIN/000141 VACCIA
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQbnRoZDhsdXl3cmc/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3246
Project website	http://www.environment.fi/syke/vaccia Synthesis report and subproject reports available at: www.syke.fi/projects/vaccia

	<p>Synthesis paper: Forsius, M. et al. (2013). Impacts and adaptation options of climate change on ecosystem services in Finland: a model based study. <i>Current Opinion in Environmental Sustainability</i> 5: 26-40. doi: http://dx.doi.org/10.1016/j.cosust.2013.01.001</p> <p>Special issue on ecosystem services: Fu, B., Forsius, M. and Liu, J. (eds.) (2013). Ecosystem Services: climate change and policy impacts. <i>Current Opinion in Environmental Sustainability</i> Vol 5, issue 1. doi: http://dx.doi.org/10.1016/S1877-3435(13)00018-3</p>
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Benedetta Concetti	The Making Good Natura project
<p>The project is raising awareness across 21 pilot Natura 2000 sites in seven regions in Italy on the value of ecosystem services. The aim is to identify the main ecosystems services at each site through GIS analysis and stakeholder consultation so that values for payments for ecosystem services can be derived. Although the project does not directly address climate change mitigation and adaptation it is raising awareness of both Natura 2000 and the ecosystem services which include the provisioning services such as water supply and the regulating services such as carbon storage.</p>	
Project	LIFE11ENV/IT/000168 MGN
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQSDV0Z3FqNWpkaDA/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4231
Project website	http://www.lifemgn-serviziecosistemici.eu/EN/progetto/Pages/short.aspx

Sue Rees	Living with the Sea: Natura 2000 sites and dynamic coastlines
<p>Dynamic coasts are a natural response to sea level and climate changes. This is the simple message from the Living with the Sea project which continues to influence UK coastal policy. Living with the Sea was a large-scale, multi-site overview of coastal changes on Natura 2000 coastal complexes in South and East England. The project developed Coastal Habitats Management Plans (CHaMPs) which look at mainly predicted geomorphological changes over a 100 year time span. The project included a demonstration site, good practice guide and overview of European approaches. It has a strong legacy through Regional Habitat Creation Programmes led by the Environment Agency. These can respond to the gains and losses of habitats resulting from coastal change by a strategic approach for the creation of replacement freshwater and intertidal habitats. The strategic plans can reduce delays in coastal works and ensure that monitoring schemes are followed. The process will ensure that habitat created as a compensation for loss is added to the Natura 2000 network. The work of Living with the Sea is continued into the England 'PAF' project IPENS through a Natura 2000 thematic plan for coastal management.</p>	
Project	LIFE99NAT/UK/006081 Living with the Sea
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQRXl4VmNyaW1mcnc/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=346

David Mason	The Alde-Ore Estuary: adapting the management of coastal reserves in a changing climate
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<p>The Alde-Ore estuary is located on the soft coastline of Suffolk in eastern England. The coastal features will adapt and migrate in response to climate and coastal change. A project objective was to establish a functionally efficient and sustainable infrastructure for water management to enable adaptation to climate change. The project completed its work in 2013 and this was tested in a severe storm surge in December 2013, the worst in England for 60 years. The new infrastructure installed by the project to maintain the lagoon systems worked well showing how adaptation actions can be applied to maintain coastal biodiversity. The National Trust, the largest owner of the linear coastline in England promotes a policy 'Shifting Shores-Adapting to Change' which favours adaptation to provide time and space for the coastline to adjust to climate change. The principles are taking the long term view, adapting to change, working together and working with nature.</p>	
Project	LIFE08NAT/UK/000199 Alde-Ore
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQRUwxaVBiMV84RE0/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3537
Project website	http://www.lifealdeore.org/ Follow links to shifting shores report at http://www.nationaltrust.org.uk/article-1355823320656/

Patricia Prado	Habitat restoration and management in two coastal lagoons of the Ebro Delta: Alfacada and Sant Antoni-Tancada
<p>Rising sea levels and coastal erosion threaten a number of habitats and species along the Mediterranean coast. On the Ebro Delta there is a need to allow for the migration of coastal habitats and the project addresses the restoration of lagoon features from rice fields and fish ponds. The objective is to improve the ecological status of the Alfacada and Tancada lagoons through habitat restoration and management measures designed to mitigate the effects of coastal retreat and climate change. Practical actions at Alfacada included transforming the rice fields to lagoons, reconnecting saltmarsh habitats and restoring the hydrological network. At Sant Antoni-Tancada the work renaturalised former fish ponds by removing the walls, re-establishing coastal vegetation and providing bird nesting islands. The project had similarities to the work seen on the field visit at Titchwell Marsh.</p>	
Project	LIFE09NAT/ES/000520 Δ Lagoon: Ebro Delta
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQSllsSURXOHo3S0E/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3845
Project website	http://lifedeltalagoon.eu/lifedeltalagoon/ Leaflet at http://lifedeltalagoon.eu/lifedeltalagoon/images/stories/quadriptic_life_eng.pdf

Rob Lucking	Introduction to the field trip – managed coastal realignment at Titchwell Marsh and conserving the stone curlew in East Anglia
<p>An introduction to the field trips to Titchwell Marsh and Muckleton Farm (see field trip notes for more information)</p>	
Project	LIFE07NAT/UK/000938 TaCTICS & LIFE11INF/UK/000418 Stone Curlew
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQVWN5aWxyQXktMGM/edit?usp=s

	haring
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3321 http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4351
Project website	http://www.rspb.org.uk/reserves/guide/t/titchwellmarsh/coastalchange/ http://www.rspb.org.uk/securingthestonecurlew

5. 14th May 2014- Excursion

Titchwell Marsh reserve and North Norfolk Coast

Rob Lucking, RSPB Area Manager Lincolnshire, North Norfolk and the Brecks and Paul Eele, RSPB Site Manager, introduced the Titchwell Marsh Coastal Change Project. Titchwell Marsh RSPB Nature Reserve was created between 1974 and 1978. Today the Reserve covers 379 ha of the North Norfolk coastline and is one of the RSPB's most popular nature reserves. Historical records show that by 1717 the land that is now occupied by the nature reserve had been claimed from the sea and for over 200 years was in agricultural use. Following the devastating east coast floods in 1953 the sea defences protecting the land were breached and never repaired, so the land returned back to saltmarsh.

In the 1970s the RSPB enclosed 38 ha of the saltmarsh with a series of sea walls creating 11 ha of brackish (intermediate salinity) lagoon, 18 ha of freshwater reedbeds and 12 ha of freshwater lagoons. Titchwell Marsh is now a component of two Natura 2000 sites - the North Norfolk Coast SAC and the North Norfolk Coast SPA.

In the face of decades of coastal erosion, the RSPB has worked to maintain its internationally important reserve at Titchwell Marsh for as long as possible. However, it was recognised that with changing coastal processes and rising sea levels, a new approach was required to ensure a sustainable flood defence solution for the reserve whilst protecting as much of its internationally important wildlife. The purpose of the LIFE+ Titchwell Marsh Coastal Change Project (TaCTICS) was to provide flood defences for designated habitats in the short, medium and long term, whilst minimising impacts on the designated habitats outside the flood defences.

In February 1996, a storm surge hit the North Norfolk Coast and there was considerable erosion of the sand dunes and the sea defences protecting the main reserve. This raised concerns over the long term future of Titchwell Marsh. The RSPB commissioned studies to improve the understanding of the changing coastal morphology and its implications for management of the defences. The assessment revealed an accelerated rate of erosion at Titchwell caused by a combination of westerly longshore drift and an easterly tidal eddy created by an offshore island. However, Scolt Head Island is growing westwards at about 9m a year and thus it was possible to expect the island to promote coastal accretion at Titchwell after some 50-60 years. Thus a project was devised to give protection to the freshwater marshes for at least 50 years.

The project was completed over three working seasons and involved the reinforcement of the main sea wall (new visitor infrastructure was added through a separate project), maintenance of other walls and the breaching of one wall to revert an area of coastal lagoon to tidal saltmarsh. Mitigation for the loss of breeding habitats for avocet was provided at Titchwell Marsh and compensatory habitat was provided at two sites adjacent to The Wash SPA in the same region.

The sea defences protecting the internationally freshwater habitats now have a flood defence standard of 1 in 30 years. This should be sufficient to protect the site until a less erosive marine environment exists at Titchwell, as is predicted. The area from which the material for the sea defences was taken has been transformed to create an additional 2.4ha of reedbed habitat.

The eastern sea defence was breached in September 2011 allowing what was the brackish marsh to become intertidal. A monitoring programme to measure rates of sediment deposition and the development of saltmarsh vegetation has been implemented.



Titchwell Marsh Nature Reserve: On left is SPA freshwater habitat protected by strengthened sea walls; on right is former brackish marsh (saline lagoon) which is reverting to intertidal saltmarsh following completion of managed realignment project. This setback is in response to rising sea level and changing coastline morphology.

In December 2013 the North Norfolk Coast was hit by a severe tidal surge, the most extreme event since the storm of 1953. Although there was considerable erosion of the sand dune frontage the reengineered seawalls protected the freshwater marsh from inundation. Without the LIFE project the nature reserve would have been inundated by the sea with the loss of probably all freshwater habitat.

The storm surge of December 2013 and Atlantic gales of early 2014 which impacted on the UK coast (and much of North-West Europe) reinforce the 'Living with the Sea' approach. It is simply not possible to defend every site and a pragmatic approach is necessary based on Shoreline Management Plans. Sue Rees, Senior Environmental Specialist (Coastal Habitats) for Natural England made the following points about the consequences of storm events:

- Extreme events will re-shape the coast including Natura 2000 sites
- In most cases the features will recover but at some sites there may need to be a change in approach if the flooding is permanent
- An adaptive approach is essential
- A dynamic coast may be more resilient to climate change
- Opportunities should be considered. For example in the winter of 2013/14, 4,500 ha of coastal land were affected by tidal flooding- perhaps in some cases, as with Titchwell in 1953, new habitats could be created.

As coastal features change there may be both threats and opportunities to habitats and species. Sue Rendell-Read, RSPB project manager for the Little Tern Recovery Project²⁷ explained how this species is adapted to making use of dynamic shorelines, nesting on the mid to upper sections of shingle and sand beaches. The species is susceptible to the loss and modification of nesting sites resulting from storms and coastal squeeze²⁸ and is also expected to move its range northwards in response to climate change. So although the project is currently focused on improving breeding success on English colonies the long term plans must look to habitat opportunities in Scotland.

²⁷ LIFE12NAT/UK/000869 Little Terns

²⁸ See the recent press release <http://www.rspb.org.uk/news/367790-climate-change-leaving-seabirds-with-nowhere-to-tern>

The second part of the field visit was to Muckleton Farm, Burnham Market, North Norfolk, to see how Andrew Holland, an RSPB farm adviser, is working in partnership with David Lyles, a farmer, to provide breeding plots for Stone Curlew. David Lyles is currently on both Entry Level Stewardship (ELS) and Higher Level Stewardship (HLS) agri-environment schemes, with stone-curlew nesting plots as part of the agreement. Stone Curlew choose nest sites on stony ground with open views and are very easily disturbed by people and farming operations. Fallow stone curlew 'plots' are created to draw birds away from other arable land.



Visit to Muckleton Farm: left- arable land which attracts Stone Curlew- the breeding 'plot' is in the distance on an open field; right- David Lyles explains agri-environment payments in relation to whole farm management.

The conservation effort is high and the project's aim to gradually wind down the effort put in by RSPB and other conservation bodies to switch the focus to farmers and other landowners and to train up volunteers. The task is made more difficult by the need to seek opportunities to allow the species to expand its range in the UK in response to climate change. For this species in the UK climate change may present opportunities to expand the population but this can only be achieved by providing the right habitat conditions.

6. 15th May 2014- Morning Session

Project presentations on the theme of wetlands and rivers continued in the first part of the session followed by a wider look at the LIFE programme 2014-2020 including examples of the preparation of national Prioritised Action Frameworks for Natura 2000 (with examples from England and Latvia). The PAFs will be an important supporting document for applications under the LIFE-Nature strand of the LIFE programme. Juan Pérez Lorenzo, European Commission, Climate Action DG outlined the opportunities for projects addressing climate change adaptation in the LIFE programme 2014-2020 and João Silva provided an overview of biodiversity projects from the LIFE database addressing climate change adaptation.

Ali Nadir Arslan	Climate change indicators and vulnerability of the boreal zone- applying innovative observation and modelling techniques
<p>The magnitude of climate change is dependent on the atmospheric load of carbon dioxide and methane with the terrestrial biosphere (including boreal forests and peatlands) playing an important role in the global carbon balance. The carbon balance of terrestrial ecosystems is known to an accuracy of about +/-35% based on observational and modelling methods. However, uncertainty increases at the regional level, and obtaining accurate figures of country based carbon balances is a challenge. The climate is changing rapidly in arctic and subarctic regions with projected annual mean temperature increase of about 2 – 6°C from 2000 to 2100. The northern carbon balances are thus subject to both positive and negative alterations, depending on the temporal and spatial climate variation and a regional approach is needed to examine these issues.</p> <p>The project will collect information, data and expertise from institutes and existing monitoring programmes to build a comprehensive platform for analysing climate change effects. Innovation includes webcam monitoring linked to Earth Observation systems to provide time-series observations for calibration and validation, as well as being able to improve the assessment of forest ecosystem services. The work will confirm climate change indicators and establish the link between these indicators and their effects to create vulnerability maps of climate change scenarios. The webcam network will help to provide climate change vulnerability assessments for Finnish municipalities on selected ecosystem services. Work will focus on ecosystem service assessments and valuation and vulnerability expressed as a function of exposure, sensitivity and adaptive capacity, estimated change in ecosystem service provision and socio-economic characteristics of the region.</p>	
Project	LIFE12 ENV/FI/000409 MONIMET
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQZWk3OWQ4LW95Y0k/edit?usp=sharing
LIFE Database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4771
Project website	http://monimet.fmi.fi

Lisa Tenning	LIFE to ad(d)mire- mire and wetland restoration in Sweden
<p>Peatlands are one of the most important global carbon sinks accounting for 25% of all terrestrial carbon. But the loss of carbon from peatlands is also of global concern with less than 0.3% of the world's surface giving 6% of anthropogenic CO₂. The boreal and sub-arctic zone holds 2-3 times more carbon than the tropical rain forests so conservation here is imperative as healthy peatlands help cool the climate. The Swedish project is addressing the restoration of 3,800 ha of peatland across seven Counties. Peatlands in Sweden are under threat from peat mining, horticulture, agriculture and forestry with an estimated 25% already lost. The value of peatlands is for carbon storage, filtering and regulation of water supply, protecting land from flooding and conserving global biodiversity. LIFE is helping peatland restoration projects step up a gear.</p>	
Project	LIFE08NAT/S/000268 Life to ad(d)mire
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQQnFWZEd5OVdTznM/edit?usp=sharing
LIFE database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3568
Project website	http://www.lifetoaddmire.se

Eduardo Lafuente Sacristán	Segura River Basin: riparian connectivity and climate change in the Segura River Basin
<p>The Segura River Basin in Murcia is one of the driest in Europe with average rainfall only 365mm/yr. The basin covers 18,870 km² with a population of c. 2 million. Modelling suggests that the Mediterranean areas will be affected by less precipitation but more flash flooding in the future. There is a high risk of flash flooding in the Segura River: one dramatic example was shown for the river at Puerto Lumbreras where in 15 minutes the flow increased from 7.24 m³/s to 2,255,230 m³/s. Monitoring has confirmed that there has been a reduction in overall water resources over the last 30 years and this is partly caused by a loss of riparian forest (and loss of biodiversity) and the expansion of Giant Reed <i>Arundo donax</i>. Riparian forests can help to reduce the risk of floods and the loss of sediments so the challenges for the project are to explain the benefit of the forest to local people and to develop cost effective ways to re-establish forest.</p>	
Project	LIFE12ENV/ES/001140 Segura Riverlink
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQWUVpM3BHOFVyems/edit?usp=sharing
LIFE database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4635
Project website	www.segurariverlink.eu See also video of the first implementation action of the LIFE+ SEGURA RIVERLINK project: the removal of an unused weir https://www.youtube.com/watch?v=GF2NNNnXtMg&feature=youtu.be

Georg Rast	Rehabilitation, conservation and management of Floodplain Landscapes using an example of the project Elbe Floodplains at Vockerode: Floodplain restoration and adaptation of forestry and agriculture
<p>The Elbe river has a natural floodplain of over 500,000 ha yet of this less than 100,000 ha are left between the various dykes (50% meadow, 25% arable land and less than 5% forest). The project, delivered by WWF with partners from the Biosphere Reserve, the State Agency for Flood Protection and Water Management and the Agency for Cultural Heritage aims to restore a 212 ha site within the floodplain by restoration of floodplain meadows and adaptation of floodplain forests. The clear message from the project is the need to consider floodplain restoration in much larger blocks of 10,000s of ha. Adaptation to climate change is advised by historical records of floods in Dresden dating as far back as 1500. Recent floods from 2002 and 2013 are helping to map the current and potential future areas to be incorporated into the floodplain. Addressing climate change adaptation will improve the resilience of the floodplain ecosystem, reduce the risk of flooding and improve ecosystem services including flood retention, water purification, carbon sequestration and improved amenity value. Challenges are the scaling up of work (from 100s to 1000s of ha), the integrated management of existing floodplains and adopting catchment approaches. One of the problems, however, is concerned with land ownership with the example given of 55 separate owners on one 60 ha land parcel. There will need to be a major communication campaign to show farmers what options they have in the floodplain.</p>	
Project	LIFE08NAT/D/000013 Elbe Floodplains at Vockerode
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQeIjfv3JCRndWLXM/edit?usp=sharing
LIFE database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3519
Project website	http://www.wwf.de/themen-projekte/projektregionen/elbe/projekt-mittlere-elbe/

Simon Hooton	The Broads: adaptation planning with water in mind
<p>The Broads in Eastern England is a network of wetlands of undrained peat, open fens, woodland, grazing marsh and shallow lakes. It was formed by the flooding of medieval peat workings when sand and shingle ridges formed on the coast. The link between the inland wetlands and the coast will become more critical with climate change. Based on climate change projections (warmer drier summers, decreased summer rainfall, increased winter rainfall and rising sea level) including more frequent, more intense extreme events there will be a need to adjust the current 'coping range'. A high level Adaptation Panel was formed for the Broads and this led to several studies and reports. Some of these showed that potential flooding could return the area to the map of the Middle Ages. This has led to a major public engagement strategy 'Broads Community' at the level of local (Parish) council and with a special focus on young adults. Options are business as usual, increasing hard engineering or making space for water.</p>	
Project	No active project but site visit saw results of LIFE02NAT/UK/008527 Bittern
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQVEF0ZXI6NjdCdFE/edit?usp=sharing
Website	http://www.broads-authority.gov.uk/_data/assets/pdf_file/0015/400047/Draft-climate-change-adaptation-plan.pdf http://www.broads-authority.gov.uk/looking-after/climate-change http://www.naturalengland.org.uk/regions/east_of_england/ourwork/climatechange/project.aspx

Elisabetta Rossi	GESTIRE: Development of the strategy to manage the Natura 2000 network in the Lombardy Region.
<p>The project objective is to prepare a long term strategy to manage and, restore sites, habitats and species and the ecological network that connects the 242 Natura 2000 sites in Lombardy covering 15% of the territory. Outputs will be a programme of management for all sites and a regional Prioritised Action Framework for Natura 2000. As part of this work a review of knowledge on climate change adaptation and mitigation was carried out and it is being used to support specific conservation measures and provide recommendations for future management. The conclusion is that the strengthening and expansion of the Natura 2000 network will be useful for the mitigation of the negative effects of climate change, e.g. on amphibian populations. Already there are examples of funding being directed to habitats and sites where there will be a focus on climate change adaptation, e.g. the creation and restoration of wetlands and improving the connectivity between wetlands. Further the integration of Natura 2000 sites with River Basin Management Plans will scale up the work. Finally measures have also been identified through the Rural Development Programme to address climate change issues.</p>	
Project	LIFE11NATIT/000044 GESTIRE
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQcUpnMkhHOEpvdDQ/edit?usp=sharing
LIFE database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4306
Project website	www.life-gestire.eu

Juan Pérez Lorenzo	The LIFE programme 2014-2020- supporting adaptation in Europe
<p>The EU faces significant challenges in reducing Greenhouse Gas emissions and adapting to inevitable climate change. The 2014-2020 LIFE programme includes action grants, integrated projects and financial instruments that can address different challenges and constraints. The programme includes two new 'green' financial instruments, the Natural Capital Financing Facility (NCF with € 30m from LIFE Environment + € 30m from LIFE Climate Action; plus matching funds from EIB of € 50m) and Private Financing for Energy Efficiency (PF4EE with € 80m from LIFE Climate Action and a link with the EIB's initiative "DEEP Green"). These financial instruments are linked to strategic areas for EU climate action, i.e. adaptation and energy efficiency, and they complement other climate-related financing within LIFE and beyond. Action grants for DG CLIMA will be administered by the Executive Agency for SMEs (EASME) which will implement the project actions grants for DG CLIMA with a transitional phase in 2014 (DG CLIMA will launch the call in 2014 with EASME taking over from the evaluation stage). DG CLIMA will remain responsible for programming and monitoring LIFE Climate Action and for providing political steer to the implementation. The financial instruments will be implemented through Delegation Agreement(s) with the EIB, and the EIB will ensure implementation through local banks and in close relation to national energy efficiency policies.</p>	
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQQ1FNTIBhU1ZvREE/edit?usp=sharing

Simon Duffield and Sam Somers	Embedding climate change adaptation in the Natura 2000 network
<p>The Natura 2000 network in England includes 85 SPAs and 250 SACs. The work of Natural England (government body) and the IPENS LIFE project is evidence informed. Science is important in understanding the changes happening today and what may happen in the future. Long term studies (1976-2005) showed that Spring had advanced by 11.7 days in the UK based on a study of 725 taxa (83.8% showed advances). Species are moving northward in response to warming with the fastest migrations recorded for dragonflies & damselflies, soldier beetles and spiders. Insects are moving faster than fish, birds or mammals. Species also move upwards on mountains with the Mountain Ringlet butterfly moving 130-150m uphill and losing ground at the margins of its range. Change can be both incremental and transformational. The importance of Natura 2000 is borne out in studies which show that species are preferentially colonising protected areas. Climate change vulnerability, however, can only really be assessed site by site. So, whilst chalk grasslands are considered to have low vulnerability, uplands, wetlands and coastal sites have greater vulnerability. Natural England has begun to embed climate change adaptation into all National Nature Reserve management plans and the IPENS project will undertake a similar exercise for all Natura 2000 sites. Site Improvement Plans (SIPs) will develop objectives and be advised by thematic plans. Initially climate change adaptation was thought to be a cross-cutting subject but now will be addressed in a specific thematic plan.</p>	
Project	LIFE11NAT/UK/000384 IPENS
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQa3F4ZDVuNi1xQ2M/edit?usp=sharing Evidence sources quoted included 'Biodiversity management in the face of climate change' (see http://www.sciencedirect.com/science/article/pii/S000632070800387X .
LIFE database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4328
Project website	www.naturalengland.org.uk/ipens2000

Juris Jatnieks	National conservation and management programme for Natura 2000 sites in Latvia
<p>The project is an example of the development of a national Prioritised Action Framework and as such it has the potential to have a significant impact on the future focus on climate change mitigation and adaptation projects. The project will have three main outputs i) the national PAF for Latvia, ii) the National Conservation and Management Programme for Natura 2000 in Latvia and iii) Guidelines for Management of Coastal Habitats, Freshwater Habitats, Grassland, Bogs, Forest and Rocky Habitats & Caves. The work is carried out by a team of experts and the results are directly connected to the agreed National Operational Programme for 2014-2020. The project is a good example of the PAF process working to establish priorities and to have these priorities included in the national programme agreed with the EC. The PAF will support national responses to climate change adaptation by focusing on wetlands (particularly bogs and mires), freshwater habitats and forests. Ecosystem services provided by healthy wetlands will help mitigate climate change impacts by acting as carbon sinks, reducing flooding and erosion and reducing eutrophication. The PAF sets an ambitious national target to improve the conservation status of 33% of Latvia's Natura 2000 sites by 2020.</p>	
Project	LIFE11NAT/LV/000371 NAT-PROGRAMME
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQTmxGZVWVYXNTSG8/edit?usp=sharing
LIFE database	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4283
Project website	www.nat-programme.daba.gov.lv/public/lat

João Silva	LIFE programme climate change mitigation and adaptation (biodiversity)
<p>Natura 2000 network sites provide natural solutions for mitigating and adapting to climate change – based on ecosystem services. These include reducing the impact of sea level rise, carbon storage, climate regulations (shade, moisture etc), increasing water retention, reducing risks of extreme events (flooding, fires, storms etc.). LIFE projects focused on restoration are able to contribute to an increase in biodiversity value and, at the same time, increase opportunities for climate change adaptation and resilience. It can be argued that all LIFE Nature projects since 1992 have helped to some extent with climate change mitigation and adaptation. However it is generally LIFE-Environment projects which have explicit objectives for climate change. About one third of LIFE-Nature projects 2011-2013 have indicated that they address climate change (at application stage) but this percentage is not found in the completed projects. There is therefore a need for LIFE Nature projects to pay more attention to climate change relevant actions and outputs. LIFE Nature and Biodiversity adaptation project actions can be categorized as measures:</p> <ol style="list-style-type: none"> 1. To reduce existing pressures and threats (e.g. buffer zones, enlarging sites); 2. To ensure ecosystem heterogeneity (e.g. enhance structural gradients); 3. To increase connectivity(e.g. corridors and stepping stones); 4. To ensure abiotic conditions (e.g. water quality, nutrient balance); 5. To manage impacts of extreme events(e.g. fire, flood management) ; and, 6. Other measures (e.g. relocation of species). <p>Projects are encouraged to share their results on the Climate-ADAPT web-pages http://climate-adapt.eea.europa.eu</p>	
Presentation	https://drive.google.com/file/d/0B02grvgQWDIQT0xjbW1tMWRMMVU/edit?usp=sharing

7. 15th May 2014 –Excursion

A second field visit was to the Norfolk Broads with Simon Hooton, Head of Strategy and Projects, and Andrea Kelly, Senior Ecologist, of the Broads Authority.

The first site visited was the How Hill National Nature Reserve which forms a large area of established wetland within the River Ant Valley with fen, reedbed, wet woodland and shallow lakes. The site is owned by The Broads Authority and management includes the commercial harvesting of sedge and reed to maintain habitat quality. Reedbeds were restored as part of the 2002 LIFE Bittern project.



Reedbeds at Buttle Marsh created through the 2002 LIFE Bittern project

The Broads Authority purchased 42 ha of arable land next to the How Hill Nature Reserve for restoration to wetland. The work at How Hill involved reed-bed creation, re-profiling dykes, and creating shallow lagoons. The new marsh is called Buttle Marsh after an old local name for the Bittern.

The second site visited was Barton Broad which by the 1970s was severely affected by decades of nitrate and phosphate pollution from water running off agricultural land and two local sewage treatment works. This led to excessive algae growth in what had been a lake rich with water lilies and underwater plants twenty years previously.

The solution to the problem was a combination of improvements to sewage discharges to reduce phosphates and the removal of the build up of phosphate-rich mud in the shallow lake. 300,000 m³ of nutrient enriched mud were pumped into lagoons on 22 ha of farmland adjacent to the broad. Restoration took four years. Once the silt in the lagoons had dried out the soil was excellent for agriculture. The dredging removed 50 tonnes of phosphorus, there is now 60% less phosphorus release from the sediment and there are now 75% fewer algal cells in the area²⁹.

²⁹ Further information on this interesting case study can be found at <http://www.broads-authority.gov.uk/looking-after/managing-land-and-water/water-quality/barton-broad-case-study> and http://www.broads-authority.gov.uk/data/assets/pdf_file/0006/404268/Darkness_to_Light.pdf



Excursion to How Hill Nature Reserve and Barton Broad (bottom right)

8. Summary of issues raised in presentations and discussions

The focus of the meeting was on climate change, biodiversity and associated ecosystem services. In terms of the LIFE programme this is a milestone moment with an opportunity to look back to the achievements of recent and current projects in addressing climate issues and to look forward to the LIFE programme for 2014-2020. The new programme, as outlined by Juan Pérez Lorenzo, will have a specific sub-programme for climate action running in parallel to the sub-programme for the environment.

Nature conservation bodies should seize the opportunities presented in the LIFE programme to continue to present traditional projects but also to develop new partnerships through the climate sub-programme and Integrated Projects. Aidan Lonergan, in opening the meeting, began with a call to arms to 'traditional' conservationists to embrace climate change responses in all their work. This is beginning to take shape through the promotion of 'landscape scale conservation' and the strengthening of partnerships within the conservation sector. These sentiments are echoed in the Prioritised Action Framework (PAF) projects which look to opportunities to improve habitat connectivity and ecosystem heterogeneity.

There should be a natural progression from understanding the issues (through evidence work) to developing the national and regional Prioritised Action Frameworks (to protect the 'jewels in the crown') to delivering conservation action at the landscape scale with core sites, stepping stones, corridors and buffers etc. The conservation sector is moving in the right direction and is increasingly engaging with other sectors to explain the value of ecosystem services.

Natura 2000 sites will be essential for safeguarding Europe's biodiversity and allowing it to adapt to a changing climate. In relation to protected sites and ecological networks the 'Lawton Report'³⁰ for England sets out the need for more, better managed, bigger and more connected sites. Simon Duffield showed examples of evidence that protected sites are preferentially used by species as they adjust their ranges in response to climate change. Thus, as João Silva pointed out, almost all LIFE-Nature projects since 1992 have contributed to the resilience of the Natura 2000 network.

Although the LIFE+ application process identifies 'climate change adaptation projects' (about one-third of all nature projects say that climate change is addressed) there are few concrete examples in project reports of specific actions. There is therefore a need to turn the intention into practical delivery mechanisms including better informing stakeholders and local populations about the need to consider how climate change may affect their interests. Many of the projects highlighted the need to engage with local users and other stakeholders.

In several of the presentations the local target audiences were well defined. In Finland, for example, Martin Forsius, explained how climate change assessments were made sector by sector, e.g.

- *Biodiversity*: Maintaining the migration possibilities of forest species in the management of forest landscapes
- *Forestry*: Species selection, optimal stand densities, and timing of intermediate cuttings
- *Agriculture*: Breeding of cultivars that can make use of the prolonged growing season
- *Fisheries*: Adaptation of commercial fishing to changes in fish stocks
- *Tourism*: Development of year-round tourism services

³⁰ <http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>

Adaptation measures should be at a scale where they are relevant: this may be local, regional or national so data at the right scale is needed. Ali Nadir Arslan gave a similar view, stressing that as climate change impacts will be felt at local or regional levels, it is important to engage with local stakeholders and offer locally relevant data. Martin Forsius added that adaptation requires some lateral thinking, as sectors such as agriculture or forestry in Finland may benefit from a change climate with potentially longer growing seasons.

Conservationists will have to get better at communicating and engaging with wider society. Whilst the conservation of biodiversity is the aim of nature projects the support for the work may come from 'selling' its value as an ecosystem service, to reduce warming, to provide water or to reduce flooding. By working at larger scales and in broader partnerships conservation bodies can better engage with stakeholders who can consider the social and economic benefits of habitat restoration and management.

Recent experience in the UK, arising from the flooding of winter 2013-2014, shows the urgent need to better engage with the public on ecosystems services approaches to climate change. Aidan Lonergan expressed his frustration with the media's portrayal of climate change as still up for debate, while climate scientists and governments now accept that climate change, and therefore adaptation to climate change, is unavoidable. This explains why the EU has made the commitment to allocate 20% of its budget to actions addressing the impacts of climate change and why most governments have now prepared national adaptation strategies.

In the UK the awareness of climate change and its potential impact on the environment, the economy and on citizens is relatively high at government level.^{31,32} The report 'England Biodiversity Strategy: Climate Change Adaptation Principles' published in 2008³³ identified five key principles to guide conservation practitioners aiming to help wildlife and habitats adapt to climate change:

- Take practical action now
- Maintain and increase ecological resilience
- Accommodate change
- Integrate action across partners and sectors
- Develop knowledge and plan strategically

These principles are relevant to the Natura 2000 network and similar networks of protected areas. It is becoming clear, as pointed out by Sue Rendell-Read, that the suite of current SPAs for the Little Tern in the UK may not be the same set of sites that will be needed in 20 or 50 years time. The Natura 2000 network of sites needs inbuilt flexibility and has to operate in a wider landscape context where there is equal focus on corridors and stepping stones.

³¹ <https://www.gov.uk/government/organisations/department-of-energy-climate-change> The Department of Energy and Climate Change is supported by the Committee on Climate Change <http://www.theccc.org.uk/> an independent, statutory body established under the [Climate Change Act 2008](#) to advise the UK Government on emissions targets and report on progress made in reducing greenhouse gas emissions and preparing for climate change. A publication of interest is 'Managing the land in a changing climate' <http://www.theccc.org.uk/publication/managing-the-land-in-a-changing-climate/>

³² <https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>

³³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69270/pb13168-ebc-ccap-081203.pdf

The need for ecological networks is supported by studies such as the CHAINSPAN project led by the British Trust for Ornithology (BTO)³⁴. The view of BTO and other conservation bodies is that *“if climate change is to result in significant shifts in the distribution and abundance of species, then it may require long-term planning by conservation organisations in order to adapt. This may involve increasing the connectivity of habitats in order for species to track changes in their climate, increasing the size of protected areas to increase the resilience of those populations to climate change, or managing sites to reduce negative climate change effects”*.

In many examples of adaptation there will be options to consider. In the UK Shoreline Management Plan, options are from ‘no active intervention’, through ‘managed realignment’ to ‘hold the line’ or even ‘advance the coast’. In river and floodplain management there are similar options to be considered. Georg Rast, described a project to restore and reconnect 212 ha of the Elbe floodplain, argued that such floodplain management schemes should be addressing 10,000s ha at a time to match the challenges of climate change adaptation. There was a discussion on whether the floodplains could be deepened to hold more water. Although such an approach may work in the sections of a river near the sea (e.g. the Netherlands) it would not work so well in the upper reaches and there would be an issue with the loss of habitat.

Regional and national Prioritised Action Framework (PAF) projects should consider the potential impacts of climate change on the Natura 2000 network. However, in an analysis by Astrale of the 2011 PAF projects³⁵ it was found that four projects did not consider themselves to be climate change adaptation projects whilst another four gave reasons such as addressing fragmentation and the need for connectivity (Trentino), mitigation of negative effects and enhancement of positive effects (Lombardy), environmentally friendly management methods reducing vulnerability of natural systems (Latvia) and supporting actions which will address the vulnerability of Natura 2000 sites to climate change effects (Wales).

Eight of the nine 2011 and 2012 PAF projects attended the platform meeting and the discussions should help these projects to reinforce their focus on climate change adaptation. Sam Somers explained that for the English PAF project climate change was not initially considered as a ‘theme plan’. The reasoning was that it was a cross cutting theme but a specific climate change theme plan will now be prepared. Sam added that the IPENS project would be taking on several of the issues discussed at the meeting: the need to address pressures and threats, working with natural processes, connectivity, considering nutrients and water quality and the management of extreme events.

Juris Jatnieks showed how the PAF prepared for Latvia will be the main document supporting all projects concerning nature conservation in the period 2014-2020. The PAF has been translated into the national Operational Programme 2014-2020 and this will ensure that projects funded through LIFE Nature, ERDF, Interreg, and others will be developed according to the PAF and will be tested for compliance with the priorities of the national PAF. The focus on forests, freshwater and wetlands is relevant to actions addressing climate change adaptation.

The development of the PAF for England has learnt that there will always be site-by-site issues to address in preparing adaptation strategies. Some sites are naturally more robust to climate change

³⁴ <http://www.bto.org/science/climate-change/informing-adaptation>

³⁵ See information on the meeting held in Brussels in 2012 at <http://ec.europa.eu/environment/life/news/newsarchive2012/november/index.htm#paf> The background note is available by selecting ‘process’.

impacts than others, based on habitat types rather than geographical location. The project has also learnt to listen carefully to local views and national plans will be stronger when advised by local knowledge.

The sharing of experience and adaptation case studies is important within and between sectors. The European Climate adaptation Platform 'Climate-ADAPT'³⁶ is collecting case studies and several of the projects attending the LIFE platform would be relevant examples. This is a powerful database with an easy to use search function.

In presenting an update on the LIFE programme 2014-2020 Juan Pérez Lorenzo showed how, despite an overall cut in the EU budget, the LIFE programme had increased. This reflects well on the value of the programme and its track-record of delivering successful and relevant projects. Applicants to the programme should select the sub-programme according to the project objectives. It is expected that most nature conservation projects would apply, as now, to the environment sub-programme and actions arising from national climate change adaptation or mitigation strategies would be more relevant under the climate sub-programme.

The LIFE programme will include each year a call for applications for climate project action grants. This will be set by DG CLIMA in close cooperation with DG ENV and there will be a significant focus on pilot projects, demonstration projects and best practice projects in the 'green' sector, encouraging action on urban adaptation, including ecosystem-based approaches to adaptation and information, awareness and dissemination projects on climate change issues.

Examples in the 2014 call for proposals relevant to mitigation include;

- Landscape and land management strategies and practice which limit emissions, particularly organic soils, conservation of natural carbon sinks
- Greenhouse gas monitoring and accounting of land use change and forestry
- Sustainable use of solid biomass
- Implementation of low carbon farming practices with a transformational impact and analysis and development of improvements for existing climate measures under CAP

Examples in the 2014 call for proposals relevant to adaptation include;

- Cross-border flood management
- Cross-border coastal management
- Urban environments
- Mountain and island areas
- Drought-prone areas (water, desertification, fire risks)

There is to be a particular focus on urban adaptation in 2014 to develop and implement integrated local adaptation strategies, to develop innovative adaptation technologies, to promote green infrastructure and to reduce flood risks (e.g. through multi-use retention areas).

Conclusions

The LIFE climate change platform helped to show how climate change mitigation and adaptation should be more prominent in the new LIFE programme and that nature projects should step up their communication about the ecosystem services benefits of their work. Several projects, and in

³⁶ <http://climate-adapt.eea.europa.eu/>

particular LIFE-Environment projects, have specifically addressed the impacts on biodiversity, ecosystem services, local communities and land use sectors from climate change. Future meetings, as follow ups to this first platform on climate change, could focus in more detail on sectors to exchange experience and best practice. On a subject such as climate change mitigation and adaptation the platform meeting found it useful to share information across the LIFE-ENV, LIFE-INF and LIFE-NAT strands.

Annex 1. Agenda

Tuesday 13 th May	Arrival
Wednesday 14 th May	Introductory session and focus on Ecosystems Services
	Juan Pérez Lorenzo (chair), European Commission, Climate Action DG: Welcome and introduction to the workshop
	Aidan Lonergan, RSPB: Climate Change and the Adaptation Response needed from Conservationists
	<i>Project presentations</i> Linda Maria Martinello, Province of Trento, Italy: Landscape planning, ecological networks and participatory processes. Martin Forsius, Finnish Environment Institute: Modelling and assessment of climate change impacts on key ecosystem services in Finland: experiences from the VACCIA-project. Benedetta Concetti, ERSAF, Lombardy, Italy: The Making Good Natura project
	Discussion and refreshment break
	Thematic areas 1 & 2: Coasts and agricultural land
	Sue Rees, Natural England: Living with the Sea; how can Natura 2000 respond to a changing coast?
	<i>Project presentations</i> David Mason, National Trust: The Alde-Ore Estuary: Adapting the management of coastal reserves in a changing climate Patricia Prado, IRTA, Spain: Habitat restoration and management in two coastal lagoons of the Ebro Delta Rob Lucking, RSPB: Introduction to the field trip- managed coastal realignment at Titchwell Marshes and conserving the stone curlew in East Anglia.
	Sandwich lunch at the Village Hall
	Thematic field trip: coasts and agricultural land Titchwell Marsh reserve and North Norfolk Coast Managing land for stone curlew
Thursday 15 th May	Thematic areas 3 & 4: Wetlands and rivers Juan Pérez Lorenzo, European Commission, Climate Action DG
	<i>Project Presentations</i> Ali Nadir Arslan, Finnish Environment Institute: Climate change indicators and vulnerability of the boreal zone - applying innovative observation and modelling techniques. Lisa Tenning, County Administrative Board of Jämtland County: LIFE to ad(d)mire- restoring drained and overgrowing wetlands in Sweden Eduardo Lafuente Sacristán, Segura River Basin: Riparian connectivity and climate change in the Segura River Basin Georg Rast, WWF Germany: Floodplain restoration and adaptation of forestry and agriculture. Simon Hooton, The Broads Authority: The Broads: adaptation planning with water in mind Elisabetta Rossi, Lombardy Region: GESTIRE: management of the Natura 2000 Network in Lombardy
	Discussions and refreshment break

	Towards the new LIFE programme 2014 - 2020
	Juan Pérez Lorenzo, European Commission, Climate Action DG: The LIFE programme 2014-2020 – supporting adaptation in Europe
	Sam Somers and Simon Duffield, Natural England: Climate change adaptation and Natura 2000 sites- the Prioritised Action Framework for England
	Juris Jatnieks, Nature Conservation Agency of Latvia: Development of the national PAF for Latvia
	João Silva, Senior Expert, LIFE Communications Team: LIFE projects addressing climate change- review of experience so far.
	Close of official meeting
	Thematic field trip: Wetlands and rivers Optional visit to Norfolk Broads with The Broads Authority.

Annex 2. Participants List

LIFE Platform Meeting: Climate change – ecosystem services approach for adaptation and mitigation

14-15th May 2014, Norwich, UK

List of participants:

Name:	Organisation:	LIFE Project code:	LIFE Project Name:
Joao Pedro Silva	Astrale - External Communications Team		
Chris Rose	Astrale - External Monitoring Team		
John Houston	Astrale - External Monitoring Team		
Andrea Kelly	Broads Authority		
Simon Hooton	Broads Authority		
Livia Bellisari	Comunità Ambiente S.r.l	LIFE11 NAT/IT/000044	GESTIRE - Development of the strategy to manage the Natura 2000 network in the Lombardia Region
Tania Deodati	Comunità Ambiente S.r.l	LIFE12 NAT/IT/000370	SPIN
Eduardo Lafuente Sacristán	Confederación Hidrográfica del Segura	LIFE12 ENV/ES/001140	LIFE SEGURA RIVERLINK
Mónica Gonzalo Martinez	Confederación Hidrográfica del Segura	LIFE12 ENV/ES/001140	LIFE SEGURA RIVERLINK
Lisa Tenning	County Administrative Board of Jämtland	LIFE08 NAT/S/000268	Life to ad(d)mire
Richard Findon	DEFRA		
Julian Wright	Environment Agency (England)		
Benedetta Concetti	ERSAF Lombardia	LIFE11 ENV/IT/000168	Making Good Natura
Giuliana Cavalli	ERSAF Lombardia	LIFE11 NAT/IT/000044	Development of the strategy to manage the Natura 2000 network in the Lombardia Region (Life GESTIRE)
Juan Pérez Lorenzo	European Commission - DG CLIMA		
Martin Forsius	Finnish Environment Institute	LIFE07 ENV/FIN/000141	VACCIA
Miia Parviainen	Finnish Forest Research Institute	LIFE12 ENV/FI/000150	LIFEPeatLandUse
Ali Nadir Arslan	Finnish Meteorological Institute	LIFE12 ENV/FIN/000409	MONIMET:Climate change indicators and vulnerability of boreal zone applying innovative observation and modeling techniques
Jouni Penttinen	Finnish Natural Heritage Services	LIFE08 NAT/FIN/000596	Boreal Peatland LIFE
Barbara Bric	Fisheries Research Institute of Slovenia	LIFE11 NAT/SI/000880	SI Natura 2000 Management
Maria Matas Gallardo	Fundacion Biodiversidad	LIFE11 NAT/ES/000700	Elaboration of the Prioritized Action Framework for Natura 2000 in Spain (PAF NATURA 2000 SPAIN)

Name:	Organisation:	LIFE Project code:	LIFE Project Name:
Peter Suhadolnik	Institute for Water - Republic of Slovenia	LIFE11 NAT/SI/000880	SI Natura 2000 Management
Patricia Prado	IRTA - Aquatic Ecosystems Program	LIFE09 NAT/ES/000520	Habitat restoration and management in two coastal lagoons of the Ebro Delta: Alfacada and Tancada
David Mason	National Trust	LIFE08 NAT/UK/000199	The Alde-Ore Estuary-Securing a sustainable future for wildlife
Sam Somers	Natural England	LIFE11 NAT/UK/000384	Improvement Programme for England's Natura Sites (IPENS)
Simon Duffield	Natural England		
Sue Rees	Natural England	LIFE99 NAT/UK/006081	Living with the Sea: Managing N2k sites on dynamic coastlines
Kathryn Hewitt	Natural Resources Wales	LIFE11 NAT/UK/385	LIFE Natura 2000 Programme for Wales
Juris Jatnieks	Nature Conservation Agency of Latvia	LIFE11 NAT/LV/000371	National Conservation and Management Programme for N2000 sites in Latvia
Paul Vertegaal	Natuurmonumenten	Various	Various
Laura King	Peak District National Park Authority	LIFE08 NAT/UK/000202	MoorLIFE
Linda Martinello	Provincia Autonoma di Trento	LIFE11 NAT/IT/000187	Life+ T.E.N. (Trentino Ecological Network)
Elisabetta Rossi	Regione Lombardia	LIFE11 NAT/IT/000044	GESTIRE
Aidan Lonergan	RSPB	LIFE10 INF/UK/000189	Futurescapes
Andrew Holland	RSPB	LIFE11 INF/UK/000418	Securing the stone-curlew
Ian Robinson	RSPB	LIFE10 INF/UK/000189	FUTURESCAPES
Nick Folkard	RSPB	Various	Various
Rob Lucking	RSPB	LIFE07 NAT/UK/938	TACTICS
Sue Rendell-Read	RSPB	LIFE12 NAT/UK/000869	LIFE+ Little Tern Project
Alistair Yeomans	Sylva Foundation	LIFE12 NAT/UK/000473	NaturEtrade: creating a marketplace for ecosystem services
Rosa Olivo del Amo	Typsa	LIFE12 ENV/ES/001140	LIFE SEGURA RIVERLINK
Outi Salminen	University of Helsinki	LIFE ENV/FI/911	Urban Oases
Georg Rast	WWF Germany	LIFE08 NAT/D/000013	Elbauen bei Vockerode