



Strasbourg, 4 November 2011
[Inf18a_2011.doc]

T-PVS/Inf (2011) 18

CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

**Bern Convention Group of Experts
on Biodiversity and Climate Change**

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**Groupe d'experts de la Convention de Berne
sur la Biodiversité et le Changement climatique**

Strasbourg (10-11 October 2011)

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Strasbourg (10-11 octobre 2011)

NATIONAL REPORTS AND CONTRIBUTIONS

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RAPPORTS NATIONAUX ET CONTRIBUTIONS

*Document prepared by
the Directorate of Democratic Governance, Culture and Diversity*

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1. ALBANIA / ALBANIE

NATIONAL REPORT UPDATE ON BIODIVERSITY AND CLIMATE CHANGE

ALBANIA

For the period under report from June 2010 to September 2011 in Albania the following activities have taken place:

The preparation of the draft for the third National Communication report to UNFCCC in which in the frame of a chapter biodiversity and climate change issues are considered. Vulnerability assessment along entire Albanian coastal zone and Adaptation action plan based on ICZM

The UNDP-GEF project on Identification and Implementation of Adaptation Response Measures in the Drini - Mati River Deltas is on its third year of implementation.

The Drini and Mati River Deltas (DMRD) are 2 of 3 deltas found on the northern Adriatic coast of Albania, which harbour significant biodiversity values. The DMRD has been identified as a region of critical vulnerability to climate change and variability. Climate change scenarios for Albania have predicted an increase in sea surface temperature and sea level rise of up to 61 cm. This is expected to place additional stress on marine and littoral biodiversity as well as livelihoods of local communities. Climate change, including variability, could undermine biodiversity conservation efforts under the protected area regime in the DMRD.

The project is assisting Albania in establishing a mechanism by which strategies to moderate, cope with, and take advantage of the consequences of climate change are enhanced, developed, and implemented. The specific objective is to build adaptive capacities in the DMRD to ensure resilience of the key ecosystems and local livelihoods to climate change. This is done by first identifying, and then integrating climate change response measures into development programming in the DMRD.

Permissions have been given so far for the establishment of three wind farms in the south of the country. However the construction has not started yet.

Last, but not least in January 2012 a project funded by UNEP-GEF for the updating of the National Biodiversity and Action Plan of 2000. In the revision process a chapter will be dedicated to biodiversity and climate change, including adaptation and mitigation measures, especially for the coastal area. The revised NBSAP will be completed by the end of 2012.

2. ARMENIA / ARMENIE

ARMENIA: PROGRESS IN IMPLEMENTING MEASURES ON BIODIVERSITY AND CLIMATE CHANGE

Since its launch in 2009, the UNDP/GEF Project “Adaptation to Climate Change Impacts in Mountain Forest Ecosystems of Armenia” has taken wide-ranging activities on both national and local levels to enhance the resilience of Armenia’s forests to the main adverse impacts of climate change. The project is implemented by the Ministry of Nature Protection of the Republic of Armenia with assistance of UNDP and will be completed in 2013. Financed through the Strategic Priority on Adaptation (SPA) as part of the Global Environment Facility’s Trust Fund, the project on mountain forest adaptation to climate change is in the global spotlight. The SPA is a pilot program with a total funding of US\$ 50 million allocated to 23 projects worldwide.

Armenia’s forest ecosystems are of a global conservation priority, listed by the WWF as a Global 200 Eco-region, and by Conservation International as a biodiversity hotspot. Containing nearly every plant community found in the Caucasus, the forests are home to over 300 species of trees and bushes as well as over a half of the region’s floral diversity. Armenia’s forests also possess rare species found nowhere else on earth and form a vital eco-corridor that extends through the region. Under changing climate conditions, biodiversity in forest ecosystems of Armenia is threatened by reduced regeneration success and infiltration of semi-desert and steppe vegetation into forest ecosystems. Potential threats are also induced by invasive species. In combination with the aforementioned as well as other anthropogenic factors affecting forests, the most immediate impacts on forest biodiversity and thus the inherent adaptive capacity of the forests of Armenia under climate change are posed by forest fires, pest outbreaks and fragmentation. Accordingly, preservation and rehabilitation of forest biodiversity have been recognised as the main targets of adaptation measures in forest and protected area management in Armenia. The UNDP/GEF project is working in cooperation with scientists, government officials, forestry enterprises, and local communities in the fragile forests to reduce their vulnerability to climate change while helping communities to participate in and benefit from the adaptation efforts.

Benefitting 75,000 hectares of forest land, the project is piloting and showcasing measures to enhance the resilience of the sensitive forest ecosystems to climate change and to respond to adverse impacts such as pest outbreaks and forest fires. Adaptation measures in reforestation and forest rehabilitation are piloted on three sites affected by pest outbreaks, forest fire and forest degradation. The resilience of the pilot forests is enhanced by planting mixed forest stands with local genotypes of endemic species including wild fruit trees benefitting local communities as well as by reducing fragmentation to maintain ecosystem functioning and to facilitate migration. The experience gathered during the implementation of the pilot projects is allowing the identification of forest regeneration strategies that enable successful reforestation under climate change and climate variability. Implemented in close cooperation with regional forest and national park management units, the pilots are furthermore building the capacities within the forest and protected area management sectors to plan for adaptation through revision of the current management practices.

Critical capacities to attack forest and grassland fires have been addressed under the project by equipping foresters in the most vulnerable regions of the country with forest fire early-suppression equipment and hand tools, as well as by providing training in fire pre-suppression, forest fire monitoring and forest fire suppression. Involving all relevant stakeholders on the national level, the project encourages the establishment of a clear command chain and effective stakeholder cooperation in forest and grassland fire management. To further address the issue of agricultural waste and grassland burning threatening forest biodiversity, the project is supporting an initiative with other stakeholders on legal restriction of pastureland and agricultural waste burning.

The project is also improving the scientific capacities and knowledge of key stakeholders to develop and implement pest monitoring. A feasible method for monitoring pest populations has been

developed under the project and later suitable environmentally sound pest control measures will be piloted under the project.

Additionally, the project is advocating the importance of sustainable forest resources use practices and addressing climate change adaptation among governmental agencies, local communities, educational institutions, non-governmental and community based organizations. Utilising the experiences gathered under the different components of the project presented above, the project aims to include climate change considerations into forest and protected area management plans and relevant national documents guiding forest management planning. Furthermore, several activities ranging from TV broadcasts to lectures organized for school children, university students and teachers and from installing warning signs on forest fires in recreational areas to distributing informational posters about the hazards associated with grassland burning to communities have been carried out under the project to raise public awareness on forest fire prevention and to reduce activities that lead to forest fires.

Prepared by:

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“Adaptation to Climate Change Impacts in Mountain Forest
Ecosystems of Armenia” UNDP/GEF/00051202 Project

Date: 15 September 2011

3. BELGIUM / BELGIQUE

ACTIVITIES RELATED TO BIODIVERSITY AND CLIMATE CHANGE IN BELGIUM

1. Biodiversity in climate change mitigation and adaptation strategies :

A Belgian National Climate Change Adaptation Strategy has been adopted in 2010 and includes among others a chapter on the impacts of climate change on biodiversity, ecosystems and water as well as adaptation actions for biodiversity, ecosystems and water. This strategy will be the basis for the development and the future endorsement of a national adaptation plan.

<http://www.climat.be/IMG/pdf/NASpublicatiedruk.pdf>

Federal

➤ The Belgian Marine Environment Service works at reducing all pressure on the marine environment, in line with the EU Marine Strategy Framework, making the marine ecosystems more resilient to Climate Change. The Service works towards concrete politically agreed implementation measures with regard to e.g. the management of human activities at sea (environmental permits, eventual limited restrictions in some areas, etc).

➤ The federal plan 2009-2013 for the integration of biodiversity in four key federal sectors (economics, development cooperation, science and transportation) plans, among others, to strengthen the synergies between climate and biodiversity in the development cooperation activities particularly through the reduction of emissions from deforestation and forest degradation in developing countries (REDD+). Specific actions are proposed in this plan:

- A toolkit for mainstreaming the environment (including biodiversity and climate change) in the Belgian development cooperation is being developed.
- Belgium supports the project 'TEMATEA' thematic modules developed by UNEP, among which the **Biodiversity & climate change module** (www.tematea.org).
- Belgium insists on the importance of reducing deforestation and forest degradation, as well as the conservation and sustainable management of forests and the enhancement of forest carbon stocks in developing countries (REDD+), in the context of international negotiations (ea CBD, UNFCCC, CCD...).
- Belgium contributes to REDD+ pilot projects. Existing projects are being expanded to take measures against deforestation and forest degradation. The Federal government financially supports UNESCO for several REDD+ projects in developing countries.
- Belgium also attempts to establish a link with biodiversity in the adaptation fund.

The plan is available in French and Dutch on:

<http://www.health.belgium.be/eportal/Environment/BiodiversityandGMO/Biodiversity/Conceptsandactions/Nationalactions/index.htm>)

➤ The project COBIMFO :Congo basin integrated monitoring for forest carbon mitigation and biodiversity <http://www.belspo.be/belspo/ssd/science/projects/COBIMFO.E.pdf>

➤ Several research projects addressing links between climate change and biodiversity are carried out in the framework of the "science for a sustainable policy" programme (2006-2011), supported by the Belgian scientific policy see http://www.belspo.be/belspo/ssd/science/pr_biodiversity_en.stm and http://www.belspo.be/belspo/ssd/science/pr_terrestrial_en.stm. Research does not directly address biodiversity in climate change adaptation and mitigation strategies but rather aim at improving knowledge on processes underlying the relationships between both aspects. Most of projects are analysing the consequences of climate change as a main global change driver on biodiversity structure and function. More recently enhanced financial support has been given to research projects dealing

with "ecosystem services" in which climate change is being considered amongst those important ecosystem services provided by biodiversity and ecosystems.

Walloon Region

- A study identifying the impacts of climate change in the Walloon Region and what should be done at the regional scale to overcome these has just been finalized. It includes vulnerability evaluation of biodiversity and an action plan for biodiversity protection and ecosystem resilience. This study will be the basis for the development of a Walloon Regional plan on adaptation that should be adopted in 2012. This plan will make the connections with the national plan on adaptation but will also address recommendations to specific sectors and ecosystems.
- A Walloon agency for air and climate has been created and a Walloon action plan for air and climate has been adopted in 2007. It aims to reduce pollution by having air pollution reduction targets and greenhouse gases emission reduction targets in order to contribute to the global targets. One of its measures (measure 18) is to act for public health by having emergency procedure in case of a high pollution. Biodiversity is in this measure identified as a very important issue. Another action focuses on facilitating migration by restoring the ecological network (measure 20). Measure 21 focuses on the role of forests and natural habitats, while measure 22 insists on natural elements helping to fight against soil erosion. See link : <http://airclimat.wallonie.be/spip/Plan-Air-Climat.html>
- The 'rain plan' was adopted in order to coordinate measures aiming at preventing flood damages. One of its actions is the conservation and restoration of wetlands. The cartography of all areas liable to flooding has been done.

Some particular measures also have a great impact on water quality and biodiversity such as:

- restoration of flood plains,
- limiting cattle access to river banks
- new water treatment plants

- The Walloon Region Nature and Environment policies aim at reducing the pressures on all environmental components, among which biodiversity. This enables resilience of biodiversity components to climate change.

Flemish Region

- In July 2011 the Flemish government agreed on a general approach in preparing the third Flemish Climate Change Policy Plan for the period 2013 till 2020. This policy plan will be based on two distinct but closely connected parts, a Flemish Mitigation Plan (FMP) and a Flemish Adaptation plan (FAP). This new Flemish Climate Change Policy Plan will be connected into broader policy plans which guide the work of the Flemish Government (Pact 2020; Via) and will feed in the Flemish Strategy for Sustainable development and the Flemish Environment and Nature Policy plan (MINA4) and other relevant policy plans. At the moment biodiversity is only partly present in the current Flemish Climate Policy Plan since only some forestry issues were identified as priority issues. (<http://www.lne.be/themas/klimaatverandering/vlaams-klimaatbeleidsplan-2006-2012/flemish-climate-policy-plan-2006-2012>).
- The preparations for the Flemish Adaptation plan (FAP) are well underway, based on directions in the EU' White Book and the national adaptation strategy of 2010. Based on a general study that identified building blocks for adaptation strategies, (<http://www.lne.be/themas/klimaatverandering/adaptatie/studies-en-onderzoek>) different adaptation plans will be developed for the most important policy areas. For this purpose a Flemish adaptation steering group was established in 2007. In the field of environment and nature, the process of preparing its adaptation plan started in 2011 and should result in draft policy plans by the end of 2011. Biodiversity is one of the key themes identified for the FAP. One of the items under consideration will be the issue of connectivity and developing a green infrastructure in relation to ecological networks.
- Preparations for the new FMP will start in the second half of 2011.

Brussels Region

➤ The Brussels Capital Region's policy on climate change is guided by an air-climate plan. It contains different measures aiming to reduce the GES emissions of Brussels that are gradually being implemented. A new Air-Energy-Climate plan is currently in preparation and will be more ambitious and more integrated. It will address several action areas, among which urban planning and green infrastructures.

<http://www.bruxellesenvironnement.be/Templates/Particuliers/informer.aspx?id=3900&langtype=2060>

➤ A "rain plan" has also been adopted by the Brussels Capital Region and is being implemented. An important area of action is the development of the blue network in order to assure a good level of water quality and quantity in the hydrographic network, allowing the clean surface runoff water to flow in it and improving the ecological quality of the rivers, lakes and wetlands thanks to restoration projects.

<http://www.bruxellesenvironnement.be/Templates/Particuliers/Informer.aspx?id=2002&langtype=2060>

➤ Several studies on the Sonian Forest indicating possible large modification in suitable areas for several dominant tree species and beech especially, call for an adaptation of the management plan of the forest. The revision process is started and a new strategy taking climate change scenarios into account should be adopted in late 2012.

<http://www.bruxellesenvironnement.be/Templates/news.aspx?id=25410&langtype=2060&site=et>

2. Information on impact of climate change on species distribution :

Walloon Region

- Dragonfly species

For the past two decades, the frequency of southern dragonfly species has increased significantly. Seven species have recently settled down. If various colonisation trends have always been observed, they used to be limited in time (e.g. during warm summers). The new arrivals are more durable in time, and are interpreted as a consequence of climate change. Species with a more northern distribution also suffer from the rise in temperature as they have quite strict habitat requirements.

<http://environnement.wallonie.be/eew/rapportchapitre.aspx?id=ch12>

- Bird species

A recent study by BirdLife International predicted a movement in the ranges of European bird species of 550 km to the north east by 2100. This study is based on the "climate envelope" model for a probable rise of 3°C for the global average temperature. Wallonia would be the range limit for 60 species, 44 of which would be on the decline and 16 on the rise. There would be 19 new species, and the same number of species which would disappear.

<http://environnement.wallonie.be/eew/rapportProblematique.aspx?id=p105>

- Butterfly species

The climate's warming benefits certain southern species, which have posted the greatest expansions of their ranges. Still, the lack of relay habitats in Wallonia, e.g., "hot" habitats such as chalk grasslands for xerothermophilic species, is thought to limit the northward expansion of a series of other species that have more demanding habitat requirements and/or are less mobile.

<http://environnement.wallonie.be/eew/downfile.aspx?dwn=ffh.pdf&dir=tbe2005en>

Flemish Region

- Dragonflies

The first appearance of dragonflies in spring advanced gradually between 1984 and 2006, but the degree of shift varied considerably between species. Eight of the 26 species analysed, advanced

significantly. For 18 species this was not the case. Some species even tended to appear later. During the last 20 years, the flying season of dragonflies has become extended by an average of 2 weeks.

This extension is positively correlated with the increased range of the species. The number of records of Southern European dragonflies increases in Flanders. Some species that were only occasional visitors in the past, such as *Lestes barbarus* now have permanent populations.

See also:

http://indicatoren.milieuinfo.be/indicatorenportal.cgi?detail=701&lang=en&id_structuur=25 and http://indicatoren.milieuinfo.be/indicatorenportal.cgi?detail=404&lang=en&id_structuur=25.

- *Migrating birds*

The arrival date for 15 species has been monitored during the past 20 years. This arrival date has advanced by on average 7.63 days (or 0.45 days/year). The biggest change was recorded for Common Chiffchaff (total 20 days or 1.16 days/year), the smallest for Marsh Warbler (total 3 days or 0.17 days/year).

Since some species adapt better than others, there is a risk of changes in the food web and/or ecological cohesion of ecosystems. This is illustrated by the Pied Flycatcher. The arrival date of this migratory species advances more slowly than the period of occurrence of the main food for its young, the caterpillars of the Winter Moth. This is a possible cause of the decline of this forest woodland bird.

See also:

http://indicatoren.milieuinfo.be/indicatorenportal.cgi?detail=406&lang=en&id_structuur=25

Brussels-Capital Region

Recent changes in flora indicate that Brussels flora is adapting at stony and warmer surfaces, warmer soils and warmer ambient temperatures that are typical for urban areas. It seems however too soon to attribute it to climate change.

<http://www.bruxellesenvironnement.be/Templates/Particuliers/Niveau2.aspx?id=4508&langtype=2060>

3. Others

Walloon Region

- Discussions are undergoing for a future Walloon Nature Action Plan, and many of its actions will favor adaptation of biodiversity (restoring ecological network, many sectoral actions, ...).
- A set of recommendations on forest management in the context of climate change has been developed and is available for all forest managers.
- Many provisions of the Walloon Forest code encourage sustainable management practices that will help to adapt to climate change.
- The Walloon « rain plan » aims to prevent floods and their effects on population. One of its objectives is to manage river beds and river plains preserving and restoring natural habitats. http://environnement.wallonie.be/de/dcenn/plan_pluies/index.htm

Brussels Region

- A Regional Nature Plan is also in preparation for the Brussels Capital Region that will identify many measures that will favour adaptation for biodiversity (restoring ecological network, many sectoral actions, ...).

<http://www.bruxellesenvironnement.be/Templates/Particuliers/informer.aspx?id=4528&langtype=2060>

4. BOSNIA AND HERZEGOVINA / BOSNIE-HERZEGOVINE

BOSNIA AND HERZEGOVINA

Climate changes were emphasized in the Millennium Ecosystem Assessment as one of the strongest drivers for changes in biodiversity and its loss in general. Since the Summit on Earth there has been growing civilization awareness on almost inevitable effects of global changes, which are the result of high pollution and uncontrolled exploitation of resources on one, and changes in vegetation cover on the other side. Changes in temperature, moisture, soil acidity, yield, species extinction within a food web, act as new factors in the environment, which loosen the synergism between biological events which is so typical for ecological balance. If there is any chance to “follow up” the effects of climate changes, first step would be to monitor changes on living world around us. Lack of knowledge here could have severe consequences on both sides. In the area of Bosnia and Herzegovina, the following main groups of climate change effects on biodiversity are to be expected:

- Shift of vegetation zones (layers) in a horizontal and vertical direction,
- Shift and changes in areals of individual taxa of flora and fauna,
- Extinction of individual species,
- Changes in the quality and quantity composition of biocenoses,
- Fragmentation of habitats,
- Changes in functioning of ecosystems.

Bosnia and Herzegovina has a particularly rich biodiversity due to its location in three distinct geological and climatic regions: The Mediterranean region, the Euro Siberian-Bore American region and the Alpine-Nordic region. According to this, it may be concluded that geographic, geologic, climate and historical diversities and factors have provided for development of a very diverse spectra of ecosystems on a horizontal and vertical profile, from the sea level to the highest top of the Maglic Mountain at 2386 m. Bosnia and Herzegovina is home to a number of endemic species and habitats, and the location of relict-refugial centres of tertiary flora, fauna and ecosystems, preserved today in the specific conditions of paleo-climate, and also, Bosnia and Herzegovina is one of the countries in Europe with the greatest diversity of species of plants and animals. Vascular flora counts for about 5 000 confirmed taxa of species, subspecies, and variety and form level. As much as 30% about of the total endemic flora on the Balkans (1 800 species) is contained within the flora of Bosnia and Herzegovina. There are still no reliable data on the number of bacteria, blue-green bacteria or blue-green algae, but they are estimated to more than 2 000 species. Lichen and moss are poorly documented, as are fungi, although it is estimated there are several thousand fungi. Fauna inventories are more advanced and indicate that the animal kingdom is rich and diverse, particularly in comparison to other countries in the Balkans and in Europe. This rich biodiversity is endangered. Today there is a large number of registered domesticated plants in fruit growing, wine growing, tillage, vegetable growing and horticulture that are only preserved in certain parts of the country. There were previously a number of indigenous breeds of bovine cattle, sheep, goats, horses, donkeys and dogs. These are now decreasing and some are becoming extinct. B&H has extremely high level of diversity of biotopes (habitats), i.e. geodiversity. This is contributed by specific orography, geological surface, hydrology and ecoclimate. Given the area of the country and the number of registered geological rarities, Bosnia and Herzegovina is one of the countries with the greatest diversity in Europe and worldwide. Centuries of coexistence and a broad range of interactivity between biological and geologic diversity, are best reflected in extremely high diversity of landscapes, in the whole area of Bosnia and Herzegovina. However, many landscapes are now changed, devastated, and degraded through different antropogenic activities and transformed into lower forms of ecological organization.

Effects of global climate changes are expected all over the national scale. But the most affected, as the most sensitive ecosystems, could be these belonging to the group of specific landscapes of Bosnia and Herzegovina. The areas of Bosnia and Herzegovina which are the most sensitive to global climate changes are defined by „Strategy with action plan for protection of biological and landscape diversity of Bosnia-Herzegovina - NBSAP BiH“. The sensitive ecosystems, exposed to strong pressure of changing climatic conditions are:

- High-mountainous ecosystems
- Mountain ecosystems
- Ecosystems of Submediterranean forests and underwoods
- Ecosystems of karst caves, basins and abysses;
- Ecosystems of highlands
- Ecosystems of Peripannonian area
- Pannonian ecosystems

High-mountainous and mountain ecosystems, on the basis of an up to now conducted research on global climatic changes in B&H, are exposed to the biggest impact. Extremes in temperature represent the biggest pressure that is being exerted on the areas, what is especially visible in warmer season of the year, leading to melting and drying, and to a threat that many glacial and boreal relicts species and ecosystems. On a biodiversity of high-mountainous and mountain areas negatively impact acid rains, which appear as a result of over-pollution of the atmosphere. Within forest ecosystems, one of the most endangered are the fir-tree forests, which, taking into account the temperature and humidity, have a very narrow ecological range. Defining of appropriate measures for sustainable forest management requires more advanced research of an impact of regional climate changes, combined with an analysis of the socio-economic needs in relation to role of forestry sector in BH economy in transition. Pannonian ecosystems (natural and cultural) are endangered the most by the floods, as one of the main factors which significantly change the quality of a habitat. The floods are one of the dominant factors in the expansion of invasive species in Sava catchment area. The process of adaptation can not be easily accelerated, but monitoring could be way in finding a solutions. Under strategic goal “Decrease of pressures on biodiversity in BiH”, a target “Monitoring of the effects of global climate changes” is established. As part of NBSAP BiH, the target comprises following proposed projects:

- Monitoring of the effects that climate changes have got on state in species diversity in B&H
- Monitoring of the effects that climate changes have got on state in ecosystem’s diversity in B&H
- Co-operation by the implementation of Convention on biological Diversity and Framework Convention on climate changes at local level

In adaptation activities Bosnia-Herzegovina would like to follow ecosystem based approach for planning. However, it is necessary to stress the existing constraints:

- Incoherency between strategic and development documents (in forestry, agriculture and water management) and biodiversity management;
- Lack of well-defined socio-related research addressing the current problems in the fields of biodiversity and implementation of relevant international conventions and directives;
- Low level of public awareness of the importance of biodiversity for preservation of fundamental environmental values, in particular in climate change management;
- Lack of human and institutional capacities,
- Lack of financial resources and funds for scientific research in the field of climate change and biodiversity as well as the environment as a whole.

The conservation of specific landscapes and ecosystems has to be in place of the first BH task in adaptation strategy. However, BH also would like to stress negative impacts of hydroenergy projects, which are very often promoted as mitigation activities through using renewable energy. In fact, those projects lead to main habitat conversion in our country.

In the end, we would like to emphasize an importance of Report of Ad Hoc technical expert group on biodiversity and climate change. One global action on dissemination of the Report in local languages, could play as an appropriate base for better coordination in adaptation activities on national scale.

5. BULGARIA / BULGARIE

BIODIVERSITY AND CLIMATE CHANGE - PERIOD 2010-2011

A. Political framework

After ratifying the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 Bulgaria started Country Study to Address Climate Change. Inventory of Greenhouse Gases Emission Sources and Sinks and since 01.01.2007 has implemented the Directive 2003/87/EC and introduced quotas for trade of greenhouse gases emissions. Joint Implementation mechanism and Green investment are successfully carried out.

One of the main priorities of Ministry of Environment and Water is to initiate activities to develop national policies for adaptation of the most sensitive to the negative consequences of climate change sectors. Therefore the Ministry will participate in the development of EU common policies for adaptation. Preference is given to sectors that are most vulnerable to these changes. like forestry, agriculture, tourism. Biodiversity has a key role to play in climate change mitigation and adaptation and good management of ecosystems such as wetlands and forests remains an effective mitigation options given the high sequestration potential of natural systems.

In process of preparation are **Third National Action Plan on Climate Change, Strategy on adaptation to climate change, including specific measures for biodiversity protection and National Climate change Act.**

Forestry sector

The forests cover 1/3 of the territory of Bulgaria and therefore, forest ecosystems are considered very important both from environmental and economic point of view.

In relation to climate change the forestry sector is changing some of its management practices and/or legislation documents. Among the most important issues related to climate change and biodiversity we should mention the following ones:

1. Biodiversity issues were included in the forest management planning. The presence of rare and protected species is considered during the process of planning the forest management activities.
2. Forest certification (FSC standard) has been implemented in about 10 % of the forest territory and the process gradually continues. The certification is a proof that the forests on the territory are managed in sustainable and nature friendly way, considering conservation of existing biodiversity under the changing environment.
3. The issue of dead wood presence in forests is gaining more popularity. The objective is to reach dead wood up to 20 % of the growing stock in the next 20 years. This is an important issue both from the point of view of carbon sequestration and biodiversity conservation because the dead wood is a habitat of many species of invertebrates.
4. A special network and system for early detection of forest fires is currently under development and it covers the most vulnerable areas. The system could help the prevention and control of forest fires, which are one of the most factors causing loss of biodiversity in forests, especially under the dry and hot summer conditions.

B. Research

The following projects developed in Bulgaria during the last two years could be outlined:

1. *International projects*

- ***Environmental quality and pressures assessment across Europe: the LTER network as an integrated and shared system for ecosystem monitoring (ENVEUROPE)(2010-2013)***, funded by LIFE+. It focuses on three types of ecosystems (**terrestrial**, **freshwater** and **marine**), and it aims at defining research and monitoring activities relevant to different levels/scales of

investigation, with specific monitoring intensities and with methods adjusted to the respective assessment intensity, implementing a multi-level and multi-functional approach. The project has been ideated and planned in the conceptual and operative context of SEIS and will contribute to the development of the GMES initiative. The project is implemented by the Institute of Biodiversity and Ecosystem Research (IBER) – Bulgarian Academy of Sciences.

- ***Further Development and Implementation of an EU-level Forest Monitoring System (FutMon) (2009-2011)*** is being carried out by 38 beneficiaries from nearly all EU-Member States, under the funding of Life+ and national authorities of the respective beneficiaries. Bulgarian side of the project is implemented by the University of Forestry and the Forest Institute, BAS and Executive Agency for Environment at the Ministry of Environment and Water is an associated beneficiary. FutMon uses latest technical developments and defines and implements more precise monitoring methods in order to collect data more efficiently and make quite precise predictions how the climate will develop using climate modelling. However, it is widely accepted that a high biodiversity in forests are the best way to guarantee that forests will be able to adapt to present and future changes. The project provides information for the database of condition of forest ecosystems, which is a part of National System for Ecological Monitoring (NSEM). NSEM is managed by the Executive Agency for Environment at the Ministry of Environment and Waters of Bulgaria. It maintains databases at national and regional level. The system provides information about the properties of air, water, soil and other indicators for environmental quality. It is functioning permanently since several decades and has an extensive database about different environmental variables and indicators
- ***WETLANET (2009-2012)***, funded by FP7 EC (FP7 CSA – SUPPORT ACTION). The project enhancing research potential by strengthening a local network of laboratories for studying wetland ecosystems functioning, restoration and management.

2. *National Projects*

- ***Defining of the main zones of vulnerability of forest ecosystems under climate changes***, funded by the National Forestry Board – Ministry of Agriculture. . The project provided prediction of change of forest ecosystems under different climate change scenarios during the next 70 years. The main focuses were: hydrology, biodiversity, productivity, soil properties, carbon storage, forest fires, pests and diseases. Particular measures were recommended for each scenario to minimize the loss of forest area, its vitality and biodiversity.
- ***Application of dendrochronology in the climate studies*** , implemented by University of Forestry. Extensive climate studies were performed in the forests during the last 30 years. The studies aim to predict the status of the forests in relation to climate change. These predictions could serve as a base for decision making for future sustainable management. Extensive climatologic studies were performed in the forests during the last 30 years. The studies are part of long-term monitoring process and include a periodic survey on the plant diversity.
- ***Biological diversity of aquatic ecosystems in wetlands of flood plane of the Lower Danube regarding optimizing ecosystem functions under global climate change***; funded by Nationale Science Fundation and implemented by Institute of Biodiversity and Ecosystem Research.¹

¹ The report is prepared by Ms Penka Stoichkova, Ministry of Environment and Water and Assoc.Prof. PhD Petar Jelev, University of Forestry

6. CROATIA / CROATIE

PROGRESS OF WORK REGARDING ADAPTATION MEASURES OR STRATEGIES TAKEN FOR BIODIVERSITY IN FACE OF CLIMATE CHANGE IN CROATIA

General characteristics

Due to its specific geographical position on the dividing line between several biogeographic regions and its characteristic ecological, climatic and geomorphologic conditions, Croatia is one of the richest European countries in terms of biodiversity. The great diversity of land, marine and underground habitats has resulted in a wealth of species and subspecies, including a significant number of endemics. Due to its exceptional natural value and high level of preservation many areas have some level of protection in accordance with Nature Protection Act. Protected areas, including areas under preventive protection, cover about 7.82% of Croatian area or 11.26% of the Croatian land and 1.56% of territorial sea². The Regulation on Proclamation of the Ecological Network³ established the network of ecologically important areas (National Ecological Network, NEN), which covers 47% of the land and 39% of the territorial sea of Croatia. The proposal for Natura 2000 network in Croatia is drafted based on analysis of collected data on distribution of Natura 2000 species and habitat types. By the date of accession to the EU, Croatia has to propose NATURA 2000 network. Although Croatian nature is of high value, many of its components are threatened. The Red List of Threatened Species, within the analyzed groups (vertebrates, butterflies, dragonflies, cave fauna, vascular plants and fungi) lists 2,235 threatened taxa. All these taxa are strictly protected by the Ordinance on proclamation of Wild Taxa as Protected and Strictly Protected⁴. For some groups, climate changes are only one cause of their endangerment.

Croatia`s climate⁵

Croatia`s climate is determined by its geographic location in the North mid-latitudes, modified by its topography and the influence of the Adriatic and the Mediterranean Seas. In Croatia during the 20th century, most regions had a decrease in precipitation and an increase in temperature in almost every season. It has not been possible to distinguish how much of this is due to natural climate fluctuations or to human influence, but climate models for Croatia point to significant future changes in climatic conditions especially if emissions are not cut dramatically. In the future, Croatia is expected to be hotter and drier – especially in the summer. Increased temperatures nationwide are expected to have considerable impacts: increase of water temperature in the sea and in inland bodies of water, soil temperature increase, groundwater temperature increase which may lead to higher rates of evaporation and a decrease in the groundwater table, a decrease of lake and river levels, decreases in soil moisture leading to droughts, more heat waves that affect health, and numerous other impacts.

Legislation

Republic of Croatia ratified all international treaties relevant for the CC issue and biodiversity. It is a Party to the CBD, UNFCCC and Kyoto Protocol. It is also a party to the Barcelona Convention and its protocols; Bern Convention; Bonn Convention and its agreements as well as to the UNCCD. Requirements of all these treaties have been incorporated into national legislation. Croatia participates in the work of IPCC form 1993. Meteorological and Hydrological Service is systematically monitoring atmosphere, freshwater and sea parameters according to recommendations of World Meteorological organization.

As the country in the process of accession to the EU, Croatia has already harmonized its legislation with EU acquis and started with implementation of obligations, like preparation of EU ecological network NATURA 2000.

² Ministry of culture, Register of Protected Areas (2011)

³ Official Gazette No. 109/07

⁴ Official Gazette No. 99/09

⁵ UNDP (2008): Human Development Report Croatia: A Climate for Change

- Strategy and Action Plan for The Protection of Biological and Landscape Diversity of the Republic of Croatia⁶ recognizes global climate change as one of the causes of the loss of biodiversity in Croatia, and the following action plans specifically address biodiversity and CC issue:
 - Develop a monitoring programme and establish monitoring of the impacts of climate change on biodiversity
 - Monitor the distribution of invasive species that are indicators of climate change
- Nature Protection Act⁷ does not address CC issue as a separate subject, but regulates the protection of species and habitats, as well as the protection and use of natural assets. All international mechanisms of nature protection are incorporated in this Act
- Regulation on proclamation of ecological network of the Republic of Croatia - establishes sites of National ecological network, including potential NATURA 2000 sites
- Environment Protection Act⁸ recognizes “protection of ozone layer and mitigation of CC” as one of objectives of environment protection
- Air Protection Act⁹ is framework for set of regulations related to air protection and implementation of Kyoto Protocol. Among them the most relevant to the CC issue is the Regulation on monitoring of greenhouse gases emissions¹⁰ that establishes National system of monitoring of greenhouse gases emissions and Register of greenhouse gases emissions
- National Environment Strategy and National Environment Action Plan¹¹ mentions the issue of CC is in the second group of priorities. The Action plan calls for preparation of the Programme of greenhouse gasses reduction that would be mainly based on increase of energetic efficiency and participation of renewable energy sources.
- Plan for the protection and improvement of air quality in the Republic of Croatia in the period from 2008 to 2011¹²
- Strategy of the sustainable development of the Republic of Croatia¹³ states that Croatia will achieve stability and progressive development if takes measures to mitigate climate change, adapt to climate change and minimize its impact on the creation of CC.

Impact of climate change on biodiversity

Vulnerability Assessment, Climate Change Impacts and Adaptation Measures on water, forests, Biological diversity and Terrestrial Ecosystems, Coast and Coastal Zone, Marine Ecosystem and Fish Resources¹⁴

Researches show that water resources in Croatia are already under challenge of climate change, as certain impacts and changes occur referred to water flow, evapotranspiration, underground water inflow, water level in rivers and lakes, water temperature etc. Results of global and regional models of climate change indicate changes in precipitation in Croatia.

The assumed climate changes may lead to changes in spatial distribution of forest vegetation reflected in the altered share of current forest types, possible disappearance of the existing or appearance of new types, change in the density of population of certain tree species, productivity of

⁶ Official Gazette No.143/08

⁷ Official Gazette Nos.70/05, 139/08 and 57/11

⁸ Official Gazette No. 110/07

⁹ Official Gazette Nos.178/04 and 60/08

¹⁰ Official Gazette No. 1/07

¹¹ Official Gazette No. 46/02

¹² Official Gazette No. 61/08

¹³ Official Gazette No. 30/09

¹⁴ MEPPPC (2010): Fifth National Communication of the Republic of Croatia under the United Nation Framework Convention on the Climate Change. Ministry of Environmental Protection, Physical Planning and Construction, Zagreb

forest ecosystems, ecological stability, forest health condition, and the change in the overall productive and forest value.

In the area of Croatia three various interconnected impacts of climate change on species are expected: phenological, distributional and genetic. Phenological changes, i.e. seasonally linked biological cycles depend on climate indicators. These changes, recorded in Europe, such as the shift in a period of the freshwater fish spawning and earlier arrival of migratory birds from the wintering grounds, occur in Croatia as well. It is predicted that the vegetation of the premountain region of the Dinarides could be replaced by the vegetation of a temperate climate zone. Adaptation to new conditions presumes a change of populations genetic constitution. Populations of numerous species, especially those on the edges of the areals, are expected to be exposed to fragmentation to smaller subpopulations.

Main indirect measures for the protection of terrestrial ecosystems and biodiversity are:

- Ex-situ and in-situ protection of threatened species, especially endemics, in order to protect the gene fund;
- Preservation of migratory corridors for species able to survive by changing the area and scope of appearance;
- Enhancement of the connectivity between EN/N2000 sites;
- Adjustment of spatial plans and protected areas management plans;
- Planning/predicting changes in boundaries of protected areas;
- Adjustment of protection programmes at the species level;
- Development of infrastructure for scientific evaluation of the status, forecast and monitoring of changes in terrestrial ecosystems and biodiversity.

In the long term, the sea level increase could be potentially one of the most expensive climate change impacts on Croatian coast. The whole Croatian coast lies on carbonate rocks and karstic habitats which are quite vulnerable to physical changes, so the sea-level increase could be potentially one of the most serious and expensive climate change consequences. Areas, which will probably be vulnerable to a sea level increase at the Croatian coast, are identified.

The impact of climate change on marine ecosystem and fish resources is complex. They include changes in the marine environment, changes in the migration patterns of fish in the open sea, potential changes in the growing season and rearing time for farmed fish, and the potential increase of invasive species. Researches of the Adriatic Sea have shown the impact of the water inflow from the Mediterranean Sea: changes in phytoplankton and zooplankton species composition, productivity increase of Adriatic, that otherwise has relatively low nutrient levels. Climate change caused a biodiversity change in Adriatic as well, that can be observed through the expansion of thermophilic fish species areals, i.e. through species movement from south to north.

Research, systematic observation and monitoring¹⁵

The assessment of climate change impacts on terrestrial ecosystems is based on two groups of data: climatic prognostic models of global changes relating to the given area and data on terrestrial ecosystems in the widest context. For the purpose of overcoming the shortage of adequate amounts and quality of data on thematic areas of biodiversity and natural terrestrial ecosystems it is advisable:

- to develop climate change models under one or more selected scenarios specifically for the area of Croatia, respecting national climatic and orographic peculiarities and applying sufficient resolution of basic data for the entire national territory
- to map current distribution of target indicator flora and fauna groups using the adequate methodology as a basis for monitoring changes and developing prognostic models;

¹⁵ MEPPPC (2010): Fifth National Communication of the Republic of Croatia under the United Nation Framework Convention on the Climate Change. Ministry of Environmental Protection, Physical Planning and Construction, Zagreb

- to increase resolution of Croatia's map of habitats from a scale of 1:100 000 to a scale of 1:25 000 as a basis for monitoring changes and for predictive models;
- to monitor the development, to acquire and apply in time the latest methodological achievements in the field of ecological modelling with the aim to develop as reliable prognostic scenarios as possible;
- to map the distribution and determination of areals in Croatia for target indicator groups of flora and fauna;
- to evaluate appropriateness of migratory ways for the most threatened flora and fauna taxa;
- to evaluate the migration of invasive flora and fauna taxa on the national territory;
- to establish a seed-bank for keeping the collected plant seed material and to collect samples of animal taxa, all this for the purpose of conserving the gene fund of endemic and vulnerable plant and wildlife taxa

¹⁶Coastal Croatia, with its extremely rich biodiversity, due to sea level rise, will be the area most affected by climate change. The Adriatic's long and very indented coastline contains a great number of islands and vulnerable habitats like lagoons, estuaries, small Mediterranean wetlands, salinas, karstic rivers and subterranean hydrological systems, providing habitat that supports incredible biodiversity. The expectation is that low-lying coastal and shallow marine habitats will be exposed to sea-level rise and lack freshwater due to predicted increases in droughts. Many species may be affected because of the loss of suitable habitats and because of new conditions in marine waters, like changes of temperature, salinity and sea level and the invasion of non-native species better adapted to climate changes. The abundant native species in the coastal part of Croatia are expected to become threatened – especially those connected to Adriatic rivers, subterranean habitats (caves), islands, and coastal mountains. Migratory birds and other migratory species will have to adapt their life-cycles to new climate conditions and find new, suitable stopover sites during migration. Some predatory marine and terrestrial species may be threatened by changes in the quantity and distribution of their prey. The rich genetic diversity in agriculture along the Croatian coast, including a great number of native varieties of grapes, olives, cherries and other cultures might be affected, but it is still difficult to predict the exact consequences. Many important protected sites may also be vulnerable to climate change. The Report states that though experts in Croatia have predicted the vulnerability of biodiversity to climate change, the issue has yet to be recognized as an important issue at the national policy level, which should be incorporated into strategy documents or action plans. No specific monitoring or physical impact study programmes regarding climate change impacts on biodiversity have been undertaken, even though on-going research activities could have significant results and serve as a basis for future systematic monitoring and actions. Report gives recommendations and proposes urgent actions on this issue.

UNDP National Human Development Report gives overview of climate change and its impacts on society and economy in Croatia. Report quantified the damages in several sectors (agriculture, fisheries, health, hydropower, tourism and the coastal zone) of the Croatian economy over the past several years as a result of climate variability.

Projects

¹⁷There is a number of research and monitoring activities as well as national or international projects that are directly or indirectly dealing with the issue of CC impact on biodiversity or can contribute to it with its results. On the policy level, the issue of CC has been incorporated into strategic documents of the environment protection sector; biodiversity-related strategic documents do not yet fully address this issue. There is extensive research work going on related to biodiversity inventory for the purpose of establishing ecological network NATURA 2000 as well as for significant number of international projects. This work is not directly connected to the CC issue but its results that can be used as a basis

¹⁶ Radovic J., 2008. National Overview on Vulnerability and Impacts of Climate Change on Marine and Coastal Biodiversity in the Republic of Croatia

¹⁷ Radovic J., 2008. National Overview on Vulnerability and Impacts of Climate Change on Marine and Coastal Biodiversity in the Republic of Croatia

for future activities in this field. There are ongoing monitoring programmes related to CC in meteorology and air protection sector (greenhouse gasses emissions), representing a good basis for more extensive monitoring in future. Biodiversity related monitoring programmes are scarce and not related to the problem of CC impact on biodiversity; anyway, some of them can be taken as a starting point for future targeted activities. Possible mitigation and adaptation measures have not been identified so far and no related activities have started yet.

- ***Phenological, ethology and nidobiological adaptations of birds to habitat changes***

The project aim is to research how the birds adapt to changes in habitat caused by climate changes and anthropogenic factors. It will be investigated how climate changes affect the timing of migration and nesting of birds.

- ***Co-oscillations of the atmosphere and the sea important for the ecosystem of the Adriatic***

The main objective is to define of stable climatic conditions in the Adriatic Sea and related climate indices in order to predict future conditions.

- ***Forest habitats in conditions of exposure to harmful impacts and climate change***

Monitoring of the dynamics of groundwater and surface water in the lowland forest habitats and monitoring of water quality in the soil.

- ***Biodiversity and status of fish communities in the Croatian coastal***

- ***Climate variability and change and its consequences***

7. CYPRUS / CHYPRE



REPUBLIC OF CYPRUS

MINISTRY OF AGRICULTURE, NATURAL
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NOTE ON MEASURES AND STRATEGIES FOR BIODIVERSITY AND CLIMATE CHANGE

The severity of the impacts of climate change varies depending on the geographical region. According to recent international studies, the Mediterranean region is particularly vulnerable to climate change.

Cyprus, being an island in the Mediterranean Sea is faced with the challenge of combating and adapting to climate change. Based on relevant assessments undertaken by the competent authorities, climate change is expected to affect certain sectors of the economy in Cyprus.

In agriculture, the expected implications will affect the productiveness of the soil and the crop-output, the management of livestock and the geographic orientation of production. The increasing likelihood of an occurrence of extreme natural phenomena, in turn increases the likelihood of damage on the crops and the harvest.

Climate change is expected to affect the health and productivity of forests and forest habitats and change the geographic distribution of certain species of flora.

Additionally, climate change is expected to further affect the sectors of fishery and aquaculture. Impacts are also expected on coastal development and marine ecosystems.

In the sector of energy, the prolonged periods of dry and high temperatures will result in an increase in energy demand that may in turn cause problems with electricity distributions. The extreme weather conditions have both social and economic impacts, since they affect the infrastructure (buildings, transports, production of energy and water supply), threatening particularly the highly-populated areas, as well as the agriculture productivity.

Climate change will also affect the quality and availability of aquatic resources, affecting in turn many sectors, such as food production.

The loss of biodiversity and the degradation of ecosystems is also an important impact of climate change and such degradation not only affects the animal and plant species but also ecosystem services and consecutively our society.

Recognizing the difficulties and challenges of tackling the issue of climate change, the Ministry of Agriculture, Natural Resources and Environment, in collaboration with other competent authorities and stakeholders is currently preparing the following:

- National Action Plan to Combat Desertification
- National Action Plan on Biodiversity

- Impact Assessment of Climate Change on the Forests of Cyprus
- Assessment of the future of agriculture in Cyprus, which includes impact assessment of climate change on Cypriot agriculture.
- Experimental investigation of the impacts of minimizing irrigation needs while keeping the high sunlight and high temperature exposure in specific types of crops.
- Action Plan for achieving continuation of drinking water supply, independently from precipitation levels for production and supply of drinking water.

Recognizing the need for a National Strategy for Adaptation to Climate Change, Cyprus is proceeding with a comprehensive approach and development of such an action plan.

The first phase of the Action Plan (2011-2012) will focus on four issues:

1. Recognize and thoroughly record the impacts of climate change,
2. Inclusion of the concept of adaptation in all strategies and policies
3. Use of a combination of policies to ensure adaptation
4. Improvement of the international cooperation with regards to adaptation

The second phase which will be dealing with the implementation of the Strategy starts in 2013.

Additionally, the competent authorities have recognized challenges that will have to be dealt with in order to enhance progress in the implementation of the Strategy. These include:

- The improvement of the climate models and scenarios, at a detailed regional and local level, especially with regards to extreme weather conditions, to minimize the high level of uncertainty.
- Promotion and development of understanding the importance of “good practice” with regards to searching for alternative solutions for adaptation measures through the exchange and dissemination of knowledge about costs and benefits of different actions.
- Active involvement of both public and private sectors, as well as citizens is an issue, in order to promote cooperation and ensure compatibility of the adaptation measures with other EU policy targets.

8. ESTONIA / ESTONIE

BACKGROUND INFORMATION ON BIODIVERSITY AND CLIMATE CHANGE.

Being rather small in size (45,227 sq km), Estonia is characterised by diverse climatic conditions and quite pristine biodiversity mainly due to its location and low population density. Situated on the eastern coast of the Baltic Sea and bordered by Peipsi and Pihkva lakes from the east, this small country can be geographically considered almost an island. Estonia has a variety of geographical features that form the basis of its climatic value: long coastline, both at seaside and lakeside; high number of islets (ca 1,620); large untouched bogs (ca 15% of territory); large number of lakes (ca 1,450) and rivers; very flat relief (almost two thirds of the territory lies less than 50 m above sea level. The highest point is Suur Munamägi, 317 m above sea level); unique baserock openings – limestone cliffs – all along the Nordic coastline of the mainland and largest islands.

Located between latitudes 57°30' N and 59°49' N and longitudes 21°46' E and 28°13' E, Estonia has typical conditions for Boreal bio-geographic region. Although due to the strong influence of the Baltic Sea, half of the country can be considered to have boreo-nemoral and the other half more continental boreal conditions.

Almost half of the land surface is covered by forests (ca 47%), one-third is agricultural land (cropland 28% and pastures 7%), around 2% is under settlements and the rest of the territory is covered by mires and bogs. There are about 1,450 natural and man-made lakes in Estonia (6.1 per cent of the country's territory). Compared with other territories of a similar size situated north of the 57th parallel, Estonia's biological diversity is one of the richest. This is due to the varied climatic conditions, the existence of island and continental sectors, the abundance of sea and inland waters and the variety of base rocks with correspondingly diverse soil conditions, all of which formed the basis for the evolution and development of a wide diversity of ecosystems. Almost 40,000 living species are thought to be represented in Estonia. So far about 26,600 or 67% of them have been found. The other 13,400 species or 34% of biota are yet to be discovered. In Estonia almost 18% of land is under nature protection.

According to the Intergovernmental Panel on Climate Change (IPCC) the territory of Estonia lies within the region where the most significant increase in air temperature has been observed over the past few decades. The annual mean air temperature in Estonia increased by 1.0-1.7 °C during the second half of the 20th century. Seasonality plays an important part in climate warming in Estonia. A statistically significant increase in the monthly mean temperature is present only during the period from January to May, with the greatest increase in March (up to 4 °C). For the rest of the year, practically no change in the annual mean air temperature has been identified.

Estonia has not carried out exhaustive study on impacts of climate change. According to available information the impacts of climate change in Estonia are expected to be relatively small compared to the southern and northern regions of Europe. Therefore no significant consequences are expected for biodiversity or public health. Some change in species composition is expected.

The rise in temperature and precipitation will have a positive rather than negative effect on Estonian economy. For example, it will probably be favourable for agriculture, especially grassland husbandry. The total growing season will lengthen and a greater number of harvests will become possible. In the case of higher temperatures and higher rainfall, the growth and development of herbaceous plants will quicken and harvesting times will shift to an earlier period. Livestock will be better provided with fodder in summer and winter.

The main hazards and economic losses in Estonia will result from the rise of sea level which will cause flooding in coastal areas, the erosion of sandy beaches and the destruction of harbour constructions. (Source: Estonia's Fifth National Communication).

Adaptation measures or strategies

The document describing current status of climate change adaptation issues in Estonia is "Estonia's Fifth National Communication" under the Framework Convention on Climate Change (the document can be found from <http://www.envir.ee/1147516>).

There is no national adaptation strategy or policy document in Estonia yet, but here are other indirect strategies and laws on climate change adaptation, for example Estonian Forest Development Plan until 2020, Public Health Development Plan 2009-2020, HELCOM Baltic Sea Action Plan, developed emergencies and crisis management plans under regulation of Emergency Act. The aim to adapt to climate change is added to the draft of new Estonian Environmental Action Plan 2007-2013, to the draft of Ministry of the Environment's Development plan for the period 2012-2015 and to the draft of Nature Conservation Development Plan up to 2020. However, various programmes such as the Common Agricultural Policy also include climate change adaptation issues.

Estonian Forest Development Plan until 2020 also states that no exhaustive studies have been carried out to assess impact of climate change to Estonian forest and forest management. The climate change could change the forest stands therefore it is important continuously update relevant forest management and protection strategies.

There are on-going various trans-national projects and national activities on climate adaptational field. For example:

On Baltic Sea Region, the project BALTADAPT project, led by the Danish Meteorological Institute and Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of Germany (period 2010-2013), aims at creating circumbaltic adaptation strategies for the sea and the coastal zone. The project partner is also University of Tartu, Estonian Marine Institute and related Ministry of the Environment of Estonia. BaltAdapt aims at transnational, political understanding and approaches to climate adaptation of the sea and coastal zone. Although this can be read as including the whole Baltic States, it is understood as a project to tackle the impact on the sea and direct coastal zone only. Inland areas are not considered coastal regions in the Baltic States (more information <http://baltadapt.eu>).

Baltic Environmental Forum BaltClim project's (period 2011-2012) goal is to encourage and support relevant stakeholders on national and/or regional level in Estonia, Latvia and Lithuania to initiate climate adaptation programmes. The project shall be achieved goal by organising a seminar and providing a background paper on these issues, based on the needs of the responsible ministries (more information www.bef.ee).

European-wide project RegioClima (period 2008-2011) project is about regional cooperation towards adaptation to climate change in Europe. The purpose of the project is to enhance cooperation among selected EU regions towards avoiding risk and reaping the benefits from a changing climate (project homepage <http://www.regioclimate.eu/>).

Ministry of the Environment of Estonia is preparing EEA Grants environmental programme propose about mapping the impacts of climate change, developing measures and awareness raising in Estonia. The goal is moving toward developing the national climate adaptation strategy.

Additional impulses for adaptation strategies can be expected from the EU climate change impacts vulnerability and adaptation Clearing House Mechanism that is planned to be operational by 2012 (COM homepage).

9. EUROPEAN COMMISSION / COMMISSION EUROPEENNE

The European Commission has set up an EU Ad Hoc Expert Working Group on Biodiversity and Climate change in autumn 2008. The Working Group collaborates with the ENCA (European Nature Conservation Agencies) adaptation group, the Group of Experts on Biodiversity and Climate Change under the Bern Convention, the AHTEG (Ad Hoc Technical Expert Group) on Biodiversity and Climate Change established under the CBD (Convention on Biological Diversity) and the Intergroup Climate Change, Biodiversity and Sustainable Development of the European Parliament.

One of the main outputs of the work of this group so far is the Discussion Paper - Towards a Strategy on Biodiversity, Ecosystem services and Climate Change".¹⁸ This includes consideration of the Natura 2000 network and ecological connectivity, and the role of biodiversity and ecosystem services with regards to combating climate change. More information on the work of the group as well as background documents are accessible via the CIRCA group "Biodiversity and Climate Change": http://circa.europa.eu/Public/irc/env/biodiversity_climate/home.

The White Paper on "Adapting to climate change: Towards a European framework for action" was adopted on 1 April 2009 together with a number of staff working papers, i.e. the Impact Assessment, documents on "Adaptation and Health", "Climate Change and Water, Coasts and Marine Issues" and a report on "Adapting to Climate Change: the challenge for European agriculture and rural areas". All documents are available on the DG CLIMA adaptation website.

Most relevant with regards to biodiversity and ecosystems is the sub item 3.2.3 of the Adaptation White Paper: Increasing the resilience of biodiversity, ecosystems and water and the related action points which include: "Explore the possibilities to improve policies and develop measures which address biodiversity loss and climate change in an integrated manner to fully exploit co-benefits and avoid ecosystem feedbacks that accelerate global warming"; and secondly "draft guidelines by 2010 on dealing with the impact of climate change on the management of Natura 2000 sites".

The White Paper also mentions an Impact and Adaptation Steering Group (IASG) which is supposed to be supported by other technical groups. The Ad Hoc Expert Working Group on Biodiversity and Climate Change is to serve as the technical group on biodiversity, ecosystem services and ecosystem-based approaches to adaptation – short "ecosystem-based adaptation".

The European Commission together with the Swedish Presidency held a side-event on "Ecosystem-based approaches - Convenient solutions ready for use" at UNFCCC COP 15 in Copenhagen in December 2009. The presentations have been webcasted and can be watched under <http://www.se2009.eu/en/1.26298> or downloaded from the CIRCA site of the EU Ad Hoc Expert Working Group on Biodiversity and Climate Change http://circa.europa.eu/Public/irc/env/biodiversity_climate/home.

The **Environment Council Conclusions** adopted on 22 December 2009¹⁹ include the following paragraphs:

...

RECOGNISES that financing of activities to mitigate and adapt to climate change should contribute to the conservation and sustainable use of biodiversity, ecosystem services and socio-economic co-benefits, based on appropriate criteria;

9. EMPHASIZES the need for targeted and strengthened actions to effectively reverse the loss of forest cover and the loss of forest biodiversity through, inter alia, action at global level within the initiative on Reducing Emissions from Deforestation and Forest Degradation (REDD), and forest conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+),

¹⁸ See http://ec.europa.eu/environment/nature/pdf/discussion_paper_climate_change.pdf

¹⁹ See http://www.se2009.eu/polopoly_fs/1.28576!menu/standard/file/112041.pdf

based on an active participation by developing countries, keeping in mind the objectives of the EU to reduce gross tropical deforestation by at least 50% by 2020 compared with current levels and halt global forest cover loss by 2030 at the latest

10. HIGHLIGHTS the mitigation and adaptation potential of resilient wetlands, oceans, forests, peatlands and grasslands and other ecosystems, and that conservation, restoration and sustainable use of these ecosystems result in carbon emission reductions, carbon storage and increased adaptation potential; RECOMMENDS the development and use of ecosystem-based approaches for the mitigation of and adaptation to climate change;...

The **Commission Communication "Options for an EU vision and target for biodiversity beyond 2010"** (COM(2010) 4)²⁰ refers to the climate change – biodiversity link:

... As well as having intrinsic value, biodiversity delivers 'value' through ecosystem services, for example through the provision of food and water, by offering natural protection from floods and storms, and by regulating the climate. ...

... Since nature is both the most effective climate regulator and the largest carbon sink, biodiversity loss jeopardises climate objectives. Strong and resilient ecosystems are our life insurance against climate change, providing a 'natural fix' for mitigating and adapting to its consequences. ...

... Also, since biodiversity provides many of the same services as man-made technological solutions, often at significantly lower cost, protecting and restoring biodiversity provide some cost-effective opportunities for climate change mitigation or climate change adaptation. As natural resources are inputs to a wide range of economic activities, restoring their status and enhancing their use may raise productivity or develop new sources of growth, through eco innovation process. ...

... It should be a priority to seize all opportunities to make progress towards biodiversity policy goals while at the same time delivering cost-effective climate change mitigation and adaptation. ...

At the **poster session at CBD SBSTTA 14** in May 2010 a poster "Working with –Nature – Ecosystem-based approaches to climate change adaptation and mitigation"²¹ was presented in the name of the EU Ad Hoc Expert Working Group on Biodiversity and Climate Change and the ENCA adaptation Group referring to the discussion paper and the ENCA workshop report²².

The European Spring Council in 2010 committed to the long term biodiversity 2050 vision and the 2020 target set out in the Environment Council's conclusions of 15 March 2010. The EU Biodiversity Strategy up to 2020 (COM(2011)244 reiterates that biodiversity loss and climate change are intrinsically linked and 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*".

On many occasions during the International Year of Biodiversity 2010 it was highlighted that the conservation and sustainable use of biodiversity is one pre-requisite for mitigation of and adaptation to climate change and the need to further develop the synergies between the Convention on Biological Diversity and the UNFCCC was stressed. Two decisions adopted at CBD COP 10 in Nagoya (18-29/10/2010) were particular relevant for climate change namely the decision on biodiversity and climate change (CBD COP X33) and the decision on protected areas (CBD COPX 31). The role of protected areas in climate change and the potential of multiple benefits of ecosystem-based approaches to climate change adaptation and mitigation are highlighted.

In addition in 2010 for the first time the "Rio Conventions' Ecosystems and Climate Change Pavilion" was hosted at CBD COP10 and UNFCCC COP16 by the Secretariats of three Rio Conventions in collaboration with core partners including the European Commission. The Pavilion showcased latest research results as well as practical examples for synergies, and multiple benefits of ecosystem-based approaches to climate change adaptation and mitigation. For more information e.g.

²⁰ See http://ec.europa.eu/environment/nature/biodiversity/policy/pdf/communication_2010_0004.pdf

²¹ See http://circa.europa.eu/Public/irc/env/biodiversity_climate/home

²² See <http://www.bfn.de/fileadmin/MDB/documents/service/Skript264.pdf>

daily messages, presentations, interviews, photos and videos see <http://ecosystemspavilion.org> and www.facebook.com/ecosystemspavilion. The momentum of this collaborative outreach initiative will be extended in 2011 to UN CCD COP 10 in South Korea and UNFCCC COP 17 In Durban and to Rio + 20 and CBD COP 11 in 2012.

The need to develop and use ecosystem-based approaches for adaptation and mitigation has been reiterated in consecutive Environment Council Conclusions (14 October 2010)²³ and most recently in the Environment Council Conclusions "Follow-up to Cancun" adopted on 14 March 2011²⁴.

On May 2011 the Commission adopted the Communication on "Our life insurance, our natural capital: an EU Biodiversity Strategy up to 2020"²⁵.

The European Council endorsed the EU Biodiversity Strategy up to 2020 during its meeting on 21 June 2011.

ONGOING WORK

Work is ongoing with regards to the implementation of the EU Biodiversity Strategy. This includes – *inter alia* - the promotion of working with nature – green infrastructure – ecosystem-based approaches

Green Infrastructure is seen as an essential means of integrating biodiversity and climate change adaptation. Work is underway to further shape Green Infrastructure for the EU. A Strategy on Green Infrastructure shall be developed by 2012²⁶. The development of Green Infrastructure - using ecosystem-based approaches - working with nature is embedded in target 2 "By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems." of the EU Biodiversity Strategy to 2020 A note on flood risk management and natural flood management options is also being developed, linking to the Green infrastructure aspects.

Several projects are ongoing to support the activities on Green Infrastructure including 1) "*Green Infrastructure Implementation and Efficiency (lead by IEEP)*". The study's aim is to prepare the basis for an Impact Assessment of a future GI Strategy by gathering data and evidence on effectiveness, costs and benefits of GI. This in particular involves an assessment of the effectiveness and efficiency of different types of GI measures in terms of biodiversity and broader ecosystem benefits. The project will contribute to expanding the necessary knowledge base in a number of ways. Information on the variety of GI initiatives and their implementation across the EU will be gathered and in-depth case analyses of the most advanced approaches will be prepared to shed light on their socio-economic and biodiversity benefits. Socio-economic benefits assessed could include health benefits, regulating services (eg water purification, recharging of groundwater, flood control, erosion control, carbon storage), provisioning services (eg water provision, soil fertilisation), cultural benefits (eg recreation, cultural identity), and broader economic benefits (eg tourism, employment) and supporting services (e.g. genetic diversity, nutrient cycling and decomposition, photosynthesis). This assessment is meant to provide the basis for an analysis of the environmental, social and economic impacts of implementing GI initiatives at MS and EU levels according to four different policy scenarios ranging from business as usual to more ambitious options. The results are expected in January 2012.

2) *Assessment of the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe (lead by ECOLOGIC)*. The first objective of this study is to take stock of current examples of working with nature - ecosystem-based approaches to adaptation - in Europe and compare to the extent possible their cost to the costs of traditional engineered approaches. Secondly it shall be reviewed where and to what extent ecosystem-based approaches have been integrated in

²³ <http://register.consilium.europa.eu/pdf/en/10/st14/st14975.en10.pdf>

²⁴ <http://www.consilium.europa.eu/uedocs/cmsUpload/st07755.en11.pdf>

²⁵ COM (2011) 244 <http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>

²⁶ In COM (2010)4. More information on Green Infrastructure in http://ec.europa.eu/environment/nature/info/pubs/docs/nat2000newsl/nat27_en.pdf.

climate change programmes on local, regional, national and transnational levels. Existing obstacles for integration of ecosystem-based approaches into climate change programmes shall be identified and recommendations brought forward how to overcome them. It is expected that this work will help to raise awareness to the multiple benefits provided by ecosystem-based approaches in particular with a view to the post 2010 Biodiversity Policy and a Strategy on Green Infrastructure. The results are expected in October 2011

10. GEORGIA / GEORGIE

CLIMATE CHANGE AND BIODIVERSITY

Georgia became party to the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and in 2006-2009 Georgia prepared its second national notification to the Convention. During this process a national inventory of green-house gasses was conducted, scenarios of expected climate change processed and vulnerability of various ecosystems and branches of economics to current and expected changes was assessed. Along with plans for reducing green-house gas emissions, adaptation projects were also developed and activities aimed at improving public awareness arranged.

With due regard to the second national notification and the results of other completed or active projects, the short and long-term strategy for climate change was prepared. It does not yet cover the entire country but focuses on priority regions selected according to the results of the initial study. Based upon the expected scenario of climate change, three regions (the Black Sea coast, Dedoplistskaro district and Kvemo Svaneti) were evaluated using identified vulnerability and adaptation measures.

The following information details the impact of climate change on these ecosystems and the expected threats and adaptation measures which are directly connected with biodiversity issues.

Black Sea Coast: against the background of global warming four main threats have become distinct for the Black Sea ecosystems:

- an increase in the speed of eustatic variations (the global rise of the sea level towards land);
- an increase in the intensity and frequency of storms and a change in seasonality;
- the activation of sedimentation in deltas of rivers feeding on glaciers (this threatens only the Rioni delta and middle reaches);
- changes in the thermal characteristics of the sea.

Evaluations revealed that the most vulnerable sectors within the coastline are the Rioni and Chorokhi river deltas and the lower reaches of the Rioni River. Kolkheti National Park is directly adjacent to the Black Sea and comprises coastal waters, coastal peat bogs, Paliastomi Lake and wetland Colchic forests. As the evaluation showed, the rise in sea water levels has significant negative impact on the protected areas, particularly Lake Paliastomi. Between 1927 and 2006 the temperature had risen by 0.7° C which, along with other factors resulted in serious changes of the lake's ecosystem (increase of lake water salinity caused by intrusion of sea water and causing the replacement of endemic fish species by marine species). Climate change adaptation measures are planned for the lake within the strategy plan and include: a detailed study of the impact of climate change, the preparation of adaptation measures and the sourcing of investments to implement.

Dedoplistskaro District: this is one of the priority regions located in extreme south-eastern part of Georgia selected during the preparation of the second national notification as a territory under the threat of desertification and where effective adaptation measures should be introduced. Dedoplistskaro is rich with fertile soils and vast pastures, but poor in water resources, with low annual precipitation rates. Represented here are unique semi-arid ecosystems, untypical for the country and rich with flora and fauna. In order to protect these ecosystems, protected areas have been established over various periods: Vashlovani Protected Areas (comprises a national park (25,114 ha) and a Reserve (10,142 ha) as well as Natural Monuments (the Alazani floodplain and the Artsivi gorge) and Chachuna State Reserve (5,200 ha). The total area of the protected areas is 30,552 ha, or 12% of the district.

The role of protected areas in monitoring of anthropogenically free climate change impact on endemic species of flora and fauna is very important. As there is virtually no anthropogenic impact on natural landscapes at the protected areas the changes in vegetation cover of these areas could serve as an additional indicator of climate change. For instance, in last decade such new species as porcupine and land rabbit are becoming familiar in the region, apparently as a result of migration

from hot and arid areas of Pakistan and Iran. At the same time in many places the pheasant population are disappearing, that in some way could indicate the beginning of desertification process in the region. It should be also mentioned, that in natural landscapes of protected areas a number of old Pistachio trees, Juniper, Black Poplar and other plants are preserved during the several centuries. In the form of annual rings they contain valuable information on the variability of climate in the region for the last centuries.

Agriculture plays a leading role in the economy of the region but is seriously impeded by a lack of water (irrigation systems are in a state of total disrepair), frequent droughts and strong winds (windbreaks have been entirely eliminated during the last 20 years). Soil degradation in Dedoplistskaro district represents one of the most acute problems; with pasture management almost absent, erosive processes are accelerated, impoverishing the vegetation and intensifying the desertification processes.

The following adaptation measures are determined for Dedoplistskaro district:

- the establishment of a permanent monitoring system, within the protected areas, to evaluate land degradation and the impact of climate change on endemic species of flora and fauna (in conditions free from anthropogenic pressure);
- the planting of plantation stands on abandoned and eroded land (a project is proposed for
- the planting of a 40 ha bio-energetic forest);
- the rehabilitation of windbreaks.

In 2008 the project on the Climate Tolerant Rehabilitation of Degraded Landscapes, Georgia, was implemented by MoE, in cooperation with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and GTZ. The goal of the project is to restore degraded landscape and provide aid to the government of Georgia in implementing measures against land degradation and desertification. The project mainly focuses on Dedoplistskaro district, where the restoration of windbreaks has begun on a 30 ha plot, and actively involves the local community.

Kvemo Svaneti (Lentekhi region): this mountainous region located in the central part of West Georgia's northern sector was selected as an ecosystem whose vulnerability to natural disasters is intensified by the threat of global warming. The increase in frequency and intensity of such disasters (flash floods, landslides and mudflows) severely damages agriculture, forests, roads and other infrastructure.

Due to landslides and flash floods the population of Lentekhi district has fallen by 40% since 1986. Forests covering more than 60% of the region area represent one of the major natural treasures of Kvemo Svaneti but, during the past 15 to 20 years parasite-borne diseases have widely spread in the forests. In particular, if this index in 1986-1996 did not exceed the sanitary norms, in 1995-2005, the number of spruce trees hurt by *Ips typographus* had increased up to 8 %, and the number of *Dioryctria splendidella* up to 7,3%. The spread of *Phellinusa* pine (7,6%) and *Armillaria mellea* (3,5%) had also grown in the coniferous species. Given the background of the recent rises in temperature, the number of injured (to 20%) and excessively dry (to 8%) trees, have increased as well, transforming the Lentekhi region forests into a high vulnerable category. It is thought that this may, in part, be driven by climate change. An evaluation of glaciers in the Central Caucasus region (of which Kvemo Svaneti is a part) revealed that their total area has decreased by about 25% whilst total volume has fallen from 1.2 km³ to 0.8 km³ since the 1950s. The expected increase in temperature by 2050 could result in the vanishing of the glaciers of Kvemo Svaneti and presumably further increase the vulnerability of the Kvemo Svaneti forests.

The following adaptation measures have been identified for Kvemo Svaneti:

- ✓ rehabilitation and adequate management of severely damaged forests;
- ✓ restoration of forests, for protection against landslides, in appropriate areas;
- ✓ development of economic packages for the protection of local forests from harmful insects.

11. GERMANY / ALLEMAGNE

Our vision for the future:

The increase in average global warming is limited to a maximum of 2 degrees Celsius compared with preindustrial levels. The effects of climate change on biological diversity in Germany (e.g. shift in the vegetation zones, changes in bird migration patterns, the threat to cold-loving species) have been ameliorated or minimised. Sensitive species and biotic communities are able to respond to climate-induced changes by means of geographical migration.

Our aims:

Assuming that the EU, within the context of international climate protection negotiations, undertakes to reduce its greenhouse gas emissions by 30 % by 2020 compared with 1990 levels, Germany will aim to reduce its emissions to an even greater extent. In the long term, the increase in the average global temperature is limited to 2 degrees Celsius compared with preindustrial levels.

Sensitive species and biotic communities are able to respond to climate-induced changes by means of geographical migration within a network of spatially or functionally linked biotopes that will have been created by 2020.

By 2020, the natural storage capacity of land habitats for CO₂ (e.g. as a result of the rewatering and renaturation of peatlands and the increase in semi-natural forests) has increased by 10 %.

Reasons:

Climate change influences the distribution of species, their genetic features, and the structure of ecosystems. The current isolation of habitats means that many sensitive species are unable to escape climate-induced changes. Certain forms of ecosystem intervention may adversely affect the climate (such as the release of climate-relevant gases during peatland dehydration). As heat stress and periods of drought adversely affect the hydrological balance of watercourses, still waters and peatlands, water management plans must make allowance for climate change, with due consideration for biodiversity aspects. Many of the measures to conserve biological diversity (such as the establishment of new forests, renaturation of peatlands) contribute to climate protection. Under the Kyoto Protocol, and within the context of EU burden sharing, Germany has undertaken to produce a total of 21 % fewer climate-acting gases by 2008 – 2012 compared with 1990 levels. In the spring of 2007, the EU adopted ambitious climate protection targets for the period up to 2020, and resolved to commence negotiations for a climate protection convention. The EU is willing to cut its emissions of greenhouse gases by 30 % by 2020 compared with 1990 levels, and thereby contribute to a global and comprehensive agreement for the post-2012 period, provided other developed countries commit to similar emission reductions and less developed countries make contributions commensurate with their responsibilities and abilities. Under this prerequisite, Germany is prepared to commit to a reduction of significantly more than 30 %.

Independently of international agreements, the EU has already undertaken to cut its greenhouse gases by at least 20 % by 2020 (compared with 1990 levels). Thanks to these resolutions, the EU has assumed a leading role in climate protection.

We aspire to the following:

- To achieve an international system of interlinked biotopes
- To continuously increase CO₂ sink capacity by creating new forest areas in suitable locations
- To promote natural development throughout all upland moors and peatland forests; to significantly reduce peat harvesting from 2015 coupled with an increase in the use of peat substitutes in horticulture; to rewet dehydrated sites
- To give increased consideration to the interactions between biodiversity and climate change throughout all areas of social action

- To more widely integrate biodiversity protection into the German Government's climate protection programme
- To promote greater cooperation between all national and international players in the updating and implementation of the Convention on Biological Diversity, the Framework Convention on Climate Change and the Kyoto Protocol, as well as the Convention to Combat Desertification.
- To formulate a concept on "nature conservation and climate change" by July 2008
- To formulate and establish a system of indicators for assessing the impacts of climate change on biological diversity by 2015.

12. LATVIA / LETTONIE

1. The policy documents:

A new Climate Change Adaptation Policy is under preparation;

The National Environmental Policy Strategy (containing chapters “Climate Change” and “Biodiversity”) was approved in 2009 and aims to minimize the clash between biodiversity conservation and climate change mitigation measures.

The State Program for Environment Monitoring was approved in 2010 (containing chapters “Air monitoring program”, “Water monitoring program”, “Land monitoring program” and “Biodiversity monitoring program”)

2. Projects

The University of Latvia as a partner is involved in the Baltic sea regional programme 2007-2013 project "Baltic Sea Region Climate Change Adaptation Strategy" (BaltAdapt) (2007-2013).²⁷ Baltadapt is developing a Baltic Sea Region-wide climate change adaptation strategy. This truly transnational strategy will focus on the sea itself and its coastline. While it is understood that such a strategy cannot be adopted by BaltAdapt, the project can ensure its preparation and clear the ground for its adoption.

INTERREG IVC Project: FUTURE forest - Woodlands for Climate Change (2008-2011)

Project partner – the Ministry of Agriculture; activities carried out in cooperation with Latvian State Forestry Research Institute “Silava” and Latvian Forest Owners’ Association

The project aims to ensure that future European forests continue to deliver multiple benefits and to leave future generations forests that are well adapted and resilient to natural risks, including effects of climate change.

3. Research

Several researches were and are being done on climate change and its impact, major of them:

National Research Program „Climate Change Impact on Water Environment in Latvia”²⁸ starting from 2006. Scientists in Latvia have joined forces to investigate how climate change will potentially influence Latvian lakes, rivers and the Baltic Sea coast and coastal waters, and to elaborate scientifically justified proposals to adapt to and mitigate adverse impacts;

“Importance of Genetic Factors on Formation of Forest Stands with High Adaptability and Qualitative Wood Properties” (2009-2012) – funded by ESF, lead by State Forestry Institute “Silava”. The aim of the project is to unit competence in forest research, chemical engineering and biology sectors, attracting young professionals and foreign experts, to analyze the potential impact of the genetic factors of pine, spruce and hybrid aspen to increase the adaptability and improve the wood.

“Adaptation of forestry to climate changes” (2011-2015) – funded by JSC “Latvia’s State Forests”, lead by Latvian State Forestry Research Institute “Silava” in cooperation with University of Latvia. Project aims to improve Latvian-scale predictions of climate variables, important for forestry, considering both tree growth and development (trends) of diseases, insects, possible damages from abiotic factors, and provide recommendations for minimization of possible adverse effects of climate changes on forest sector. During the project also methodology for further in-depth studies of identified most important factors in relation to climate changes and sustainable forest management will be developed.

27 http://baltadapt.eu/index.php?option=com_content&view=article&id=91&Itemid=222

28 <http://kalme.daba.lv>

„Solutions for maintenance and improvement of productivity, resistance, genetic diversity, and propagation ability of coniferous trees in conditions of Global climate changes” (2009-2012) – funded by Latvian Council of Science, lead by State Forestry Institute ‘‘Silava’’ – concentrates on specific aspects of selection and propagation of trees (genotypes), resilient to several possible adverse effects of climate changes.

1st Stakeholder Dialogue in the framework of WP 5 which will be held on 28 October 2011 in Riga, Latvia.

The event shall form a debate on the perception of climate change and adaptation in the eastern Baltic Sea Region of political decision makers. The idea is to focus the discussion on regional development and coastal protection. The stakeholder dialogue will be organized as side event to the OURCOAST stakeholder’s conference, 27-28 October 2011 in Riga, Latvia.

13. NORWAY / NORVEGE

REPORT ON BIODIVERSITY AND CLIMATE CHANGE IN NORWAY

The **governmental report** on climate change adaptation (CCA) from 2008 is the basis for the work on climate change adaptation in Norway (*The Norwegian adaptation strategy*). One central follow up from the strategy is the **Climate change adaptation programme**: a national coordination programme linking 13 ministries to provide cross-sectoral perspectives and policies on CCA. The coordination group is chaired by the Ministry of Environment, whereas the programme's executive secretariat is hosted by the Directorate for Civil Protection and Emergency Planning (subordinate to the Ministry of Justice). The programme thus links both the environmental and the civil preparedness issues inherent in climate adaptation. Their activities include maintaining and developing the Norwegian CCA clearinghouse - www.klimatilpasning.no. They provide CCA courses, training programmes, etc. and operate the CCA part of "Cities of the Future" (pilot programme for 13 biggest cities in Norway). They have now developed an online climate adaptation guide for local and regional planners (in English also), a sea-level rise guideline for planners (not published yet) and also developed the use of GIS in CCA planning.

A **Norwegian Climate Change Adaptation Commission** was appointed by the Norwegian government in Dec. 08, Expert group of 17 persons from many different sectors. Their mandate included to give an overview of risks of climate change on different parts of the society: health and safety, physical infrastructure, trade and the natural environment. They should also identify and prioritize tools and means for reducing vulnerability and increasing adaptation ability. The work ended in **A Norwegian Official Report (NOU 2010-10)** submitted on 15 Nov. 2010 (translation to English in process), in which one of the main conclusions is that management must be based on an ecosystem-based approach, and the commission recommends a comprehensive approach where consequences for greenhouse gas emissions, pollution and the natural environment shall always be assessed when adaptive measures are planned. The NOU also points out the need of appointing/determining the national agencies in charge of sea-level rise and stormwater runoff management. The report has now been on public consultation, and the Government plans to prepare a White Paper for Stortinget (the Parliament of Norway) on climate change adaptation.

In 2010 a national commission also presented *[Climate Cure 2020: Measures and instruments for achieving Norwegian climate goals by 2020](#)*. A review **evaluating the potential conflicts with biodiversity** of all the possible mitigation measures listed in this report was afterwards made by the Norwegian Directorate for Nature Management. A **White Paper on Climate change mitigation** is at present under preparation by the Government, and is planned to be presented for the Parliament in spring 2012.

Special focus the last years has been on evaluating **carbon storage and uptake** in different nature types in Norway, both terrestrial ([Bioforsk Nr 162 2010](#)) and marine ([NIVA 6070-2010](#)) with the intention of demonstrating the importance of protecting the ecosystems and the biodiversity, also as mitigation measures. Norway has since 2007 had particular focus on protecting forests in other countries as mitigation measures (REDD/REDD+ activities). More focus is now on identifying how Norwegian nature can be useful as ecosystem services, among others with regard to climate change adaptation and mitigation (report to be delivered by end 2011).

Nature management measures with regard to climate change are to a large extent based on the report *[Climate Change - Nature Management \(Norwegian Directorate for Nature Management Report 2007-2\)](#)* and the strategy within nature management is to integrate climate change adaptation measures into existing managing structures (mainstreaming). Focus areas have been protected areas, cultural landscapes, freshwater systems, marine systems, game management, alien invasive species, areal planning and areal use and outdoor recreation. All the main **monitoring programmes** for biodiversity have been or are in progress of being evaluated with respect to how climate change effects are taken into account. A few monitoring programmes have been established with climate change as the main driver in focus: The national palsa mire monitoring program and repeated vegetation analyses at GLORIA (mountain) sites, whereas other programmes have been adjusted to

incorporate climate change better, in particular the terrestrial monitoring program. The common bird indicator in Norway have are also being adjusted to incorporate species that can be used for identifying effects of climate change. Some other recent reports of special interest with regard to biodiversity, climate change and nature management are:

- *Changes in Norwegian marine benthic fauna 1997-2010.* ([DN utredning 8-2011](#)) (English abstract)
- *Effects of climate change on seashores* ([NINA Rapport 667-2011](#)) (English abstract)
- *Atlantic salmon in future climates: Review on current knowledge and scenarios with focus on water discharge and temperature* ([NINA Rapport 646-2010](#)) (English abstract)
- *Climate change and Norwegian vegetation. How are Norwegian vegetation models affected by climate change?* [NINA Rapport 529-2009](#) (English abstract)
- *Alien species and climate change in Norway: An assessment of the risk of spread due to global warming* [NINA Rapport 468-2009](#) (in English)
- *Adaptation to climate change and Northern Norway and Svalbard. An assessment for the need for new protected areas and terrestrial ecosystem's ability to bind carbon* [NINA Rapport 436-2009](#) (English abstract)

A Norwegian follow-up of ACIA – the NorACIA programme – finished in 2010 with in total five reports and a synthesis report. All the reports are to be found here: <http://noracia.npolar.no/> **Climate research**, including research on climate change and biodiversity (among others; the “Climate Change and Impacts in Norway” -[NORKLIMA programme](#) which goes on until 2013) is under evaluation. The Norwegian Research Council has appointed an international committee for this evaluation until 2012. Further climate research will be based on this evaluation.

14. POLAND / POLOGNE

INFORMATION ON INITIATIVES AND MEASURE IN FRAME OF CLIMATE CHANGE AND BIODIVERSITY IN POLAND

General Directorate for Environmental Protection organized the seminar on “Biodiversity and climate change – risks, prospects and trends of measures” on 25 of November 2010. The seminar was organized in frame of the implementation of the Bern Convention Standing Committee recommendations on climate changes impacts on biodiversity.

There was a great attendance at the seminar including representatives of the Ministry of the Environment, Ministry of Regional Development, Ministry of Agriculture and Rural Development, National Fund for Environmental Protection and Water Management, Chief Inspectorate of Environmental Protection, National Water Management Authority, regional directorates for environmental protection, General Directorate of the State Forests, regional directorates of the state forests, environmental protection and nature conservation institutions, academies and non-governmental organizations.

Seminar papers and presentations in Polish are public available on the website: http://www.gdos.gov.pl/News/view/2308/25_listopada_2010_r_odbylo_sie_seminarium_Bioroznorodnosc_a_zmiany_klimatyczne_zagrozenia_szanse_kierunki_dzialan.

The seminar was the first step to elaborate a study on assessment of the climate change impact on the biological diversity and following it recommendations for nature conservation administrative measures in Poland 2030.

According to Polish Government’s Statement on EU White Paper on adoption to climate change: towards European framework for action (COM (2009) 147) which was adopted on 19th of March 2010, Poland is being preparing national adaptation strategy for sectors and the most vulnerable areas to climate change impact that should be ready by the end of 2012. This document will contribute towards the comprehensive European adaptation strategy and will be developed starting from the year 2013. The implementation of the strategy is needed on national, sectoral and specific areas levels by the governmental and regional administration, also enterprises and other groups of stakeholders.

Among the other climate change mitigation programs National Program of Increasing Forested Areas should be mentioned which sets up a goal to increase forested areas to 30 % of the area of the country in 2030 and to 33 % to 2050.

In frame of the Polish Presidency there was organized the international conference “Forestry for the climate and biodiversity”, which was a good opportunity to exchange information and experience on sustainable forestry and the role of forests in the climate change adaptation.

15. SERBIA / SERBIE

REPORT ON CLIMATE CHANGE AND BIODIVERSITY IN THE REPUBLIC OF SERBIA

Within the Republic of Serbia we can expect significant changes to grasslands, riparian habitats and forested ecosystems, due largely to changes in the amount and seasonal distribution of precipitation. The most vulnerable ecosystems also include wetland and steppe habitats. Forests will change in terms of their composition, structure and distribution patterns, as some species shift their geographic range and others simply decline. These impacts are largely due to the fact that projected movement of climatic zones will be faster than migration of some species and forest types. Rising temperatures could increase the frequency and intensity of fire and pest outbreaks, which could in turn reduce the diversity and extent of forests.

The Republic of Serbia's territory is mountainous, there are species with populations limited to mountain peaks ("islands") that have no natural migration corridors. These species will be among those most affected by climate change, as they are already vulnerable due to low population size and isolation. Most of these mountaintop species are either endemic or steno-endemic and their disturbance and/or disappearance will result in biodiversity loss, including genetic loss.

1. Impacts of Climate Change

There is no systematic monitoring of the impacts of climate change on biodiversity within the Republic of Serbia. Current research and planning has primarily been based on global findings and the experiences and recommendations of other countries. There is, however, some data on forests where changes to underground water levels have been monitored, as have their impacts on forest drying and impacts on stand compositions (monitored for Narrowleafash and oak species).

As a part of the Strategy of Biological Diversity of the Republic of Serbia (2011-2018), the Action Plan contains activities, responsible institutions and timeframes, as well as potential source of financial resources for implementation of the Strategy.

1.2 National Action on Climate Change

- Develop and implement a National Biodiversity and Climate Change Action Plan
- Develop climate change adaptation strategies for PAs based on the results of climate change vulnerability analysis
- Climate Change Research, Monitoring and Evaluation
- Conduct a national climate change vulnerability assessment focused on protected areas and vulnerable, rare and threatened ecosystems
- Identify indicators, information and equipment requirements and priorities for the long-term monitoring of climate change impacts on biodiversity
 - Identify indicators, information and equipment requirements and priorities for the long-term monitoring of climate change impacts on biodiversity
 - Conduct ongoing evaluations and refinements of adaptation strategies and actions
- Climate Change Awareness
 - Integrate climate change information into the national biodiversity web portal to facilitate learning and information exchange by resource and land managers, decision makers and the general public

2. The Initial National Communication of the Republic of Serbia

The Republic of Serbia is a member of the UN Framework Convention on Climate Change (the Convention) since 10th of June 2001. The Kyoto Protocol (the Protocol) has come into force on 17th of January 2008.

The Republic of Serbia, as a non-Annex I Party of the Convention, in line with its capabilities and principles of sustainable development, endeavors to contribute to the fulfilment of the primary goals of the Convention.

The development of the Initial National Communication to the Convention represents one of the activities of the Government aiming to contribute to the climate change mitigation on global level, as well as to the adaptation to the changed climatic conditions on the national level.

The Initial National Communication of the Republic of Serbia established by the Government of the Republic of Serbia (2010) is an important national strategic document which represents a base for future actions, research and policies in the area of climate change, national capacity building and attainment of knowledge, sustainable development of the country, as well as the preparation of the future national communications.

In the development of the National Communication, not only were involved the relevant ministries, institutions that deal with observation and monitoring of climate change and scientific institutions involved, but also relevant businesses and economic entities, non-governmental sector and other stakeholders.

2.1 Vulnerability Assessment and Adaptation

2.1.1 Biological diversity and natural land ecosystems

Systematic collection of data and analyses concerning climate change impacts on biodiversity has not yet been realised. Still, the observed climate change impacts on biodiversity and natural ecosystems in the Republic of Serbia indicate that climate change may lead to the following: phenological changes; changes in the morphology, physiology and behaviour of species; loss of existing habitats and emergence of the new ones; changes in the number and distribution of species; increase in the number of vermin and diseases; genetic changes, followed by extinction of species unable to adjust to climate change and changes in the natural fish population.

2.1.2 Forestry

The net annual amount of carbon dioxide bound in the timber mass of the forest complex has been rising in the last 20 years. This trend is also expected in the coming period, hence, the amount of removed CO₂ will increase by about 68% by the end of the considered period compared to the reference amount of CO₂ removed in the base year 1990.

According to the alternative scenario, with the provision of providing financial resources for further afforestation of 9000 ha/year, the amount of removed CO₂ will increase by 69.5% in 2012 and 74.5% in 2015, compared to the reference amount of CO₂ removed in the base year 1990.

3. Climate Change Impacts and Adaptation Measures

3.1 Biodiversity and Natural Terrestrial Ecosystems

Systematic collection of data and analyses concerning climate change impacts on biodiversity has not yet been realized. Still, the observed climate change impacts on biodiversity and natural ecosystems in the Republic of Serbia indicate that climate change may lead to the following: phenological changes (*i.e.*, changes in the periodic plant and animal life cycle events, with considerable shifts in the migration, reproduction and hibernation periods of some species); changes in the morphology, physiology and behaviour of species; loss of existing habitats and emergence of the new ones that the species had not encountered before; changes in the number and distribution of species; increase in the number of vermin and diseases; genetic changes, followed by extinction of species unable to adjust to climate change and changes in the natural fish population (spawning and migration times).

Detailed analysis of climate change impacts on biodiversity is of utmost importance for preparing adequate adaptation measures. Starting from available data and information, short-term adaptation measures, as well as challenges and obstacles in their application, are proposed in Table

Strategic area	Adaptation measures	Challenges and obstacles
Reducing risks	<ul style="list-style-type: none"> – Develop a biodiversity indicator system – Detailed vulnerability assessment to climate change – Increase protected areas – Ensure corridors for the migration of species 	<ul style="list-style-type: none"> – Insufficient funds – Lack of awareness – Insufficient technical capacity

	– Decrease pressure of other anthropogenic factors to biodiversity	
Policy and institutional framework	– Include climate change in sector strategy and planning – Adopt an adaptation plan within the sector – Adopt protection plans for especially endangered species and ecosystems – Adopt a plan for increasing protected areas	– Insufficient funds – Lack of awareness – Insufficient technical capacity
Monitoring and research	– Organize monitoring of relevant parameters within protected areas – Establish systematized and continuous monitoring – Establish a data base – Commence monitoring of endangered species and ecosystems	– Insufficient funds – Lack of awareness – Insufficient technical capacity
Capacity building and public awareness	– Strengthen scientific and research capacity – Strengthen private and public sector capacity – Strengthen capacity of personnel in protected natural resources – Improve the informing of professionals and the general public on climate change impacts and possible adaptation options	– Insufficient funds – Lack of awareness – Insufficient technical capacity

4. Global Climate Observing System (GCOS)

As a member of the World Meteorological Organization, the Republic of Serbia supported the establishment of the GCOS and actively participates in the implementation of the GCOS Action Plan for Central and Eastern Europe (adopted in 2005).

The National Hydrometeorological Service of Serbia (NHMSS), as a national hydrometeorological institution, is tasked with meeting Serbia's obligations towards the GCOS.

In this way, the Republic of Serbia directly meets the obligations arising from the UNFCCC referring to systematic climate observation and international data exchange.

4.1 Southeast European Virtual Climate Change Centre

In 2006, following the WMO call to Member States to take measures and strengthen international cooperation through relevant national, sub-regional and regional climate centers, the NHMSS started the initiative on setting up a sub-regional centre for climate change for Southeast Europe.

The initiative was fully supported by the Serbian Government as well as national hydrometeorological services across Southeast Europe at the meeting of directors held in Dubrovnik, Croatia, in 2006, and at the Sixth UNECE Ministerial Conference „Environment for Europe”, held in Belgrade, Serbia, in 2006 (Belgrade Initiative on enhancing regional cooperation in Southeast Europe in the field of climate change).

The South East European Virtual Climate Change Centre (SEEVCCC) was set up in 2008, within the NHMSS. On the sub-regional level, the SEEVCCC performs the following functions: operational issuing of national and sub-regional climate, analytical and prognostic products; research and development; education and training/capacity building, as well as coordination of the production and implementation of sub-regional action plans and programmes in the field of climate change.

As a result of all these activities, the WMO officially included the SEEVCCC in the preparation of a bi-annual implementation plan of basic functions of the RCC Network in RA VI. The SEEVCCC actively participates in all RCC activities with its binding operational functions, capacity building functions, coordination functions and highly recommended research and development functions.

The successful work of the Centre was confirmed at the very beginning by the production of the Framework Adaptation Action Plan for Southeast Europe (SEE/CCFAP), adopted at the Regional Ministerial Conference „Combating Climate Change in South Eastern Europe”, in Sarajevo, Bosnia and Herzegovina (2008). A Framework Action Plan was developed under a project funded by the Norwegian Government. Representatives of Albania, Bosnia and Herzegovina, Montenegro, FYR Macedonia and the Republic of Serbia were involved in the production of the Action Plan, whilst the project was coordinated by the SEEVCCC and the Regional Environmental Centre for Central and

East Europe. The development of the Framework Action Plan confirmed the need for regional cooperation in the field of adaptation to climate change.

4.2 Problems and Needs

Effective responses to disturbances resulting from and adaptation to climate change requires that all relevant sectors are involved in research, measurements and analyses.

The Republic of Serbia applies systematic observations in the fields of meteorology and hydrology. However, maintenance and meeting new requirements in the context of climate change remains a challenge.

Due to the limited funding and inadequate equipment, systems of integral monitoring of climate parameters and environmental parameters in forestry, agriculture, public health, biodiversity and ecosystems are still underdeveloped or even non-existent.

Almost identical problems are present in scientific research. Imperative is multidisciplinary research of climate change effects in certain sectors and systems.

Capacity building for climate research, use of monitoring data and early warnings of extreme meteorological, climate, hydrological and other adversities caused by climate change is necessary for effective fight against climate change. Capacity building and education are especially required for the use of satellite observation data.

Strengthening the cooperation among sectors and adopting climate change impacts as the priorities of the sectors is one of the key preconditions for efficient and complete implementation of systematic observation.

5. On-going activities

As a first step towards harmonisation of the regulations in the area of the nature protection and biodiversity, as well as towards the implementation of Bern convention and CBD, and UNFCCC several important national/international projects have been started and are in progress in this field.

1. The National Strategy for Sustainable Use of Natural Resources and Goods
2. IPA Project “Strengthening Administrative Capacities for Protected Areas in Serbia” Twinning Project SR 2007/IB/EN-02.
3. Projects: “Establishment of the Natura 2000 Network in the Republic of Serbia” and “Development of the EMERALD Network in the Republic of Serbia” according to the Decree on Ecological Network in Serbia.
4. Currently under implementation is project: “Studying climate change and its influence on the environment: impacts, adaptation and mitigation”, finance by the Ministry in charge for science of the Republic of Serbia. The project results will contribute to improvement of knowledge and more deep analysis in, among else, field of biodiversity and climate change.

6. Follow up activities

1. Project Proposal “Impact of Climate Change on the Forest Biodiversity” is elaborated by the Ministry of Environmental Protection of the Republic of Serbia and Forest Faculty of the Belgrade University for IPA Funds.

This project will enable UNFCCC, Kyoto Protocol, UNCCD, UNCBD and NEAP implementation by strengthening capacities for monitoring effects of climate change on forest ecosystems biodiversity in Serbia.

References:

- National Strategy on Biological Diversity of the Republic of Serbia;
- Initial national Communication of the Republic of Serbia
- Publication of the Emerald ecological network in Serbia (N. Sekulic and J.Shinzar-Sekulic);

Prepared by Snezana Prokic, Focal Point for Bern Convention in Cooperation with Climate Change Unit in the Ministry
Belgrade, September 2011.

16. SPAIN / ESPAGNE



SECRETARÍA DE ESTADO
DE CAMBIO CLIMÁTICO

DIRECCIÓN GENERAL DE MEDIO
NATURAL Y POLÍTICA FORESTAL

SUBDIRECCION GENERAL DE
BIODIVERSIDAD

CLIMATE CHANGE AND BIODIVERSITY IN SPAIN: IMPACTS, VULNERABILITY AND ADAPTATION

The Spanish National Climate Change Adaptation Plan (PNACC), adopted in July 2006 after a wide consultation process channeled through the main coordination and participation bodies dealing with Climate Change (the National Climate Council, the Coordination Commission of Climate Change Policies and the Environmental Sector Conference) provides the current framework for carrying out assessment actions to evaluate impacts, vulnerability and adaptation to climate change in Spain.

The Plan fulfill the compromise acquired by Spain as a Party of the UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, in which article 4.1b, states that all Parties to the Convention shall “formulate, implement, publish and regularly update national programs containing measures to facilitate adequate adaptation to climate change”.

The Plan’s objective is to mainstream adaptation to climate change in the planning processes of all the relevant sectors or systems. To achieve this, it is important that the development of the Plan becomes a major collective project with the participation of all institutions and key stakeholders.

The National Adaptation Plan defined an initial set of 15 sectors and systems to assess their vulnerability and their options to adapt to climate change. It is important to bear in mind that sectors and systems are strongly interdependent from each other, which implies a challenge for the coordination and integration of disciplines, expert groups and institutions responsible for the different areas.

The Plan is being implemented through work programs, in which the activities and projects to be carried out, as well as their schedules are determined.

The First Work Program, approved in 2006, targets the development of regional climate scenarios and the impacts of climate change on water resources, biodiversity and coastal areas. The Second Work Program reviews progress made since 2006 under the framework established by the PNACC and sets ambitious goals to address climate change adaptation in Spain. It is structured into the following four axis of action:

1. Sectoral assessment of climate change impacts, vulnerability and adaptation. This lies at the core of the Second Work Program, which maintains the focus of the First Program. It continues to produce regionalized climate scenarios and sectoral assessments of water resources, coastal areas and biodiversity, and now extends its scope to include other relevant sectors, such as tourism, agriculture, health, forests and soils/desertification.
2. Mainstreaming of climate change adaptation into sectoral legislation, by systematically and consensually identifying the legal instruments necessary to achieve this goal.
3. Mobilization of key stakeholders (from the public, social and private spheres) in the sectors included in the PNACC to ensure they participate actively in identifying adaptation measure.

4. Development of a climate change impacts and adaptation indicators system for every sector, with the aim of developing a monitoring and assessment tool to guide future implementation of the Plan.

To complete the four lines of action mentioned above, the Second Work Program is founded in two basic pillars:

- Strengthen R&D and Innovation to research, innovate, develop and implement adaptation Technologies.
- Reinforce co-ordination between national and regional government through the Climate Change Policy Co-ordination Committee and its Impact and Adaptation Working Group.

The Second Program, which has been given a 4-year horizon and assumes all the progress of the First Work Program, represents a qualitative advance in terms of its systematic approach to adaptation in Spain. During the second work program the sectoral assessment of climate change impacts, vulnerability and adaptation will continue.

The PNACC describes the following lines of action in biodiversity:

- Mapping the vulnerability of Spanish biodiversity.
- Consolidation of ecological monitoring networks.
- Development of a system of biological indicators for impact assessment.
- Assessment of the protected areas -including the Natura 2000 Network – under different climate change scenarios.
- Evaluation of the potential of ex-situ conservation measures.
- Assessment of the impacts on ecosystems goods and services.

Regarding these lines of action the Ministry of Environment, Rural and Marine affaires has developed different projects:

1. Climate change and biodiversity in Spain: Impacts, vulnerability and adaptation

The Ministry of Environment started in 2007 a project to assess the potential effects and the vulnerability of the Spanish Biodiversity to climate change along the XXI century, using spatial modeling techniques applied to the best available information of climate change and objective species distribution.

It had been developed by two research Spanish Institutions, the University of Extremadura, which had carried out the assessment over the flora species and habitat types, and the National Museum of Natural Sciences- CSIC, (Centro Superior de Investigaciones Científicas), which had been the one in charge of assessing the impacts in the fauna species. The project finished in 2010 and had been coordinated by the Directorate General on Nature and Forest Policy and the Spanish Office of Climate Change, both of them from the Ministry of Environment and Rural and Marine affaires.

At this moment the Project is about to be published by the Ministry and the main results can be summed up as follows:

- Distribution models depending on the climate of the taxa of flora, fauna and habitats most representative of Spain.
- Projections of climate envelopes along the XXI century (3 temporary horizons).
- A preliminary interpretation of model results, including a vulnerability assessment of each of the taxa, an analysis of the evolution of the optimal climatic areas, both in area and location.
- An initial proposal of adaptation measures and implications for conservation of projected climate changes.
- Proposed lines of research for the future.

The results show a reduction, along the XXI century, of the territory with an adequate climate for almost all the species that have been analyzed.

Some of the products that are about to come out from this study:

- Atlas of Climate Change impacts over the Spanish Iberia fauna.
 - Atlas of impacts and vulnerability of climate change over flora and main land habitats of the Spanish peninsula. The publication can be watched under <http://www.marm.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/iniciativas-en-el-ambito-nacional/>
 - Wiki: web page (<http://secad.unex.es/wiki/libroOECC/>) where all the information regarding the project is localized. It includes links to the different reports, data and models, ect.
 - Informatics application for consultation and analysis.
- 2. Consolidation and expansion of the Global Change Monitoring network in the Spanish National Parks. Publication of a six monthly Electronic Newsletter containing information about the network.**

The Global change monitoring program at the National Parks network is being developed by four organizations, all of them from the Ministry of Environment, Rural and Marine affairs: National Park Autonomous Organization, The Spanish meteorological agency, the Biodiversity Foundation and the Spanish Climate Change Office.

The main goal of this program is to create an observatory, storage and processing data infrastructure in the Spanish National Parks, as well as to encourage its use by the scientific community, so it can be use to develop an assessing and monitoring system of global change impacts.

Until now, only 4 out of the 14 National Spanish Parks have Joint the Project: Three since the beginning: Parque Nacional Marítimo - Terrestre del Archipiélago de Cabrera, P. N. de los Picos de Europa, y P. N. de Sierra Nevada, and the P N. del Teide since 2010.

In each park a meteorology station has been installed which data is published at the web page of the project (<http://reddeparquesnacionales.mma.es/parques/rcg/index.htm>).so the scientific community can have access to them.

Also, a specific scientific-technical report had been elaborated for each Park, which describes a complete system for monitoring global change effects at the physic and biologist systems. Right now we are working in the establishment of an indicator system of the global climate effects at the natural systems of the natural protected areas of the National Parks.

The widespread of the Global change monitoring network has been made by different media and activities. Some panels have been made allowing the exposition of the project in different seminars, workshops, ect. Also a periodic electronic bulletin had been launched. It is a communication channel among all the interested people and participants in this initiative, which zero number had been distributed in electronic format in 2010. The number 1 is also finished and has been published during spring of 2011.

3. Invasive alien species

In November 2009, a project to establish the current knowledge state of climate change effects over the invasive alien species in Spain started.

The first stages were to revise knowledge (biography, data bases, experts, researchers, etc), to develop a preliminary diagnosis of the problem and to carry out a preliminary list of taxa, geographic areas and ecosystems which need to be studied in depth.

The project also foresees a methodology proposal for a detail assessment of impacts, vulnerability and adaptation to climate change in this field. It might include data source, methods, models, and tools for the assessment, as well as information about the desirable results, possible adaptation measures, and the kind of products which should be developed to guarantee the maximum

diffusion of the results. The project which has been carried out by the Spanish Group on Biologist Invasions (GEIB) will give rise to a publication of the main results.

4. Mainstreaming of adaptation to climate change into Spanish legislation

One of the main goals of the PNACC is mainstreaming of adaptation to climate change into sectoral legislation. One example of this action is the **Strategic Plan for Natural Heritage and Biodiversity** developed by the Ministry of Environment, Rural and Marine Affairs in accordance with the EU Biodiversity Strategy to 2020 and the CBD Strategic Plan 2011-2020. The Plan, which has been approved in September by the Council of Ministers, includes actions to promote mainstreaming of biodiversity into sectoral legislation. Adaptation to climate change is one of the benchmarks of the Plan which is collected widely in the development of actions.

5. Mobilization of key stakeholders

Mobilization of key stakeholders (from the public, social and private spheres) is another of the lines of action of the PNACC. Participation, information, communication, public awareness and training are social key instruments to obtain effective results, which are tackled on the Second Work Program under its third line of action.

5.1 Participation: sectoral seminars

Integration of adaptation to climate change in different sectors is achieved by the participation of key stakeholders (private and public) in the exploration and identification of adaptation options in its competence fields and activity, as well as by using the results of the impact and vulnerability assessment activities or contributing to the design of those projects in accordance with its needs and technical requirements.

In this framework, a Sectoral and Technical Participatory Workshop on Climate Change and Biodiversity was organized in Spain, to present results and outcomes of the projects mentioned above, as well as to discuss ways of implementation among relevant stakeholder. The seminar's main objectives:

- (i) Provide information to a group of key stakeholders about the results of the impact and vulnerability assessment projects developed under the PNACC.
- (ii) Exchange of ideas and experiences related to climate change adaptation.
- (iii) Debate about the implications that the results of the projects and initiatives might have in each sector.

The workshop took place on 11 and 12 of November 2010 at the CENEAM (Centro Nacional de Educación Ambiental), Valsain (Segovia), with a wide representation from both, regional and central administration. Also members from the NGOs assisted, as well as foundations, professional associations, ect. Report of the workshop can be downloaded from: <http://www.marm.es/es/ceneam/grupos-de-trabajo-y-seminarios/cc-y-cbdb/default.aspx>.

17. SWITZERLAND / SUISSE

BIODIVERSITY AND CLIMATE CHANGE – REPORT OF SWITZERLAND

Switzerland's work towards a climate change adaptation strategy (<http://www.bafu.admin.ch/klima/00493/06573/11075/index.html?lang=fr>) is progressing. A preliminary version is in consultation within national administration. The strategy is focusing on impacts and measures for adaptation to a climate change scenario until 2050. The overall objectives of the strategy are to:

- assess potential opportunities provided by climate change
- minimise the risks of climate change, protect the population and the livelihood base
- increase the adaptive capacity of all resources.

Biodiversity management has been considered one out of nine most affected sectors. Need for action has been identified in the biodiversity sector across all levels from genes to ecosystems, as outlined in the following:

For the gene pool, importance has been emphasized to the:

- identification of important (sub-)populations of selected climate sensitive species,
- surveillance of gene drift in small (sub-)populations of selected species, and
- the reduction of loss of genetic diversity.

For habitats and species, priority is given to the:

- identification of primarily affected habitats and species by climate change,
- regional adjustments of assessments to changing conditions,
- international and national coordination of the necessary conservation and supporting measures, and
- immediate first measures for habitats and species already particularly affected (moist habitats, alpine habitats)

Furthermore, with regard to the spread of alien species, it is of importance to:

- early detect those invasive alien species with high damage potential,
- internationally harmonize measures of prevention and control with early implementation across sectors, and
- to sensitize trade and population to this issue.

In the context of habitat connectivity and networks, the aim is:

- an ecological infrastructure providing a wide spectrum of climatic migration- and expansion pathways, and
- a habitat network that is internationally embedded and nationally binding for spatial planning.

On the ecosystem level:

- multifunctional ecosystem services are recognized in all sectors and respected when decisions are made,
- the development of ecosystem services is surveilled, and
- national decisions on climate adaptation measures by other sectors consider potential impacts on global biodiversity and ecosystem services.

Within EPA (European Network of Heads of the Environment Protection Agencies) and ENCA (European Network of Heads of Nature Conservation Agencies) representatives of Switzerland actively participate at various working groups such as a.o. the ENCA Climate Change Working Group (<http://encanet.eu/home/index.php?id=clchange>) dealing with ecosystem based adaptation to climate change.

A monitoring project of alpine peak vegetation and its changes over the last century is running and revealed constantly rising species numbers on high mountain areas (http://www.slf.ch/ueber/organisation/oekologie/gebirgsoekosysteme/projekte/gipfflora/index_EN). In addition, national data from the biodiversity monitoring program (<http://www.biodiversitymonitoring.ch/english/aktuell/portal.php>) has been analysed with regard to climate change related changes of selected species groups. With regard to the scientific debate on human assisted migrations, a research project funded by the Swiss Federal Office for the Environment has just been launched with the aim to elaborate a scientific basis and sound methods for ex-situ conservation and re-colonisation of threatened plants in Switzerland.

18. UKRAINE / UKRAINE

NATIONAL POLICIES AND ACTIVITIES OF UKRAINE IN THE FIELD OF BIODIVERSITY AND CLIMATE CHANGE (2010)

INFORMATION SUBMITTED TO THE SECRETARIAT OF THE CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE AND NATURAL HABITATS

National policy and activities in the field of biodiversity conservation and national ecological network development

Issues of conservation, sustainable use of biodiversity and development of an ecological network are reflected in the following national policy documents: State Program of Ukraine's National Ecological Network Development for Years 2000-2015 (adopted in 2000) and Basic Principles (Strategy) of Environmental Policy until 2020 (adopted in 2010).

The draft of the National Action Plan on Environmental Protection for Years 2011-2015 for the implementation of the Basic Principles mentioned above is prepared and includes activities on biodiversity conservation and econet development.

The area of nature reserve fund of Ukraine constitutes 5.7% from the territory of the country (increased by 0.9% over the previous reporting period). The total area of the protected areas of nature reserve fund is 3458.9 thousand hectares within the territory of Ukraine and 402.5 hectares within the Black Sea. Network of Wetlands of International Importance, which are part of the national ecological network, includes 33 Wetlands of the total area of 676,251 ha (approximately 1.12% from the territory of the country).

With the aim of identification of the main elements of ecological network at national and local levels works on development of the regional schemes establishing an ecological network continue. According to oblasts (regions within Ukraine), in 2010 19 draft regional schemes are developed and are in various stages of completion and approval; relevant schemes approved in the Crimea, Zhytomyr, Ternopil and Kyiv oblasts.

Implementation of the international project "Realising transboundary ecological connectivity in the Ukrainian Carpathians" (within international policy program of the Netherlands "BBI-MATRA") could serve as a good example of effective cooperation between local authorities, scientists and ecological NGOs. In the framework of this project schemes of two local ecological corridors – Turkivsky and Bukovinsky – were developed and approved. Turkivsky ecocorridor is designed to facilitate migration of bison, brown bear, lynx, wild boar and other wild animals between protected areas and national parks of Poland and national park "Skolivsky Beskidy" (Ukraine). Bukovinsky ecocorridor between national parks "Vizhnitsky" (Ukraine) and "Vanatori Neamt" (Romania) aims to restore natural ecosystem linkages between populations of bison, bears and lynx. This was the first embodiment of the local authorities' decisions in practice concerning establishment of the structural elements of ecological network.

The negotiations and preparation to the signing of Agreement between the Governments of Ukraine, Belarus and Poland on the establishment of transboundary biosphere reserve "Zakhidne Polissya" are in progress. Agreement will be signed shortly.

Works continue on creating:

1. Romanian-Ukrainian Biosphere Reserve "Maramoros mountains";
2. Polish-Ukrainian Biosphere Reserve in the region "Roztochchya" (in September 2010 nomination of Ukraine to establish a biosphere reserve "Roztochchya" was submitted to UNESCO program "The Man and the Biosphere");
3. Ukrainian-Russian transboundary reserve in Desna river basin.

In the framework of the State Plant Cadastre preparation, preliminary list of invasive plant species is created for further researches and inclusion into the State Plant Cadastre in 2012.

National policy and activities in the field of climate change

Ukraine consistently contributes to the fight against global climate change. Being Party to the UN Framework Convention on Climate Change and the Kyoto Protocol Ukraine fulfills its commitments to reduce greenhouse gas emissions. Being Party to the Kyoto Protocol Ukraine takes an active part in reducing greenhouse gases through “flexible mechanisms” – Joint Implementation and Emissions Trading in the framework of Green Investment Scheme.

In October 2010 the draft Law of Ukraine “On the regulation of energy saving” was approved in first reading by the Parliament of Ukraine – Verkhovna Rada. The document defines legal, economic and organizational basis of state policy regarding regulation anthropogenic emissions and removal of greenhouse gases to improve energy efficiency through energy saving technologies and aimed at the fulfillment of Ukraine’s commitments in this area.

The draft National Action Plan on Environmental Protection for 2011-2015 (mentioned above) among others includes measures to encourage the use of alternative energy sources.

In 2010 during 4 meetings of the Intergovernmental Working Group on review and approval of green investment projects under the State Environmental Investment Agency of Ukraine 640 projects for thermal rehabilitation of buildings of social significance in 8 oblasts of Ukraine were reviewed and recommended for approval. 139 of them have already received previous funding (117 billion UAH) and their implementation began.

Ukraine prepared and sent to the UNFCCC Secretariat the National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1999-2008 year (May 2010, electronic version) and the Fifth National Communication on Climate Change (December 2009).

Executive Committee of the Commission on Climate Change of Portugal and State Environmental Investment Agency of Ukraine signed a Memorandum of Understanding on cooperation in the field of climate change (May, 2010).

19. UNITED KINGDOM / ROYAUME-UNI

UK NATIONAL REPORT ON BIODIVERSITY AND CLIMATE CHANGE

Climate change policy framework

- The **Climate Change Act 2008** (http://www.opsi.gov.uk/acts/acts2008/ukpga_20080027_en_1) requires the UK to produce a Climate Change Risk Assessment (CCRA) every five years followed by a National Adaptation Programme (to cover England) to address the most pressing impacts.
- The 1st **CCRA**, which is a collaborative programme across all the administrations of the UK, will be published in January 2012. Work has included detailed analysis on 100 risks and opportunities across 11 sectors (of which Biodiversity and Ecosystem Services is one), as well as drawing together cross-sectoral risks through 5 overall themes (one being natural environment). An Economics of Climate Resilience (ECR) study will provide further assessment of impacts and potential adaptation actions in support development of specific policy options.
- The **Climate Change Act** also requires public authorities and ‘statutory undertakers’ (companies such as water and energy utilities) to report to Government on how they have assessed and will address climate change risks. 91 priority organisations have been instructed to report in 2011 including the Environment Agency, with a number of others reporting voluntarily such as Natural England. Reports received are made available on the Defra website²⁹.
- These reports, combined with the CCRA and ECR findings, will all contribute to the development of the National Adaptation Programme (NAP), which we expect will be laid before Parliament in spring 2013. The first NAP will cover five years (2013-2018), with a review and a new Programme laid on a five yearly cycle, following each new CCRA.
- The **Parliamentary Adaptation Sub-Committee** was set up through the Climate Change Act 2008 to provide a critical source of advice and on adaptation issues. Their 2nd progress report³⁰ in July 2011 provides an assessment of the UK’s preparedness, including an initial set of indicators to track trends in impacts, vulnerability and the uptake of adaptation actions.
- Under the Scottish climate change legislation the Scottish Government published in March 2011 a [Land Use Strategy for Scotland](http://www.scotland.gov.uk/Topics/Environment/Countryside/Landusestrategy) <http://www.scotland.gov.uk/Topics/Environment/Countryside/Landusestrategy> which provides a framework for integrating climate change objectives onto land use. The Strategy promotes an ecosystems approach, and is supported by [An Information Note on Applying an ecosystems approach to land use.](http://www.scotland.gov.uk/Topics/Environment/Countryside/Landusestrategy/ecosystemsapproach) <http://www.scotland.gov.uk/Topics/Environment/Countryside/Landusestrategy/ecosystemsapproach>
- The **Welsh Government** published The [Climate Change Strategy for Wales](#) in October 2010, along with delivery plans covering [emissions reduction](#) and [adaptation](#). The Strategy and delivery plans confirm the areas where Welsh Government will act to reduce emissions and enable effective adaptation in Wales. The Strategy commits Welsh Government to delivering a reduction of greenhouse gas emissions by 3% per year from 2011 in areas of devolved competence, against a baseline of average emissions between 2006-10. Sectoral adaptation plans are currently being drafted, with the assistance of the Wales Climate Change Commission. The Countryside Council for Wales has prepared a Position Statement that outlines how it will assist government and society in the delivery of these objectives
- **The UK Government** is developing a **bio-energy strategy** to determine the role bio-energy should play in meeting the 2020 EU renewable energy targets and UK target of reducing

²⁹ <http://www.defra.gov.uk/environment/climate/sectors/reporting-authorities/>

³⁰ <http://www.theccc.org.uk/reports/adaptation/2nd-progress-report-2011>

greenhouse gas emissions by 2050 to 80% of their 1990 levels. The strategy is expected to be published by the end of 2011.

Adaptation Measures taken for Biodiversity in face of Climate Change

- In August 2011, Defra published 'Biodiversity 2020- a strategy for England's wildlife and ecosystem service' <http://www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-110817.pdf>. This will guide conservation efforts in England over the next decade in response to the commitments made at Nagoya. Following the 'Making Space for Nature' (Lawton) report, which considered whether England's collection of wildlife areas (both the legally protected areas and others) represented a coherent and robust ecological network that will be capable of responding to the challenges of climate change and other pressures (<http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>). The new strategy shifts the emphasis towards a more integrated landscape-scale approach. It also aims to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent, resilient ecological networks capable of responding to the challenges of climate change. 'Biodiversity 2020' is one of a wider suite of measures being taken forward in England. In June 2011, the Government published an overarching Natural Environment White Paper setting out these measures; with climate change adaptation being a key theme running through the White paper.
- **In England**, Natural England's work on climate change adaptation and mitigation continues. A long-term process of embedding climate change responses is ongoing and includes, for example, developing clear guidance on the most effective agri-environments scheme measures for adaptation and mitigation. A series of research and development activities is continuing with some major projects completed :
 - A series of pilot studies assessing vulnerability of biodiversity and ecosystem services in a range of contrasting landscape areas (National Character Areas) to climate change has recently been completed and will be published shortly.
 - Methodology for assessing climate change vulnerability at regional and national scales, using geographical information systems has been developed. A system piloted in the South East of England will be rolled out across the whole of the UK in the coming year.
 - The long term monitoring of environmental change continues to be expanded, with new nature reserve monitoring sites being added to the Environmental Change Biodiversity Network this year. NE is also developing ways to integrate existing diverse sources of long-term monitoring data into a national monitoring system
 - An analytical project to evaluate adaptation principles in light of contrasting responses of butterfly and bird populations to climate fluctuations in areas with different landscape characteristics has been completed. The findings are currently being evaluated and will be published later in the year.
 - A project on the nature of resilience (Resilience to climate change: what is it and what makes ecosystems and landscapes resilient?) is being completed.
 - A well attended international conference on Adapting Conservation to a Changing Climate was jointly organised with the British Ecological Society. Proceedings are now available: http://www.britishecologicalsociety.org/policy/climate_change_conference_2011.php
- In March 2011, **the Scottish Government** published 12 Sector Action Plans to deliver its Adaptation Framework for Scotland, including an Action Plan for Biodiversity and Ecosystem Resilience. <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/adaptation/AdaptationFramework/SAP/Biodiversity>.
- **The Scottish Government** has set up a Centre of Expertise on Climate Change <http://scotland.gov.uk/Topics/Research/About/EBAR/StrategicResearch/future-research-strategy/CoEClimateChange> which aims to deliver objective, independent, integrated, and authoritative evidence to support the Scottish Government in relation to its climate change

activities. The Adaptation Workstream incorporates biodiversity within a systems approach to identifying adaptation options.

- **Scottish Natural Heritage (SNH)** has undertaken an assessment of vulnerability of priority habitats to climate change. Adaptation priorities are being identified and integrated into relevant action plans.
- **SNH** has developed summaries for different parts of Scotland of the potential impacts of climate change on landscapes and quality of life.
- **The Countryside Council for Wales (CCW)** has compiled and published details of a number of [adaptation projects involving the natural environment in Wales](#), in order to facilitate sharing of best practice in this emerging field: **In 2010/11 CCW undertook a preliminary assessment of the vulnerability of special sites (SACs, SPAs, Sites of Special Scientific Interest) to the impacts of climate change**, in order to prioritise sites for proactive management.
- Welsh Government is developing [Living Wales – a Natural Environment Framework \(NEF\)](#). The NEF will support the Government's sustainable development commitment through better integration of environmental issues in wider decision making. Climate change adaptation in the wider landscape is an integral part of this approach and the Natural Environment Sectoral Adaptation Plan is being developed in conjunction with the NEF.
- CCW continues to assist approaches to adaptation at a landscape scale: The [Cambrian Mountains Initiative](#) has been engaged in a Defra sponsored research project no. [CR0449](#) to explore the use of existing biodiversity adaptation guidance in the context of real world constraints in three catchments on the western side of the Cambrian Mountains. The report and separate policy guidance and practical notes will be available in 2011 at <http://randd.defra.gov.uk> (use search facility for CR0449). This project took an ecosystems approach, and employed visualisation tools and interaction with local people to arrive at choices for the future which would benefit biodiversity and the local communities under a changing climate.
- **The UK Overseas Territories** – Climate change is one of the major threats to biodiversity in the UK Overseas Territories. Climate change adaptation strategies are developed, or in development, for Anguilla, British Virgin Islands, Cayman Islands, Montserrat and Turks and Caicos Islands under a DFID funded project <http://www.dfid.gov.uk/R4D/SearchResearchDatabase.asp?projectID=60563>

Scientific publications and Research

Many of the following are collaborative projects involving a range of inputs from all countries within the UK, although often only the lead organisation is identified :

- **The UK National Ecosystem Assessment**, covering the terrestrial, freshwater and marine ecosystems across the UK has been published. It is the first analysis of the UK's natural environment in terms of the benefits it provides to society and our continuing economic prosperity. The project has produced an independent and peer-reviewed assessment of the state and value of the UK's natural environment and ecosystem services, identifying what has driven change observed in the natural environment and the services it has provided over the last 60 years, and what may drive change in the future. It includes an investigation into the monetary and non-monetary value to the economy, society and individuals from various ecosystem services, including how some of these may change in future.
- **Bicconet** – the purpose is to detect signals of responses to climate change based on investigating existing species monitoring data sets for relationships with climate variables: www.bicconet.org. The report was published in 2011 ([BICCO-Net Reports](#)), and a second phase is under procurement with a view to extend the work to production of simple report cards showing selected species or guilds responses (abundance and geographical distribution) to climate change.
- **Chainspan** – using UKCP09 climate change projection models to assess the possible impacts of climate change on the ornithological interest of Special Protected Areas (SPAs) in the UK. . This research showed projections of some changes in bird interest in SPAs, some gains and some

losses in SPAS across the UK, and emphasised the need for trans boundary collaboration, and considerations of the possible redistribution of important bird populations under a changing climate. It also provided guidance on site management measures for a range of habitat types that would help bird species survive under changing climate. The report will be available in 2011 at <http://randd.defra.gov.uk> (use search for Chainspan or CR0440)

- **Developing Tools** – Identifying the potential threat of sea level rise to the English wetland coastal habitats above the mean high water tide mark– and examining the potential to re-create threatened habitats on land. It has worked closely with a parallel Environment Agency project examining impacts below the mean high-water tide mark. The tool incorporated projections using UKCP09 and National Flood Risk Assessment modelling of related marine inundation, and factored in sensitivity of selected freshwater wetland habitats in the 1/1000 year coastal floodplain to frequency and duration of sea water flooding to show that at significant proportion was at currently at risk and increasing amounts over time, with potential impacts on the ecology of the coastal fringe. It includes a brief expert opinion based assessment of the re-creation feasibility of selected wetland habitats, intended to facilitate planning for the future. Uncertainties are covered in the assessment which will be available in 2011 at <http://randd.defra.gov.uk>(use search tool for project code CR0422).
- **Protected sites, Priority Habitats and Climate Change** – an integrated review of possible implications of climate change in three parts to produce an integrated analysis across all three elements and inform policy guidance, which covers:
 - Investigation of whether existing legislation eg designation, is climate change proof;
 - Common Standards Monitoring, to review the methodology to assess condition and set site objectives and The contribution of Priority Habitats to mitigation of Climate Change.
- So far, the geographically and spatially referenced assessment of potential climate change impacts has shown relative stability of habitat types, although vegetation communities may change subtly-but it is in their context related to surrounding habitat types that may be important for biodiversity, particularly protected sites and their role in supporting biodiversity in the wider landscape. The report will be available in 2011 at <http://randd.defra.gov.uk>, and use search tool for project code CR0439.
- **Environmental Change Network** – monitoring and data analysis to detect and distinguish signals of Climate Change impacts on Biodiversity www.ecn.ac.uk . A short review of signals of climate change is available at: <http://www.ceh.ac.uk/products/publications/ECNClimateChangeImpacts.html>
- **Development of an indicator of habitat connectivity** – development of the method and an indicator based on functional connectivity using data from the c 600km squares used in the periodic Countryside Survey across UK(see <http://www.countryside.gov.uk/>). An existing set of biodiversity indicators for the UK is available at JNCC website: www.jncc.gov.uk/biyp, this includes an existing connectivity indicator <http://www.jncc.gov.uk/page-4249> . The connectivity indicator report is available at <http://randd.defra.gov.uk> (use search tool for project code CR0429)**Scottish Natural Heritage** has commissioned a literature review, *Translocations as a tool for biodiversity conservation during climate change'* <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=1760>. This is being followed up with a trial translocation of a montane lichen species.
- **REDD+** - Defra has co-chaired and is financially supporting a series of regional workshops for experts in forestry, climate change and biodiversity organised by the Convention on Biological Diversity. The UK's 2010 Spending Review provides DECC, DFID and Defra with an International Climate Fund (ICF) of £2.9bn to deliver international climate finance for developing countries from 2011-2015. This will support climate change adaptation and low-carbon development in developing countries and help tackle deforestation. Two pieces of research on REDD+ have been completed: 1. A review of biodiversity safeguards and indicators for international forestry agreements (REDD+)

[http://blog.decc.gov.uk/?p=603](http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17659&FromSearch=Y&Publisher=1&SearchText=wc1003&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description; and, 2. Funding for Forests: UK government support for REDD+ <a href=)

- **Marine Climate Change Impacts Partnership (MCCIP)** – MCCIP is a partnership between marine scientists and sponsors from the UK and devolved governments, their agencies and industry. The principal aim of the partnership is to develop a long-term multi-disciplinary approach to understanding the implications of climate change in UK seas. The co-ordinating framework enables the transfer of high quality evidence on marine climate change impacts, and guidance on adaptation and related advice to policy advisors and policy makers. Since 2006, MCCIP has produced Annual Report Cards on marine climate change impacts every two years. In alternated years, MCCIP has produced different special topic reports related to impacts and adaptation to climate change in the British Isles. <http://www.mccip.org.uk/welcome.aspx>.

Climate change mitigation - biofuels and low carbon energy

- **Defra** published a report in 2010 on the effectiveness and practicability of a model proposed by the Institute for European Environmental Policy to implement criteria contained in the EU Renewable Energy Directive aimed at ensuring cultivation of highly biodiverse grassland for biofuel crops is done in a sustainable manner. A copy of the report is at : http://randd.defra.gov.uk/Document.aspx?Document=WC1005_9796_FRP.doc
- **The Joint Nature Conservation Committee** published a report on a framework developed by the World Conservation Monitoring Centre for measuring the impacts of indirect land use change (ILUC) on biodiversity. A copy of the report is at: http://jncc.defra.gov.uk/pdf/456_webFINAL.pdf. Part of a subsequent research contract will test the effectiveness of this framework in 2011 and 2012 (see below).
- **Defra** is developing an evidence strategy to inform policy development and intending to commission:
- **Low carbon energy impacts on biodiversity** – this will review the evidence of the UK's low carbon energy policies impacts on biodiversity- in the UK and globally to identify the gaps in our knowledge of those impacts and propose how they might be tackled. It will also develop a method for incorporating effects on biodiversity into the calculator that the Department for Energy and Climate Change has created to examine options, trade-offs and consequences of different energy technology mixes (solar, nuclear, bio, hydro etc) that could be used to meet the 2050 statutory target of reducing greenhouse gases by 80% compared with 1990 levels. It will test the practicality of the preliminary framework developed by WCMC (referenced above) for measuring indirect land use changes (ILUC) associated with application of these technologies and impacts on biodiversity; and assess the effectiveness and optimal mix of ILUC mitigation measures. The research is expected to report in the autumn of 2012. See <http://randd.defra.gov.uk>, (use search for WC1012, or project title: Towards integration of low carbon energy and biodiversity policies: an assessment of impacts of low carbon energy scenarios on biodiversity in the UK and an assessment of a framework for determining ILUC impacts based on UK bio-energy demand scenarios).